



# State Trust Lands Habitat Conservation Plan 2014 Annual Report

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For Fiscal Year 2014  
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Published April 2015

▲ Large down wood in streams and riparian forests is slow to replace, given natural self-thinning among smaller trees. In unmanaged riparian areas, the only large woody debris tends to be historical (left). Large down wood is crucial to DNR's riparian forest restoration goals, so restoration thinning treatments in riparian areas require the creation of new large down wood (right).



WASHINGTON STATE DEPARTMENT OF  
**Natural Resources**  
Peter Goldmark - Commissioner of Public Lands



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Prepared by  
Washington State Department  
of Natural Resources  
**Forest Resources Division**



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**Natural Resources**  
Peter Goldmark - Commissioner of Public Lands

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## Acronyms and Abbreviations

ADA	Americans with Disabilities Act
ATV	All-terrain vehicle
BNR	Board of Natural Resources
dbh	Diameter at breast height
DFC	Desired future condition
DNR	[Washington State] Department of Natural Resources
EIS	Environmental impact statement
ESA	Endangered Species Act
FIU	Forest inventory unit
FRIS	Forest resource inventory system
FSC®	Forest Stewardship Council®
FVS	Forest Vegetation Simulator
FY	Fiscal year
GNN	Gradient nearest neighbor
HCP	(State Trust Lands) Habitat Conservation Plan
ITP	Incidental take permit
LIDAR	Light detection and ranging
MMLTCS	Marbled Murrelet Long-Term Conservation Strategy
MoRF	Movement, roosting, and foraging
MOU	Memorandum of understanding
NAP	Natural area preserve
NOAA	National Oceanic and Atmospheric Administration
NRCA	Natural resources conservation area
NRF	Nesting, roosting, and foraging
NSO	Northern spotted owl
OESF	Olympic Experimental State Forest
ORV	Outdoor recreation vehicle
QMD	Quadratic mean diameter
P&T	DNR's forest management planning and tracking database
PHODAR	Photogrammetric detection and ranging
RCW	Revised Code of Washington
RD	Relative density or Curtis's relative density
REGIS	Road easement geographic information system
RFRS	Riparian Forest Restoration Strategy
RMAP	Road maintenance and abandonment plan
ROS	Rain on snow
RS-FRIS	Remote-sensing forest resource inventory system

SEPA	(Washington) State Environmental Policy Act
SFI®	Sustainable Forestry Initiative®
SOMU	(Northern) spotted owl management unit
SPS	South Puget Sound (Region)
USFWS	United States Fish and Wildlife Service
VDT	Variable density thinning
VRH	Variable retention harvest
WAC	Washington Administrative Code
WAU	Watershed administrative unit
WDFW	Washington Department of Fish and Wildlife
WWRP	Washington Wildlife and Recreation Program
Services	USFWS and NOAA Fisheries



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# Introduction

## Background on the State Trust Lands Habitat Conservation Plan

In fiscal year (FY) 2014, Washington's Department of Natural Resources (DNR) continued to balance fiduciary and ecological responsibilities on Habitat Conservation Plan (HCP)-covered forested state trust lands. FY 2014 brought increases in acreage protected under the Natural Areas Program as well as recreational opportunities on forested state trust lands. DNR has also made progress on a number of projects investigating innovative silviculture practices in the Olympic Experimental State Forest (OESF) and elsewhere. The *2014 State Trust Lands HCP Annual Report* details those and other activities that impact HCP-covered lands managed by DNR.

New this year, DNR is also providing the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration Fisheries (the Services) with [GIS data for Trust Lands covered by the HCP](#). It is DNR's hope that this data will facilitate comparisons between HCP lands and relevant GIS layers maintained by the Services.

## Report Organization

Similar to the [2013 report](#), the 2014 report addresses three HCP reporting commitments:

1. **A comprehensive review of selected DNR programs**, starting on page 2. This year's comprehensive review section focuses on the Land Transactions Program and the Natural Areas Program.
2. **An annual report of research and monitoring activities from FY 2014**, starting on page 21. (The *Implementation Monitoring Report* is a separate annual report published by the [Implementation Monitoring Program](#).)
3. **An annual report of DNR's forest management activities**, starting on page 29.

Updates to the northern spotted owl (NSO), marbled murrelet, and riparian habitat conservation strategies begin on page 13. The [NSO Data](#) section from the 2013 comprehensive review has been added to Appendix A, since it provides useful context for understanding DNR's ongoing efforts to preserve and improve NSO habitat on forested state trust lands.

## Highlights for Fiscal Year 2014

In 2014, the programs that contribute to managing HCP-covered lands continued to implement more effective practices and sharpen their reporting capabilities. DNR has seen slight but significant increases in funding during the continued economic recovery that have enabled a broader range of silvicultural activities, opened up important forest management research and monitoring opportunities, and expanded DNR's training capabilities. Highlights from FY 2014 include:

- **A comprehensive review of DNR's Land Transactions and Natural Areas Programs.** These two programs encompass DNR's largest mechanisms for adding acres to the land base covered

by the HCP. Since 1997, DNR has seen increases in the total acres covered by the HCP and total acres of land deferred from timber harvest for conservation and education.

- **The development of a new suite of forest inventory tools.** In 2014, DNR’s Forest Inventory Group piloted a Remote-Sensing Forest Resource Inventory System (RS-FRIS) to replace the current inventory system. The new system combines light detection and ranging (LiDAR) and photogrammetric detection and ranging (PHODAR) data to provide detailed, three-dimensional information on stand conditions.
- **Several new NSO effectiveness monitoring studies.** DNR has resumed monitoring the effects of various thinning regimes on NSO habitat across the state.
- **Implementation monitoring of Curtis’s relative density (RD) treatments in designated NSO habitat.** DNR staff assessed several timber sale units that were thinned to RD 48 to maintain 70 percent canopy closure and help achieve NSO habitat goals.
- **A larger and revamped state lands training program for forestry staff.** DNR expanded its training opportunities by converting classroom-based courses into online modules and introducing new topics.

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## Comprehensive Review of Selected HCP Elements

The [HCP Implementation Agreement](#) (Section 21.0, p. B.8) requires periodic comprehensive reviews of the HCP, the Incidental Take Permit, and the Implementation Agreement, as well as consultation in good faith between DNR and the Services to identify amendments that might more effectively and economically mitigate incidental take. In 2012, DNR and the Services agreed to conduct the comprehensive review by subject over the next several years, as funding and staffing allow. In 2013, the annual report focused on forestland management activities and NSO data. This year’s report highlights the Land Transactions Program and the Natural Areas Program.

### Land Transactions Program

#### Background on Land Transactions

##### *Overview*

DNR’s Land Transactions Program buys, sells, and trades land to achieve its two main objectives: provide revenue to trust beneficiaries through improving the productivity of the trust land base, and protect high-quality conservation lands by acquiring property for DNR-managed natural areas. All real estate transactions are based on market opportunity.

When pursuing these priorities through land acquisitions and dispositions, every potential transaction must be considered in light of the laws, regulations, and policies that affect the feasibility of the proposal. DNR conducts an extensive property review on all transactions, including an analysis to determine whether the proposal would have a positive, negative, or neutral effect on the strategies outlined within the HCP.

## Total Acreage Change by HCP Planning Unit

Between 1997 and 2003, DNR engaged in several large west-side land exchanges that particularly affected the Columbia, North Puget, and South Puget Planning Units. In the mid-2000s, DNR shifted focus to consolidating scattered trust ownership on the east side of the state in the Yakima and Klickitat Planning Units. Since 1997, DNR has added approximately 150,000 acres of forested state trust land to the planning units managed under the HCP. Table 1 shows how overall planning unit acreage has changed since 1997.

**Table 1: Change in Planning Unit Acres 1997–2014.** Acres in this table are rounded to the nearest whole number.

Planning Unit	Acres Acquired <sup>1</sup>	Acres Disposed <sup>1</sup>	Net Change in Acres
Chelan	404	722	(318)
Columbia	10,796	16,994	(6,198)
Klickitat <sup>2</sup>	2,594	11,445	(8,851)
North Puget	37,437	8,679	28,758
OESF	6,548	3,970	2,578
South Coast	14,798	12,176	2,622
South Puget	35,257	8,923	26,335
Straits	10,512	1,608	8,904
Yakima <sup>2</sup>	104,190	8,006	96,184
<b>Total</b>	<b>222,536</b>	<b>72,523</b>	<b>150,013</b>

<sup>1</sup> Acquired and disposed acres are obtained from the Transactions All and HCP2 databases maintained by the Land Transactions Program. This data, which represents acreage determined through land surveys at the time of the transaction, is consistent with the Land Transactions Program's annual reporting data from previous years. However, DNR's GIS system automatically calculates acreage, and those calculations are often slightly different than surveyed acreage reported by the Land Transactions and Natural Areas programs. The numbers in this table do not reflect boundary adjustments such as *HCP Amendment No.1, Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat HCP Planning Unit*.

## Land Disposition

Land disposition includes both sold and exchanged property. DNR sells trust properties that are no longer suited for resource production and uses the funds generated by sales to acquire replacement properties. Exchanged properties are often manageable resource lands, but they may be scattered or considered inholdings in another party's ownership. DNR usually exchanges property for improved manageability and overall improvement of the asset base. Table 2 provides further detail on disposition transactions in each planning unit from the implementation of the HCP in 1997 through FY 2014.

**Table 2: Acres Disposed 1997–2014 by Disposition Type.** Acres in this table are rounded to the nearest whole number.

Planning Unit	Trust Acres Disposed <sup>1</sup>		Total Acres Disposed
	Sold	Exchanged	
Chelan	640	82	722
Columbia	2,181	14,813	16,994
Klickitat	-	11,445	11,445
North Puget	4,296	4,382	8,679
OESF	161	3,809	3,970

Planning Unit	Trust Acres Disposed <sup>1</sup>		Total Acres Disposed
	Sold	Exchanged	
South Coast	110	12,066	12,176
South Puget	3,368	5,555	8,923
Straits	1,246	361	1,608
Yakima	291	7,715	8,006
<b>Total</b>	<b>12,293</b>	<b>60,228</b>	<b>72,523</b>

<sup>1</sup> Disposed acres are obtained from the Transactions All and HCP2 databases maintained by the Land Transactions Program. This data, which represents acreage determined through land surveys at the time of the transaction, is consistent with the Land Transactions Program's annual reporting data from previous years. However, DNR's GIS system automatically calculates acreage, and those calculations are often slightly different than surveyed acreage reported by the Land Transactions and Natural Areas programs. The numbers in this table do not reflect boundary adjustments such as *HCP Amendment No.1, Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat HCP Planning Unit*.

### Acquisition of Trust and Conservation Lands

Since 1997, DNR has steadily acquired both trust lands and conservation lands. Conservation lands are credited as HCP permit lands when they are located within an HCP planning unit. Since the implementation of the HCP, the Yakima Planning Unit has gained the most trust acres, as DNR worked with private timber companies and the Washington State Department of Fish and Wildlife (WDFW) to consolidate ownership in the Ahtanum and Naneum Ridge State Forests and in the L.T. Murray and Wenas Wildlife Areas. Some land in the Klickitat Planning Unit was traded in order to receive the Yakima acres. Table 3 shows the number of trust land and conservation acres acquired in each HCP planning unit.

**Table 3: Trust and Conservation Acres Acquired 1997–2014.** Acres in this table are rounded to the nearest whole number.

Planning Unit	Trust Acres Acquired <sup>1, 2</sup>		Conservation Acres Acquired <sup>1, 3</sup>	Total Acres Acquired
	Purchase	Exchange		
Chelan	-	-	404	404
Columbia	4,098	5,926	772	10,796
Klickitat	253	-	2,341	2,594
North Puget	21,203	14,860	1,374	37,437
OESF	3,631	2,917	-	6,548
South Coast	943	10,935	2,921	14,798
South Puget	2,174	30,539	2,545	35,257
Straits	1,813	8,246	452	10,512
Yakima	-	104,190	-	104,190
<b>Total</b>	<b>34,115</b>	<b>171,687</b>	<b>10,809</b>	<b>222,536</b>

<sup>1</sup> Acquired acres are obtained from the Transactions All and HCP2 databases maintained by the Land Transactions Program. This data, which represents acreage determined through land surveys at the time of the transaction, is consistent with the Land Transactions Program's annual reporting data from previous years. However, DNR's GIS system automatically calculates acreage, and those calculations are often slightly different than surveyed acreage reported by the Land Transactions and Natural Areas programs. The numbers in this table do not reflect boundary adjustments such as *HCP Amendment No.1, Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat HCP Planning Unit*.

<sup>2</sup> "Trust acres" are acres that are managed by DNR for revenue production.

<sup>3</sup> “Conservation acres” are acres that are managed by the Natural Areas Program as natural area preserves and/or natural resources conservation areas.

### HCP Retention

DNR’s [Trust Land Transfer Program](#) identifies and transfers certain trust lands that are better suited for conservation purposes (usually due to uncommon habitat features or the presence of endangered species, threatened species, or species of interest) to Natural Area Preserves (NAPs) and/or Natural Resources Conservation Areas (NRCAs). Under these circumstances, DNR considers the acres “retained” as part of the HCP agreement with the Services. The second type of HCP retention occurs when DNR conveys land to another party that retains the HCP designation through a deed restriction limiting the new owners’ management of that property. This type of retention most commonly occurs when DNR transfers property to another government entity. The ownership status changes, but the parcel continues to be managed according to HCP guidelines.

Since 1997, the North Puget Planning Unit has had more retention activity than any other planning unit due to a handful of large transactions. DNR expanded the Morning Star NRCA along the Sultan River in Snohomish County and created the Middle Fork Snoqualmie NRCA in east King County. The largest conveyance of property to another party was the 8,800-acre Lake Whatcom block now held by Whatcom County and managed for recreation. WDFW now manages about 1,600 acres and Seattle City Light holds about 1,700 acres – both entities manage those lands for recreation, conservation, and habitat. Table 4 shows the acres of retained HCP lands since 1997.

**Table 4: Acres of Retained HCP Land 1997–2014.** Acres in this table are rounded to the nearest whole number.

Planning Unit	Trust Acres to Natural Areas <sup>1, 2</sup>	Trust Acres to Other Parties <sup>1, 3</sup>	Total Acres Retained
Chelan	226	202	428
Columbia	747	-	747
Klickitat	2,070	-	2,070
North Puget	23,403	11,784	35,187
OESF	-	-	-
South Coast	2,473	-	2,473
South Puget	6,807	539	7,346
Straits	2,771	-	2,771
Yakima	-	320	320
<b>Total</b>	<b>38,497</b>	<b>12,845</b>	<b>51,342</b>

<sup>1</sup> Retained acres are obtained from the Transactions All and HCP2 databases maintained by the Land Transactions Program. This data, which represents acreage determined through land surveys at the time of the transaction, is consistent with the Land Transactions Program’s annual reporting data from previous years. However, DNR’s GIS system automatically calculates acreage, and those calculations are often slightly different than surveyed acreage reported by the Land Transactions and Natural Areas programs. The numbers in this table do not reflect boundary adjustments such as *HCP Amendment No.1, Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat HCP Planning Unit*.

<sup>2</sup> This column represents trust land transfer acres—lands transferred out of DNR-managed trust status (revenue production) into DNR-managed conservation status (conservation and protection). Lands managed for conservation that were acquired through purchases or exchanges are reported in Table 3.

<sup>3</sup> This column represents deed-restricted lands now owned and managed for conservation by entities other than DNR. Records of these lands are maintained in DNR’s HCP GIS Layer.

Further information about specific land transactions since 1997 can be found in [previous annual reports](#). Going forward, DNR plans to use corporate GIS layers to report land transactions. In order to better streamline and report lands transacted into and out of HCP coverage, stewardship of that data for annual reporting purposes will be maintained by the Forest Resources Division’s information technology specialists. Having a central point of contact will help DNR coordinate and evaluate those results and ensure that future reports describe acquisitions, dispositions, and HCP retentions in a way this is consistent with GIS data.

## Natural Areas Program

### Background on the Natural Areas Program

#### Overview

DNR’s Natural Areas Program manages approximately 152,000 acres in 55 Natural Area Preserves (NAPs) and 36 Natural Resources Conservation Areas (NRCAs). This statewide system of natural areas was established by the Washington legislature to protect native ecosystems and rare plant and animal species or unique natural features. The lands protected in the natural areas system include estuaries, South Puget Sound prairies, bogs, ponderosa pine forests, shrub-steppe communities, and important geological features. These lands provide opportunities for research, education, and, where appropriate, low-impact public use. In addition, they provide important contributions to statewide conservation priorities and DNR’s HCP obligations.

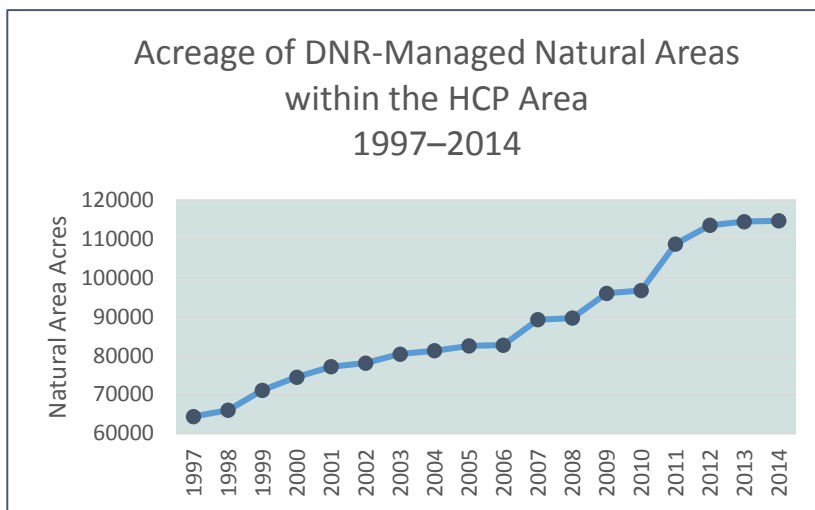
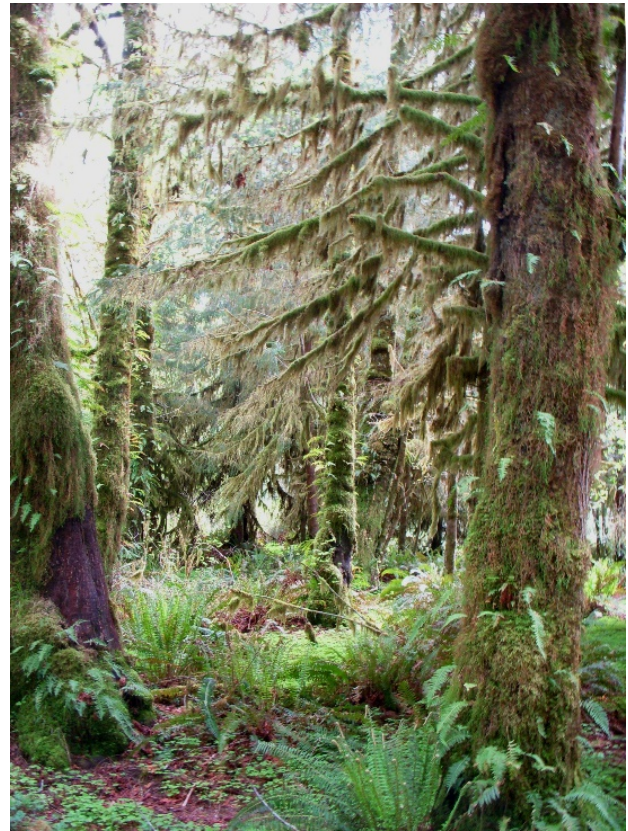


Figure 1: Total Acreage of HCP-Covered Natural Areas, 1997–2014.

The number and acreage of NAPs and NRCAs within the area covered by the HCP has grown considerably since the HCP was signed in 1997 (Figure 1). As of June 2014, 68 of the natural areas that DNR manages were situated within the area covered by the HCP, and 19 of them were established after the HCP was signed in 1997. These 68 sites encompass over 114,000 acres—more than one and one-half times the approximately 66,000 acres at the inception of the HCP. This acreage has increased fairly steadily over the past 17 years.

Late-seral forests and trees with potential nesting platforms are important features to the northern spotted owl and the marbled murrelet. A number of natural areas were established because of their high-quality, mature or late-seral native forest ecosystems. Some of these, such as Clearwater Corridor NRCA and Willapa Divide NAP, are dominated by late-seral forests, while others are dominated by natural-origin mature forests with areas of old forest, such as South Nemaah NRCA (Figure 2). Other natural areas are dominated by forests that are at least 70 years old and naturally regenerated after their original harvest (such as Mount Si NRCA, West Tiger Mountain NRCA, and Rattlesnake Mountain Scenic Area). Some of the native forests on these sites are among the highest-quality examples of globally imperiled forest ecosystems, such as the Douglas fir – western hemlock/sword fern forest community at Willapa Divide NAP. As a result of adding new sites and expanding existing ones, the acreage of DNR-managed natural areas dominated by mature and late-seral forest has nearly doubled from 43,494 in 1997 to 81,251 in 2014.



**Figure 2: Late-Seral Forest at Clearwater Corridor NRCA in the OESF Planning Unit.** Photo courtesy of Curt Pavola.

In addition to providing habitat for the marbled murrelet and northern spotted owl, NAPs and NRCAs support populations of 44 other federally listed or “special-status” animal and plant species identified in the HCP (federal species of concern, state-listed species, state candidate species, and other sensitive species). Conservation of such species is one of the key goals of the Natural Areas Program. The number of these species found on NAPs and NRCAs within the area covered by the HCP has increased since 1997 for three reasons: the establishment of new sites that contain listed species, the discovery of listed species on existing NAPs and NRCAs, and several additions to special-status species lists and federal listings since 1997.

Currently, 12 federally listed species occur on 30 NAPs and NRCAs in the HCP area – an increase of nine listed species since 1997. Two of these, Bradshaw’s lomatium (a perennial herb) and lower Columbia River coho, were added to the DNR natural areas system through establishment of new NAPs or NRCAs. The remainder of the increase is due to the listing of new species that already occurred on natural areas. Of the 30 sites on which federally listed species occur, eight were established since 1997.

In addition to federally listed threatened and endangered species, 33 special-status species currently occur on NAPs or NRCAs within the HCP area, compared to 28 such species in 1997. The five additions to this list include two species (slender-billed white-breasted nuthatch and Columbia torrent salamander) found on natural areas established since 1997 and three species (greater Sandhill crane, Makah copper butterfly, and pale blue-eyed grass) that were discovered since 1997 to occur on natural areas. The greater Sandhill crane, a state-endangered species, has recently established nesting sites in the Trout Lake NAP and the Klickitat Canyon NRCA (Figure 3).



**Figure 3: Sandhill Cranes at Klickitat Canyon NRCA.** Photo courtesy of Jeanne Demorest (WDFW).

### **Habitat Restoration**

In managing the NAPs and NRCAs, the Natural Areas Program prioritizes maintaining ecological processes, controlling invasive species, addressing public use issues, and restoring and enhancing disturbed or degraded portions of sites. To date, most habitat restoration has focused on either South Puget Sound prairies and oak woodlands, or Puget Sound estuarine and shoreline areas. Much of this work has targeted habitat improvements for federally listed or special-status species such as the Taylor’s checkerspot and mardon skipper butterflies and various salmonid species. The majority of restoration on natural areas is funded through grants, many from the Washington Wildlife and Recreation Program (WWRP) administered by the state Recreation and Conservation Office. This competitive grant program includes funding for restoration on state-managed lands including natural areas. Since its inception in 2007, the WWRP has funded \$2.9 million in restoration on 12 natural areas across the state including ten within the area covered by the HCP.

### **Grassland and Oak Woodland**

While the Natural Areas Program has a long history of restoring grassland and oak woodland habitats in western Washington, these efforts have increased substantially in recent years due in part to an increased focus on rare prairie-associated species and related increases in funding for habitat restoration. Since 1997, the Natural Areas Program has received approximately \$1.6 million in grants for prairie and oak woodland restoration from a variety of sources, including USFWS, the United States Department of Agriculture’s Natural Resources Conservation Service, the Joint Base Lewis-McChord Army Compatible Use Buffer Program, and WWRP. Over this time period, DNR’s Natural Areas Program has made substantial progress on natural areas in the South Puget, South Coast, and Columbia HCP Planning Units restoring grassland and oak habitats and controlling key invasive species like Scot’s



broom. In addition to invasive species control, restoration efforts include prescribed fire, mechanical tree removal, and seeding and planting native vegetation (Figure 4). The program has implemented these activities on approximately 525 acres at six sites, improving habitat conditions for existing grassland- and oak-associated species, as well as preparing for potential future reintroductions of rare species. Efforts are currently underway to establish a population of one federally listed species, golden paintbrush, at Mima Mounds NAP to help meet USFWS-defined recovery goals for this species.



**Figure 4: Prescribed Burn at Mima Mounds NAP.** Photo courtesy of Birdie Davenport.

### Estuarine and Shoreline

Aquatic and near-shore habitats have been another focus of the Natural Areas Program’s restoration efforts since 1997. This work has largely focused on repairing and restoring conditions for salmonids as well as other species that use marine intertidal and estuarine habitats (Figure 5). As of 2014, the program has received more than \$3.7 million in grants for these types of restoration efforts at nine sites, all within the area covered by the HCP. The Natural Areas Program has received another \$1.6 million for restoration projects from other sources, primarily the DNR Aquatics Creosote Removal Program and the state Jobs Now Act. Highlights of these restoration projects include the removal of creosote-contaminated structures and removal of large amounts of fill affecting water flow, sediment transport, and intertidal habitats at Woodard Bay NRCA near the south end of Puget Sound. This project removed 600 pilings and nearly 2,000 tons of other creosote-contaminated structures including a trestle bridge across Woodard Bay, and 40,000 cubic yards of fill, restoring habitat conditions for various native species including Olympia oyster, purple martin, Chinook salmon, Puget Sound coho, fall chum, and winter steelhead. At Stavis and Cypress NRCAs, the Natural Areas Program converted heavily degraded riparian and shoreline areas back into functioning “pocket” estuaries through removal of structures, bulkheads, and fill, followed by grading and channel creation, placement of large woody debris, and establishment of native near-shore vegetation. These projects have restored nearly five acres of pocket estuaries and an additional 40 acres of associated riparian and upland habitat. In addition, the program has targeted a number of invasive aquatic plants that



**Figure 5: Restored Pocket Estuary at Stavis NRCA in the South Puget Planning Area.** Photo courtesy of Smayda Environmental Associates.

threaten natural areas and adjacent habitats, including major efforts to control smooth cordgrass on natural areas in Willapa Bay. Cordgrass was reduced from numerous large patches distributed in mudflats and river channels, to scattered individuals and smaller patches limited primarily to more upstream portions of river channels.

### Road Abandonment

Abandonment of roads in natural areas was also key to restoration efforts, particularly over the last 15 years. To date, the Natural Areas Program has undertaken about 50 road abandonment and restoration projects or culvert replacement projects at 30 sites within the coverage area of the HCP. Most funding for road abandonment work comes from the state capital budget (about \$2.7 million since 2001), with federal and state restoration grants sometimes providing additional funds to fully restore ecosystem function. The Natural Areas Program is currently implementing a roadwork list of 13 projects at ten sites within the coverage area of the HCP, with a statewide appropriation of about \$600,000.

### Research

To date, more than 410 research-related projects have been conducted on DNR-managed natural areas. The majority of these were led by various universities and colleges or state agencies. Other projects were conducted by high schools, local governments, volunteers, non-profits, federal agencies, and consultants. Notable project leaders include:

- The Dishman Hills Conservancy in Spokane
- Cascadia Research Collective
- The Natural History Museum of Los Angeles
- The Nature Conservancy
- The Canadian Museum of Nature
- Researchers from 32 universities and colleges across the United States and Canada

Projects have focused on air and water quality, soil ecology, genetics, population monitoring, habitat restoration methods, earthquake history, rare species recovery, plant cultivar development, fossils, cultural resource inventories, and cultural history. Most projects have focused on species inventory, monitoring, and recovery, but researchers have increasingly focused on habitat restoration techniques and the effects of climate change. Some notable examples are described below.

- The United States Geological Service is [conducting a study](#) to assess key factors influencing potential climate change responses of pika populations. Among other components, this project is examining the distribution and connectivity of pika within the Columbia River Gorge as well as microclimatic variables at occupied and unoccupied sites including **Columbia Falls NAP** and **Table Mountain NRCA** (Figure 6).
- Researchers from Portland State University are conducting research to better understand how climate



Figure 6: Pika at Columbia Falls NAP in the Columbia Planning Unit. Photo courtesy of Joe Bettis.

change will affect species range distributions from the local to regional scale. This project involves collecting plant tissue for genetic sampling to assess the ability of plants to disperse to habitat sites that may become available as a result of climate change. Samples for this project are being collected from **Mima Mounds NAP**.

- The Nature Conservancy collected data from **South Nemah NRCA** and **Ellsworth Creek NRCA** to help document vegetation composition and structure within old and young forest patches in coastal Washington (Figure 7). This information was used to assist in developing forest restoration plans for young, managed forest stands in the region, including the Ellsworth Creek Preserve and the USFWS Willapa National Wildlife Refuge.



**Figure 7: Old-Growth Forest in South Nemah NRCA.** Photo courtesy of Joe Rocchio.

- The Institute for Applied Ecology and The Nature Conservancy cooperated to develop regional strategies for restoring invaded prairies. Their research included evaluating the effectiveness of restoration treatments designed to reduce target exotic weeds with minimal non-target impacts and increase native species diversity and abundance. Several different restoration treatments were implemented on a number of Willamette Valley and South Puget Sound prairie sites, including **Mima Mounds NAP**. Information from this project has been instrumental in designing prairie restoration projects over the past five years.

