Mount St Helens Wildlife Area

Draft Management Plan