### **Environmental Education Access**

Washington State law guarantees some public access to both NAPs and NRCAs for educational purposes. [RCW 79.70.010](#) states that NAPs are designated, in part, “for the purposes of scientific research, teaching, as habitats of rare and vanishing species, as places of natural historic and natural interest and scenic beauty, and as living museums of the original heritage of the state.” According to [RCW 79.71.030](#), one function of NRCAs is “maintaining, enhancing, or restoring ecological systems ... [for] outdoor environmental education.”

The Natural Areas Program continues to provide site-specific, environmental education opportunities in DNR natural areas. The Natural Areas Program, frequently in coordination with other DNR programs, facilitates low-impact recreational access such as hiking opportunities or water access where feasible. DNR chooses areas for public access that minimize impacts and protect the special ecological features of each site. Most access projects improve upon or repurpose existing impacted areas (such as old roads or railroad beds), or they relocate historical access from inappropriate locations. Whenever feasible, the Natural Areas Program combines relocation projects with site restoration to maintain or enhance native natural ecosystem function. Examples of access development for environmental education and low-impact recreation are provided below.

### Woodard Bay NRCA

DNR developed environmental education opportunities in conjunction with the ongoing large-scale restoration work at this site. New access facilities include a parking area, covered bike stalls, a kayak/canoe launch, an interpretive shelter, signs for ecological and historical interpretation, and cultural history displays. Conservation features highlighted at Woodard Bay NRCA include habitat for shorebirds, songbirds, harbor seals, river otters, and bald eagles in addition to a large maternity colony of bats and one of the most significant heron rookeries in the state.

### Chehalis River Surge Plain NAP

This large wetland area is spread out at the lower end of the Chehalis River, just upstream from where it empties into Grays Harbor. DNR transformed a former railroad bed into a three-and-a-half mile interpretive trail that offers views of the river (Figure 8). In addition to the trail and signs, the preserve offers toilet facilities, parking, and water access for hand-launched canoes and kayaks. Conservation features highlighted at the natural area include Sitka spruce and western red cedar, which thrive in the wet soils where fresh and salt water mingle. The 3,000-acre preserve contains the largest and best quality tidal surge plain wetland in the state, including sloughs that shelter young salmon and other fish. The surge plain also supports osprey, bald eagles, and state-listed sensitive Olympic mudminnows.



Figure 8: Viewing Platform at Chehalis River Surge Plain NAP. Photographer unknown.

### Mima Mounds NAP

Mima Mounds NAP offers an interpretive trail system including a paved, Americans with Disabilities Act (ADA)-compliant half-mile loop and two longer gravel paths. The interpretive center includes signs with information on geology, Mima mound formation hypotheses, prairie and fire ecology, and traditional Native American use. DNR staff and site stewards often host group tours and educational field trips. Conservation features highlighted at the natural area include rare examples of Mima mound landforms and Puget prairies (Figure 9). The preserve includes a small Garry oak woodland and savannah and also supports a variety of prairie-dependent butterflies and birds and a Douglas-fir forest.



Figure 9: Mima Mounds NAP. Photo courtesy of David Wilderman.

## West Tiger Mountain NRCA

West Tiger Mountain NRCA includes an education shelter, interpretive displays, and ADA-accessible trails, many of which are regularly used by schools in the Puget Sound area. Less than a quarter of a mile from the parking area is the beginning of the “Zoe and the Swamp Monster” self-guided wetland ecology tour with a series of interpretive panels aimed at younger audiences. Other outdoor classroom resources include viewing platforms along the lake and cleared areas with benches for groups. West Tiger Mountain NRCA offers an extensive system of low-impact recreational hiking trails through forest stands with old-growth characteristics.

Conservation features highlighted at the natural area include old-growth Douglas-fir forest, talus, lakes, streams, forested wetlands, a dry-site vegetation mosaic dominated by Pacific madrone, scenic landscapes, and habitat that supports a variety of wildlife, including blacktail deer, cougars, bobcats, black bears, coyotes, elks, red-tailed hawks, ospreys, pygmy owls, and pileated woodpeckers. Waterfowl, including mallard, gadwall, ruddy, and wood ducks, feed and nest along the lakes.

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# Conservation Strategy Updates

## Northern Spotted Owl Conservation Strategy Updates

[Background on the Northern Spotted Owl Conservation Strategy](#)

DNR’s northern spotted owl (NSO) conservation strategy on the west side consists of two complementary habitat threshold targets:

1. In all west-side planning units except the OESF, restore and maintain at least 50 percent of designated Nesting, Roosting, and Foraging (NRF) and Dispersal Management Areas as habitat.
2. In the OESF, restore and maintain at least 40 percent of each spotted owl management unit (SOMU) as NSO habitat with at least 20 percent of each SOMU as Old Forest Habitat.

In most west-side HCP planning units, both tracking and distribution of habitat are done at the SOMU scale. Further discussion of NSO habitat data and habitat types can be found [here](#). Below are updates (as of November 24, 2014) to west-side SOMU percentages by HCP planning unit since last year’s report.

### **Columbia**

In the Upper Washougal SOMU, habitat decreased by 0.28 percent due to approximately 55 acres of variable retention harvest activities within the Hardscramble and Gold Rush Timer Sales located in Dispersal Habitat. Upper Washougal SOMU is above the 50-percent threshold, with about 57 percent of the SOMU identified as Dispersal Habitat.

### **North Puget**

In the Howard Creek SOMU, disposed lands with retained HCP deed restrictions inadvertently deleted from the NSO Habitat Layer were added back with the last known/best available habitat condition. These 30 acres resulted in a 0.04 percent decrease in habitat.

In the Upper Skagit South NRF SOMU, disposed lands with retained HCP deed restrictions inadvertently deleted from the NSO Habitat Layer were added back with the last known/best available habitat condition. These 127 acres resulted in a 0.02 percent decrease in habitat.

Table 5 provides current total NSO habitat percentages within identified SOMUs in the Columbia and North Puget planning units. There are no SOMUs in the Straits and South Coast HCP planning units.

**Table 5: Habitat Thresholds per SOMU in Columbia and North Puget Planning Units, as of 11/24/2014.**

<b>SOMU</b>	<b>Planning Unit</b>	<b>Management Area Type</b>	<b>Percent Habitat<sup>1</sup></b>
<b>Rock Creek</b>	Columbia	NRF	<b>24.01</b>
<b>Silverstar</b>	Columbia	Dispersal	<b>47.13</b>
<b>Siouxon</b>	Columbia	NRF	<b>46.72</b>
<b>Swift Creek</b>	Columbia	NRF	<b>19.76</b>
<b>Upper Washougal</b>	Columbia	Dispersal	<b>57.47</b>
<b>Wind River</b>	Columbia	NRF	<b>5.23</b>
<b>Cougar</b>	Columbia	NRF	<b>41.44</b>
<b>Hamilton Creek Dispersal</b>	Columbia	Dispersal	<b>47.13</b>
<b>Hamilton Creek NRF</b>	Columbia	NRF	<b>13.52</b>
<b>Harmony</b>	Columbia	Dispersal	<b>34.85</b>
<b>Upper North Fork Stilly</b>	North Puget	NRF	<b>0</b>
<b>Wallace River</b>	North Puget	NRF	<b>0</b>
<b>Canyon-Warnick</b>	North Puget	NRF	<b>13.78</b>
<b>West Shannon NRF</b>	North Puget	NRF	<b>0</b>
<b>West Shannon Dispersal</b>	North Puget	Dispersal	<b>35.11</b>
<b>East Shannon NRF</b>	North Puget	NRF	<b>0</b>
<b>East Shannon Dispersal</b>	North Puget	Dispersal	<b>20.47</b>
<b>Middle Skagit Dispersal</b>	North Puget	Dispersal	<b>42.84</b>
<b>Middle Skagit NRF</b>	North Puget	NRF	<b>0</b>
<b>Upper Skagit South NRF</b>	North Puget	NRF	<b>1.27</b>
<b>Upper Skagit South Dispersal</b>	North Puget	Dispersal	<b>58.56</b>
<b>Sauk Prairie Dispersal</b>	North Puget	Dispersal	<b>48.50</b>
<b>Sauk Prairie NRF</b>	North Puget	NRF	<b>0.42</b>
<b>Deer Creek</b>	North Puget	NRF	<b>6.10</b>
<b>Ebey Hill</b>	North Puget	NRF	<b>0</b>
<b>French Boulder</b>	North Puget	NRF	<b>0.17</b>
<b>Hazel</b>	North Puget	NRF	<b>1.09</b>
<b>Howard Creek</b>	North Puget	NRF	<b>3.21</b>
<b>Loretta</b>	North Puget	NRF	<b>22.24</b>
<b>Marmot Ridge</b>	North Puget	NRF	<b>1.40</b>
<b>North Fork Skykomish</b>	North Puget	NRF	<b>4.02</b>
<b>Pilchuck Mountain</b>	North Puget	NRF	<b>1.34</b>
<b>Rinker</b>	North Puget	NRF	<b>6.66</b>
<b>Silverton</b>	North Puget	NRF	<b>0</b>

SOMU	Planning Unit	Management Area Type	Percent Habitat <sup>1</sup>
Spada	North Puget	NRF	0.11
Tenas	North Puget	NRF	0
South Snoqualmie	North Puget	NRF	3.06
Alder	North Puget	Dispersal	55.07
South Fork Skykomish	North Puget	NRF	0
Cavanaugh	North Puget	NRF	0
Clearwater	North Puget	NRF	4.32
Upper Skagit North	North Puget	NRF	0
North Snoqualmie	North Puget	NRF	2.73

<sup>1</sup> The “Percent Habitat” column contains data as it existed on 11/24/14 when the information was extracted from the SOMU spatial layer overlaid with the NSO habitat spatial layer.

### South Puget

The 2010 *South Puget HCP Planning Unit Forest Land Plan Final EIS* identifies “a forest stand-level [NSO] habitat condition that contains forest stand structural components needed for movement (tree density, cover, and canopy layering), foraging (snags and coarse woody debris), and roosting (canopy layering).” This movement, roosting, and foraging (MoRF) habitat is a subset of dispersal management areas in South Puget Planning Unit SOMUs. The South Puget Planning Unit has an overall habitat threshold target of 50 percent for each SOMU, and dispersal management areas there have a MoRF threshold target of 35 percent of each SOMU.

In the Pleasant Valley NRF SOMU, disposed lands with retained HCP deed restrictions inadvertently deleted from the NSO Habitat Layer were added back with the last known/best available habitat condition. These 181 acres resulted in a 0.08 percent decrease in habitat.

Rounding numbers in the GIS calculations for the Green SOMU resulted in a 0.01 percent decrease in habitat.

Table 6 shows current total NSO habitat percentages in South Puget Planning Unit SOMUs.

**Table 6: Habitat Thresholds per SOMU in South Puget Planning Unit, as of 11/24/2014.**

SOMU	Planning Unit	Management Area Type	Percent Habitat <sup>1</sup>	
			Movement, Roosting, and Foraging (MoRF)	Total Habitat
Black Diamond	South Puget	Dispersal	7.50	25.54
Green	South Puget	NRF	N/A	23.65
Pleasant Valley Dispersal	South Puget	Dispersal	1.35	22.13
Pleasant Valley NRF	South Puget	NRF	N/A	0.84
Tahoma	South Puget	Dispersal	1.66	16.97
Elbe Hills	South Puget	Dispersal	1.81	37.01

<sup>1</sup> The “Percent Habitat” columns contain data as it existed on 11/24/14 when the information was extracted from the SOMU spatial layer overlaid with the NSO habitat spatial layer.

## OESF

In the OESF HCP Planning Unit, SOMUs are based on the eleven landscape planning units there. The habitat goal for each SOMU within the OESF is that at least 40 percent of the landscape qualifies as NSO habitat. The Old Forest Habitat goal for each SOMU is at least 20 percent of the landscape.

A 148-acre increase in Old Forest Habitat due to decadence creation within OESF resulted in a 0.82 percent increase in Old Forest Habitat and a 0.21 percent increase in total habitat within the Clallam River SOMU.

A 1,065-acre decrease in the Dickodochtedar SOMU due to disposed lands in conjunction with the Foothills Land Exchange resulted in a 0.31 percent increase in Old Forest Habitat and a 0.87 percent increase in total habitat.

A 1,103-acre increase in the Kalaloch SOMU due to acquired lands in conjunction with the Foothills Land Exchange resulted in a 0.68 percent decrease in Old Forest Habitat and a 1.22 percent decrease in total habitat.

A 51-acre increase in Old Forest Habitat due to decadence creation within the OESF and a 398 acre increase due to acquired lands in conjunction with the Foothills Land Exchange resulted in a 0.06 percent decrease in Old Forest Habitat and a 1.21 percent decrease in total habitat within the Reade Hill SOMU.

A 1,869-acre decrease in conjunction with the Foothills Land Exchange and a 159-acre increase in conjunction with the Anderson Creek acquisition (Hoko River parcel) resulted in a 0.69 percent increase in total habitat within the Sekiu SOMU.

A 119-acre increase in conjunction with the Anderson Creek acquisition (East Pysht parcel) resulted in a 0.01 percent decrease in Old Forest Habitat and a 0.07 percent decrease in total habitat within the Upper Sol Duc SOMU.

A 30-acre increase in old forest habitat due to decadence creation within the OESF resulted in a 0.08 percent increase in Old Forest Habitat within the Willy Huel SOMU.

Table 7 shows current total NSO habitat percentages within OESF Planning Unit SOMUs.

**Table 7: Habitat Thresholds per SOMU in OESF Planning Unit, as of 11/24/2014.**

SOMU	Planning Unit	Percent Habitat <sup>1</sup>		
		Structural Habitat	Old Forest	Total Habitat
Reade Hill	OESF	16.23	14.41	30.64
Sekiu	OESF	4.33	0	4.33
Upper Clearwater	OESF	3.65	25.85	29.50
Upper Sol Duc	OESF	11.79	1.02	12.81
Willy Huel	OESF	6.23	18.79	25.01
Copper Mine	OESF	4.41	14.58	18.72
Dickodochtedar	OESF	15.64	8.57	24.21
Goodman Creek	OESF	8.78	16.81	25.59
Queets	OESF	4.46	21.96	26.42



SOMU	Planning Unit	Percent Habitat <sup>1</sup>		
		Structural Habitat	Old Forest	Total Habitat
Kalaloch	OESF	9.23	11.70	20.93
Clallam River	OESF	12.44	0.82	13.26

<sup>1</sup> The “Percent Habitat” columns contain data as it existed on 11/24/14 when the information was extracted from the SOMU spatial layer overlaid with the NSO habitat spatial layer.

## Marbled Murrelet Conservation Strategy Updates

### [Background on the Marbled Murrelet Conservation Strategy](#)

#### **Long-Term Conservation Strategy**

DNR continues to work jointly with the Services to develop a Marbled Murrelet Long-Term Conservation Strategy (MMLTCS) for the six western Washington HCP planning units. The strategy is being designed to conserve marbled murrelet habitat on state trust lands in western Washington while allowing for timber harvest and other activities that earn revenue for the trust beneficiaries.

DNR completed a comment summary from both phases of scoping and presented it to the Board of Natural Resources (BNR) on December 3, 2013. The summary shared information about the types and content of the comments received on the scope of the project; conceptual alternatives; the need, purpose, objectives, and potential impacts of the strategy; and other topics.

DNR and USFWS have been working toward developing alternatives for the MMLTCS on 1.3 million acres of state trust lands within the range of the marbled murrelet. Both agencies are committed to an objective and transparent analytical framework as a basis for building alternatives.

The analytical framework is a set of assumptions that is consistent across alternatives for quantifying take and mitigation. Presented to the BNR on November 4, 2014, the framework was designed to be a set of objective, repeatable, and defensible standards that builds on the actual effects to the marbled murrelet.

The next step in the development of the strategy is to present to the BNR a draft set of alternatives. Once approved, those alternatives will be analyzed in a Draft Environmental Impact Statement. More information on the MMLTCS can be found on DNR’s [marbled murrelet conservation strategy webpage](#).

#### **Interim Conservation Strategy**

Negotiations between DNR and the USFWS surrounding the MMLTCS began on July 8, 2013. DNR will continue to implement the Marbled Murrelet Interim Conservation Strategy throughout western Washington until a long-term conservation strategy is completed. Over the past year, DNR has held consultations to discuss the interim strategy’s implementation with the Forest Resources Division, regions, state lands programs, and the USFWS. Some surveyed, unoccupied marbled murrelet habitat has been released from deferral status as directed in Step 4 of the marbled murrelet interim conservation strategy in the HCP (p. IV. 40).

As of FY 2014, inventory surveys using the 2003 [Pacific Seabird Group murrelet survey protocol](#) have been completed in the Straits, South Coast, and Columbia HCP Planning Units. Columbia Planning Unit does not contain any released reclassified acres. Table 8 shows the amount of released reclassified

marbled murrelet habitat in Straits and South Coast Planning Units and how much has been harvested within each watershed administrative unit (WAU).

Table 8: Released Reclassified Marbled Murrelet Habitat.

WAU Name	Total Reclassified Area in Acres <sup>1, 2</sup>	Area of Reclassified Habitat Available for Harvest	Harvested Acres as of 6/30/2014 <sup>3</sup>
<b>Straits HCP Planning Unit</b>			
Bell Creek	222	-	-
Big Quil	122	61	1
Chimakum	13	6	-
Cushman	15	8	-
Dabob	22	11	-
Discovery Bay	1,161	581	255
Dungeness Valley	1,410	264	39
Hamma Hamma	184	92	29
Lake Crescent	156	-	-
Lilliwaup	573	287	38
Little Quil	97	49	-
Ludlow	94	47	45
Lyre	636	19	-
Morse Creek	308	8	3
Port Angeles	1,441	154	92
Salt	2,418	745	239
Sequim Bay	1,959	450	232
Siebert McDonald	1,857	607	136
Skokomish, Lower NF	71	36	10
Sutherland-Aldwell	1,925	561	168
Twins	731	347	59
<b>South Coast HCP Planning Unit, North of Highways 8 and 12</b>			
Cook-Elk	230	-	-
Copalis River	249	21	1
Hoquiam, EF	8	4	1
Hoquiam, WF-MF	57	-	-
Humptulips, Middle	110	55	66
Humptulips, WF	253	30	2
Joe-Moclips	635	158	27
Skookumchuck, Lower	91	45	-
Stevens Creek	107	54	54

WAU Name	Total Reclassified Area in Acres <sup>1, 2</sup>	Area of Reclassified Habitat Available for Harvest	Harvested Acres as of 6/30/2014 <sup>3</sup>
<b>South Coast HCP Planning Unit, East of I-5</b>			
<b>Newaukum, Lower NF</b>	5	3	-
<b>Scatter Creek</b>	167	84	-

<sup>1</sup> Values in this column have adjusted from the 2013 State Trust Lands HCP Annual Report due to the disposal of properties and subsequent updates to the State Lands Marbled Murrelet HCP Policy layer.

<sup>2</sup> The Skokomish (Straits); Wishkah, Lower (South Coast, North of Highways 8 and 12); and Hanaford (South Coast, East of I-5) WAUs have no reclassified habitat due to disposals, so they are not displayed in this table.

<sup>3</sup> Data originated in DNR's Planning and Tracking (P&T) system. Subsequent new data or corrections are not reflected here. The P&T data has been overlaid with the Marbled Murrelet Habitat GIS layer queried 6/30/2014 to identify timber sale activities (sold and completed) in released habitat. Values have been rounded to the nearest acre.

## Riparian Conservation Strategy Updates

### [Background on the Riparian Conservation Strategy](#)

#### **Riparian Forest Restoration Strategy (RFRS)**

Restoration thinning in riparian areas is an activity that is conducted through the 2006 RFRS in concert with DNR's Timber Sales Program. These thinnings provide growing space to encourage older forest stand structures, and in the short term they provide large wood to streams, maintain overstory tree growth, and enhance understory development. DNR tracks timber sales that implement the RFRS to ensure stand conditions are appropriate for thinning and to monitor progress toward achieving long-term goals of riparian forest complexity. Table 9 provides a summary of completed timber sales, by DNR region, that have implemented thinnings within riparian management zones (RMZs) according to the RFRS since 2012.

**Table 9: Riparian Thinnings by Region since 2012.**

Region	RFRS Sales by Completion Year					
	2012		2013		2014	
	RFRS Sales	% of Total Sales	RFRS Sales	% of Total Sales	RFRS Sales	% of Total Sales
<b>Northwest</b>	10	22	6	29	5	22
<b>Olympic<sup>1</sup></b>	0	0	0	0	0	0
<b>Pacific Cascade</b>	8	11	5	14	7	20
<b>South Puget Sound</b>	2	14	2	20	4	24
<b>Totals</b>	<b>20</b>	<b>13</b>	<b>13</b>	<b>18</b>	<b>16</b>	<b>21</b>

<sup>1</sup> This includes the Straits HCP Planning Unit and part of the Columbia Planning Unit, but it excludes the OESF HCP Planning Unit, where the RFRS does not apply.

There were approximately 240 acres of RFRS thinnings conducted during calendar year 2014, compared with 152 acres in 2013 and 177 in 2012. The regional distribution of sales employing RFRS enhancements showed Northwest and Pacific Cascade regions each thinning about 100 acres of RMZ, while South Puget Sound Region thinned about 35 acres. Twenty-one percent of timber sales in western Washington (excluding the OESF) included RFRS enhancements in calendar year 2014, compared to 18

percent in 2013 and 13 percent in 2012. In 2013, the majority (58 percent) of the treatments took place in stands with some existing structural complexity (Type II thinnings), and the most mature stands treated were in the understory-development or stand-development stages. In calendar year 2014, DNR did not conduct any hardwood conversion treatments, which include removing primarily hardwoods from riparian areas. In the past, about 10 percent of RFRS sales focused on restoring a higher proportion of conifers in hardwood-dominated RMZs. This year's lack of hardwood conversions is commensurate with the risk- and cost-based priorities of the RFRS.

### **Wetland Management and the RFRS**

Forested wetlands are wetlands that have (or would have, if the trees were mature) a crown closure of less than 30 percent. A wetland management zone (WMZ) is the upland area that surrounds the forested wetland. Forested wetlands and WMZs are currently managed under standards published in the HCP (p. IV.69–70). These standards consist of short-term measures to maintain minimal acceptable wetland and buffer function (at least 120 ft<sup>2</sup> basal area of the most wind-firm trees). In practice, forested wetlands themselves are rarely thinned because there is generally insufficient basal area to meet the 120 ft<sup>2</sup> requirement and because thinning on wetland soils tends to increase the risk of windthrow for the remaining trees. In order to maintain at least 120 ft<sup>2</sup> of basal area within the WMZ, extra basal area is typically retained to allow for possible blowdown or other types of mortality. This was documented in the [2013 HCP Implementation Monitoring Report](#), which found that the DNR WMZs exceeded basal area requirements in the 15 WMZs that were evaluated for HCP compliance.

Since wetlands are an ecologically important part of the aquatic system and are frequently difficult to spatially differentiate from their associated streams, DNR investigated how current WMZ management compares with RMZ management under the RFRS. Based on the sales selected in 2013 for implementation monitoring, researchers found that the RD averaged 45 (with a standard deviation of 12) and the quadratic mean diameter of trees after any management averaged 19.2 inches (with a standard deviation of 4.5 inches).

This data suggests that current thinning in WMZs is consistent with restoration thinning under the RFRS, although there are no down-wood requirements associated with WMZ management.

### **Headwaters Conservation Strategy**

The draft Headwaters Conservation Strategy was developed in 2007 to complete the HCP riparian conservation strategy. The document represents a multi-year collaboration between the Services, the scientific community, and DNR managers. The strategy incorporates emerging ideas about the importance of non-fish-bearing stream habitat for ecosystem conservation and the linkage to downstream fish habitat quality. The strategy provides guidance to prioritize site-specific aquatic habitat protections. In response to a letter of support from the Services in November 2008, DNR conducted outreach to tribes and initiated preparations for the final State Environmental Policy Act (SEPA) process on headwater conservation. During FY 2014, competing priorities continued to prevent adoption and implementation of the Headwaters Conservation Strategy.

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# Monitoring, Research, and Adaptive Management

## [Background on Monitoring and Research](#)

### Monitoring and Research

#### *Implementation Monitoring*

In 2014, the Implementation Monitoring Program continued field-based reviews to monitor implementation of HCP conservation strategies. This past year, the Implementation Monitoring Section focused on four topics selected through a new collaborative process between region and division staff for determining and prioritizing implementation monitoring projects. This year's implementation monitoring topics included:

1. Curtis's relative density (RD) maintenance treatments in NSO habitat.
2. The roads component of the RFRS as applied to type 3 water crossings.
3. Protection of uncommon habitat features (cliffs, balds, caves, and talus fields).
4. A review of mitigation measures associated with implementation consultation, joint concurrence, and noncompliance letters.

For RD maintenance treatments, monitoring staff visited 11 timber sale units where a stand-level RD value greater than or equal to 48 was used to assess HCP compliance (Figure 10). RD is used as a surrogate for 70 percent canopy closure, a component of the NSO habitat definitions.

To review the roads component of the RFRS, staff visited 31 streams where road construction, reconstruction, and/or maintenance required the harvest and placement of trees within 25 feet of the ordinary high water mark into the stream.

The RFRS requires the placement of one log and three root wads, if available. This assessment verified that wood placement was in line with RFRS guidance. The results of these projects are reported in the [2014 Implementation Monitoring Report](#).

For uncommon habitats, monitoring staff visited 45 habitat features (24 cliffs, 18 balds, two caves, and one talus) on 26 timber sales where they determined whether the respective HCP conservation objectives were met. Monitoring staff reviewed 12 approved letters (eight implementation consultations, three noncompliances, and one joint concurrence), where field and/or office verification of specific mitigation measures were conducted. Field work is ongoing for these projects, the results of which will be published in calendar year 2016.



**Figure 10: An RD Maintenance Treatment in a Designated Northern Spotted Owl Dispersal Management Area.** This unit was successfully treated to maintain an RD value of greater than or equal to 48 and will retain its habitat status. Photo courtesy of Zak Thomas.

## Northern Spotted Owl Effectiveness Monitoring

The NSO Effectiveness Monitoring Program evaluates whether the HCP strategies and associated silvicultural treatments maintain or enhance NRF and dispersal habitat. The program is being revived after a lull associated with staff reductions during the economic downturn. It currently consists of four components:

1. Long-term tracking of the effects of variable density thinnings (VDTs) to improve habitat structure in stands designated as habitat.
2. Measurement of the response of habitat features to small-gap creation within thinned stands.
3. Comparison of the spatial structure of both thinned and unthinned stands designated as habitat to late-successional reference stands known to function as NSO habitat.
4. Landscape-scale monitoring of basic habitat indicators across the entire west-side HCP land base.

The first component was initiated in 2005–2008 across five VDTs in the North Puget (Whitehorse Flat timber sale), South Puget (Big Beaver and Cougarilla timber sales), Columbia (Lyons Share timber sale), and Klickitat (Loop timber sale) Planning Units. These five timber sales were designed to maintain or accelerate the development of structural NSO habitat in stands ranging from approximately 50 to 80 years old (Figure 11). The study design includes two or three replications of treated stands and one untreated control stand at each site. All stands were measured prior to treatment and again immediately after treatment. The sites are currently receiving their five- to seven-year post-treatment measurement, and data summarization has begun. This process will allow DNR to observe how the trajectories of stand development differ between thinned and unthinned stands and evaluate these findings against the habitat definitions described in the HCP (p. IV.22). By spring of 2015, all sites will have received this round of measurement, and the full data set will be ready for analysis. Consistent with the monitoring objectives in the HCP (p. V.2), DNR’s intent is to track habitat conditions in these treatments at approximately five-year intervals over the life of the HCP.

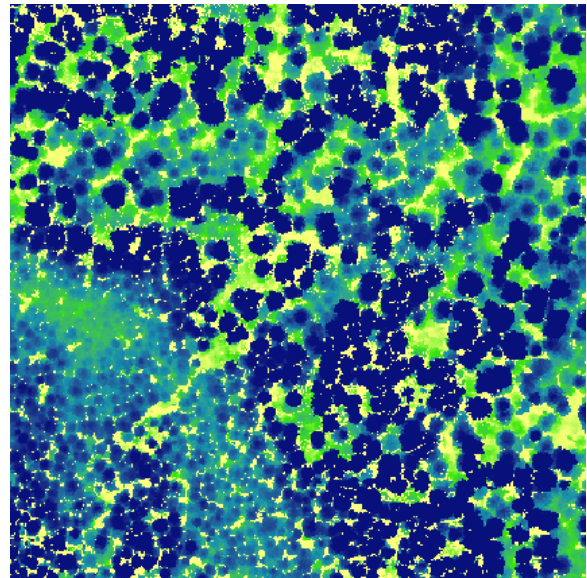


**Figure 11: Thinned NSO Habitat within the Elbe Hills State Forest.** Photo courtesy of Dan Donato.

The second component of the NSO Effectiveness Monitoring Program is being conducted in the Olympic Experimental State Forest (OESF) with a focus on silvicultural gap treatments. Much of the managed landscape is regrowing after past harvests and is in a relatively uniform stage of competitive exclusion with simple canopy structure. DNR has been creating gaps within VDTs to introduce

structural heterogeneity to encourage variable light environments; greater canopy complexity; multiple canopy layers; and specific habitat features such as crown expansion, branch platforms, and deadwood. In 2014, a retrospective study was established to monitor the outcome of these treatments, replicated across 18 gaps created 10 to 14 years prior. DNR researchers measured structural characteristics with a series of vegetation/stand plots both within the gaps and in the surrounding thinned matrix as a reference. Recently acquired LiDAR data for the OESF will be used to analyze effects on canopy complexity relative to thinned stands without gaps, unthinned second growth, and older forest habitats. Entry and quality control of field data and initial summarization are underway.

The third component of the NSO Effectiveness Monitoring Program aims to develop innovative approaches for using spatial structure analysis to create higher-quality habitat in managed second-growth forests. Current habitat definitions are based on the relatively simple presence or abundance of certain structural features (such as large trees and snags), but they do not capture the fine-scale spatial structure of older forests that function as habitat, such as the arrangement of large and small trees that determines cover, flyways, and prey distribution for forest raptors such as NSOs. Adapting recently developed methods for restoration thinnings on the eastern slopes of the Cascades, this study aims to characterize patterns of stems in old forest reference stands (focusing on known NSO nest sites and territories) and evaluate the degree to which these patterns can be emulated in VDT treatments. Methodologies to evaluate these patterns will include field stem-mapping as well as analysis of LiDAR data in a series of old forest sites, unthinned second growth, and recently thinned second growth (using other monitored stands described above in the first two components) (Figure 12). This project is being conducted in partial collaboration with University of Washington forest scientists. Stem-mapping has begun in monitoring sites, and DNR is currently identifying candidate old forest reference stands.



**Figure 12: High-Resolution LiDAR Data on Canopy Structure.** This image shows the canopy structure in an older forest on state lands. Colors represent vegetation heights ranging from zero (yellow) to 300 feet (blue). Image courtesy of the DNR Forest Inventory Team.

The fourth component of the program is a landscape-scale assessment of HCP effectiveness for NSO habitat across all west-side HCP lands. The objective is to determine whether broad-scale trends in basic habitat features such as tree height, mean tree size, and canopy layering meet HCP goals. To accomplish this, DNR is using Gradient Nearest Neighbor (GNN) data, a regional data set produced by the US Forest Service that covers all forestland in all Pacific Coast states. GNN data map the distribution of vegetative characteristics across the landscape, and despite limitations at the single-pixel or small-stand scale, it is sufficiently accurate for assessments over broad spatial extents. (The NSO Effectiveness Monitoring Program plans to validate GNN with contemporary LiDAR- and orthophoto-derived data.) GNN also provides an independent, quantitative dataset back to 1984, affording a look at both pre-HCP and post-HCP trends. DNR researchers have commenced comparing trends in the above habitat features from 1984–1991 (before the impact of habitat concerns), 1991–1998 (transition period), and 1998–2012

(the post-HCP era). Of particular interest is whether SOMUs are showing different trends than other non-DNR-managed lands.

## Riparian Silviculture Effectiveness Monitoring

### Stand-Level Monitoring

DNR initiated stand-level riparian silviculture effectiveness monitoring in 2005 to document the effectiveness of silviculture treatments toward meeting the management objectives in the RFRS. After budget constraints prevented DNR from taking field measurements for several years, monitoring of existing sites resumed in 2013. Table 10 lists the six current sites where DNR is conducting riparian silviculture effectiveness monitoring.

**Table 10: RFRS Effectiveness Monitoring Sites.** Treatments consist of thinning to RD 40 or 50 (RD40 or RD50), thinning to RD 50 with intentional canopy gaps (RD50 gap), and unthinned reference (REF).

Site Name	Region	Year Established	Treatments
H1320	Olympic	2005	RD40, RD50, REF
Salmon PC	Olympic	2005	RD40, RD50, REF
Cougarilla	South Puget Sound	2006	RD40, RD50, RD50 gap, REF
Big Beaver	South Puget Sound	2008	RD40, RD50, RD50 gap, REF
North Mountain	Northwest	2008	RD40, RD50, REF
Pink Flamingo	Northwest	2008	RD40, RD50, REF

To evaluate differences between treatments, DNR assesses several variables in each treatment area before harvest, immediately after harvest, and periodically thereafter. Repeated measurements on individual trees are tracked through time and compared with the management expectations of the treatments. DNR measures four variables in this study.

1. Overstory structure and composition (Figure 13)
2. Understory structure and composition
3. Canopy structure
4. Large woody debris

In FY 2013, DNR completed overstory stand structure and composition re-measurements. In FY 2014, DNR began re-measuring understory and vegetation response. Next steps include compiling the measurements and concluding the ten-year measurements on the monitoring sites.

## OESF Research and Monitoring Program

[Background on OESF Research and Monitoring](#)



**Figure 13: Riparian Thinning.** In this stand, thinned to RD 40, tree crowns have elongated by 20 percent since thinning ten years ago. In the adjacent unthinned riparian forest, crowns have shortened by about three percent. Photo courtesy of Richard Bigley.



The OESF was designated as a place to learn how to more effectively integrate ecological values and revenue production across the forested landscape. DNR implements integrated management in the OESF through landscape-level planning, innovative silviculture, continuous research and monitoring, adaptive management, efficient information management, and effective communication. The OESF Research and Monitoring Program coordinates and implements individual research and monitoring projects, the adaptive management process, information management, research collaboration, and outreach. This section of the *2014 State Trust Lands HCP Annual Report* includes updates on specific research and monitoring projects and programmatic-level updates on research collaborations and staffing.

### Status and Trends Monitoring of Riparian and Aquatic Habitat in the OESF

This project characterizes the status and trends of riparian and aquatic habitat across the OESF as DNR implements existing land management procedures under the HCP. Seven aquatic indicators (stream temperature, shade, discharge, coarse substrate, large wood, habitat units, and channel morphology) and two riparian indicators (microclimate, measured through air temperature and humidity, and vegetation) are monitored in 50 type 3 streams (the smallest fish-bearing streams). Field sampling started in 2012 and is expected to continue for at least ten years. DNR provides the majority of the funding for this project, while the United States Forest Service (USFS) Pacific Northwest Research Station, DNR's main collaborator on the study, provides scientific expertise, field support, and additional funding.

In the short term, monitoring provides empirical data on current in-stream and riparian conditions. The long-term objectives are to:

1. Document directional change (trend) of individual monitoring indicators or watershed condition scores across the OESF.
2. Test assumptions around the recovery of riparian and aquatic conditions and evaluate the projections of riparian habitat over time as presented in the revised draft environmental impact statement for the OESF forest land plan.
3. Supply information that is useful for HCP effectiveness and validation monitoring.
4. Supply information for inferences about management effects on habitat as a basis for adaptive management.

In FY 2014, DNR field crews conducted stream surveys in 23 monitored basins, bringing the total number of surveyed basins to 33 (Figure 14). Microclimate and stream temperature data were downloaded from all continuously recording data loggers. Stream discharge measurements were taken in the 14 basins monitored for hydrologic regimes, and the water-level data was downloaded from the continuously recording water-level



Figure 14: DNR Staff Tour a Riparian Monitoring Site in the OESF. Photo courtesy of Teodora Minkova.

sensors. Data for December 2014–January 2015 has been collected. The next steps include developing the database and running quality control checks of the data.

The project's progress report for 2013 and several presentations to external parties are available on the [OESF webpage](#).

### Mind the Gap: Developing Ecologically Based Guidelines for Creating Gaps in Forest Thinning on the Olympic Peninsula

The goal of this DNR-funded project is to better match silvicultural gap treatments with the late-successional forests they aim to emulate. The project started in April 2014 with development and peer review of a study plan. It will be conducted in three phases:

- **Phase I:** A retrospective study of ten-year-old gaps, which will capitalize on the learning opportunity afforded by a decade of ecosystem response.
- **Phase II:** An observational study of natural gap structures in primary (never managed), mature, and old-growth forests, which will establish critical reference information.
- **Phase III:** A replicated silvicultural experiment to test novel gap treatments (informed by the structures found in primary forests) within a variable density thinning treatment.

DNR will track tree recruitment, understory vegetation response, branching/crown responses, decadence (dead wood) creation around gap edges, and post-treatment dynamics of gap contraction and expansion (e.g., blowdown). Results from the study will lend immediate relevance to objectives for providing structural diversity and habitat in managed forests.

DNR completed data collection for Phase I in the summer of 2014. A total of 18 gaps (10–14 years old) were each sampled with three vegetation plots spanning a north-south gradient within the gap, plus three reference plots in the surrounding thinned forest matrix to provide better inference on gap influence. The metrics listed above were measured in each plot/gap, and data quality control and analysis have commenced. Data processing for Phase II has also begun, and DNR researchers conducted field validation of the remote sensing monitoring data. Field layout for Phase III is mostly complete and awaits results from Phase II to guide marking of experimental gaps. A summary of this project is available on the [OESF webpage](#).

### Influence of Repeated Alternative Biodiversity Thinning Treatments on Coastal Forests

This project will quantify the effects of alternative pre-commercial thinning treatments and subsequent thinning on stand complexity and growth. The project started in April 2014 with development and peer review of a study plan. DNR funds this project, which will be conducted in two phases: 1) re-measurement of a set of pre-commercial thinning treatments (a randomized block design with five treatments and five replicates) implemented in 1999 to test biodiversity stand management pathways, and 2) commercial thinning to test a range of management objectives covering the spectrum from wood products to wildlife habitat.

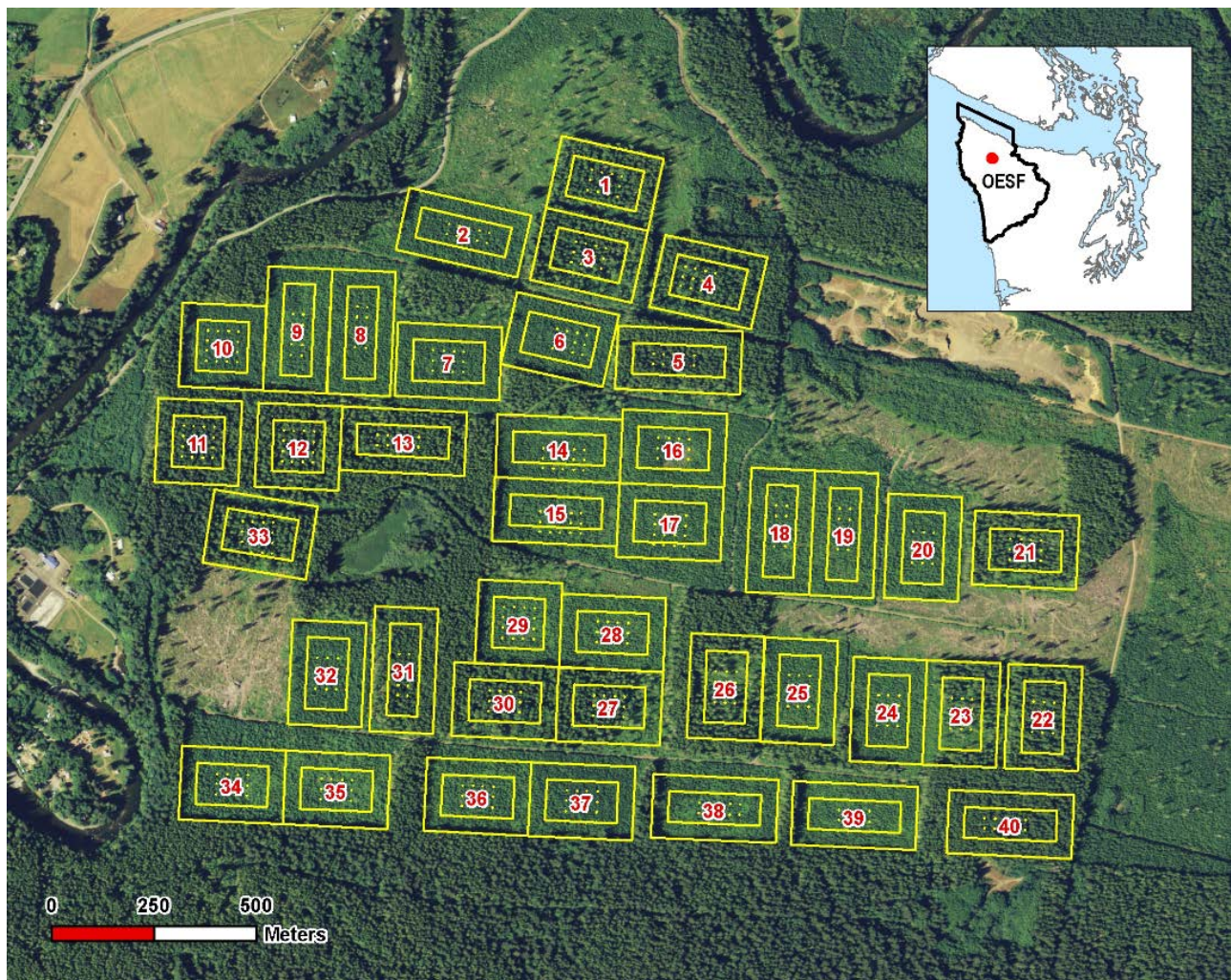
This project will allow DNR to measure the influence of repeated thinning on both vegetation structure and timber production. Treatment responses will be quantified with a combination of measuring a permanent plot network and analyzing LiDAR-derived canopy metrics. Information gained from this project will inform agency decisions about the value of different treatment options in meeting multiple management objectives under the biodiversity pathways approach.

Data collection for Phase 1 was completed in the summer of 2014. The stands initially treated in 1999 are approaching their scheduled commercial thinnings. A summary of this project is available on the [OESF webpage](#).

### Experiment in Long-Term Ecosystem Productivity

The goal of the project is to evaluate the effects of harvesting, woody-debris retention, and the presence of different plant species on tree and soil productivity; carbon levels, nutrient content, and structure of soil; and plant species diversity. It is organized as long-term (multiple decade) monitoring study replicated in four experimental sites across the Pacific Northwest: Isolation Block in the Willamette National Forest in Oregon, Siskiyou site in Siskiyou National Forest in Oregon, Hebo site in Siuslaw National Forest in Oregon; and Sappho site in the OESF.

The OESF-based installation in Sappho (Figure 15) was initiated in 1995 with funding provided by the Pacific Northwest Research Station and DNR. Field installations and pre-harvest and postharvest measurements and analyses were conducted with help from the Pacific Northwest Research Station, Western Washington University, Oregon State University, and the University of Washington.



**Figure 15: Experimental Units for the Long-Term Ecosystem Productivity Project at Sappho.** The 40 plots include four complete replicates of a three-by-three factorial design of stand condition and wood debris utilization levels. Image courtesy of Teodora Minkova.

Ten-year postharvest measurements, including vegetation and soils sampling were conducted in the summer of 2014 as a cooperative effort between the Pacific Northwest Research Station, Western Washington University, University of Washington, and DNR. A summary of this project is available on the [OESF webpage](#).

### OESF Forest Land Planning Project

DNR published the [OESF Revised Draft Environmental Impact Statement \(EIS\) and the associated Draft OESF Forest Land Plan](#) in October 2013. Development of the final EIS and a final forest land plan is underway. The OESF Research and Monitoring Program has contributed to this planning process by:

- **Developing an adaptive management chapter for the draft forest land plan.** This chapter describes the integration of research and monitoring activities with planned management activities and prioritizes the ecological uncertainties identified during the planning process, creating a helpful perspective for OESF research and monitoring.
- **Developing an adaptive management procedure.** The procedure describes the steps in the OESF adaptive management process and the roles and responsibilities of DNR staff in this process.

An adaptive management working group, consisting of DNR staff from Olympic Region and the Forest Resources Division, developed elements of the adaptive management process such as information management, budget, and outreach and communication. This working group will provide its recommendations to DNR management in early 2015 and the approved adaptive management program will be described in the final OESF forest land plan.

### Staffing

Two new positions, OESF data manager and fish biologist, were established in FY 2014. The OESF data manager is the steward for research and monitoring data from projects conducted by DNR on the OESF and creates and maintains tabular and spatial databases related to program activities. The fish biologist will conduct riparian validation monitoring in the OESF and consult on fish-related topics for DNR planning projects.

## Adaptive Management

### [Background on Adaptive Management](#)

DNR uses the best available information from scientific literature, research, and monitoring to consider management changes that would increase the efficiency and effectiveness of current practices. The Forest Resources Division manager and assistant managers, with support from division scientists, convene the Adaptive Management Steering Committee to review priorities for potential research projects conducted by DNR on state trust lands and evaluate new information to support potential changes in management practices.

In the OESF, where the state trust lands HCP identifies adaptive management as one of the six management processes, DNR is formalizing an adaptive management program. Elements of the program, such as administrative procedure for implementing adaptive management, key uncertainties,

and information management are described in the [Draft OESF Forest Land Plan](#). The final description of the program will be included in the final OESF Forest Land Plan.

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## Program Activities

### Silvicultural Activity for FY 2014

#### Background on Silvicultural Activity

Information and analysis provided in this section is based on activities designated as “complete” in DNR’s planning and tracking database (P&T) as of December 5, 2014. P&T is a dynamic system in which data is continually updated.

Five major silvicultural activity types are discussed in this report: timber harvest, site preparation, forest regeneration, vegetation management, and pre-commercial thinning. While there is some variation, these activities generally occur in this sequence for a unit where timber has been harvested. Timber harvests are the primary driving force for other silvicultural activities, as most harvests remove enough trees to require reforestation of the stand. Table 11 shows completed acres of silvicultural activities in the second decade of the HCP.

#### ***Timber Harvest***

The rights to harvest timber from state trust lands are purchased at regional public auctions held each month. A timber sale contract allows the purchaser to remove timber, typically over a one- to two-year period. Thus, the levels of sold timber sales may stay relatively stable from year to year. However, timber removals or levels of completed activities may vary based on the purchaser’s choice of when to harvest (and thus complete) the sale. The overall acreage of completed timber harvests as of December 2014 was about 30 percent below the six-year mean.

Variable retention harvest levels in FY 2014 were roughly 28 percent below the six-year mean. Of the other two most common harvest types, commercial thinning was performed at typical levels, whereas variable density thinning acres were 33 percent below the six-year mean.

#### ***Forest Site Preparation***

Primarily due to FY 2013’s decline in completed variable retention harvest (VRH) acres, forest site preparation acreage remained relatively low in FY 2014—about seven percent below the six-year mean. Aerial herbicide treatments were 21 percent below average. Ground herbicide treatments were 48 percent above average.

#### ***Forest Regeneration***

Forest regeneration acreage was four percent lower than the six-year mean. Natural regeneration continues to account for a small percentage (six percent) of the FY 2014 total.

#### ***Vegetation Management***

Vegetation management activities in FY 2014 were 23 percent higher than the six-year mean. This increase is due to increased funding since FY 2012 for vegetation management after several years of budget cuts, during which time treatments of many forest management units were postponed or

cancelled. Hand-cutting treatments accounted for most of the increase in FY 2014. Thirty-nine percent more acres were treated with ground herbicide in FY 2014 compared with the six-year mean. Ground herbicide treatments were ten percent above average.

### ***Pre-Commercial Thinning***

Due to budget limitations, essentially no pre-commercial thinning was completed from FY 2010–FY 2012. Funding was available in FY 2013 and FY 2014 for this activity. Accordingly, the 8,574 acres treated in FY 2014 are 66 percent above the six-year mean of 5,162 acres.

### ***Salvage***

Salvaged acres are not classified as an individual harvest type in P&T. Instead, salvage areas are included in the harvest activity type that best fits the silvicultural prescription for the stand being managed. They are then flagged so they can be captured separately. Table 12 compares the FY 2014 completed salvaged acres to the FY 2009–2014 mean annual salvage acres by P&T timber harvest activity type for the second decade of the HCP. Overall, salvage levels were less than half the six-year mean.

Table 11: Acres of Completed Silvicultural Activities on State Trust Lands Managed under the HCP from FY 2009–2014.

	FY 2014							FY 2014 Totals				FY 09–14 Mean Annual Acres <sup>1</sup>			
	EAST <sup>2</sup>		WEST					East	West	OESF	Total	East	West	OESF	Total
	Klickitat	Yakima	Columbia	North Puget	South Coast	South Puget	Straits								
<b>Timber Harvest</b>															
Clearcut	-	-	1	-	5	9	-	-	15	-	15	12	23	42	78
Commercial thinning	142	65	704	301	-	5	-	207	1,010	513	1,730	704	969	207	1,879
Seed tree intermediate cut	-	-	-	-	-	-	-	-	-	-	-	123	6	-	129
Seed tree removal cut	-	253	-	-	-	-	-	253	-	-	253	42	-	-	42
Selective product logging	-	-	-	-	-	-	48	-	48	-	48	-	255	-	255
Shelterwood intermediate cut	-	-	-	-	-	-	-	-	-	-	-	86	28	-	114
Shelterwood removal cut	-	-	-	-	-	-	-	-	-	-	-	126	11	-	137
Temporary retention first cut	-	-	-	-	-	-	-	-	-	-	-	-	4	-	4
Uneven-aged management	84	301	-	-	24	-	-	385	24	-	409	892	91	-	983
Variable density thinning	113	534	151	239	-	70	-	647	460	51	1,158	582	1,079	84	1,745
Variable retention harvest	143	-	2,432	2,500	1,851	739	1,240	143	8,762	1,081	9,986	638	12,253	1,061	13,951
Salvage <sup>3</sup>	Salvage is not a stand-alone timber harvest activity type. Instead, it is included in other timber harvest types. Refer to Table 12 for explanation.														
<b>Total timber harvest</b>	<b>482</b>	<b>1,153</b>	<b>3,288</b>	<b>3,040</b>	<b>1,880</b>	<b>823</b>	<b>1,288</b>	<b>1,635</b>	<b>10,319</b>	<b>1,645</b>	<b>13,599</b>	<b>3,206</b>	<b>14,719</b>	<b>1,393</b>	<b>19,318</b>
<b>Forest Site Preparation</b>															
Aerial herbicide	-	-	1,566	815	1,446	-	-	-	3,827	-	3,827	-	4,759	89	4,848
Ground herbicide	-	-	938	174	631	296	885	-	2,924	999	3,923	146	2,116	385	2,647
Ground mechanical	-	288	-	-	-	-	-	288	-	-	288	751	7	-	758
Hand cutting	-	-	-	-	-	-	-	-	-	-	-	-	-	15	15
Pile and burn <sup>4</sup>	-	857	-	-	8	-	-	857	8	-	865	1,054	207	-	1,260
Under burning	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
<b>Total forest site preparation</b>	<b>-</b>	<b>1,145</b>	<b>2,504</b>	<b>989</b>	<b>2,085</b>	<b>296</b>	<b>885</b>	<b>1,145</b>	<b>6,759</b>	<b>999</b>	<b>8,903</b>	<b>1,951</b>	<b>7,089</b>	<b>490</b>	<b>9,529</b>
<b>Forest Regeneration</b>															
Hand planting	457	1,791	2,900	3,069	2,083	569	1,352	2,248	9,973	1,608	13,829	1,082	12,375	1,136	14,593
Natural regeneration	-	940	-	-	-	-	-	940	-	-	940	789	30	-	819
<b>Total forest regeneration</b>	<b>457</b>	<b>2,731</b>	<b>2,900</b>	<b>3,069</b>	<b>2,083</b>	<b>569</b>	<b>1,352</b>	<b>3,188</b>	<b>9,973</b>	<b>1,608</b>	<b>14,769</b>	<b>1,871</b>	<b>12,405</b>	<b>1,136</b>	<b>15,412</b>
<b>Vegetation Management</b>															
Aerial herbicide	-	-	-	-	-	-	-	-	-	-	-	-	654	-	654
Ground herbicide	-	-	551	792	560	117	1,257	-	3,277	404	3,681	37	3,164	137	3,338
Hand cutting	-	603	1,087	2,890	798	808	1,991	603	7,574	211	8,388	101	5,763	172	6,036
Hand pulling	-	-	-	-	49	226	52	-	327	-	327	-	87	-	87

	FY 2014							FY 2014 Totals				FY 09–14 Mean Annual Acres <sup>1</sup>			
	EAST <sup>2</sup>		WEST					East	West	OESF	Total	East	West	OESF	Total
	Klickitat	Yakima	Columbia	North Puget	South Coast	South Puget	Straits								
Seeding grass <sup>5</sup>	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Total vegetation management	-	603	1,638	3,682	1,407	1,151	3,300	603	11,178	615	12,396	139	9,668	309	10,115
<b>Pre-Commercial Thinning</b>															
Total pre-commercial thinning	1,074	590	1,193	609	2,907	1,395	557	1,664	6,661	249	8,574	864	3,353	946	5,162
<b>Pest Management</b>															
Animal repellent	-	-	-	-	-	-	-	-	-	-	-	-	55	-	55
Shielding or fencing	-	-	64	-	211	-	5	-	280	225	505	-	170	38	208
Total pest management	-	-	64	-	211	-	5	-	280	225	505	-	225	38	262
<b>GRAND TOTAL</b>	<b>2,013</b>	<b>6,222</b>	<b>11,587</b>	<b>11,389</b>	<b>10,573</b>	<b>4,234</b>	<b>7,387</b>	<b>8,235</b>	<b>45,170</b>	<b>5,341</b>	<b>58,746</b>	<b>8,030</b>	<b>47,458</b>	<b>4,310</b>	<b>59,798</b>

<sup>1</sup> Completed acres from P&T as of 12/5/2014 have been used to calculate mean annual acres for the time period of 7/1/2009–6/30/2014. Therefore, the actual mean includes six years of data.

<sup>2</sup> No silviculture activities were reported “complete” for Chelan HCP Planning Unit for FY 2014.

<sup>3</sup> Salvage activities are not a stand-alone activity in DNR’s P&T database; instead, they are included in the planning and tracking activity category that best fits the silvicultural prescription for the stand being managed.

<sup>4</sup> Acreage data is inconsistent for the "pile and burn" activity. In some cases, only the footprint of the burn piles is included. In other cases, the entire unit is counted.

<sup>5</sup> Seeding grass is rarely implemented, usually for restoration of areas with large noxious weed infestations.

**Table 12: Comparison of FY 2014 Completed Mean Annual Salvage Acres for FY 2009–2014 by Timber Harvest Activity Type.**

	FY 2014 Completed Salvaged Acres				FY 2009–2014 Completed Mean Annual Salvaged Acres <sup>1</sup>			
	East	West	OESF	Total	East	West	OESF	Total
<b>Harvest Type</b>								
Clearcut	-	-	-	-	-	20	42	62
Commercial thinning	-	-	-	-	-	13	-	13
Seed tree intermediate cut	-	-	-	-	60	-	-	60
Selective product logging	-	-	-	-	-	3	-	3
Temporary retention first cut	-	-	-	-	-	-	-	-
Uneven-aged management	-	1	-	1	41	34	-	75
Variable density thinning	534	1	-	535	199	92	-	291
Variable retention harvest	-	89	-	89	282	600	32	914
<b>Total</b>	<b>534</b>	<b>91</b>	<b>-</b>	<b>625</b>	<b>581</b>	<b>763</b>	<b>75</b>	<b>1,419</b>

<sup>1</sup> Completed acres from P&T as of 12/5/2014 have been used to calculate mean annual acres for the time period of 7/1/2009–6/30/2014. Therefore, the actual mean includes six years of data.



## Forest Inventory

Since 2013, the DNR Forest Inventory Team has been developing the Remote-Sensing Forest Resource Inventory System (RS-FRIS) to replace the current inventory system. RS-FRIS combines conventional plot measurements with data from remote sensors to provide information at a higher spatial resolution and lower cost than conventional inventory. RS-FRIS combines two remote sensing technologies, LiDAR and photogrammetric detection and ranging (PHODAR), to provide a variety of three-dimensional information on stand conditions including the height of dominant trees, board-foot volume of all trees, canopy closure, and relative density (Figure 16).

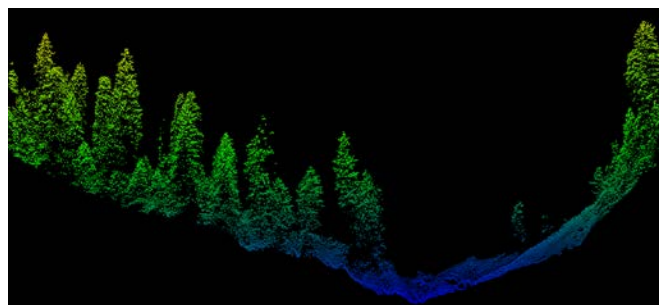


Figure 16: Stand Data from RS-FRIS Measurements. Image courtesy of Peter Gould.

In FY 2015, the DNR Forest Inventory Team will release an RS-FRIS prototype that covers 1.59 million acres of State Trust lands, including approximately 90 percent of west-side trust lands. In the coming years, the DNR Forest Inventory Team plans to inventory nearly all agency lands using RS-FRIS and hopes to expand the system's capabilities to include all forest metrics available in DNR's current FRIS.

## Non-Timber Management Activity

### Background on Non-Timber Management Activity

The processes for collecting and reporting data for non-timber forest products vary depending on the type of activity as well as the region in which the activity takes place. Therefore, the information in Table 13 represents data from different points in time from 2013 to 2014.

Table 13: Number and Acres of Non-Timber Management Activities.

	Occurrences	Acres
<b>Special Forest Products<sup>1</sup></b>		
Special forest products leases	24	64,856
Special forest products permit areas	48	606,000
Special forest products direct sales	5	19,728
<b>Total Forest Products Leases and Permits</b>	<b>77</b>	<b>690,584</b>
<b>Grazing Leases and Permits<sup>2</sup></b>		
East-side leases	57	95,951
East-side range permits	8	92,301
West-side leases <sup>3</sup>	1	50
<b>Total Grazing Leases and Permits</b>	<b>66</b>	<b>188,302</b>
<b>Total Communications Sites</b>	<b>75</b>	<b>61</b>
<b>Total Leases on Communications Sites</b>	<b>317</b>	<b>N/A<sup>4</sup></b>
<b>Total Recreation Sites<sup>5</sup></b>	<b>123</b>	<b>1,397</b>

	Occurrences	Acres
<b>Total Silvicultural Pits<sup>6</sup></b>	<b>194</b>	<b>838</b>
<b>Total Rock, Sand, and Gravel Sales</b>	<b>5</b>	<b>290</b>
<b>Total Special Use Leases</b>	<b>25</b>	<b>991</b>

<sup>1</sup> Data on special forest products comes from HCP planning units only. The large increase in special forest products permit areas since the FY 2013 report represents a correction in data collection methods rather than an actual increase in the number of areas where DNR issues permits to gather special forest products.

<sup>2</sup> Most of the east-side grazing permits and leases are on non-forested lands and are therefore not managed under the HCP. However, at this time DNR do not have the ability to distinguish forested from non-forested acres in NaturE, the database DNR uses to track revenue generated on leased lands. Therefore, this section of the table includes data on all grazing leases throughout the state.

<sup>3</sup> This lease represents an acquired parcel in which the seller was allowed to retain grazing rights. These rights will expire in FY 2015.

<sup>4</sup> Each communication site contains several leases from multiple tenants. Since each lease occupies a single position within one communication site or a position on a communications tower, individual leases are not assigned distinct acreages.

<sup>5</sup> DNR's Recreation Program houses reliable spatial data for 61 of the 123 recreation sites. Acreage for all recreation sites on HCP-covered land was calculated by adding the acreage of those 61 sites and using the mean size of those polygons as the size for each of the remaining 62 sites.

<sup>6</sup> Since the *2003 State Trust Lands HCP Annual Report*, DNR has reported the number and acreage of active, inactive, and abandoned silvicultural pits using an inventory completed in 2003. However, due to budget constraints, a comparable survey has not been conducted since then. The 2014 report includes the total number of silvicultural pits identified using FRIS data as of 12/22/2014.

## Road Management Activity

### Background on Road Management Activity

The Forest Roads Program continues to improve forest-road infrastructure around the state. Due to the complexities of collecting data and reporting road-related activities during the height of the construction season, road management activities are reported by calendar year instead of fiscal year. The data presented here represents all relevant data available for calendar year 2013.

On March 29, 2013, United States District Judge Ricardo S. Martinez issued a [permanent injunction](#) that applies to barrier and passable culverts on salmon and steelhead streams within the Puget Sound and Olympic Peninsula Drainage Areas of Western Washington (Water Resource Inventory Units 1–23). All of these culverts are covered under forest practices obligations with the exception of four salmon barriers on orphan roads that were specifically added to comply with the injunction. Among other requirements, the injunction directs the state to achieve fish passage by “(a) avoiding the necessity for the roadway to cross the stream, (b) use of a full-span bridge, (c) use of the ‘stream simulation’ methodology;” reevaluating culverts and identifying those that become barriers; and repairing new barriers within a reasonable amount of time. The injunction also requires natural resource agencies including DNR to remediate the barrier culverts by October 31, 2016.

During the 2013 legislative session, DNR received a reappropriation of \$2.7 million of the original \$5.7 million from the 2012 Jobs Now Act. In 2013, DNR used these funds to continue correcting fish-passage barriers (Figure 17) and upgrading roads to Forest Practices Standards through Road Maintenance and Abandonment Plans (RMAPs). The Forest Roads Program continued to accomplish this work through calendar year 2014, when the program expected to spend the remaining funds.

Through land transactions and inventory activities, DNR acquired 74 new fish-passage barriers that must be addressed. With the addition of these culverts and the growing complexity and cost of the remaining fish-barrier projects, the Forest Roads Program plans to apply to Forest Practices for extensions to RMAP work in some Road Management Blocks. However, the majority of the RMAP work throughout the state remains on track to meet DNR's original October 2016 commitment.

Of the 122 total barriers removed from the fish-barrier work list, 101 were physically removed or replaced, opening up an estimated 51 miles of fish habitat on DNR-managed lands in calendar year 2013. The remaining 21 fish-passage barriers were removed from the work list for the following reasons:

- The stream designation was downgraded from “fish” to “non-fish” following protocol survey requirements.
- The fish-passage barrier was on a road that was not on state trust lands or not managed under Forest Practices Standards (for instance, a county road, a highway, or a road through agricultural or commercial properties).
- Removing the barrier would result in very limited habitat gain (usually less than 200 meters). These barriers were reprioritized for replacement at the end of the culvert's useful life with consensus from Washington Department of Fish and Wildlife (WDFW) and Forest Practices.

Remediation of the 122 fish barriers represents an investment of \$3.3 million.

On lands managed under the State Lands HCP, 134.02 miles of road were abandoned or decommissioned. DNR showed a net loss of total road miles on HCP-covered lands—from 10,141 to 10,074—due to road management activities in 2013. Table 14 summarizes DNR's road management activity on both HCP- and non-HCP-covered lands.



**Figure 17: Tributary to Christmas Creek in the OESF.** This project replaced an existing 72" corrugated metal culvert with a 60' bridge, opening approximately 1.5 miles of previously obstructed Coho, steelhead, and cutthroat habitat. Photos courtesy of Candace Montoya.

Table 14: Road Management Activities Summary for Calendar Year 2013, including HCP- and Non-HCP-Covered Lands.

	Chelan	Columbia	Klickitat	North Puget	OESF	South Coast	South Puget	Straits	Yakima	Non-HCP Lands	Total
<b>Miles of New Road Constructed</b>	-	23.86	0.04	32.35	7.43	20.26	11.45	4.19	5.30	13.59	<b>118.47</b>
<b>Miles of Road Reconstructed</b>	-	13.35	0.36	102.60	1.46	6.87	1.83	0.88	3.02	29.04	<b>159.40</b>
<b>Miles of Decommissioned Forest Road</b>	-	-	0.75	-	7.46	2.61	0.45	1.27	9.40	0.15	<b>22.09</b>
<b>Miles of Forest Road Abandoned</b>	-	23.60	2.70	53.65	-	7.94	2.56	1.56	20.06	1.20	<b>113.28</b>
<b>Miles of Inventoried Road</b>	31.87	1350	608.43	1477.22	1791	1533	1066.17	774.26	1441.94	3020.71	<b>13,094.59</b>
<b>Fish-Barrier Removal Projects</b>	-	19	3	25	27	15	15	4	5	9	<b>122</b>

## Easements

### Background on Easements

#### *Road Easement GIS*

Easements are granted to DNR by private individuals, entities, or other agencies. They provide access to DNR-managed lands across private or other public lands. In other cases, DNR may acquire easements as part of land transactions.

DNR is digitally mapping all existing and new easements in the Road Easement GIS (REGIS). This system now includes information about easements that enables DNR to access its land via other landowners' land in each region throughout the state. As of the end of calendar year 2014, easements granted over DNR-managed trust lands have been completed for the Northwest and South Puget Sound regions. Olympic Region mapping is in progress with estimated completion in 2015. Mapping of existing easements on state lands for all regions is expected to be completed in 2019.

#### *Road Easements, Road Use Permits, and Utility Easements*

Road easements, road use permits, and utility easements on state trust lands managed under the HCP are detailed in Table 15 and Table 16.

Table 15 reports the total number of acres of new easements and road use permits that created a new "footprint" (timber was cut to create a corridor or area). Table 16 reports the acres and mileage of utility easements granted during the reporting period that created no new footprint (within existing easement areas). In this reporting period, no new footprint was created for utility easements.

Table 15: Road Easements and Road Use Permits (New Footprint).

	HCP Planning Unit					Total
	OESF	Columbia	Klickitat	South Puget	North Puget	
<b>Miles of Road Constructed</b>	0.33	0.32	0.08	0.38	1.87	<b>2.98</b>
<b>Acres Impacted</b>	2.05	2.05	2	0.05	18.96	<b>25.11</b>

Table 16: Utility Easements (No New Footprint).

	OESF HCP Planning Unit	South Puget HCP Planning Unit	Total
<b>Miles Constructed</b>	3.39	0.47	<b>3.86</b>
<b>Acres Impacted</b>	3.66	1.25	<b>4.91</b>

## Land Transaction Activity

### Background on Land Transactions

A review of the Land Transaction Program’s activities since the establishment of the HCP can be found in the [comprehensive review section](#) of this report. Below is a summary by HCP planning unit of land acquisitions, dispositions, and transfers concluded during FY 2014.

#### *Chelan*

There was no activity in this reporting period.

#### *Columbia*

**Acquired:** DNR added 12 acres to the Lacamas Prairie Natural Area Preserve in Clark County.

DNR acquired 834 acres of forest land in Wahkiakum County for the Common School Trust (Figure 18). All parcels were designated as HCP permit land with “no role for northern spotted owl habitat” under the HCP.



Figure 18: A Newly Acquired Parcel of Forested State Trust Land in Wahkiakum County, South Coast Planning Unit. Photographer unknown.

**Disposed:** None

**Trust Land Transfer/State Forest Transfer:** None

#### *Klickitat*

**Acquired:** DNR added 20 acres to the Trout Lake Natural Area Preserve in Klickitat County. The parcel has been designated “no role for northern spotted owl habitat” under the HCP.

**Disposed:** None

**Trust Land Transfer/State Forest Transfer:** None

#### *North Puget*

**Acquired:** DNR purchased 596 forested acres in King and Snohomish counties for the Common School Trust. About four acres were acquired for the Cypress Island NRCA. All the North Puget acquisitions were designated as HCP permit lands with “no role for northern spotted owl” under the HCP.

**Disposed:** DNR conveyed 8,844 acres to Whatcom County in the area around Lake Whatcom, which the county will manage for recreation. The county agreed to retain the entire property as HCP permit lands, so this property is not reported as “disposed” in Table 17.

**Trust Land Transfer/State Forest Transfer:** None

### *Olympic Experimental State Forest*

**Acquired:** DNR acquired 1,493 acres in the OESF through the Foothills Land Exchange that benefitted both the Common School and State Forest Transfer trusts. The exchange consolidated DNR ownership in several blocks.

**Disposed:** DNR disposed of 2,972 acres of Common School and State Forest Transfer trust land in the OESF through the Foothills Land Exchange. The properties were isolated from other DNR ownership.

**Trust Land Transfer/State Forest Transfer:** None

### *South Coast*

**Acquired:** DNR added six acres to the Chehalis River Surge Plain NAP and added 46 acres to Niawiakum NAP. The Common School Trust acquired 453 acres of forestland, primarily inholdings in DNR blocks. All acres have been designated “no role for northern spotted owl habitat” under the HCP.

**Disposed:** DNR traded 2,061 acres of scattered sections in Grays Harbor County as part of the Foothills Land Exchange. All parcels were designated “no role for northern spotted owl” under the HCP.

**Trust Land Transfer/State Forest Transfer:** In Pacific County, a 28-acre parcel of marbled murrelet habitat on State Forest Transfer Trust lands was designated the Naselle Highlands NRCA. The property will remain part of the HCP permit lands.

### *South Puget*

**Acquired:** DNR acquired a 20-acre inholding in the Green Mountain State Forest for the Common School Trust. Two conservation transactions acquired five acres for Stavis NRCA in Kitsap County and five acres for Woodard Bay NRCA in Thurston County. All acres have been designated “no role for northern spotted owl habitat” under the HCP.

**Disposed:** DNR sold one 40-acre parcel on Vashon Island to King County for use as a park. The property had been designated “no role for northern spotted owl habitat” under the HCP.

**Trust Land Transfer/State Forest Transfer:** One Common School Trust property (163 acres) was transferred to the Mount Si NRCA and will retain its designation as “no role for northern spotted owl.”

### *Straits*

**Acquired:** DNR acquired a total of 8,329 forestland acres for the Common School and State Forest Transfer trusts through the Foothills Land Exchange and several purchases. The Dabob Bay NRCA acquired 91 acres. All acres were designated “no role for northern spotted owl habitat” under the HCP.

**Disposed:** One 41-acre parcel of State Forest Transfer land was traded in the Foothills Land Exchange. The property had been designated “no role for northern spotted owl habitat” under the HCP.

**Trust Land Transfer/State Forest Transfer:** None

## Yakima

There was no activity in this reporting period.

Table 17 provides a broad summary of transaction activities for the reporting period. Acreages of all categories are estimated but have not yet been field verified.

Table 17: HCP-Covered Land Transactions for FY 2014.

		HCP Planning Unit <sup>1</sup>									
		Chelan	Columbia	Klickitat	North Puget	OESF	South Coast	South Puget	Straits	Yakima	Totals
<b>Acquired Lands</b>											
<b>Stream miles by stream type<sup>2</sup></b>	Type 1	-	-	-	-	1.88	0.2	-	-	-	<b>2.08</b>
	Type 2	-	-	-	-	1.84	-	-	1.65	-	<b>3.49</b>
	Type 3	-	0.01	-	0.66	5.86	0.18	-	11.82	-	<b>18.53</b>
	Type 4	-	1.39	-	0.23	2.78	0.91	.03	8.89	-	<b>14.23</b>
	Type 5	-	3.61	-	2.09	14.79	1.58	.03	36.16	-	<b>58.26</b>
	Type 9	-	6.8	-	1.05	0.03	.52	-	1.00	-	<b>9.4</b>
<b>Total stream miles acquired</b>		-	<b>11.82</b>	-	<b>4.03</b>	<b>27.18</b>	<b>3.39</b>	<b>.06</b>	<b>59.52</b>	-	<b>106.00</b>
<b>Total acres acquired in rain-on-snow zones<sup>3</sup></b>		-	<b>171.28</b>	<b>20.41</b>	<b>226.27</b>	-	-	-	<b>1025.07</b>	-	<b>1443.03</b>
<b>Acres per age class<sup>4</sup></b>	Open (0–10 years)	-	115	-	-	723.13	-	0.3	1603.84	-	<b>2442.27</b>
	Regeneration (11–20 years)	-	469.8	-	127.19	421.65	57	-	3382.07	-	<b>4457.71</b>
	Pole (21–40 years)	-	56.04	-	13.6	84.66	356.03	27.1	2882.19	-	<b>3419.62</b>
	Closed (41–70 years)	-	205	-	363.7	259.42	35.78	-	285.99	-	<b>1149.89</b>
	Complex (71–100 years)	-	-	-	-	3.98	-	-	55.76	-	<b>59.74</b>
	Complex (101–150 years)	-	-	-	-	-	-	-	134.25	-	<b>134.25</b>
	Functional (150+ years)	-	-	-	-	-	-	-	-	-	<b>-</b>
	Non-forested	-	-	20.41	94.88	-	56.5	2.26	76.49	-	<b>250.54</b>
<b>Total acres acquired</b>		-	<b>845.84</b>	<b>20.41</b>	<b>599.37</b>	<b>1492.84</b>	<b>505.31</b>	<b>29.66</b>	<b>8420.59</b>	-	<b>11914.02</b>
<b>Disposed Lands</b>											
<b>Stream miles by stream type<sup>2</sup></b>	Type 1	-	-	-	-	2.06	1.99	-	-	-	<b>4.05</b>
	Type 2	-	-	-	-	-	1.82	-	-	-	<b>1.82</b>
	Type 3	-	-	-	-	5.53	2.99	-	0.04	-	<b>8.56</b>
	Type 4	-	-	-	-	3.53	3.6	-	-	-	<b>7.13</b>
	Type 5	-	-	-	-	10.96	10.16	-	-	-	<b>21.12</b>
	Type 9	-	-	-	-	1.52	0.49	0.53	-	-	<b>2.54</b>
	Total stream miles disposed	-	-	-	-	23.60	21.05	0.53	0.04	-	<b>45.22</b>
<b>Total acres disposed in rain-on-snow zones<sup>3</sup></b>		-	-	-	-	-	-	-	-	-	<b>-</b>
Open (0–10 years)		-	-	-	-	503.79	454.78	-	-	-	<b>958.57</b>

		HCP Planning Unit <sup>1</sup>									
		Chelan	Columbia	Klickitat	North Puget	OESF	South Coast	South Puget	Straits	Yakima	Totals
<b>Acres per age class<sup>4</sup></b>	Regeneration (11–20 years)	-	-	-	-	-	255.56	-	-	-	<b>255.56</b>
	Pole (21–40 years)	-	-	-	-	1677.89	607.26	40	40.61	-	<b>2365.76</b>
	Closed (41–70 years)	-	-	-	-	790	712.1	-	-	-	<b>1502.1</b>
	Complex (71–100 years)	-	-	-	-	-	23.71	-	-	-	<b>23.71</b>
	Complex (101–150 years)	-	-	-	-	-	-	-	-	-	-
	Functional (150+ years)	-	-	-	-	-	-	-	-	-	-
	Non-forested	-	-	-	-	-	7.38	-	-	-	<b>7.38</b>
<b>Total acres disposed in all age classes</b>		-	-	-	-	<b>2971.68</b>	<b>2060.79</b>	<b>40</b>	<b>40.61</b>	-	<b>5113.08</b>

<sup>1</sup> This data is intended to provide a broad picture of transaction activities for the reporting period. Acreages of all categories are estimated and have not yet been field verified. This information is provided to the Services through the HCP annual reports to provide a general understanding of what stand types and habitat conditions are being transacted.

<sup>2</sup> Stream-type data is derived from the Forest Practices Hydro Layer at the time of land acquisition to maintain consistency throughout the HCP annual reports (it has been used in State Trust Lands HCP annual reports since the first report was published in 1999). At the time of the land transaction, the Land Transactions Program evaluates stream typing using an old forest practices water-typing system (which included water types 1–5 and 9) embedded within the DNR GIS hydrology layer. It may be decades before the streams are field verified and upgraded to the more accurate HCP water-typing system.

<sup>3</sup> Rain-on-Snow (ROS) data is derived from DNR’s corporate ROS GIS layer.

<sup>4</sup> Age-class data on acquired lands is obtained from deeds and other information relative to the holdings on the land. The Land Transactions Section categorizes the age class based on the best information available at the time of acquisition. In some cases, age-class data on disposed lands is determined by DNR’s Forest Resources Inventory System (FRIS). In other cases it is based on the appraiser’s determination.

## Natural Areas Program

### Background on the Natural Areas Program

A review of the Natural Areas Program’s activities since the establishment of the HCP can be found in the [comprehensive review section](#) of this report. Below is a summary of Natural Areas Program activities during FY 2014.

In FY 2014, the Natural Areas Program protected an additional 264 acres in Natural Area Preserves (NAPs) and Natural Resources Conservation Areas (NRCAs), all of which fall within the area covered by the HCP. These protection efforts include one newly established natural area and additions to nine existing natural areas. The most significant of these were:



- Admiralty Inlet NAP:** A conservation easement was purchased through the USFWS Cooperative Endangered Species Conservation Fund on 46.5 acres at Admiralty Inlet NAP, adding to an existing 33-acre conservation easement already held there. The newly added lands include areas of old and structurally complex forest as well as additional prairie habitat that supports golden paintbrush which is federally listed as threatened (Figure 19). DNR and the landowner, Whidbey Camano Land Trust, are partners in managing this site.



Figure 19: Old-Growth Forest at Admiralty Inlet NAP. Photo courtesy of Whidbey Camano Land Trust.

- Niawiakum River NAP:** DNR added 46 acres to the Niawiakum River NAP, including salt marsh, riparian habitats, and upland forest adjacent to the salt marsh. This site now protects nearly 2,000 acres of high-quality salt marsh and adjacent forests that support marbled murrelets.
- Trout Lake NAP:** DNR purchased 20.4 acres of open meadow and seasonal wetland habitat at Trout Lake NAP, bringing the total acreage of this site to 2,014 (Figure 20). This NAP supports one of the largest populations of the Oregon spotted frog, which is federally listed as threatened.
- Naselle Highlands NRCA:** One new natural area, Naselle Highlands NRCA, was established for protection of older forest habitat to help support marbled murrelets.



Figure 20: West Meadow at Trout Lake NAP. Photo courtesy of Dave Anderson.

Table 18 lists the natural areas that are located in areas managed under the HCP.

Table 18: Acres of Natural Areas Managed under the HCP.

Natural Area	NAP or NRCA	County	Acres Added in FY 2014 <sup>1</sup>	Total Current Acres <sup>1</sup>
Admiralty Inlet	NAP	Island	46.5	79.5
Ashford	NRCA	Pierce	-	78.4
Bald Hill	NAP	Thurston	-	313.7
Bone River	NAP	Pacific	-	2,565
Camas Meadows	NAP	Chelan	-	1,987.2

Natural Area	NAP or NRCA	County	Acres Added in FY 2014 <sup>1</sup>	Total Current Acres <sup>1</sup>
Carlisle Bog	NAP	Grays Harbor	-	310
Cattle Point	NRCA	San Juan	-	112.1
Charley Creek	NAP	King	-	1,966
Chehalis River Surge Plain	NAP	Grays Harbor	5.9	3,024.4
Clearwater Bogs	NAP	Jefferson	-	504.1
Clearwater Corridor	NRCA	Jefferson	-	2,323
Columbia Falls	NAP	Skamania	-	1,193.9
Cypress Highlands	NAP	Skagit	3.6	1,075.9
Cypress Island	NRCA	Skagit	-	4,088.5
Dabob Bay	NAP/NRCA	Jefferson	91.4	2,363.5
Dailey Prairie	NAP	Whatcom	-	228.8
Devils Lake	NRCA	Jefferson	-	80
Elk River	NRCA	Grays Harbor	-	5,412.8
Ellsworth Creek	NRCA	Pacific	-	557
Goose Island	NAP	Grays Harbor	-	12
Granite Lakes	NRCA	Skagit	-	603.2
Gunpowder Island	NAP	Pacific	-	152
Hamma Hamma Balds	NAP	Mason	-	957
Hat Island	NRCA	Skagit	-	91.2
Hendrickson Canyon	NRCA	Wahkiakum	-	159
Ink Blot	NAP	Mason	-	183.6
Kennedy Creek	NAP	Mason	-	202.6
Kings Lake Bog	NAP	King	-	309.2
Kitsap Forest	NAP	Kitsap	-	571.9
Klickitat Canyon	NRCA	Yakima	-	1,515.8
Lacamas Prairie	NAP/NRCA	Clallam	12	201.1
Lake Louise	NRCA	Whatcom	-	137.7
Lummi Island	NRCA	Whatcom	-	671.5
Merrill Lake	NRCA	Cowlitz	-	114.2
Middle Fork Snoqualmie	NRCA	King	-	9,000
Mima Mounds	NAP	Thurston	-	640.5
Monte Cristo	NAP	Klickitat	-	1151
Morning Star	NRCA	Snohomish	-	33,592
Mount Si	NRCA	King	-	12,532.7
Naselle Highlands	NRCA	Pacific	27.9	27.9
Niawiakum River	NAP	Pacific	46	1,097.8

Natural Area	NAP or NRCA	County	Acres Added in FY 2014 <sup>1</sup>	Total Current Acres <sup>1</sup>
North Bay	NAP	Grays Harbor	-	1,214.9
Oak Patch	NAP	Mason	-	17.3
Olivine Bridge	NAP	Skagit	-	148
Point Doughty	NAP	San Juan	-	56.5
Rattlesnake Ridge	NRCA	King	-	1,771.4
Rocky Prairie	NAP	Thurston	-	35
Sand Island	NAP	Grays Harbor	-	8
Shipwreck Point	NRCA	Clallam	-	471.8
Shumocher Creek	NAP	Mason	-	493.7
Skagit Bald Eagle	NAP	Skagit	-	1,546
Skamokawa Creek	NRCA	Wahkiakum	-	67
Skookum Inlet	NAP	Mason	-	142.6
Snoqualmie Bog	NAP	King	-	110.5
South Nemah	NRCA	Pacific	-	2,439.5
South Nolan	NRCA	Jefferson	-	213
Stavis	NRCA	Kitsap	5.2	2,293.7
Stevenson Ridge	NRCA	Skamania	-	85.4
Table Mountain	NRCA	Skamania	-	2,836.5
Tahoma	NRCA	Lewis	-	230
Teal Slough	NRCA	Pacific	-	8.4
Trout Lake	NAP	Klickitat	20.4	2,014
Washougal Oaks	NAP/NRCA	Clark	-	264.2
West Tiger Mountain	NRCA	King	-	3,907.9
Whitcomb Flats	NAP	Grays Harbor	-	5
White Salmon Oak	NRCA	Klickitat	-	551.2
Willapa Divide	NAP	Pacific	-	587
Woodard Bay	NRCA	Thurston	5.1	867.8
<b>Total Acres</b>			<b>264</b>	<b>114,574</b>

<sup>1</sup> Acreage data in this table comes from the TransactionsAll and HCP2 databases maintained by the Land Transactions Program. This data is consistent with the Natural Areas Program's annual reporting data. It represents "legal acres" determined through surveys at the time of transaction. This acreage data may not necessarily match the "GIS acres" of transacted land as calculated by DNR's GIS system.

Table 19 lists the threatened and endangered species found in natural areas located in areas managed under the HCP.

**Table 19: Threatened and Endangered Species Found in NAPs and NRCAs Managed under the HCP.**

Species	Federal Status	Natural Area
<b>Northern spotted owl</b>	Threatened	Camas Meadows NAP, Granite Lakes NRCA, Skagit Bald Eagle NAP, Morning Star NRCA, South Nemah NRCA, Stevenson Ridge NRCA, Table Mountain NRCA, Teal Slough NRCA, Trout Lake NAP
<b>Marbled murrelet</b>	Threatened	Ashford NRCA, Bone River NAP, Clearwater Bogs NAP, Clearwater Corridor NRCA, Elk River NRCA, Morning Star NRCA, Naselle Highlands NRCA, Niawiakum River NAP, Skamokawa Creek NRCA, South Nemah NRCA, South Nolan NRCA, Teal Slough NRCA, Willapa Divide NAP
<b>Bull trout</b>	Threatened	Chehalis River Surge Plain NAP, Carlisle Bog NAP, Olivine Bridge NAP, Skagit Bald Eagle NAP, Morning Star NRCA
<b>Chinook salmon – Puget Sound</b>	Threatened	Kitsap Forest NAP, Mount Si NRCA, West Tiger Mountain NRCA, Olivine Bridge NAP, Skagit Bald Eagle NAP
<b>Chinook salmon – Lower Columbia</b>	Threatened	Klickitat Canyon NRCA
<b>Steelhead – Lower Columbia</b>	Threatened	Klickitat Canyon NRCA, Table Mountain NRCA, Washougal Oaks NAP/NRCA
<b>Coho salmon – Lower Columbia/SW Washington</b>	Threatened	Washougal Oaks NAP/NRCA
<b>Oregon spotted frog</b>	Threatened	Trout Lake NAP
<b>Mazama pocket gopher</b>	Threatened	Rocky Prairie NAP
<b>Bradshaw’s lomatium</b>	Endangered	Lacamas Prairie NAP/NRCA
<b>Golden paintbrush</b>	Threatened	Rocky Prairie NAP, Admiralty Inlet NAP
<b>Wenatchee Mountains checker-mallow</b>	Endangered	Camas Meadows NAP

Table 20 lists other species of concern in natural areas managed under the HCP.

**Table 20: Other Species of Concern Found in Natural Areas Managed under the HCP.**

Species	Natural Area <sup>1</sup>
<b>Federal Species of Concern</b>	
<b>Beller’s ground beetle</b>	Snoqualmie Bog NAP, Kings Lake Bog NAP
<b>California bighorn sheep</b>	Morning Star NRCA
<b>Cascades frog</b>	Mount. Pilchuck NRCA
<b>Columbia torrent salamander</b>	Ellsworth Creek NRCA
<b>Fringed myotis</b>	Camas Meadows NAP
<b>Gorge daisy</b>	Columbia Falls NAP

Species	Natural Area <sup>1</sup>
Harlequin duck	Morning Star NRCA
Hatch's click beetle	Kings Lake Bog NAP
Howell's daisy	Columbia Falls NAP, Table Mountain NRCA
Larch mountain salamander	Table Mountain NRCA, Columbia Falls NAP
Makah copper butterfly	North Bay NAP, Carlisle Bog NAP, Clearwater Bogs NAP
Northern goshawk	Clearwater Corridor NRCA, Morning Star NRCA
Northern red-legged frog	Carlisle Bog NAP, North Bay NAP, Table Mountain NRCA, Morning Star NRCA, Ellsworth Creek NRCA, Kings Lake Bog NAP
Olive-sided flycatcher	Numerous sites
Oregon sullivantia	Columbia Falls NAP
Pale blue-eyed grass	Trout Lake NAP
Peregrine falcon	Table Mountain NRCA, Cypress Island NAP, Mount Si NRCA, Elk River NRCA, Hat Island NRCA, Lummi Island NRCA, North Bay NAP
Slender-billed white-breasted nuthatch	Washougal Oaks NAP/NRCA, Lacamas Prairie NAP/NRCA
Suksdorf's desert-parsley	White Salmon Oak NRCA
Tailed frog	Table Mountain NRCA, Morning Star NRCA
Tall bugbane	Washougal Oaks NAP, Columbia Falls NAP
Valley silverspot	Mima Mounds NAP
Van Dyke's salamander	South Nemah NRCA, Ellsworth Creek NRCA
Wenatchee larkspur	Camas Meadows NAP
White-top aster	Rocky Prairie NAP, Mima Mounds NAP
Yuma myotis	Woodard Bay NRCA
<b>State Listed – No Federal Status</b>	
Sandhill crane	Trout Lake NAP, Klickitat Canyon NRCA
<b>State Candidate – No Federal Status</b>	
Dunn's salamander	Teal Slough NRCA, South Nemah NRCA
Pileated woodpecker	Table Mountain NRCA, Morning Star NRCA, Kitsap Forest NAP, and others
Puget blue	Rocky Prairie NAP
Purple martin	Woodard Bay NRCA, Kennedy Creek NAP
Vaux's swift	Numerous sites
<b>State Sensitive or State Monitor Species</b>	
Olympic mudminnow	Carlisle Bog NAP, Chehalis River Surge Plain NAP, West Tiger Mountain NRCA
Western bluebird	Rocky Prairie NAP, Mima Mounds NAP

<sup>1</sup> Location information was determined by consulting the Washington Natural Heritage database and the following WDFW databases: Animal Occurrences, northern spotted owl site centers, Priority Habitat, and Streamnet.

Table 21 lists NAPs and NRCAs managed under the HCP that contain significant mature forests, late-seral forests, or combinations of mature and late-seral forests.

**Table 21: Natural Areas Located in Areas Managed under the HCP that Include Mature Forests, Late-Seral Forests, or a Combination of Mature and Late-Seral Forests.**

Natural Areas	Natural Area Size (in Acres) <sup>1</sup>
<b>Coastal</b>	
Clearwater Corridor NRCA	2,323
Ellsworth Creek NRCA	557
Hendrickson Canyon NAP	159
Kitsap Forest NAP	572
Naselle Highlands NRCA	28
Skamokawa Creek NRCA	67
South Nemah NRCA	2,440
South Nolan NRCA	213
Stavis NRCA	2,294
Willapa Divide NAP	587
<b>Western Cascades</b>	
Ashford NRCA	78
Charley Creek NAP	1,966
Columbia Falls NAP	1,194
Granite Lakes NRCA	603
Middle Fork Snoqualmie NRCA	9,001
Morning Star NRCA	33,592
Mount Si NRCA	12,533
Rattlesnake Mountain Scenic Area	1,771
Skagit Bald Eagle NAP	1,546
Stevenson Ridge NRCA	85
Table Mountain NRCA	2,837
Tahoma NRCA	230
West Tiger Mountain NRCA	3,908
<b>Eastern Cascades</b>	
Klickitat Canyon NRCA	1,516
Monte Cristo NAP	1,151
<b>Total</b>	<b>81,251</b>

<sup>1</sup> Acreage data in this column represents the total size of the natural area, not the acreage of late-seral and mature forests.

## Recreation Program

### Background on the Recreation Program

DNR's Recreation Program completed new projects and continued to improve existing facilities for public use. All projects were designed, constructed, maintained, and managed consistent with the commitments of the HCP. Some highlights from this past year's work are summarized below.

#### *Development Projects*

##### Northwest Region

**Reiter Foothills Forest, Snohomish County:** DNR completed a trials bike area, 0.69 miles of motorcycle trail, one mile of ATV trail, 1.25 miles of non-motorized trail, and one mile of four-wheel-drive challenge trail and began work on two non-motorized trail bridges (Figure 21). All trails are surfaced and aligned to prevent erosion and control surface-water runoff.



Figure 21: Non-Motorized Trail Bridge over the Wallace River in Reiter Foothills Forest. Photo courtesy of Jim Patton.

**Walker Valley, Skagit County:** DNR removed approximately one mile of unauthorized trail, hardened a quarter mile of trail to improve sustainability, blocked access at four gates to prevent oversized vehicles and protect the landscape from resource damage, and installed a water quality project near the skills area.

**Blanchard Forest, Skagit County:** DNR rerouted 1,000 feet of the Lily/Lizard Connector Trail and refurbished backcountry campsites at Lizard Lake.

**Harry Osborne Forest, Skagit County:** DNR rebuilt 2,000 feet of the Mac Johnson Trail and rerouted 1,500 of the Lower Josephine Trail. Grade and drainage was improved in the vicinity of three creek crossings.

##### South Puget Sound Region

**Middle Fork Snoqualmie NRCA, King County:** This project represents a collaboration between DNR's Recreation and Natural Areas programs. At Mailbox Peak, DNR's Recreation Program completed 4.7 miles of new hiking trails and constructed a new 50-car trailhead. At the Granite Creek Trail, five miles of new road-to-hiking trail conversion were completed, including an 80-foot trail bridge.

**Tiger Mountain State Forest, King County:** DNR completed six miles of new mountain bike trails, including a 70-foot bridge and an 80-foot bridge. On the Preston Railroad Grade Trail, the Recreation Program reconstructed one mile of trail and replaced a 35-foot bridge.

**Tahuya State Forest, Mason County:** DNR's Recreation Program installed three trail bridges, removed two derelict bridges, and removed one fish barrier.

**Elbe Hills State Forest, Pierce County:** The Recreation Program installed a new kiosk and Americans with Disabilities Act (ADA)-compliant ramp at the ORV trailhead and completed one mile of a rerouted non-motorized trail within the Nicolson Horse Trail System.

**Tahoma State Forest, Lewis County:** DNR installed a new vault toilet at High Hut.

**Woodard Bay NRCA, Thurston County:** The Natural Areas Program renovated and restored the existing site and added new parking, interpretive areas, and shelters (Figure 22).

### Southeast Region

**Ahtanum State Forest, Yakima County:** DNR completed a new picnic shelter at Whites Ridge Trailhead, built 7.5 miles of Whites Ridge non-motorized trail, and improved the trailhead and an Americans with Disabilities Act (ADA)-compliant access points at Gray Rock. DNR also improved the campgrounds and ADA access at Ahtanum Meadows; installed signage, barrier rock, and fencing there; and rehabilitated three dispersed recreation sites on the South Fork Ahtanum River.



**Figure 22: One of Several New Interpretive Elements at Woodard Bay NRCA.** Photo courtesy of Curt Pavola.

### Pacific Cascade Region

**Yacolt Burn State Forest, Clark County:** DNR completed 1.5 miles of four-wheel-drive/ATV/single-track trail and 0.8 miles of ATV/single-track trail. Work continues on an additional 1.4 miles of four-wheel-drive/ATV/single-track trail and 1.1 miles of single-track trail. The Recreation Program also began construction of two non-motorized trailheads.

**Merrill Lake NRCA Cowlitz County:** DNR completed a one-mile loop trail through late seral forest. Work continues on interpretive signs that discuss the various aspects of the natural features including lake ecology, late seral forest, riparian forest, amphibians, and birds. This site is managed and administered by DNR's Natural Areas Program.

### Olympic Region

**Upper Clearwater Campground, Jefferson County:** DNR completed installation of new vault toilet.

**Willoughby Creek Campground, Jefferson County:** DNR completed installation of new vault toilet.

### Planning and Design

The South Puget Sound (SPS) Region completed planning and public outreach and began the SEPA process for the Snoqualmie Recreation Plan in eastern King County. The region began a design to relocate campsites at Anderson Lake in the Tahoma State Forest in Lewis County. The Anderson Lake project moves campsites away from environmentally sensitive lakeside locations and provides for new accessible parking, trail, camping, and fishing access. SPS also began designing a non-motorized trailhead on the Raging River State Forest in King County and completed design of an ORV campground and trailhead in Elbe Hills State Forest in Pierce County. SPS continued inventory and analysis for the Mason and Kitsap Strategic Water Access project—an evaluation of possible water



access improvements at sites in the Hood Canal, West Tahuya, Tahuya, and Green Mountain State Forests.

The Southeast Region completed planning and public outreach for the Naneum Ridge State Forest Recreation Plan in Kittitas and Chelan counties and began SEPA permitting for the plan.

In the Pacific Cascade Region, DNR continues to explore, through planning and public involvement efforts, future management options for Tunerville Campground in the Salmon Creek block. The region also began designing 17 miles of non-motorized trails in the Yacolt Burn State Forest, consistent with the Western Yacolt Burn Forest Recreation Plan and the HCP.

The Northwest Region also designed several miles of motorcycle, ATV, four-wheel-drive challenge, and non-motorized trails in Reiter Foothills Forest. Additionally, in conjunction with the Natural Areas Program, the Northwest Region began recreation-focused inventory and information gathering for the Morning Star NRCA (Figure 23). The project began this year with a comprehensive GPS and photo inventory of existing recreational facilities, campgrounds, and trails within the NRCA. DNR is currently gathering field information in GIS and assembling existing environmental conditions GIS data for overlay mapping. This project will present basic background information for future recreation planning at Morning Star NRCA.

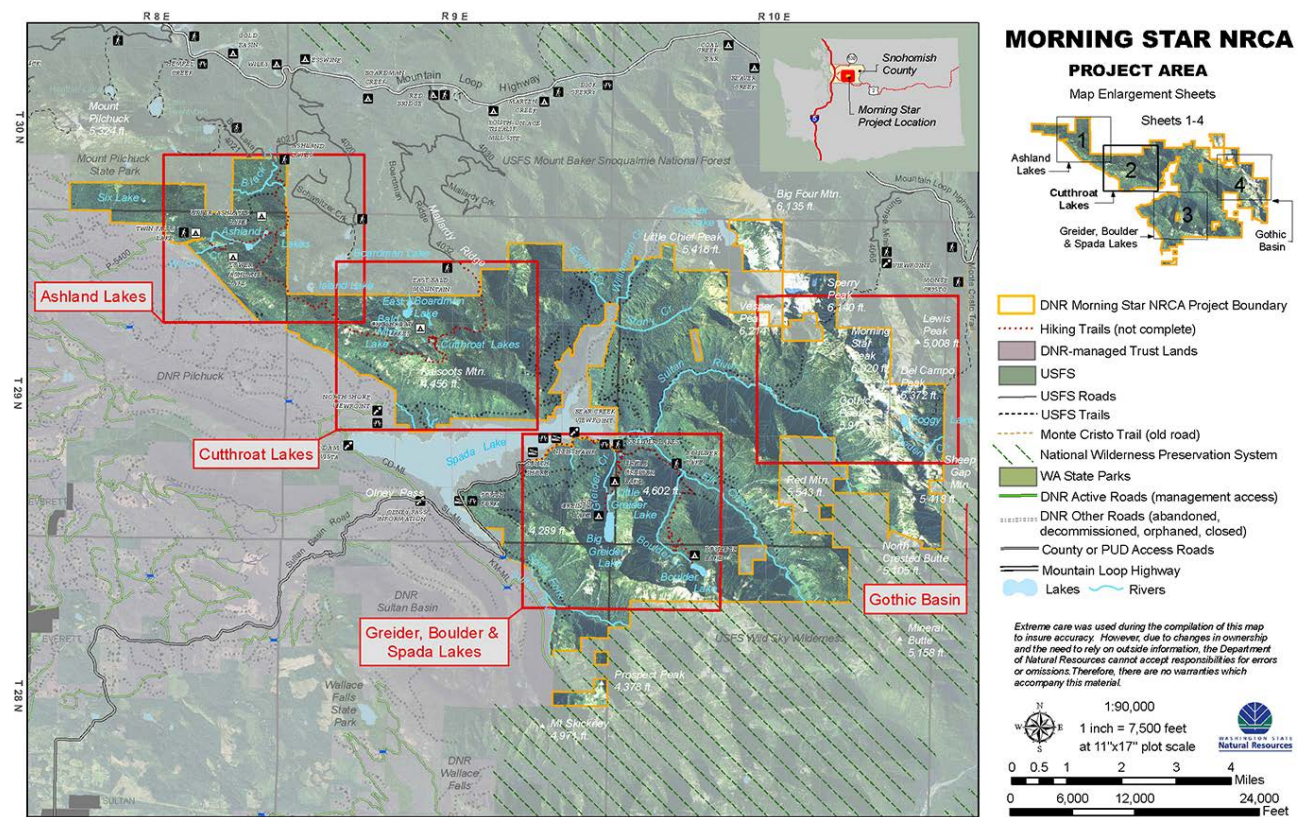


Figure 23: A Recreation-Focused Photo Inventory of the Morning Star NRCA in the Northwest Region. Image courtesy of Jason Goldstein.

## Forest Certification

### [Background on Forest Certification](#)

Forest certification is not a requirement of the HCP but is complementary to its intent. Forest certification provides value through annual audits conducted by independent, third-party auditors. These audits help DNR meet HCP obligations and the commitments outlined within forest certification standards. Forest certification updates are included in HCP annual reports to provide the Services with the auditor's annual findings.

### **Forest Stewardship Council®**

The FY 2014 Forest Stewardship Council (FSC®) surveillance audit was conducted by an independent, third-party auditing firm in the South Puget HCP Planning Unit in October 2013. The audit focused on:

- Compliance with laws and FSC principles
- Tenure and use rights and responsibilities
- Indigenous peoples' rights
- Community relations and workers' rights
- Benefits from the forests (economic viability, marketing, minimization of waste, diversification, and sustainable harvest)
- Environmental impacts
- Management planning
- Monitoring
- Maintenance of high conservation value forests
- Chain of custody
- Use of trademarks
- Consultation with stakeholders

Sites were chosen based on a range of activities related to priorities outlined within the audit plan. A total of 24 sites were visited during the two days in the field. Sites visited and activities reviewed included, but were not limited to, harvested and regenerated units, pre-commercial thinning activities, riparian management zones, Endangered Species Act conformance, and road infrastructure.

The audit team conducted a review of previous audits, and they found that DNR had addressed all previously issued nonconformities. One minor non-compliance (a failure to meet the threshold requirements of an FSC indicator) was issued during the FY 2014 audit due to timber sale contracts not including specific safety requirements. DNR implemented a corrective action plan, and the non-conformance closed.

The audit team found that DNR met the requirements of the FSC-United States Forest Management Standard. Noting that DNR continues to manage forestlands to a very high standard, they recommended continued certification.

Please refer to the [FSC-Forest Management Certification Public Summary Report](#) for more information related to FSC forest certification audits on Washington’s forested state trust lands.

### ***Sustainable Forestry Initiative®***

The FY 2014 Sustainable Forestry Initiative ([SFI®](#)) [program](#) surveillance audit was conducted by an independent, third-party auditing firm and was held in DNR’s Olympic and Northwest regions in June 2014. The audit focused on:

- Forest management planning
- Forest productivity
- Protection and maintenance of water resources
- Biological diversity
- Visual quality and recreational benefits
- Protection of special sites
- Legal and regulatory compliance
- Forestry research, science, and technology
- Training and education
- Community involvement
- Public land management
- Communications and public reporting
- Management review and continual improvement

Sites were chosen based on a wide range of activities related to priorities outlined within the audit plan. A total of 29 sites were visited over a two-day period in the field.

A review of previous audits was conducted to verify the effectiveness of those audit findings and to evaluate DNR’s past performance. There were no trends in the SFI implementation of the field audit or document review indicating that any particular area needs special attention.

Per the 2014 audit results, DNR received one minor “nonconformance” (an SFI program weakness or a lack of objective evidence of effective implementation) related to protection of water resources and monitoring best management practices. (A small gap between concrete bridge deck slabs on two recently installed bridges was allowing sediment delivery to occur into typed waters.) DNR received one “opportunity for improvement” (a weakness in the program that may lead to a non-conformance in the future if activities are not monitored for effectiveness) related to clarification of silviculture guidelines when determining a stand is free to grow. Auditors also recognized two “notable practices” (practices and actions that are exemplary and indicate a strong commitment to the SFI intent and to continual program improvement) for DNR’s Long-Term Ecosystem Productivity research in the OESF as well as DNR’s tenacity and commitment to implement the clean-up, restoration, and construction of off-road trails at the Reiter Foothills Forest Recreation Planning Area. An after-action review of the minor nonconformance determined the root cause and recommended corrective actions. DNR has until the FY

2015 SFI surveillance audit to illustrate conformance by implementing the auditor-approved corrective action plan.

The audit team summarized that DNR has a reliable internal audit program and monitoring system carried out at the central office that determines conformance at all regions and implements corrective actions when appropriate. They also found good coordination and communication between the central office and each region.

The audit team's opinion was that DNR continued to meet SFI program requirements and effectively implemented the SFI 2010–2014 program Standard, and they recommended continued certification.

Refer to the [SFI-Forest Certification Summary Report 2014](#) for more information related to the FY 2014 SFI forest certification audit on forested state trust lands.

## Training

State lands training for forestry staff ramped up in 2014. The DNR Training Program is broadening the skill level of natural resource professionals through a series of webinars on topics including unstable slopes, post-wildfire ecology, forest diseases, non-timber forest products, and relative density. To save the department money and streamline course delivery processes, where feasible, DNR has been redesigning training modules for remote delivery. The *State Lands 101* course was redesigned for distance delivery and retitled *History and Policy of Trust Land Management*. The new format is a three-and-a-half-hour course that combines Internet-based instructional delivery with worksite activities. It introduces learners to the history of trust lands in Washington, the history of DNR, the HCP, forest certification, the Policy for Sustainable Forests, and DNR's trust mandate.

One hundred thirty-seven employees received *Basic Silviculture Prescription* training, which covers the agency's silviculture prescription policy and trains DNR employees to assess the ecological conditions of a site and develop forest treatments to meet the desired conditions for management units. Nineteen employees completed the timber sales pre-sales course, which includes timber and ecological modules. Seventy-four employees attended wetlands identification training, and additional courses were provided in log scaling, timber cruising, timber sale contract administration, timber cruising software, silviculture reforestation, contract harvesting, and cultural resource awareness.

Fiscal Year 2014 also saw the implementation of the *Forester I Training Book*. This program is designed to deliver required competencies to new foresters on three tracks: silviculture, pre-sales, and contract administration. More than 70 foresters have enrolled in the program.

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## HCP Implementation Documentation

HCP implementation documentation represents the cooperative problem solving that is sometimes necessary in the course of HCP implementation. It includes the following:

- **Implementation consultations:** Agreements between DNR's Forest Resources Assistant Division Manager for the HCP and Scientific Consultation Section and regions or programs related to operational challenges where assistance and approval for a mitigation plan has been requested.

- **Joint concurrences:** Agreements between DNR and the Services related to strategy modifications and updates.
- **Noncompliances:** Unapproved deviations and/or violations of HCP conservation strategies and/or objectives.
- **Other:** Informational documented issues/activities associated with HCP strategies, objectives, or implementation.

Click [here](#) for documentation of consultations and other discussions from FY 2014.

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## Appendix A: Background

This appendix contains background information about DNR management of forested state trust lands under the *State Trust Lands Habitat Conservation Plan*.

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### State Trust Lands Habitat Conservation Plan

The *State Trust Lands Habitat Conservation Plan* (HCP) is a long-term land management plan that is authorized under the Endangered Species Act (ESA) and prepared in partnership with the United States Fish and Wildlife Service and NOAA Fisheries (the Services). The HCP describes, in a suite of habitat conservation strategies, how Washington State Department of Natural Resources (DNR) will restore and enhance habitat for threatened and endangered species such as the northern spotted owl, marbled murrelet, and salmon in conjunction with timber harvest and other forest management activities. These strategies range from passive (for example, protecting unique habitats such as cliffs and springs) to active (thinning forests to speed development of habitat). Each strategy is written in the context of an integrated approach to management, in which commercial forest stands are managed to provide both revenue and ecological values such as biodiversity. Through these strategies, DNR offsets the potential harm of forest management activities on individual members of a species by providing for conservation of the species as a whole.



#### The Changing Landscape

DNR uses harvest methods that promote development of structurally diverse forests. These harvest methods, in combination with the HCP's northern spotted owl, riparian, and other habitat conservation strategies, promote biodiversity and fundamentally change the landscape from past forest practices.

Land managed by DNR under the HCP and covered by the incidental take permit (ITP) are referred to in the HCP, ITP, and implementation agreement variously as “DNR-managed lands in the area covered by the HCP,” “PERMIT LANDS,” the “DNR forest lands,” the “DNR-managed lands,” the “lands within the planning units,” and other similar terms. All such terms, unless otherwise indicated used in the HCP, ITP, or the implementation agreement refer to those lands identified in Map I.1 of the HCP as “DNR-managed HCP lands” in addition to those lands that have been added to the HCP planning units through land transactions. (See HCP Appendix B, p. 3, 15.0 for further discussion.)

An HCP is required to obtain an incidental take permit, which allows incidental take of a threatened or endangered species. Incidental take means harming or killing individuals of a listed species “if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity” such as a timber harvest [[16 U.S. Code 1539 \(a\)\(1\)\(B\)](#)].

By meeting the terms of the HCP and incidental take permit, DNR fulfills its obligations under the ESA. In this way, the HCP and incidental take permit provide DNR the stability, certainty, and flexibility it

## Appendix A

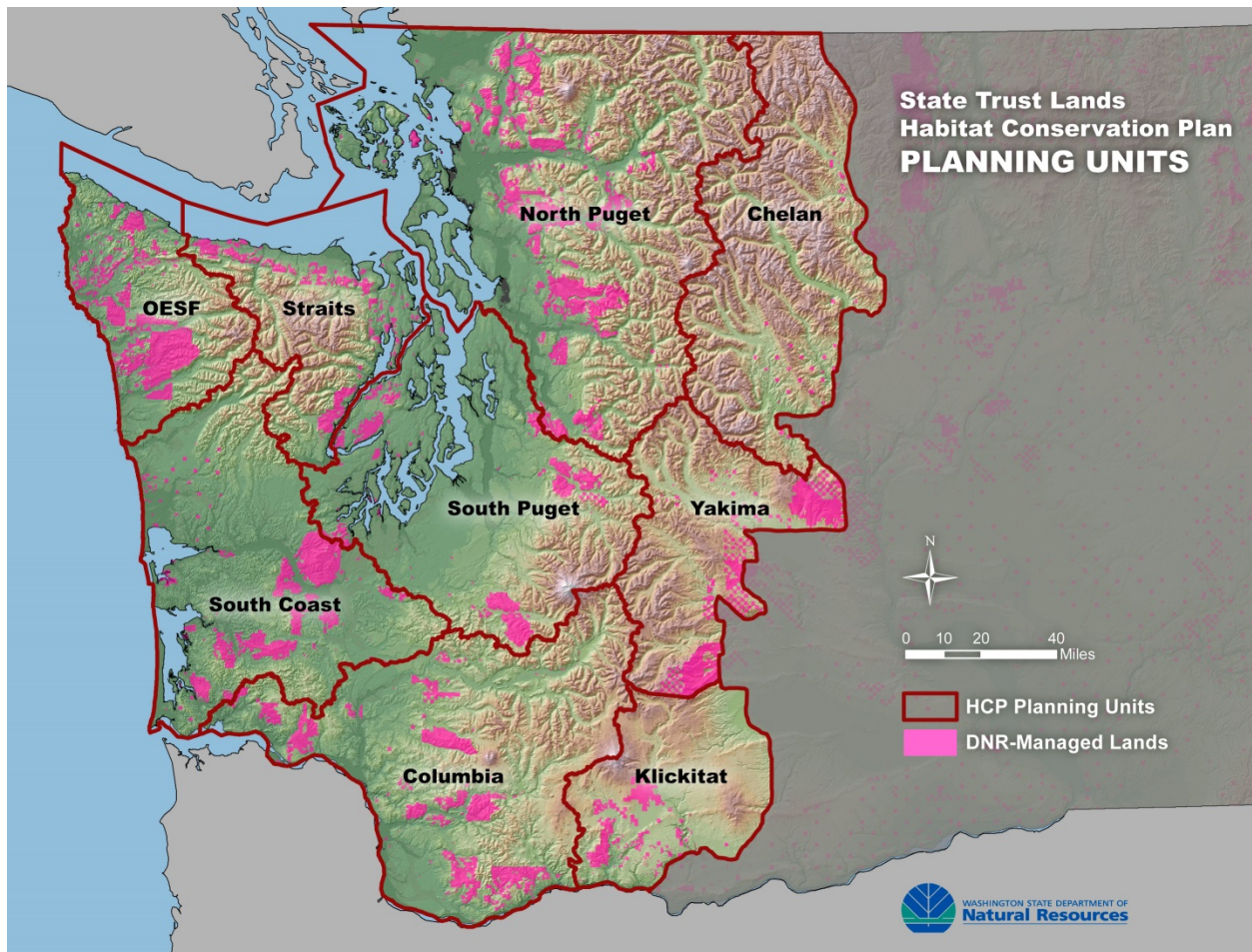
needs to meet its fiduciary and ecological responsibilities as a trust lands manager to provide a perpetual source of revenue to trust beneficiaries while simultaneously developing a complex, healthy, resilient forest ecosystem capable of supporting native species. The HCP was signed in January 1997.

### Lands Covered by the HCP

DNR manages 2.1 million acres of forested state trust lands statewide. Of this amount, the HCP guides management of approximately 1.8 million acres of land within the range of the northern spotted owl (*Strix occidentalis caurina*). In general, these 1.8 million acres are located on the western and eastern slopes of the Cascade Range in Washington, from the Canadian border to the Columbia River. To manage these areas more effectively and efficiently, we divided this area into nine planning units based primarily on large watersheds (Map A-1).

Implementation of DNR's HCP conservation objectives for the nine HCP planning units is grouped into the five west-side planning units except for the OESF (HCP, p. IV.3), the OESF (HCP, p. IV.86), and the three east-side planning units (HCP, p. IV.19). The five west-side planning units are the Straits, North Puget, South Puget, South Coast, and Columbia. The three east-side planning units are the Yakima, Chelan, and Klickitat.

Map A-1: HCP Planning Units.



[Back to the Annual Report](#)



## Conservation Objectives for ESA-Listed and Other Species

The HCP is built around habitat conservation strategies for the northern spotted owl, the marbled murrelet, riparian areas, and multispecies. These four strategies are individually described in the HCP, but each is linked to and benefits from the other strategies.

### Northern Spotted Owl Conservation Strategy

#### *Northern Spotted Owl Management Areas*

DNR is committed to providing habitat to help maintain nesting and foraging areas for northern spotted owls, and to facilitate the owl's movement through the landscape. When the HCP was developed, we identified those DNR-managed lands that were most important to northern spotted owl conservation. These areas were designated as northern spotted owl management areas. The HCP identified three types:

- **Nesting, roosting, and foraging (NRF) management areas:** Areas likely to provide demographic support and contribute to maintaining species distribution. Demographic support is the contribution of individual, territorial northern spotted owls or clusters of northern spotted owl sites to the stability and viability of the entire population. Maintenance of species distribution supports the continued presence of a northern spotted owl population in as much of its historic range as possible (HCP, p. IV.1).
- **Dispersal management areas:** Areas important for facilitating northern spotted owl dispersal (movement of young owls from nesting sites to new breeding sites).
- **OESF management area:** DNR-managed lands in the OESF; refer to [Northern Spotted Owl Conservation in the OESF HCP Planning Unit](#) later in this section for more information.

In 2006, we designated another type of northern spotted owl management area called an “owl area.” Owl areas are lands outlined in section I.C.1 of the Settlement Agreement *Washington Environmental Council, et al v. Sutherland, et al* (King County Superior Court No. 04-2-26461-8SEA, vacated April 7, 2006). These areas were a) designated in HCP Implementation Memorandum No. 1 (January 12, 1998), (b) located within Washington Department of Fish and Wildlife (WDFW) Status 1-R (reproductive) owl circles, and (c) located within the four areas identified in DNR's Standard Practice Memorandum 03-07 (*Management of Northern Spotted Owl Circles and the Identification of Northern Spotted Owl Habitat in Southwest Washington*). Owl areas are intended to sunset when the commitments of the Settlement Agreement are met.

#### *Northern Spotted Owl Habitat Classes and Types*

Each northern spotted owl management area is managed for certain habitat classes, and each habitat class includes specific habitat types. For example:

- Within NRF management areas, we manage for NRF habitat. NRF habitat is primarily high-quality roosting and foraging habitat with enough interspersed nesting structure to allow the whole area to be utilized by reproducing owls.

Appendix A

- NRF habitat is composed of two habitat classes: high-quality habitat and sub-mature habitat. High-quality habitat includes high-quality nesting, Type A, and Type B habitats. Sub-mature habitat includes the sub-mature habitat type.
- Within the OESF, we have two habitat classes: Old Forest, and structural habitat. Old Forest includes Old Forest, high-quality nesting, Type A, and Type B habitats. Structural habitat includes both sub-mature and young forest marginal habitat types.

Through HCP research and monitoring commitments, DNR is working to develop a better understanding of what constitutes functional northern spotted owl habitat and to learn which silvicultural techniques create owl habitat.

Table A-1 provides habitat classifications and types for each west-side northern spotted owl management area, and Table A-2 includes the definitions of each habitat type, as well as the data queries we use to identify it.

Table A-1: Habitat Classifications and Types for Each West-Side Northern Spotted Owl Management Area.

Northern Spotted Owl Management Area		Habitat Class		Habitat Type
NRF		NRF habitat	High-quality habitat	High-quality nesting
				Type A
			Type B	
		Sub-mature habitat	Sub-mature	
Dispersal	All other west-side planning units	Dispersal habitat	High-quality habitat	High-quality nesting
				Type A
				Type B
		Sub-mature habitat	Sub-mature	
		Dispersal habitat	Young forest marginal	
			Dispersal	
	South Puget HCP Planning Unit only	Dispersal habitat	Movement, roosting, and foraging (MoRF) plus habitat	High-quality nesting
				Type A
			Type B	
			MoRF	
Movement plus habitat	Sub-mature			
	Young forest marginal			
	Movement			
OESF	Old Forest Habitat		Old forest	
			High-quality nesting	
			Type A	
			Type B	
	Structural habitat	Sub-mature		
		Young forest marginal		

Northern Spotted Owl Management Area	Habitat Class	Habitat Type
Owl Area	High-quality habitat	High-quality nesting
		Type A
		Type B
	Low quality habitat	Sub-mature
		Young forest marginal

Table A-2: Northern Spotted Owl Habitat Types, Definitions, and Data Queries.

Habitat Type	Habitat Definitions (HCP p. IV.11 through 12 and WAC 222-16-085)	Data Query Used to Interpret Habitat Definitions
High-Quality Nesting	At least 31 trees per acre are greater than or equal to 21 inches diameter at breast height (dbh) with at least 15 trees, of those 31 trees, per acre greater than or equal to 31" dbh	(Live trees $\geq$ 21" diameter class) $\geq$ 31 trees per acre <b>and</b> (Live trees $\geq$ 31" diameter class) $\geq$ 15 trees per acre <b>and</b>
	At least 12 snags per acre larger than 21" dbh	(Snags $\geq$ 21" diameter class and $\geq$ 16' tall) $\geq$ 12 trees per acre <b>and</b>
	A minimum of 70% canopy closure	(Relative density of live trees $\geq$ 4" diameter class) $\geq$ 48 <b>and</b>
	A minimum of 5% ground cover of large woody debris	(Down wood $\geq$ 4" diameter class) $\geq$ 2,400 ft. <sup>3</sup> per acre
	At least three of the 31 trees $\geq$ 21" dbh have broken tops	Not in query
Type A	A multi-layered, multispecies canopy dominated by large ( $\geq$ 30" dbh) overstory trees (typically 15–75 trees per acre)	(FVS-derived number of canopy layers) $\geq$ 2 <b>and</b> (Primary species $\geq$ 4 diameter class) $>$ 10% and (Primary species $\geq$ 4 dbh) $\leq$ 80% (multispec = yes) <b>and</b> (Live trees $\geq$ 30" diameter class) $\geq$ 15 trees per acre and $\leq$ 75 trees per acre <b>and</b>
	Greater than 70% canopy closure	(Relative density of live trees $\geq$ 4" diameter class) $\geq$ 48 <b>and</b>
	More than two large snags per acre, 30" dbh or larger	(Snags $\geq$ 30" diameter class and $\geq$ 16' tall) $\geq$ 2.5 trees per acre <b>and</b>
	Large accumulations of fallen trees and other woody debris on the ground	(Down wood $\geq$ 4" diameter class) $\geq$ 2,400 ft. <sup>3</sup> per acre

Habitat Type	Habitat Definitions (HCP p. IV.11 through 12 and WAC 222-16-085)	Data Query Used to Interpret Habitat Definitions
	A high incidence of large trees with various deformities such as large cavities, broken tops, and dwarf mistletoe infection	Not in query
<b>Type B</b>	Few canopy layers, multispecies canopy dominated by large (greater than 20" dbh) overstory trees (typically 75–100 trees per acre, but can be fewer if larger trees are present)	(FVS-derived number of canopy layers) ≥ 2 <b>and</b>
		Primary species >10% and primary species ≤ 80% (multispec = yes) <b>and</b>
		(Live trees ≥ 20" diameter class) ≥ 75 trees per acre and ≤100 trees per acre <b>and</b>
	Greater than 70% canopy closure	(Relative density of live trees ≥ 4" diameter class) ≥ 48 <b>and</b>
	Large (greater than 20" dbh) snags present	(Snags ≥ 20" diameter class and ≥ 16 ft. tall) ≥ 1 tree per acre <b>and</b>
	Accumulations of fallen trees and other woody debris on the ground	(Down wood ≥ 4" diameter class) ≥ 2,400 ft. <sup>3</sup> per acre
<b>MoRF</b>	Forest community dominated by conifers, or in mixed conifer/hardwood forest, community composed of at least 30% conifers (measured as stems per acre dominant, co-dominant, and intermediate trees)	(Live conifers ≥ 4" diameter class) ≥ 30% of all live trees per acre <b>and</b>
	At least 70% canopy closure	(Relative density of live trees ≥ 4" diameter class) ≥ 48 <b>and</b>
	Tree density between 115 and 280 trees greater than 4" dbh per acre	(Live trees ≥ 4" diameter class) ≥ 115 and ≤ 280 trees per acre <b>and</b>
	Dominant and co-dominant trees at least 85' tall	(Largest 40 live trees per acre) ≥ 85' tall <b>and</b>
	Minimum of 5% ground cover of large down woody debris	(Down wood ≥ 4" diameter class) ≥ 2,400 ft. <sup>3</sup> per acre <b>and</b>
	At least three snags or cavity trees per acre that are at least 15" dbh	(Snags ≥ 15" diameter class and ≥ 16 ft. tall) ≥ 3 trees/acre <b>and</b>

Habitat Type	Habitat Definitions (HCP p. IV.11 through 12 and WAC 222-16-085)	Data Query Used to Interpret Habitat Definitions
	At least two canopy layers	(FVS-derived number of canopy layers) $\geq$ 2
<b>Sub-Mature</b>	Forest community dominated by conifers, or in mixed conifer/hardwood forest, community composed of at least 30% conifers (measured as stems per acre dominant, co-dominant, and intermediate trees)	(Live conifers $\geq$ 4" diameter class) $\geq$ 30% of all live tree/acres <b>and</b>
	At least 70% canopy closure	(Relative density of live trees $\geq$ 4" diameter class) $\geq$ 48 <b>and</b>
	Tree density of between 115 and 280 trees greater than 4" dbh per acre	(Live trees $\geq$ 4" diameter class) $\geq$ 115 and $\leq$ 280 trees per acre <b>and</b>
	Dominant and co-dominant trees at least 85' tall	(Largest 40 live trees/acre) $\geq$ 85' tall <b>and</b>
	At least three snags or cavity trees per acre that are at least 20"	(Snags $\geq$ 20" diameter class and $\geq$ 16 ft. tall) $\geq$ 3 trees per acre <b>and</b>
	Minimum of 5% ground cover of large down woody debris	(Down wood $\geq$ 4" diameter class) $\geq$ 2,400 ft. <sup>3</sup> per acre
<b>Young Forest Marginal (Same as Sub-Mature Except for Snag and Down Wood Requirements)</b>	Forest community dominated by conifers, or in mixed conifer/hardwood forest, community composed of at least 30% conifers (measured as stems per acre dominant, co-dominant, and intermediate trees)	(Live conifers $\geq$ 4" diameter class) $\geq$ 30% of all live trees per acre <b>and</b>
	At least 70% canopy closure	(Relative density of live trees $\geq$ 4"diameter class) $\geq$ 48 <b>and</b>
	Tree density between 115 and 280 trees greater than 4" dbh per acre	(Live trees $\geq$ 4" diameter class) $\geq$ 115 and $\leq$ 280 trees per acre <b>and</b>
	Dominant and co-dominant trees at least 85 feet tall	(Largest 40 live trees/acre) $\geq$ 85' tall <b>and</b>
	Snags greater than or equal to 2 per acre (greater than or equal to 20 inches dbh and 16" tall) OR $\geq$ 10% of the ground covered with 4" diameter or larger wood, with 25–60% shrub cover	(Snags $\geq$ 20" diameter class and $\geq$ 16 ft. tall) $\geq$ 2 trees per acre <b>or</b>  (Down wood $\geq$ 4" diameter class) $\geq$ 4,800 ft. <sup>3</sup> per acre

Habitat Type	Habitat Definitions (HCP p. IV.11 through 12 and WAC 222-16-085)	Data Query Used to Interpret Habitat Definitions
<b>Movement</b>	Canopy closure at least 70%	(Relative density of live trees $\geq$ 4" diameter class) $\geq$ 48 <b>and</b>
	Quadratic mean diameter of 11" dbh for the 100 largest trees per acre in a stand	(Largest 100 live trees per acre) $\geq$ 11" quadratic mean diameter (QMD) <b>and</b>
	Forest community dominated by conifers, or in mixed conifer/hardwood forest, community composed of at least 30% conifers (measured as stems per acre dominant, co-dominant, and intermediate trees)	(Live conifers $\geq$ 4" diameter class) $\geq$ 30% of all live trees per acre <b>and</b>
	Tree density no more than 280 trees per acre $\geq$ 3; 5" dbh	(Live trees $\geq$ 4" diameter class $\leq$ 280 trees per acre <b>and</b>
	Top height of at least 85 feet (top height is the average height of the 40 largest diameter trees per acre)	(Largest 40 live trees per acre) $\geq$ 85' tall
	At least four trees per acre from the largest size class retained for future snag and cavity tree recruitment	Not in query
<b>Dispersal</b>	Canopy cover at least 70%	(Relative density of live trees $\geq$ 4" diameter class) $\geq$ 48 <b>and</b>
	Quadratic mean diameter of 11" dbh for 100 largest trees per acre in a stand	(Largest 100 live trees per acre) $\geq$ 11" QMD <b>and</b>
	Top height of at least 85'	(Largest 40 live trees per acre) $\geq$ 85' tall
	At least four trees per acre from the largest size class retained for future snag and cavity tree recruitment	Not in query

### ***Tracking Northern Spotted Owl Habitat***

Within each northern spotted owl management area, DNR tracks habitat using spotted owl management units (SOMUs).

- In most HCP planning units, SOMUs are derived from 1997 watershed administrative units (WAUs) and in some cases modified, in accordance with the HCP, to improve conservation and management capability. For east-side dispersal management areas, SOMUs are derived from  $\frac{1}{4}$  townships.

- In the OESF HCP Planning Unit, SOMUs are derived from landscape planning units, not WAUs (the OESF is divided into 11 landscape planning units, which are administrative areas designated primarily along watershed boundaries).
- In the South Puget HCP Planning Unit, SOMUs are based on designated dispersal management landscapes (dispersal management landscapes are used only in the South Puget HCP Planning Unit and were defined through forest land planning).
- For the Klickitat HCP Planning unit, SOMUs are based on sub-landscapes (sub-landscapes are used only in the Klickitat Planning unit and were defined through an [amendment to the HCP](#)).

The HCP's northern spotted owl conservation strategy involves maintaining thresholds of habitat in each SOMU.

- Most designated NRF and dispersal SOMUs have a 50 percent overall habitat threshold objective.
- For the OESF and South Puget HCP Planning Units, habitat thresholds are two-tiered or have two threshold objectives. For example, the OESF has a 40 percent overall habitat threshold objective. This threshold is further defined as restoring and maintaining at least 20 percent of each SOMU as Old Forest Habitat with the rest made up of structural or better habitat. In the South Puget HCP Planning Unit, dispersal management areas have an overall 50 percent threshold, 35 percent of which is MoRF plus habitat, and 15 percent of which is movement plus habitat.

Table A-3 describes habitat thresholds for selected HCP planning units. Refer to Table A-2 for habitat definitions.

Table A-3: Habitat Thresholds for HCP Planning Units

HCP Planning Unit	Habitat Threshold		Habitat Classification	Habitat Types
<b>OESF</b>	40% of each SOMU	At least 20%	Old Forest Habitat	Old Forest
				High-quality nesting
				Type A
				Type B
		20%	Structural habitat	Sub-mature
			Young forest marginal	
<b>South Puget</b>	50% of each NRF SOMU		High-quality habitat	High-quality nesting
				Type A
				Type B
			Sub-mature habitat	Sub-mature
	50% of each dispersal SOMU	At least 35%	MoRF plus habitat	High-quality nesting
				Type A
				Type B
				MoRF
		15%	Movement plus habitat	Sub-mature
				Young forest marginal
		Movement		
<b>All Other West-Side Planning Units</b>	50% of each NRF SOMU		High-quality habitat	High-quality nesting
				Type A
				Type B
			Sub-mature habitat	Sub-mature
	50% of each dispersal SOMU		High-quality habitat	High-quality nesting
				Type A
				Type B
				Sub-mature
				Dispersal
				Young forest marginal

In general, harvest activities must not increase the amount of time required to achieve habitat goals beyond what would be expected in an unmanaged stand. To ensure that procedures are being followed and goals are being met, DNR tracks the types and amounts of silvicultural activities in designated NRF and dispersal management areas.

***Northern Spotted Owl Conservation in the OESF HCP Planning Unit***

The HCP describes the management approach for the OESF as “unzoned,” in that no special zones are set aside for either ecological values or revenue production. The goal behind this experimental management approach is to learn how to integrate revenue production and ecological values across state trust lands in the OESF.



However, we acknowledge that the OESF has fixed geographic features that require special management considerations. Examples include riparian areas, wetlands, potentially unstable slopes, talus fields, and other features. Therefore, we currently use the term “integrated” instead of “unzoned” to describe our management approach for the OESF.

Under this approach, we do not designate NRF or dispersal areas. Instead, in each of the OESF’s 11 SOMUs, we restore and maintain the following minimum habitat thresholds: 40 percent northern spotted owl habitat, of which at least 20 percent is Old Forest Habitat, and the remaining 20 percent is Structural Habitat or better. This strategy, which conserves northern spotted owls by restoring habitat capability, is based on working hypotheses concerning the necessary quality, quantity, and distribution of habitat.

For more information on integrated management, refer to the [OESF HCP Planning Unit Forest Land Plan Revised Draft Environmental Impact Statement](#).

### ***Northern Spotted Owl Conservation in the Klickitat HCP Planning Unit***

In the Klickitat HCP Planning Unit, forest health is being degraded because stands are overstocked with tree species that are susceptible to stand-replacing fires, drought, disease, and insect infestations. In addition, some lands originally designated as NRF management areas are not—nor will they ever be—capable of sustaining northern spotted owl habitat. This makes the original habitat goal for this unit difficult to achieve.

In April 2004, DNR implemented an amended spotted owl conservation strategy (*HCP Amendment No.1, Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat HCP Planning Unit*) to address these issues in the Klickitat HCP Planning Unit. This amended strategy involves designating four sub-landscapes within the planning unit and using field assessments, forest inventory data, and spotted owl demography data to create habitat targets for each sub-landscape.

In addition, we renamed dispersal management areas as desired future condition (DFC) management areas. Klickitat DFC management areas have the same habitat commitments as dispersal management areas, but they are managed by vegetation series with the goal of maintaining 50 percent of each vegetation series, by sub-landscape, in a mature DFC (at least 60 years old). Areas incapable of growing and sustaining habitat, and those better suited for a different habitat classification, have been reclassified.

We also adjusted the Klickitat HCP Planning Unit boundaries to exclude approximately 23,000 acres of dispersal management area. These acres, which are located north of Yakama Nation Lands, are now part of the Yakima HCP Planning Unit.

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## Northern Spotted Owl Data

This portion of the appendix describes how DNR's tracking and management of northern spotted owl data for west-side HCP planning units and the OESF has evolved since the HCP was implemented. This section initially appeared in the *2013 State Trust Lands HCP Annual Report*.

In writing the HCP, DNR identified those lands that were most important to northern spotted owl conservation using age class. These lands were designated as northern spotted owl management areas. Three types of areas were identified in the HCP: nesting, roosting, and foraging (NRF) management areas; dispersal management areas; and the OESF.

The HCP's northern spotted owl conservation strategy involves maintaining thresholds of habitat in each northern spotted owl management area or OESF landscape unit. Per the HCP, the spatial unit at which DNR would track habitat thresholds differed by HCP planning unit.

The HCP's northern spotted owl conservation strategy involves maintaining thresholds of habitat in each northern spotted owl management area or OESF landscape unit. Per the HCP, the spatial unit at which we would track habitat thresholds differed by HCP planning unit.

- In most west-side HCP planning units, DNR would maintain at least 50 percent of designated NRF and dispersal watershed administrative units (WAUs) as habitat.
- In the OESF HCP planning unit, DNR would maintain at least 40 percent of each landscape planning unit as habitat (the OESF is divided into 11 landscape planning units, which are administrative areas designated primarily along watershed boundaries).

To help DNR implement the northern spotted owl conservation strategy, the department developed the RIUOWLWAW spatial data layer using the best data available at that time. We used forest resource inventory system (FRIS) data to screen for habitat parameters and identified forest inventory units (FIU) that were expected to meet HCP northern spotted habitat requirements.

The RIUOWLWAW data layer was used to calculate the percentage of northern spotted owl habitat within each WAW. However, in this calculation we evaluated only the minimum habitat type for each NRF and dispersal management area (for example, sub-mature habitat for NRF and dispersal habitat for dispersal management areas). This process essentially missed higher-quality habitat and resulted in an erroneous (lower) habitat percentage for each WAW. This was a major shortcoming of the RIUOWLWAW data layer.

In addition, WAW boundaries were originally based on the 1997 forest practices designation. Since that time, WAW boundaries have shifted based on new or more current hydrographic information. Managing multiple WAW layers for different HCP objectives became problematic (that is, we used one WAW layer for northern spotted owl management and another layer to manage hydrologic maturity). Also, the RIUOWLWAW data layer was not corrected for any timber sales until 2002, when DNR's Forest Resources Inventory Program implemented a system to model growth and activity updates of the sample inventory.



**Northern Spotted Owl.**  
Image courtesy of USFWS.

With the completion of the 2004 sustainable harvest calculation (*Final EIS on Alternatives for Sustainable Forest Management of State Trust Lands in Western Washington and for Determining the Sustainable Harvest Level, July 2004*), the onset of forest land planning, and the implementation of a new northern spotted owl procedure (PR 14-004-120, September 2004), our Forest Resources Inventory Program initiated development of an improved, detailed dataset for northern spotted owl habitat in western Washington. For this northern spotted owl dataset (2004 dataset), we used model-grown data that was updated from a 2004 inventory dataset and sample inventory. The 2004 dataset identified all northern spotted owl habitat types in western Washington as determined by a hierarchical assessment. When forest stands met multiple habitat types, we assigned them the highest quality habitat type and corresponding habitat code. Any given area had to meet each of multiple parameter thresholds in order to be identified as a specific habitat type (see [habitat types and definitions](#)).

However, before the 2004 dataset could be fully implemented as a core dataset, we entered into the 2006 Settlement Agreement (*Washington Environmental Council, et al v. Sutherland, et al (King County Superior court No. 04-2-26461-8SEA, vacated April 7, 2006)*). As a result of this agreement:

- We designated a fourth type of owl management area, called an “owl area.” Owl areas are those areas which were (a) designated in HCP Implementation Memorandum No. 1 (January 12, 1998), (b) located within Washington Department of Fish and Wildlife (WDFW) Status 1-R (reproductive) owl circles, and (c) located within the four areas identified in Standard Practice Memorandum SPM 03-07 (*Management of Northern Spotted Owl Circles And The Identification Of Northern Spotted Owl Habitat In Southwest Washington*). Owl areas do not include any areas within NRF or dispersal management areas or the OESF.
- We used the 2004 dataset, along with maps and acreage summaries, to re-delineate northern spotted owl habitat in all northern spotted owl management areas in western Washington, including the new owl areas. The 2004 dataset was renamed the Settlement Agreement habitat layer.
- For the OESF, we included non-FRIS identified older forest stands in the Settlement Agreement habitat layer as “Old Forest.” These stands had been identified through a field and map review and approval process.

Around this time, we obtained a concurrence letter from USFWS allowing the WAU boundaries used for habitat thresholds to be modified slightly and renamed as spotted owl management units (SOMUs) to distinguish them from WAUs. A spatial layer was created displaying SOMU boundaries. This SOMU layer contained a table showing the percent of habitat for NRF and dispersal management areas using the habitat categories in the Settlement Agreement habitat layer. The SOMU layer also displays habitat percentages in the 11 landscape planning units of the OESF.

Also around this time, we compared the method used to evaluate each habitat parameter for the 2004 dataset and for the Settlement Agreement habitat layer. With a few exceptions, it became apparent that most habitat parameters were evaluated in the same way. We also recognized the importance of updating and maintaining the Settlement Agreement habitat layer in an accurate and current status.

Between 2007 and 2009, DNR held conversations with the settlement partner representatives to negotiate the best way to update the Settlement Agreement habitat layer and habitat maps outlined in section 1.D.1 of the Settlement Agreement. From those discussions, it was concluded that DNR would

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update the Settlement Agreement habitat layer (renamed the NSO habitat layer) as needed to respond to information accuracy triggers and would consult with settlement partner representatives and the Services should updates be required due to habitat-based triggers. Information accuracy triggers are day-to-day operational updates that need to take place in order for the maps to reflect accurate on-the-ground conditions (for example, timber harvest events, new or updated inventory, data clarification, next best designations, land transactions, and resolved Settlement Agreement items). Habitat-based triggers are those updates involving habitat type changes that require consultation and/or approval from the settlement partners and the Services (for example, re-designation of northern spotted owl management areas and habitat definition adjustments).

Currently, DNR uses the NSO habitat layer to track acres of both habitat and non-habitat within northern spotted owl management areas. Per our agreement, we update this layer regularly to reflect accurate on-the-ground conditions (information accuracy triggers).

### *Age Class versus Structure*

Estimates of current and future northern spotted owl habitat have evolved over time. Initially, the HCP used age-class distribution as a surrogate for habitat, acknowledging that age-class does not necessarily equate to habitat (p.IV.29). Table IV.16 in the “Forest Management Activities” section of the HCP (p. IV.212) provides an estimate of the number of acres of habitat expected to develop on state trust lands managed under the HCP in west-side planning units including the OESF at the end of the first decade, based on age class. Table IV.16 from the HCP has been reproduced below.

**Table A-4: Estimated amount of habitat on DNR-Managed lands in the area covered by the HCP at the end of the first decade of the HCP.**

Type of Habitat	East-Side Planning Units	West-Side Planning Units	OESF Planning Unit
<b>Dispersal</b>	34,000	58,000	N/A
<b>NRF<sup>1</sup></b>	25,000	66,000	56,000
<b>Riparian</b>	N/A	23,000	10,000

<sup>1</sup> NRF habitat, not to be confused with NRF management areas; refer to p. IV.88 in the HCP and Hanson et al 1993.

Since the HCP was adopted, DNR has transitioned to northern spotted owl habitat definitions that are based on forest structure (rather than age class) because forest structure is a more effective way to define habitat. For example, it is difficult to predict the development of forest structures such as down wood or snags through age class alone. We have also, through planning processes such as development of the South Puget HCP Planning Unit Forest Land Plan, adjusted habitat definitions to better reflect the owls’ needs in a particular area. Because of these changes, and because we are no longer using age class as a surrogate for habitat, it is not possible to directly compare the estimates NSO habit estimates from 1997 (Table IV.16 in the HCP) to current estimates. The most appropriate and accurate way to capture current acreages is to report habitat within northern spotted owl management areas at a particular point in time. Estimates as of August 28, 2013 are presented in Table A-5.

Table A-5: Estimated Number of Acres of Habitat and Non-Habitat in NSO Management Areas in West-Side and OESF HCP Planning Units as of 8/28/2013.

Northern spotted owl (NSO) management area		Habitat class	Habitat type <sup>1</sup>	Habitat acres	Non-habitat acres	Unknown acres <sup>2</sup>	Next best acres <sup>3</sup>	Total NSO mgmt. area acres	
<b>NRF</b>		NRF habitat	High quality habitat	High-quality nesting	0	64,582	12,750	69,492	166,132
			Type A	1,122					
			Type B	150					
		Sub-mature habitat	Sub-mature	18,036					
<b>Dispersal</b>	<b>All other west-side planning units</b>	Dispersal habitat	High quality habitat	High-quality nesting	0	18,832	1,674	2,919	125,245
			Type A	74					
			Type B	0					
		Sub-mature habitat	Sub-mature	4,064					
		Dispersal habitat	Young forest marginal	3,751					
		Dispersal	15,892						
	<b>South Puget HCP Planning Unit only</b>	Dispersal habitat	Movement, roosting, and foraging (MoRF) plus habitat	High-quality nesting	0	31,410	7,152	19,671	
				Type A	522				
				Type B	107				
			MoRF	2,097					
		Movement plus habitat	Sub-mature	461					
			Young forest marginal	3,075					
			Movement	13,546					
<b>OESF</b>		Old Forest	Old Forest	40,085	199,839	9,513	n/a	271,867	
			High-quality nesting	8					
			Type A	541					
			Type B	99					
		Structural habitat	Sub-mature	7,486					
			Young forest marginal	14,297					

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Northern spotted owl (NSO) management area	Habitat class	Habitat type <sup>1</sup>	Habitat acres	Non-habitat acres	Unknown acres <sup>2</sup>	Next best acres <sup>3</sup>	Total NSO mgmt. area acres
Owl area	High-quality habitat	High-quality nesting	0	87,421	5,378	n/a	97,860
		Type A	2				
		Type B	0				
	Low quality habitat	Sub-mature	536				
		Young forest marginal	4,523				

<sup>1</sup> Definitions of northern spotted owl habitat types can be found in the Northern Spotted Owl Conservation Strategy background section.

<sup>2</sup> Unknown stands are stands containing insufficient FRIS information to query and classify the stand. Any unknown stands greater than 25 years of age must have a FRIS inventory conducted to adequately classify it prior to any harvest activity. Once a new inventory is completed for the stand, it will be updated according to the new/updated inventory trigger and subsequent habitat classification. Stand ages are based upon the current FRIS origin date and are assessed at each layer update.

<sup>3</sup> Next best stands are those non-habitat or unknown stands that have been identified as most likely to meet a northern spotted owl habitat classification in the shortest possible time, with or without silvicultural treatment.

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## Marbled Murrelet Conservation Strategy

When the HCP was signed in 1997, DNR had insufficient information to create a long-term conservation strategy for the marbled murrelet. Murrelet ecology and habitat use were not well understood at the time, particularly in relation to nesting habitat on DNR-managed lands. To address this, the HCP specified that an interim strategy be implemented while we conduct inventories, surveys, and additional research to support development of a long-term strategy.

Following extensive research and input from an independent science team, we now have enough information to develop a long-term strategy. Although previously delayed by budgetary and staffing shortfalls, development of the long-term conservation strategy resumed as a top agency priority in 2014.

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## Riparian Conservation Strategy

For the five west-side HCP planning units, the [HCP riparian conservation strategy](#) was developed with the following specific objectives:

- Maintain or restore freshwater habitat for salmonids (species of fish in the salmon family) on state trust lands, and



**Marbled Murrelet Nest**

Marbled murrelets nest on large limbs covered with moss or other natural substances that create a relatively flat platform. Their nests are usually in mature or old conifer forest. Photo courtesy of Tom Bloxton.

- Contribute to the conservation of other species that depend on aquatic and riparian habitats, including wetlands (HCP, p. IV.55).

Meeting these objectives means providing clean water, shade, and large logs for streams through the use of riparian and wetland management zones. It also means preventing sediment delivery to streams and wetlands through management standards for road building and for conducting forest management activities on potentially unstable slopes and rain-on-snow areas.

Adopted in 2006, the [Riparian Forest Restoration Strategy \(RFRS\)](#) is part of the HCP riparian conservation strategy. The RFRS applies to all HCP planning units except the OESF, and was developed by a technical review committee consisting of technical staff from DNR, NOAA, USFWS, Northwest Indian Fisheries Commission, and WDFW.

Under the RFRS, DNR designs riparian forest thinnings to restore older forest species and forest structure in streamside forests in which historic timber harvest created forest stands that were even-aged and often overstocked. We use canopy gaps and “skips”— areas that are left unmanaged—to help increase structural diversity and accelerate the development of habitat. Accelerating the growth of large conifer trees is an important part of the RFRS. Over time, these trees will provide shade and nutrient-rich litter-fall to the stream when they are alive, and large woody debris to the stream channel when they die and fall over. Large woody debris in the stream channel creates pools and cover, which are important for salmon habitat. Once the riparian forest is on a developmental trajectory to reach an older forest structural condition, there will be no further harvest next to the stream.

During the three-year RFRS implementation period, thinning in stands 70 years of age or older was addressed on a site-specific basis with the Services. This restriction was lifted in 2012 through a [joint concurrence letter](#) signed by DNR and the Services.

When the HCP was adopted in 1997, DNR did not have enough information on the functions and protection needs of headwater streams (also known as first-order streams or type 5 streams) to develop a full strategy for these streams. For this reason, headwater streams are currently managed through an interim strategy. The interim strategy protects these streams when they are associated with unstable slopes and when such protection is necessary for water quality, fish habitat, stream banks, wildlife, and other important elements of the aquatic system. In addition, the HCP specified that we will conduct research on the effects of forest management on headwater streams, in preparation for developing a long-term headwater strategy. Research and writing of this strategy is now complete. However, competing priorities have prevented DNR from completing the steps necessary for adoption and implementation.

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## Multispecies Conservation Strategy

In addition to providing habitat for ESA-listed species, the conservation objectives developed for the HCP were designed to provide appropriate habitat protection for many native species not currently listed or protected under the ESA. The HCP also specifies habitat protection for numerous Washington State-listed plant and animal species of concern.

### **Uncommon Habitat Objectives**

The multispecies conservation strategy involves identification and protection of uncommon habitat types for unlisted species. These habitat types include caves, cliffs, talus slopes, wetlands, balds, mineral springs, snags, oak woodlands, and large structurally unique trees. These habitat types provide nesting, roosting, hiding, and foraging opportunities for many species.

## **Adaptive Management and the Conservation Strategies**

Information obtained through research and monitoring and new scientific developments sometimes identifies changes in management practices that would help address the needs of specific species and habitat conditions. For this reason, the HCP includes provisions for a dynamic, scientifically based adaptive management process that allows continual improvements of its implementation.

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## **Silvicultural Activity**

Silviculture is the art and science of managing forests to meet objectives. Through silviculture, we work with the number, size, species, and spacing of trees in the forest to provide both quality timber for harvest and ecological values including habitat for threatened and endangered species, healthy watersheds, biodiversity, and resiliency to disease and insects.

### **Selecting Silvicultural Activities**

DNR implements many types of silvicultural activities (harvest, regeneration, vegetation management, etc.). Which activities we implement, when, and how often, is determined through the silvicultural prescription.

The silvicultural prescription defines desired outcomes (objectives) and how we will accomplish them (activities) in a forest management unit over an entire rotation. A forest management unit is an area that is ecologically similar enough to be managed to meet common objectives, and a rotation is the length of time between stand replacement harvests.

#### **Objectives**

When DNR writes a silvicultural prescription, we begin by understanding the unit's contribution to landscape-level objectives set by DNR policies including the HCP and the *Policy for Sustainable Forests*. Examples of landscape-level objectives include maintaining a certain percentage of the forested landscape as northern spotted owl habitat, or maintaining enough hydrologically mature forest in a watershed to prevent periods of peak flow (periods of high stream flow after storm events).

DNR then writes specific "rotation objectives" for the unit in that context. For example, a unit that contributes to northern spotted owl habitat landscape objectives may have a rotation objective to "attain sub-mature NRF habitat." Rotation objectives are based on the biological capability of the site, including the trees suitable to the site, the site's productive capacity, the presence or absence of competing vegetation, insect and disease issues, and other considerations. Financial and budget constraints also play a role in the selection of rotation objectives.



Each rotation objective also has a series of specific, measurable “threshold targets.” For example, the threshold target for the rotation objective to attain sub-mature NRF habitat may be “at least five per-cent of the ground covered by large woody debris.” Each target is assigned a time period for its attainment.

### **Activities**

Once we define the rotation objectives and threshold targets, we determine the sequence of silvicultural activities that are necessary to meet them. The frequency and type of activities we select will depend on the biological capability of the site and the complexity of the prescription. Budget allocations and market conditions also influence the timing and extent of silvicultural activities chosen, and activities may be prioritized based on available resources and relative benefits. Other important considerations include market conditions, ecological constraints, operational constraints (for example, potentially unstable slopes), new and existing policies and procedures, and new scientific discoveries. As the stand grows, we periodically reassess it to ensure it is on track to meet its objectives.

## **Tracking Silvicultural Activities**

Data on silvicultural activities for HCP annual reports comes from DNR’s forest management planning and tracking (P&T) database, in which DNR records information about planned and implemented silvicultural activities. Using P&T, we summarize acres of activities across all state trust lands managed under the HCP in five categories: timber harvest, forest site preparation, forest regeneration, vegetation management, and pre-commercial thinning.

The number of acres of activities we report each year may be different than what actually took place on the ground during that year. These discrepancies are caused by differences in each DNR region’s procedure for recording activities in P&T. For example, some regions may wait to record individual activities until a sequence of activities is completed; if so, activities completed one year may not be entered into P&T until a subsequent year. This is especially true for timber harvests. Most timber sales have multiple units, and it is common for individual units to be completed in different fiscal years. When this occurs, foresters usually do not report an earlier unit as complete in the database until all road abandonment and logging debris cleanup has occurred, which typically happens for an individual sale after all units are complete. When this occurs, the unit where harvesting was completed in the earlier fiscal year will reflect that year because harvesting is considered more reflective of the overall activity than road abandonment or debris cleanup.

Significant increases or decreases in timber harvest volumes will usually be followed by corresponding decreases or increases in the overall level of silvicultural activity. For example, more stand-replacement harvest in one year will typically lead to more site preparation and planting in the next fiscal year, as well as increased levels of other activities in subsequent years. However, because of the possible lag time between when an activity is implemented and when it is recorded, it may be a year or more before changes in timber harvest volume and other activities are reflected in the number of acres summarized in this report.

## **Descriptions of Silvicultural Activities**

### **Timber Harvest**

DNR separately tracks and reports on each of the following types of harvests:

- **Commercial thinning:** Commercial thinning generates revenue and is performed to meet a wide range of objectives including improving the growth of the stand, enhancing stand health, reducing tree mortality, or accelerating the development of habitat. Regeneration of a stand is not an objective of thinning.
- **Variable density thinning:** Variable density thinning is a type of commercial thinning in which we create a mixture of small openings (gaps), un-thinned patches (skips), and varying stand densities to achieve specific objectives, such as accelerating development of a complex stand structure. Variable density thinning may also include treatments to create or encourage development of large down wood and snags.
- **Selective product logging:** With this type of harvest, we remove trees of certain species and sizes that are highly valuable. For example, we may remove trees that function well as poles or logs for cabins.
- **Seed tree intermediate cut:** A seed tree intermediate cut is the first in a series of harvests that is conducted as part of the even-aged seed tree silvicultural harvest system. The purpose of this harvest type is to provide a desirable seed source to establish seedlings. Typically, about ten overstory trees per acre may be left following this harvest; once the new trees are established, some of these seed trees may be harvested in a seed tree removal cut.
- **Shelterwood intermediate cut:** This harvest is the first in a series of harvests conducted as part of the even-age shelterwood harvest system. The purpose of this harvest is to provide shelter (typically shade) and possibly a seed source for the seedlings that are regenerating in the stand. Compared to a seed tree intermediate cut, a shelterwood cut typically retains more overstory trees per acre following harvest; retained trees are generally dispersed across the stand. Once the new trees are established, some of these shelter trees may be harvested in a shelterwood removal cut.
- **Temporary retention first cut:** This is a partial-cut timber harvest in which selected overstory trees are left for a portion of the next rotation. The purpose of this harvest method is to retain overstory trees without diminishing establishment of a new stand. These overstory trees can be removed through a temporary retention removal cut, or they can be left through the entire rotation, potentially resulting in a two-aged stand.
- **Seed tree, shelterwood, or temporary retention removal cut:** In these cuts, trees retained in the earlier harvests are removed.
- **Uneven-aged management:** In uneven-aged management, trees are removed from a multi-aged forest stand while maintaining multiple age classes within that stand. Uneven-aged management is often used on sites with poor soils on which more intensive management is not cost effective. This type of management also may be used in fire-prone areas to mimic the effects of periodic, lower-intensity fires that do not remove all of the trees.



**Variable Density Thinning**  
A variable density thinning in the OESF

- **Variable retention harvest:** Variable retention harvest is a type of regeneration, or stand-replacement harvest. With this type of harvest, we remove most of the existing forest stand to make room for regeneration of a new stand, but leave elements of the existing stand, such as down wood, snags, and live leave trees (trees that are not harvested), for incorporation into the new stand. Variable retention harvest is different from a clearcut, in which all or nearly all of the existing stand is removed.
- **Clearcut:** According to Washington forest practices rules, a clearcut is a harvest method in which the entire stand of trees is removed in one timber harvesting operation. In the 1990s, DNR began doing variable retention harvest instead of clearcuts on the majority of its timber sales. However, between the adoption of the HCP in 1997 and fiscal year 2008, variable retention harvests were still reported as clearcuts even though the vast majority of those harvests met the definition of variable retention harvest. From 2009 on, few acres have been reported as clearcuts.

### ***Forest Site Preparation***

After a stand replacement harvest and before planting the new stand, we remove slash (residue of logging, such as tree limbs) and undesirable plants that would compete with seedlings for nutrients, water, and light. Site preparation may be performed during logging, for example by pulling up and disposing of brush clumps, or after logging by piling and burning slash, manually cutting undesirable vegetation, applying herbicide to undesirable tree and brush species, or a combination of methods.

### ***Forest Regeneration***

In this step, we establish a new stand by planting seedlings or allowing the site to seed naturally from adjacent stands or trees that are retained within the harvested area.

### ***Vegetation Management***

After the site has been planted but before the seedlings have become fully established, we may re-move competing vegetation to give the new seedlings room to grow. Vegetation may be removed by hand, by mechanical means, or through application of herbicide. Vegetation management is done when we determine that competing vegetation will have a negative effect on the stand's ability to meet its objectives.

### ***Pre-Commercial Thinning***

In a pre-commercial thinning, we remove the less desirable trees to maintain the growth and stability of the retained trees. Pre-commercial thinning is performed before the trees are large enough to be marketable. This type of thinning does not generate revenue, and cut trees are left on site to decompose.

Pre-commercial thinning is needed in some stands to reduce high stem densities. When implemented within the optimal timeframe, this prescription increases the chances that stand development will lead to desired future forest conditions. Proper thinning helps maintain individual tree vigor and accelerates diameter growth, resulting in more rapid attainment of size requirements for product or habitat goals. Pre-commercial thinning is a particularly important strategy for addressing forest health concerns, because maintaining lower stand densities with good individual tree vigor is important for making stands more resistant to insect attack. In addition, pre-commercial thinning improves height-to-diameter

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ratios, a measure of stem stability, reducing risk of windthrow or stem buckling if partial cutting treatments are applied.

Pre-commercial thinning does not immediately create habitat for endangered species such as the northern spotted owl or marbled murrelet. However, it does set thinned stands on a developmental trajectory that is more likely to produce future habitat because thinning accelerates the development of large, live trees with stable tree architecture.

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## Non-Timber Management Activity

Numerous non-timber management activities take place on DNR-managed lands. For each category of activity, we explain trends or noticeable differences in reported numbers, if possible. In some cases, such differences may be due to improvements in our methods for identifying and tracking data.

In this section, we discuss recreation and public use activities on state trust lands and the steps we take to minimize the impacts of these activities on ecological systems. This section also includes information on our Natural Areas Program, through which we manage and protect rare native ecosystems, habitat, and unique natural features.

We work continually to improve our methods of tracking and reporting on non-timber activities. As our systems improve, and we are able to collect more accurate data, we may change our reporting methods or make corrections to our data.

### Special Forest Products

Special forest products are Christmas greens, medicinal plants, western greens (typically used by florists), or other items that can be harvested from forested state trust lands but do not fall into traditional timber or fiber categories. We promote the sale of special forest products when doing so will benefit the trusts and not cause significant damage to the environment. Permits are selectively granted to prevent habitat degradation.

Currently, we cannot accurately report on specific categories of special forest products because we no longer have program staff dedicated to tracking this information. For instance, we cannot distinguish acres leased for Christmas greens from those leased for western greens. However, we have made improvements in the accuracy of reported acreage involved in special forest product leases as a whole.

### Valuable Materials Sales

Rock, sand, and gravel (valuable materials) sales from commercial pits are handled under special sale contracts. Most of our active commercial pits are not in forested areas. Generally, the few commercial contracts we have on forested trust lands are small sales from silvicultural pits (pits used primarily for construction of forest roads).

The number of silvicultural pits and inactive commercial pits was not tracked until fiscal year 2003, when we initiated an inventory of all such pits. Since the initial inventory, changes—such as abandoning pits or creating new ones—have not been consistently tracked.

Early in the implementation of the HCP, we had a substantial number of rock, sand, and gravel sales, but currently there are few. This primarily is due to two factors: (1) the lengthy contract development process, including requirements for more valuable or long-term contracts to be reviewed and approved by the Board of Natural Resources; and (2) periodic changes to keep contracts alive regardless of whether or not there were removals. Most rock, sand, and gravel sales are now from private pits, which have fewer time and procedural constraints. Direct sales are one-time agreements that remove only small amounts of a resource (a maximum of \$25,000 in value) and do not require Board of Natural Resources approval. Other (non-direct) sales are active for longer periods of time and/or have larger maximum removal value limits.

## Prospecting Leases and Mining Contracts

Like oil and gas leases, prospecting and mining leases are simply exploration agreements that allow a lessee to search for mineral deposits. A lease must be converted to a contract if the lessee would like to begin active mining operations that could alter habitat. Before any surface-disturbing work is conducted, the lessee must submit a plan of operations for review and approval. In 1996, when the HCP was written, there were no active mining operations (activities that actually extract minerals) on lands managed under the HCP. There have not been any since.

## Oil and Gas Leases

Oil and gas exploration leases simply allow a lessee to reserve the right to explore for underground deposits. The lessee has the sole and exclusive right to explore for, drill, extract, or remove oil and gas. However, any proposed on-the-ground activities must undergo State Environmental Policy Act (SEPA) review and have a plan of operations, which we must approve.

One of the early steps of this process is acquiring a drilling permit. If the lessee then wants to actively drill or thump (measure seismological tremors caused by the dropping of large weights or detonation of explosives), he or she must obtain an “active” lease. Regulations exist to protect water and air quality, and any exploration holes must be plugged following use. Any new permits are subject to SEPA review. There has been only one active oil and gas lease involving drilling on lands that are now managed under the HCP (in 1996), and the well has since been abandoned and plugged. In 2013, all oil and gas exploration leases were surrendered, most likely due to an increase in scheduled rental fees. Historically, oil and gas leases on state trust lands are cyclical, and we expect to see new exploration leases signed in the next decade.

## Grazing Permits and Leases

Most DNR-managed grazing takes place on non-forested state trust lands east of the Cascade crest on lands that are not managed under the HCP. Grazing is selectively allowed on forested state trust lands managed under the HCP in both eastern and western Washington, though the number of acres permitted in western Washington is minimal.

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In eastern Washington, state trust lands are grazed under permits and leases. Permits cover large acreages, and each permit includes a resource management plan with ecosystem standards that must be met, such as turnout and removal dates and the number of animals allowed on the range. Leases cover smaller areas than permits, and they include a resource management plan. These leases can allow grazing at any time during the year, as long as guidelines in the plan are followed.

In our tracking methodology, we currently are not able to distinguish acres of grazing on forested versus non-forested state trust lands in eastern Washington. Thus the number of acres reported for grazing may be inflated. As we refine our tracking methodology we should be able to separate forested from non-forested grazing to improve the accuracy of our reports.

Land transactions, including large-scale exchanges such as the Central Cascades exchange completed in 2008, can influence which lands will be managed under the HCP and where grazing will be allowed.

## Communication Site Leases

Communication site leases allow private and public entities to build new towers or attach communication equipment to existing towers (for example, cell phone towers). These sites typically are located on non-forested mountaintops or along second-growth highway corridors and are less than an acre in size. They are accessed by the same road system used for forest management activities and are subject to the same management practices.

## Special-Use Leases

Special-use leases are issued for a wide variety of commercial and other uses on state trust lands. Some examples include golf courses, small commercial businesses and buildings, commercial recreation facilities, colleges, takeoff or landing sites for paragliding, governmental or public use facilities, honeybee hive sites, and stockpile sites. Special use leases do not cover major urban commercial uses or aquatic land uses. Often, but not always, these leases are for “interim uses,” and, as such, they contain language that allows for termination should we wish to take advantage of a “higher and better use” of the land.

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## Recreation Sites

Recreation sites allow public recreation on forested state trust lands as long as it is compatible with state laws and the objectives of the *Policy for Sustainable Forests* and the HCP. Sanctioned recreational activities on state trust lands include hiking, biking, horseback riding, off-road vehicle use, and camping. DNR’s vision statement for recreation and public access is to “Manage public and trust lands



### Trail Restoration

These box steps were built as part of a trail restoration project and will help minimize erosion by providing a stable and water-permeable hiking surface.

in a manner that provides quality, safe recreational experiences that are sustainable and consistent with DNR’s environmental, financial and social responsibilities.” DNR is developing recreation plans for many of the areas it manages. Plans are developed with extensive involvement of local recreation groups and the public, many of whom also volunteer to help maintain recreation sites.

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### Natural Areas Program

DNR’s Natural Areas Program protects outstanding examples of the state's extraordinary biodiversity. Lands managed under this program represent the finest natural, undisturbed ecosystems in state ownership and often have one-of-a-kind features unique to this region.

The Washington State Legislature established the system of Natural Area Preserves (NAPs) in 1972 to protect the highest quality examples of native ecosystems, rare plant and animal species, and other natural features of state, regional, or national significance. The Washington State Legislature established the system of Natural Resources Conservation Areas (NRCA) in 1987 to protect areas that are a high priority for conservation because they have critical wildlife habitat, prime natural features, or examples of native ecological communities. Together, these natural areas include Puget prairies, estuaries, native forests, bogs, ponderosa pine forests, shrub steppe communities, alpine lakes and meadows, scenic vistas, and significant geological features. These areas provide opportunities for research, education and, where appropriate, low-impact public use. In addition, these areas help meet statewide conservation priorities and our HCP obligations.

#### ***Habitat for Listed, Candidate, and Sensitive Species***

Washington’s natural areas contain habitat for 11 species listed as threatened or endangered under the ESA. Nine of these species are known to occur on natural areas located within the area managed under the HCP. Outside of HCP-managed areas, the Canada lynx (*Lynx canadensis*) is found in the Loomis NRCA and several natural areas provide suitable habitat for grizzly bears (*Ursus arctos horribilis*).

Federally listed species living on natural areas include the largest and healthiest population of golden paintbrush (*Castilleja levisecta*); the largest and most viable population of Wenatchee Mountain checker-mallow (*Sidalcea oregana var. calva*); the only Washington population of Bradshaw’s lomatium (*Lomatium bradshawii*); more than 15 established territories for the northern spotted owl (*Strix occidentalis caurina*); and waters that contain listed runs of Chinook salmon (*Oncorhynchus tshawytscha*), chum salmon (*Oncorhynchus keta*), steelhead trout (*Oncorhynchus mykiss*), and bull trout (*Salvelinus confluentus*). Ten of DNR’s natural areas contain occupied marbled murrelet (*Brachyramphus marmoratus*) sites. At South Nemah NRCA, more than 30 marbled murrelet occupancies have been recorded, including a confirmed murrelet nest site.

Natural areas provide habitat for three species that are candidates for federal listing. Trout Lake NAP contains the second largest population and highest quality native habitat for the Oregon spotted frog (*Rana pretiosa*), which is currently proposed for federal listing as threatened. Washougal Oaks NAP/NRCA protects spawning habitat for coho salmon (*Oncorhynchus kisutch*). Both the Loomis NRCA and Chopaka NAP support substantial populations of whitebark pine (*Pinus albicaulis*), recently determined to be a candidate species for federal listing.

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Natural areas also provide habitat for other sensitive species (federal species of concern, state-listed, state candidate, and others) identified in the HCP. Examples include butterflies like the Valley silverspot (*Speyeria zerene bremnerii*) and Puget blue (*Icaricia icarioides blackmorei*) that are associated with prairie habitat, amphibians like the Larch Mountain salamander (*Plethodon larselli*) that depend on forested talus slopes, birds like the harlequin duck (*Histrionicus histrionicus*) that are associated with mountain streams and rivers, bats that depend on maternal colonies like the colony found at Woodard Bay NRCA, and mammals like the California bighorn sheep (*Ovis canadensis sierrae*) in Morningstar NRCA that depend on high elevation rocky outcrops and alpine communities.

### Native Forests

A number of our natural areas were established because of their high-quality native forest ecosystems. These areas are dominated by mature and/or late-seral forests. Late-seral forests and trees with potential nesting platforms are important to both the northern spotted owl and the marbled murrelet. The native forests on these natural areas also represent some of the highest quality examples of globally imperiled forest ecosystems.

### Estuaries

In the Natural Areas Program, there are five high-quality estuaries, including three on Washington's coast and two on the shores of the Puget Sound. These sites protect rare tidal wetland communities and provide important foraging and cover habitat for anadromous fish during the critical transition from a freshwater to a marine environment. In addition, estuaries help dissipate potentially damaging wave energy before it reaches the land and provide a sink for sediments and wastes derived from both land and sea. Estuaries are some of the most biologically productive systems in the world.

### Rare Species

NAPs and NRCAs protect a broad representation of ecological communities and contribute to the conservation of many species, which is important since our inventory of the state's biodiversity is incomplete. For example, Mima Mounds NAP was originally established to protect unusual geologic formations and high-quality prairie habitat. We recently learned that it also has the only known population of the ground-dwelling lichen *Cladonia ciliata* in the United States. Similarly, North Bay and Carlisle Bog NAPs were established to protect high-quality wetlands. We later discovered that they both contain populations of the rare Makah copper butterfly (*Lycaena mariposa charlottensis*).

### Restoration and Research

DNR is actively working to restore and enhance habitat for special-status species at a number of NAPs and NRCAs. At Mima Mounds and Rocky Prairie NAPs, for example, we are using prescribed fire, invasive species control, and seeding of native grassland plants to restore native prairie habitats that



Oregon Spotted Frog



Carlisle Bog NAP

Carlisle Bog NAP represents the most diverse and undisturbed example of a sphagnum bog ecosystem and connected lake on the Olympic Peninsula. The site supports populations of the Olympic mudminnow and Makah copper butterfly.



have been heavily fragmented and degraded over most of their range. We are restoring and enhancing oak woodland habitat at two sites (Washougal Oaks NAP/NRCA and Bald Hill NAP) by removing competing conifer trees, planting oak seedlings, and replanting native understory species. In addition, we are restoring Puget Sound estuary and near-shore habitats at Stavis and Woodard Bay NRCAs by removing bulkheads, fill, and creosote-treated structures.

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## Road Management Activity

Roads that are improperly constructed or maintained can negatively impact habitat in a number of ways. Such roads can increase the rates of slope failure, contribute sediment to streams, and block fish passages, which can potentially harm salmon and other aquatic and riparian-obligate species. Current road-building and maintenance practices create better roads that minimize damage while also allowing DNR to abandon or improve poorly built roads.

In 2001, Washington’s state forest practices rules were updated to reflect “Forests and Fish” legislation passed in 1999. This legislation required all large forest landowners to manage forest roads constructed or used for timber harvest and other forest activities after 1974 under an approved road maintenance and abandonment plan (RMAP) by July 1, 2006. The legislation also stipulated that all forest roads must be improved and maintained to the standards established in WAC 222-24 by 2016. DNR completed a full stream-crossing assessment in 2001 and a road assessment for all forested state trust lands in 2006.

Under the HCP, DNR made a commitment to develop and institute a process to achieve comprehensive, landscape-based road network management. The major components of this process include the following:

- Minimization of active road density;
- A site-specific assessment of alternatives to new road construction (for example, yarding systems) and the use of such alternatives where practicable and consistent with conservation objectives;
- A baseline inventory of all roads and stream crossings;
- Prioritization of roads for decommissioning, upgrading, and maintenance; and
- Identification of fish passage blockages caused by stream crossings, and a prioritization of their retrofitting or removal.

DNR evaluates overall active road density through [forest land planning](#) (completed for the South Puget HCP Planning Unit and underway in the OESF HCP Planning Unit). The department conducts site-specific assessments of alternatives to new road construction at the operational level when we plan individual activities, and we address the last three components of this process through implementation of RMAPs.

As part of meeting HCP annual reporting requirements, DNR tracks and reports on the number of road miles constructed (newly built roads), reconstructed (existing roads improved to a timber-haul standard), decommissioned (roads stabilized and made impassable to vehicular traffic), or abandoned (roads

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stabilized and abandoned to forest practices standards), as well as active forest road miles and the total number of fish barriers removed.

Unlike other activities, road management activities are reported on a calendar year (rather than fiscal year) basis because the end of the fiscal year is at the start of the busiest time of the construction season. Most road work is subject to a hydraulic “work window” that limits in- or near-stream work to the summer (typically June 15 to September 30).

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## Easements and Road Use Permits

DNR generally grants access across its lands, and acquires access to its lands, through easements and road use permits. Easements are long-term (typically permanent) agreements in which property owners grant the rights to cross their land to another individual or entity. Easements are an interest in real property, and most transfer with the land, serving landowner after landowner. DNR also receives easements when it acquires lands.

Road use permits are usually short-term rights that do not convey any interest in property and are revocable by the entity that grants them. Permits are generally non-transferrable.

DNR primarily grants easements and road use permits to other governmental entities for public roads and utilities, and to forest and agricultural landowners for access to valuable materials such as timber or rock. DNR also grants easements and road use permits for many other uses such as irrigation pipelines and railroads. The department acquires easements and road use permits from private individuals and government agencies to allow staff to access DNR-managed lands.

Unlike other categories of non-timber activities, we do not report easements and road use permits on a cumulative basis. Only new easements and permits that create a new “footprint” on state trust lands managed under the HCP are reported for the fiscal year. These include easements for new roads and utilities. We do not have a system to tally total easement acres, primarily because many easements were granted in the early 1900s and hand-entered on records that are now archived.

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## Land Transactions

DNR’s Land Transactions Program is designed to reposition state trust lands for better long-term management and increased revenue for each of the trusts. Repositioning simply means disposing of properties that do not fit DNR’s management strategies or objectives and acquiring replacement properties that are more suitable. When DNR sells parcels at public auction or transfers (sells) them to other public owners, the department uses the proceeds to acquire replacement lands for the trusts to keep the trust whole.

Land transactions affect the amount of habitat or potential habitat on state trust lands. Transactions may be carried out to consolidate state trust lands in certain areas. Consolidation allows for more cost-effective management and offers opportunities to optimize trust revenue while maintaining habitat and allowing public recreation where appropriate. We often consolidate state trust lands by working with owners of adjacent lands to trade their properties for scattered parcels of state trust lands elsewhere.

Often, lands that DNR identifies for disposal are better suited to other public benefits, such as parks or habitat for rare, native species. The department may transfer state trust lands out of trust status into protected status as a NAP or NRCA in our Natural Areas Program. DNR may also transfer state trust lands to other government agencies to be used as parks or open space or for public facilities. When this happens the department compensates the trust at fair market value and acquire replacement properties to maintain trust assets over time. Acquired lands are assessed to determine if they should be included as HCP permit lands (managed subject to the commitments in the HCP). If they are found to qualify, we determine whether they should be designated as northern spotted owl NRF or dispersal management areas. We also assess their potential role in other HCP conservation strategies.

Some state trust lands have important social or ecological values. These state trust lands are best managed for protection of these special values and uses, rather than for income production. These lands may be candidates for the [Trust Land Transfer Program](#), which applies only to Common School trust lands. Through this program, DNR transfers state trust lands to WDFW, the State Parks and Recreation Commission, county governments, city governments, or the Natural Areas Program. The value of the timber (which is not cut) is given to the common school construction account, which helps fund K–12 schools statewide. The value of the land is used to purchase replacement property for the trust. State trust lands transferred to the Natural Areas Program contribute to the objectives of the HCP. State trust lands that are transferred to entities outside of DNR are evaluated for their HCP conservation value. If their conservation value is high, the department either does not transfer them, or DNR issues a deed restriction stipulating their continued management under the HCP.

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## Monitoring, Research, and Adaptive Management

Monitoring and research provide the information necessary to improve the implementation and effectiveness of the conservation strategies in the HCP. Monitoring and research also help DNR document how well different plans and actions are working to achieve the desired outcomes. The information gained can be used to adjust or adapt our management practices as needed.

Since the HCP was adopted in 1997, there have been advances in understanding the biology of northern spotted owls, marbled murrelets, and other species addressed by the HCP. However, much remains to be learned, and new systems and techniques continue to be developed and tested. Monitoring and research support the completion of conservation strategies, test promising alternatives to current methods, and contribute to the ecological foundation of our management.

### Implementation, Effectiveness, and Validation Monitoring

A science-informed adaptive management program relies primarily on research and monitoring to provide new, relevant information for increasing confidence in current management or developing new management options. A system consisting of three types of monitoring—implementation, effectiveness, and validation—has become a common organizational framework for monitoring programs in forest management.

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- **Implementation monitoring** determines whether or not the HCP is being implemented properly on the ground, and is sometimes referred to as compliance monitoring.
- **Effectiveness monitoring** determines whether or not the HCP strategies are producing the desired habitat conditions.
- **Validation monitoring** determines whether or not a certain species responds to the desired habitat conditions as anticipated.

### *Implementation Monitoring*

The HCP requires DNR to monitor implementation of the conservation strategies to ensure that the physical outcome of our management activities matches our intention as described in the HCP. Conservation strategies are selected for implementation monitoring based on a number of criteria. These criteria may include the level of risk or uncertainty associated with the strategy, the level of management discretion, the cost and timeliness of monitoring results, new information, and input from the Services and DNR managers. Examples of monitoring projects include monitoring large, structurally unique trees left on timber sales following harvest, monitoring for compliance with the marbled murrelet interim conservation strategy and the northern spotted owl conservation strategy, and monitoring of wetland and riparian management areas.

### *Effectiveness Monitoring and Research for HCP Conservation Strategies*

Effectiveness monitoring documents changes in habitat conditions, including general forest structure and specialized habitat features that result from timber harvest and other forest management activities. Only habitat areas addressed by the conservation strategies are monitored for effectiveness.

Information from this type of monitoring increases our ability to understand the influence of land management on aquatic and upland habitat conditions, and to effectively implement the conservation strategies to reach the goals of the HCP.

#### *Riparian Conservation Strategy Effectiveness Monitoring*

The objectives of effectiveness monitoring for the riparian conservation strategy fall under four main categories:

- **Riparian forest restoration management:** Provide information on proper management to achieve older stand conditions in riparian areas by testing existing and promising alternative approaches to integrating biodiversity-type thinning into our management options.
- **Headwaters conservation:** Support the development and future implementation of the headwaters conservation strategy, including assessing the strategy's effectiveness.
- **Riparian forest integrity:** Support our understanding of the loss of riparian area integrity due to blown down trees using long-term measurements of windthrow.
- **In-stream conditions:** Provide linkage between management techniques in riparian management zone forests, and in-stream habitat conditions, habitat trends, and water quality.

#### *Northern Spotted Owl Conservation Strategy Effectiveness Monitoring*

The objective of northern spotted owl research and effectiveness monitoring is to help DNR better understand the habitat needs of the northern spotted owl and how to effectively manage forest stands

and landscapes to create and sustain suitable habitat. Our effectiveness monitoring program documents changes in habitat conditions, including general forest structure and specialized habitat features that result from timber harvest and other forest management activities.

Currently, effectiveness monitoring is being expanded and incorporated into broader research studies into the structural patterns and development of suitable habitat and mature and older forests. We are also focused on how northern spotted owl habitat, and complex-structured forests in general, can best be maintained in the fire-prone eastern Cascades.

Effectiveness monitoring also supports the adaptive management goals for the northern spotted owl conservation strategy, such as developing better stand- and landscape-level habitat definitions.

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## **OESF Research and Monitoring Program**

The OESF is unique among HCP planning units in both management and purpose. The OESF is a place for applied research and monitoring to learn how to integrate revenue production and ecosystem values more effectively across state trust lands. This learning is achieved through a strong emphasis on adaptive management.

The long-term vision for the OESF is a productive, resilient, and biologically diverse commercial forest in which both revenue generation for trust beneficiaries and ecological values are maintained through integrated management. The intent behind integrated management is to actively manage as much of state trust lands as possible using innovative silviculture, landscape-level planning, and quick application of new knowledge.

The OESF Research and Monitoring Program furthers the OESF mission by implementing or coordinating research and monitoring projects; establishing and maintaining research partnerships; reaching out to stakeholders, tribes, and the general public; managing information; and linking management activities and new knowledge through a structured adaptive management process.

### ***Past and Current Research and Monitoring in the OESF***

A number of research and monitoring projects have taken place in the OESF since its status as an experimental forest was confirmed in 1992 (for more detail, see the [catalog of past projects](#)). Some of these projects were funded and conducted by DNR. Others were implemented through research partnerships such as silvicultural research cooperatives.

The main focus of OESF research and monitoring is innovative silviculture. For more detail, reference DNR's [list of ongoing projects in the OESF](#). The list of DNR priority research and monitoring activities to be implemented in the near term is available in Chapter 4 of the Draft OESF Forest Land Plan, which is Appendix A of the *Olympic Experimental State Forest HCP Planning Unit Forest Land Plan Revised Draft Environmental Impact Statement*.

### ***Draft OESF Forest Land Plan***

Policy direction for management of the OESF is provided by the HCP and the [Policy for Sustainable Forests](#). The policies in these documents are implemented, in part, through a series of planning processes including the sustainable harvest calculation and forest land planning.

## Appendix A

DNR is currently developing a forestland plan for the OESF. The forestland plan will include goals, objectives, and strategies as well as research, monitoring, and adaptive management and information on silviculture and expected outcomes. When completed and adopted, the forest land plan will guide management of the OESF.

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## Adaptive Management

The HCP's adaptive management process allows changes to our forest management when results from our monitoring programs or new information from the scientific literature indicate that such changes are warranted. For example, adaptive management has resulted in management modifications such as the [Riparian Forest Restoration Strategy](#), the [Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat HCP Planning Unit](#), and a [legacy tree procedure for eastern Washington](#) that protects old-growth trees and stands.

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## Forest Certification

Forest certification is a confirmation process conducted by an independent third-party audit team that verifies forest management practices against a set of environmentally responsible, socially beneficial, and economically standards. DNR's commitment to these standards comes from a recognition that we play a critical role in ensuring the long-term health and sustainability of Washington's forests.

The Forest Stewardship Council® (FSC®) is an independent, non-profit organization that promotes responsible management of working forests around the world through the development of forest management standards, a voluntary certification system, and trademarks that provide recognition and value to products bearing the FSC label in the marketplace.

Sustainable Forestry Initiative, Inc. is an independent, non-profit organization internationally endorsed and accepted around the world. The *Sustainable Forestry Initiative*® (SFI) program is based on the premise that responsible environmental behavior and sound business decisions can co-exist. Its three-chamber Board of Directors governs all aspects of the SFI® program, with equal representation from environmental, economic, and social sectors.

All forested state trust lands (2.1 million acres) in Washington State are certified under the SFI program Standard. Of this amount, approximately 160,000 acres are also certified under the FSC Forest Management and Chain of Custody Standards. These FSC-certified forests are located within DNR's South Puget Sound HCP Planning Unit (located in King, Pierce, Thurston, Kitsap, and Mason counties).

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## Appendix B: Glossary

This appendix contains a glossary of terms used in this annual report.

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### A

**Abandoned road:** A road that is stabilized and removed from use to Washington forest practices standards, including removing water crossings, providing erosion control, and making the road impassible to vehicles.

**Activity objective:** A measurable and possibly transient condition sought at the conclusion of an activity, such as a certain number of trees left following a timber harvest to serve as habitat and a seed source.

**Adaptive management:** A process of periodically reviewing and adjusting management practices based on feedback from internal and external research and monitoring.

**Aerial herbicide:** Application of herbicides from a helicopter or plane to achieve site preparation or vegetation management objectives.

**Aerial pesticide:** Application of an insecticide or other pesticide from a helicopter or airplane.

**Age class:** A grouping of trees in the same age group used to simplify data that describes age composition for a stand or landscape. Age classes are often divided into decadal groups to portray the distribution of tree ages within a stand, or stand origin dates on a landscape.

**Animal repellent:** Chemicals or other products applied to discourage animals from damaging seedlings.

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### B

**Biodiversity Pathways Approach:** A silviculture management regime applied to a landscape to conserve biodiversity by using enhancement techniques—retaining legacy trees, creating cavity trees and/or adding down woody debris—to achieve specific forest management unit objectives such as biodiversity, habitat conservation, and revenue generation.

**Biosolids:** The nutrient-rich organic materials resulting from the treatment of sewage sludge. When properly treated and processed in a sewage treatment facility, biosolids can be safely applied as fertilizer to maintain productive soil and stimulate tree growth.

**Blowdown (windthrow):** A tree that has been knocked over or had its top blown out by wind.

**Board of Natural Resources:** A Washington State board that establishes policies for the DNR to ensure that the acquisition, management, and disposition of lands and resources within DNR's jurisdiction are based on sound principles. The board is composed of six members: the Commissioner of Public Lands, the Governor, the Superintendent of Public Instruction, the dean of the College of Agriculture at Washington State University, the dean of the College of Natural Resources at the University of Washington, and an elected representative from a county that contains Forest Board land.

**Broadcast burn:** Allowing prescribed fire to burn over a designated area to achieve site preparation or vegetation management objectives.

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## C

**Certification:** See forest certification.

**Clearcut:** According to Washington forest practices rules, a clearcut is a harvest method in which the entire stand of trees is removed in one timber harvesting operation. In the 1990s, DNR began doing variable retention harvest instead of clearcuts on the majority of its timber sales. However, between the adoption of the State Trust Lands Habitat Conservation Plan in 1997 and fiscal year 2008, variable retention harvests were still being reported as clearcuts even though the majority of those harvests met the definition for variable retention harvest. Since 2009, few acres have been reported as clearcuts.

**Commercial thinning:** Commercial thinning generates revenue and is performed to meet a wide range of objectives including improving the growth of the stand, enhancing stand health, reducing tree mortality, or accelerating the development of habitat. Regeneration of a stand is not an objective of thinning.

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## D

**dbh:** Diameter at breast height, which is the diameter of a tree measured 4.5 feet above the ground on the uphill side of the tree.

**De minimis:** A legal term for a level of activity that is too small or insignificant to merit consideration.

**Decommissioned road:** A road made impassible to vehicles.

**Demography:** The study of populations or communities, including births, deaths, movement, and distribution.

**Desired future condition:** A set of parameters that can be compared to current conditions, showing any management changes needed to achieve specific goals. In the Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat Habitat Conservation Plan Planning Unit, DFC habitat represents a sustainable set of stand characteristics (canopy closure level, maximum tree height, etc.) that could realistically be achieved in a 60-year old stand that has been properly managed.

**Direct sale:** A one-time agreement that removes only small amounts (a maximum of \$25,000 in value) of a resource such as gravel or trees from state trust lands and is not subject to public auction or advertisement.

**Dispersal habitat:** Habitat used by northern spotted owls when moving from one area of nesting, roosting, and foraging habitat to another, often to establish new breeding sites.

**Dispersal:** The movement of an animal from one subpopulation to another or movement from one area to another, often to establish a new nesting area.



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## E

**Easement:** Permission given by one person or business to another, allowing one to access their property by crossing through property owned by the other.

**Ecoregion:** An area with generally similar ecosystems and types, quality, and quantities of environmental resources. It is designed to provide a spatial framework for research and monitoring of ecosystems and their components.

**Effectiveness monitoring:** For the State Trust Lands Habitat Conservation Plan, a system used to determine whether or not a management plan and its specific strategies are producing the desired habitat conditions.

**Endemic:** A species that is a native of, prevalent in, or confined to a specific region.

**Equestrian highline:** A rope stretched taut between two secure uprights above the animal's head. The stretched rope has tie loops spaced for securing horses or other stock with lead ropes. Sturdy trees are used as anchors for highlines. When trees are not available, posts set in concrete may serve as uprights.

**Even-aged management:** A set of final harvest systems defined as a method to “regenerate a stand with a single age-class” (Society of American Foresters). For purposes of managing forested state trust lands, even-aged includes final harvest systems of clearcut, seed tree, variable retention harvest, and shelterwood.

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## F

**Fencing:** See shielding

**Final harvest:** The harvest that signifies the end of a rotation by harvesting trees within a forest management unit in order to make room for regeneration of a new stand.

**First order stream:** A stream that does not have any other streams intersecting or feeding into it.

**Forest certification:** A confirmation process by an independent auditor that shows that a landowner manages forests by a set of standards that demonstrate environmentally responsible, socially beneficial, and economically viable practices. It is also known as “green” certification.

**Forest fertilization:** Ground or aerial-based fertilization of forest stands using chemical fertilizers or biosolids to enhance growth.

**Forest land planning:** A DNR process—focused at the scale of State Trust Lands Habitat Conservation Plan planning units—to integrate sociocultural, economic, and ecological issues into management strategies for forested state trust lands.

**Forest management unit:** A forested area with conditions that are ecologically similar enough to allow it to be managed to obtain specific objectives; the unit for which a silvicultural prescription is written.

**Forest practice:** Any activity conducted on or directly pertaining to forest land and relating to growing, harvesting, or processing timber or forest biomass, including but not limited to road and trail

## Appendix B

construction, harvesting (final and intermediate), pre-commercial thinning, reforestation, fertilization, prevention and suppression of diseases and insects, tree salvage, and brush control.

**Forest Practices:** The administrative branch of DNR responsible for regulating forest-practice activities on all state and private forestlands.

**Forest Vegetation Simulator:** A family of forest growth simulation models developed by the US Forest Service that simulate a range of silvicultural activities to help predict how forest vegetation will change in response to natural succession, disturbances, and management actions.

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## G

**Grazing lease:** A DNR lease agreement covering smaller areas of land (as compared to the larger rangeland of a grazing permit) which includes a resource management plan to protect natural resources. It allows grazing at any time of year as long as the plan's guidelines are followed.

**Grazing permit:** A DNR agreement covering large areas that includes a resource management plan containing specific details regarding the number of animals allowed and when the animals may be on the land.

**Ground herbicide:** Ground-based applications of herbicides used to achieve site preparation or vegetation management objectives. Using ground herbicides allows for application in smaller work areas, thus avoiding spraying areas where herbicides are not desired (i.e., streams, wetlands, and adjacent properties).

**Ground mechanical:** In forestry, using mechanized equipment to achieve site preparation objectives.

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## H

**Habitat conservation plan:** A long-term management plan authorized under the Endangered Species Act to conserve threatened and endangered species across a large landscape while allowing activities to occur under specific conditions.

**Hand planting:** In forestry, planting seedlings of various species or species mixes.

**Hand cutting:** In forestry, using hand-held equipment to cut stems of existing vegetation to achieve site preparation or vegetation management objectives, such as removing invasive species.

**Habitat Conservation Plan permit lands:** Lands that are managed subject to the commitments in the State Trust Lands Habitat Conservation Plan.

**Headwater stream:** A small, first- or second-order stream that forms the beginning of a river. It is often seasonal and forms where saturated ground flow first emerges as a recognizable watercourse.

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## I

**Implementation monitoring:** A form of monitoring that determines whether or not a management plan (for example, the State Trust Lands Habitat Conservation Plan) or its components are implemented as written.

**Inholding:** A parcel of land owned by one party that is entirely surrounded by another ownership. In terms of DNR land transactions, private land surrounded by state-owned property.

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## L

**Landslide hazard zonation:** A screening tool in which watershed-scale maps are created that show and describe all areas of potentially unstable slopes in a watershed as well as potential mitigation measures to minimize damage.

**Large, structurally unique tree:** A tree that is tall and/or has a large diameter and contains structural elements which are important for habitat such as a hollow trunk, broken top, open crown, or large strong limbs.

**Late-rotation thinning (or, older-stand thinning):** A partial-cut timber harvest that extends the rotation age of a stand, generally to more than 80 years, or achieves a visual or habitat objective that requires larger trees. Stands eligible for late-rotation thinning are typically 45 to 70 years old and contain a diversity of tree sizes.

**Leave tree:** A live tree left on a timber sale after harvest, intended to provide habitat and structure in the developing stand.

**LiDAR:** Short for “light detection and ranging,” a remote sensing technology that uses lasers to detect distant objects and determine their position, velocity, or other characteristics by analyzing reflections. It has a wide variety of uses, including measuring tree canopy heights, making topographical maps, and mapping floodplains.

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## M

**Marbled murrelet management area:** Proposed areas managed to protect occupied sites and develop future marbled murrelet habitat in areas that are not occupied.

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## N

**Natural area preserve:** A state-designated area that protects a high-quality, ecologically important natural feature or rare plant and animal species and their habitat. It often contains a unique feature or one that is typical of Washington State or the Pacific Northwest.

**Natural regeneration:** Allowing naturally produced seedlings to grow after harvest and produce a new forest without human intervention. DNR assesses success by carrying out a thorough regeneration survey of the stand.

**Natural resources conservation area:** A state-designated area managed to protect an out-standing example of a native ecosystem or natural feature; habitat for endangered, threatened, or sensitive species; or a scenic landscape.

**Nesting, roosting, and foraging habitat:** A forested area with the right forest structure, a large enough size, and adequate food to meet the needs of a nesting pair of northern spotted owls.

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**Next-best stands:** Within spotted owl management units that are below the habitat threshold, next-best stands are considered non-habitat, but are predicted to attain the structural characteristics that define northern spotted owl habitat either through passive or active management relatively sooner than other non-habitat stands. Next best stands count towards the target amount of suitable habitat, but are still considered non-habitat. Remaining stands not identified as habitat or next best are available for the full range of silvicultural activities.

**No-role lands:** A term used by DNR's Land Transactions Program to refer to lands not designated as a nesting, roosting, and foraging, dispersal, or desired future condition management area and thus having no role in northern spotted owl management under the State Trust Lands Habitat Conservation Plan.

**Non-commercial pit:** Also called a "silvicultural pit." A rock, sand, or gravel pit primarily used to supply materials for DNR's silviculture-related activities, primarily building forest roads and logging landings.

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## O

**Oil and gas lease:** An agreement that allows the leaseholder to reserve the right to explore for underground oil and/or gas deposits on state trust land. Before active drilling or thumping can occur, the proposal must undergo State Environmental Policy Act review and have a plan of operations approved by DNR.

**Ordinary high water mark:** on all lakes, streams, and tidal water, that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1, 1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the department. Where a stream's ordinary high water mark cannot be found, the ordinary high water mark shall be the line of mean high water. ([WAC 173-22-030](#))

**Overstory:** The upper canopy in a multi-canopy stand.

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## P

**Pest management:** Treatments or management decisions designed to prevent pest populations from reaching levels that present an unacceptable risk of damage to forest stands.

**Phased patch regeneration cut:** An even-age timber harvest method using small patch cuts (one to five acres) to progressively harvest and regenerate a single stand over a period of up to 15 years. Several separate patches are simultaneously harvested within a forest management unit. After an adequate green-up period (five to ten years), additional patches are harvested and the process is repeated until the forest management unit is completely harvested.

**Pile and burn:** A process where logging slash is placed in piles, generally using mechanized equipment, and the piles are burned under controlled conditions.

**Planning unit:** In the State Trust Lands Habitat Conservation Plan, a management unit based on large watersheds. The approximately 1.8 million acres managed under the Habitat Conservation Plan are divided into nine planning units to allow for more efficient planning and management.

**Pre-commercial thinning:** Removal of less desirable trees to maintain the growth and stability of retained trees. Pre-commercial thinning is performed before the trees are large enough to be marketable. This type of thinning does not generate revenue, and cut trees are left on site to decompose.

**Prospecting and mining lease:** An exploration agreement that allows the holder to search for mineral deposits on state lands; if the leaseholder wants to begin active mining operations (extraction and removal of valuable materials) that could alter habitat, they must convert the lease to a contract which includes a plan of operations and undergoes State Environmental Policy Act review.

## Q

**Quadratic mean diameter:** The measure of average tree diameter, conventionally used in forestry. The quadratic mean diameter is the diameter of a tree with average stand basal area.

## R

**Radio telemetry:** A tracking system in which wildlife are outfitted with collars that transmit individual signals that can be monitored to track their movement.

**Rain-on-snow zone:** Generally, an elevation band in which it is common for snow pack to be partially or completely melted during rainstorms several times during the winter.

**Relative density:** A mathematically derived parameter that indicates the level of intra-stand competition between trees, and consequently, a theoretical optimal range for thinning. Relative density guidelines for thinning vary by species and sometimes other factors, such as climatic zones. A commonly used version of relative density is formally known as Curtis's RD after Bob Curtis, a United States Forest Service biometrician who developed the measure.

**Reclassified habitat:** Two classes of marbled murrelet habitat, identified based on a predictive model:

1. Marginal habitat: Those lands expected to contain a maximum of five percent of the occupied sites on state trust lands within each State Trust Lands HCP planning unit. These areas were made available for harvest. All known occupied sites were deferred from harvest, and were not included in this habitat designation.
2. Higher-quality habitat: In contrast to marginal habitat, those lands expected to contain at least 95 percent of the occupied sites on state trust lands within each HCP planning unit. This habitat is frequently referred to simply as "reclassified habitat."

**Recreation plan:** A DNR document for a forest block or landscape outlining what types of recreation are appropriate in what portions of that block or landscape, as well as what facilities are needed. It includes broad management guidelines and a plan to implement them.

**Regeneration:** The act of renewing or reestablishing tree cover in a forest by establishing young trees through natural seeding or planting sites—usually those sites that were harvested or burned in a wildfire.

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**Repositioning:** A land transaction process in which DNR exchanges, sells, or transfers state trust land, using the proceeds to acquire more suitable property for the affected trust(s). Repositioning occurs on lands that do not fit with management strategies or that are not appropriate for long-term revenue production for the trusts.

**Riparian desired future condition:** In the Riparian Forest Management Strategy, the riparian desired future condition refers to six measureable target stand conditions that are intended to eventually develop into the Fully Functional stand development stage.

**Riparian management zone:** A buffer of trees and shrubs applied along a stream to protect the stream and habitat for salmon and other species.

**Road abandonment:** The permanent closure of forest roads in compliance with DNR guidelines and state forest practices standards. Abandonment work includes placing road barriers to prevent vehicle traffic, removing all culverts and bridges, and vegetating exposed soils to prevent erosion and sediment delivery to surface waters. In some circumstances, the road prism is rehabilitated to resemble the conditions that existed prior to road building. Abandoned roads are exempt from further maintenance.

**Road construction:** The building of new roads in compliance with DNR policy and state forest practices standards.

**Road maintenance and abandonment plan:** A plan that covers all forest roads on a landowner's property constructed or used for forest practices after 1974. It is based on a complete inventory that also shows streams and wetlands adjacent to or crossed by roads. The plan lays out a strategy for maintaining existing roads to meet state standards and shows areas of planned or potential road abandonment.

**Road reconstruction:** A process of bringing existing roads back to drivable conditions in compliance with DNR policy and state forest practices standards.

**Rotation:** The length of time between when a stand of trees is planted or naturally regenerates and when a final harvest occurs.

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## S

**Salvage cut:** A type of timber harvest used to log trees that are dead, dying, or deteriorating due to fire, insect damage, wind, disease, or injuries.

**Seed tree intermediate cut:** The first timber harvest in a series conducted as part of the even-aged seed tree silvicultural harvest system. The purpose is to provide a desirable seed source to establish seedlings. Typically, about ten trees per acre may be left following this harvest; once the new trees are established, some of these seed trees may be harvested.

**Selective product logging (selective cutting):** A timber harvest that removes only specific species from certain size classes which are highly valuable, for example trees that function well as poles or logs for cabins.

**Seral:** Relating to the stages of an ecological sere.

**Sere:** The sequential stages in forest succession; the gradual replacement of one community of plants by another.

**Shelterwood intermediate cut:** The first harvest in a series of harvests conducted as part of the even-age shelterwood harvest system. The purpose of this harvest is to provide shelter (typically shade) and possibly a seed source for the seedlings that are regenerating in the stand. Compared to a seed tree intermediate cut, a shelterwood typically retains more trees per acre following harvest; retained trees are generally dispersed across the stand.

**Shelterwood removal cut:** The second or final harvest in a series of harvests conducted as part of the even-aged shelterwood harvest system. The purpose is to remove overstory trees that create shade levels that are too high to allow the new understory to thrive.

**Shielding:** Using a physical barrier to prevent animals from entering an area and damaging trees or other resources.

**Silvicultural pit:** Also called a non-commercial pit. A rock, sand, or gravel pit primarily used for construction of DNR forest roads and timber sale landings. DNR sometimes sells valuable materials (rock, sand, or gravel) from silvicultural pits through a one-time direct sale (a sale with a value of no more than \$25,000). Silvicultural pits are distinct from commercial pits, from which DNR sells rock, sand or gravel through direct sales or longer-term leases.

**Silvicultural regime:** The specific sequence of activities defined in a silvicultural prescription.

**Silviculture:** The art and science of managing or cultivating trees and forests to achieve particular goals and objectives.

**Site preparation:** Activities performed to increase the probability of successful regeneration in a harvested unit by reducing slash and/or undesirable plants that would compete with seedlings for nutrients, water, and light. Site preparation may be performed concurrently with logging (by, for example, pulling up and disposing of brush clumps or it may be performed through piling and burning logging slash; through broadcast- or under-burning logging slash; by manually cutting undesirable vegetation; by applying herbicide (aerial or ground) to undesirable tree and brush species prior to planting; or by other methods or combinations of methods.

**Slash:** The residue (for example, tree tops and branches) that is left on the ground after logging or following a storm, fire, girdling, or delimiting.

**Smallwood thinning:** A partial-cut timber harvest in young stands (typically less than 40 years of age) that maintains or enhances the stand's growth potential and improves the quality of the remaining trees.

**Special forest products:** Items that can be harvested from forests but do not fall in traditional timber or fiber categories, such as Christmas trees and boughs, medicinal plants, and floral greens.

**Special use lease:** A DNR lease for state trust lands that is issued for one of a wide variety of commercial or other uses, often best described as "miscellaneous" uses (for example, golf courses, paragliding landing sites, and public use facilities).

**Stand:** A group of trees that is similar enough in composition, structure, age, spatial arrangement, or condition to distinguish it from adjacent groups of trees.

**Stand development stage:** A developmental phase of a forest, defined using a classification system based on the structural conditions and developmental processes occurring within a forest stand.

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**State Environmental Policy Act:** A state law that provides a process for reviewing proposals that require permits or other forms of agency approval. It requires government agencies to consider the potential environmental consequences of their actions and incorporate environmental values into their decision-making processes. It also involves the public and provides the agency decision-maker with supplemental authority to mitigate identified impacts.

**State Forest Transfer (State Forest Trust Replacement):** A program in which State Forest Trust (formerly known as Forest Board) lands in timber-dependent counties are transferred from trust status to natural resources conservation areas. The state legislature provides funds to pay for the land and timber on certain properties considered not harvestable due to the presence of federally listed endangered species. The timber value is distributed to the counties as revenue, and the land value is placed in an account for purchasing replacement property for the State Forest Trust.

**State trust lands:** DNR-managed lands held as a fiduciary trust and managed to benefit specific trust beneficiaries (public K–12 schools and universities, capitol buildings, counties, and local services such as libraries).

**Stream:** A naturally occurring body of periodic or continuously flowing water where the mean annual flow is greater than 20 cubic feet per second and the water is contained within an either naturally or artificially created channel.

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## T

**Take:** As used in the Endangered Species Act, refers to harming, hunting, wounding, collecting, capturing, or killing an endangered or threatened species or disturbing habitat in a way that disrupts a species's normal behavior.

**Temporary retention first cut:** A partial-cut timber harvest in which selected overstory trees are left for a portion of the next rotation. The purpose of this harvest method is to retain overstory trees without diminishing establishment of a new stand. If these overstory trees are left through the entire rotation, the result may be a two-aged stand.

**Thumping:** The exploration for oil or gas deposits by measuring seismological tremors caused by dropping large weights or by detonating explosives.

**Trust land transfer program:** A program in which Common School state trust land is transferred from DNR to another public agency or conservation program. The state legislature provides the value of the timber (which is not cut) to the Common School Construction account to build K–12 public schools. The value of the land is placed in an account used to purchase replacement property for the school trust. Land can be transferred to the State Parks and Recreation Commission, Washington Department of Fish and Wildlife, a county or city government, or DNR's Natural Areas Program.

**Trust:** A legal term for a relationship in which one person, company, or entity (the trustee) holds title to a property and/or manages it for the benefit of another person, company, or entity (the beneficiary).

**Type II thinning:** A commercial thinning that increases stand stability and diameter growth, protects existing legacy structures, maintains species diversity, and provides large woody and down woody debris to the forest system.



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## U

**Uneven-aged management:** Removal of trees from a multi-aged forest stand while maintaining multiple age classes within that stand. Uneven-aged management is often used on sites with poor soils on which more intensive management is not cost effective. This type of management also may be used in fire-prone areas to mimic the effects of periodic, lower-intensity fires that do not remove all of the trees.

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## V

**Validation monitoring:** For the State Trust Lands Habitat Conservation Plan, a data-collection system that determines whether or not certain species respond as expected to habitat conditions created by following a management plan and its strategies.

**Variable density thinning:** Thinning to create a mosaic of different stand densities, with canopy openings generally between 0.25 and one acre that capitalizes on landforms and stand features. DNR uses variable density thinning to encourage development of structural diversity in areas where spotted owl habitat is needed or to meet other objectives. Diversity is created by thinning to different residual tree densities, retaining large trees, and, in some cases, adding down woody debris and snags.

**Variable retention harvest:** An approach to harvesting based on the retention of structural elements or biological legacies (trees, snags, logs, etc.) from the harvested stand for integration into the new stand to achieve various ecological objectives. The following threshold targets apply under the State Trust Lands Habitat Conservation Plan:

- Retention of at least eight trees per acre. Of these:
  - At least two per acre are suitable for wildlife, and are from the largest size class,
  - At least three per acre are snag recruits, and
  - At least three per acre are snags, provided that safety requirements are met; if snags are not available, then three live trees will be retained.
- There are at least two down logs per acre of largest size class (but at least 12” on small end by 20’ long).

**Vegetation management:** Using hand-cutting, herbicide, mechanical removal, or other means to remove undesirable competing vegetation in a stand after planting but before seedlings become fully established.

**Vegetation series:** A conceptual grouping of related plant associations that have, in the absence of disturbance, the same predicted, dominant conifer species; also known as potential vegetation. In practice, vegetation series represents a way to stratify growing sites by ecological characteristics that determine the bounds of tree species occurrence, growth rates, management potential, and vulnerabilities to climate change and other risk factors.

## W

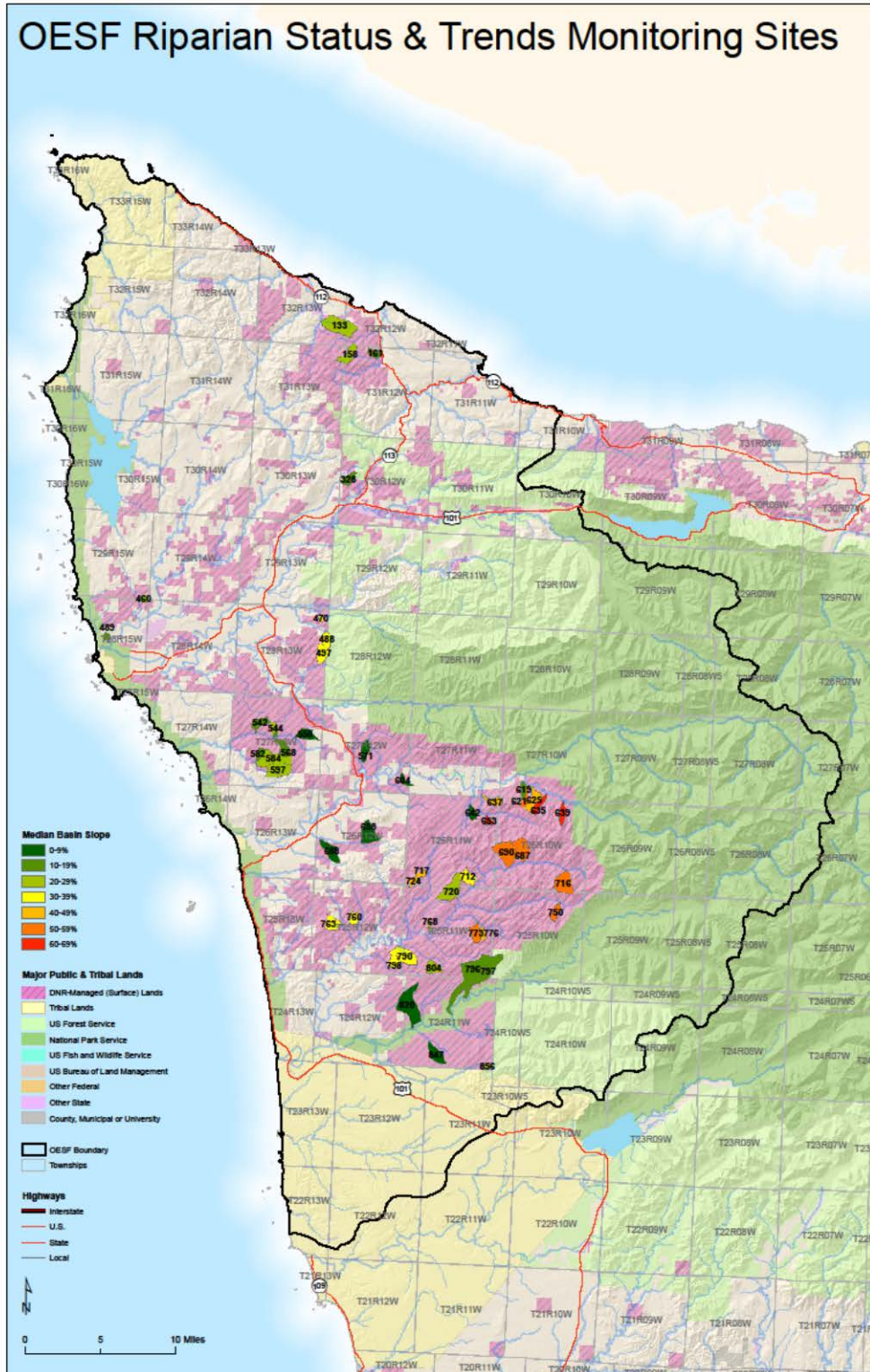
**Washington Administrative Code:** Administrative regulations, or rules, adopted by state agencies to enact legislation and [Revised Codes of Washington \(RCWs\)](#).

**Water typing system:** A simplified version of Washington’s classifications of water types appears here. The complete classification system is described in [WAC 222-16-030](#) and [WAC 222-16-031](#).

- Type 1: All waters, within their ordinary high-water mark, as inventoried as “shorelines of the state.”
- Type 2: Segments of natural waters which are not type 1 and have a high fish, wildlife, or human use. These are segments of natural waters and periodically inundated areas of their associated wetlands.
- Type 3: Segments of natural waters which are not type 1 or 2 and have a moderate to slight fish, wildlife, and human use. These are segments of natural waters and periodically inundated areas of their associated wetlands.
- Type 4: Segments of natural waters which are not type 1, 2, or 3 and for the purpose of protecting water quality downstream are classified as type 4 water upstream until the channel width becomes less than two feet in width between the ordinary high-water marks. These may be perennial or intermittent.
- Type 5: Natural waters which are not type 1, 2, 3, or 4 including streams with or without well-defined channels, areas of perennial or intermittent seepage, ponds, natural sinks and drainage ways having short periods of spring or storm runoff.
- Type 9: A water feature that has yet to be classified as type 1, 2, 3, 4, or 5.

**Windthrow (blowdown):** A tree that has been knocked over or had its top blown out by wind.

# Appendix C: Map of Riparian Status and Trends Monitoring Sites



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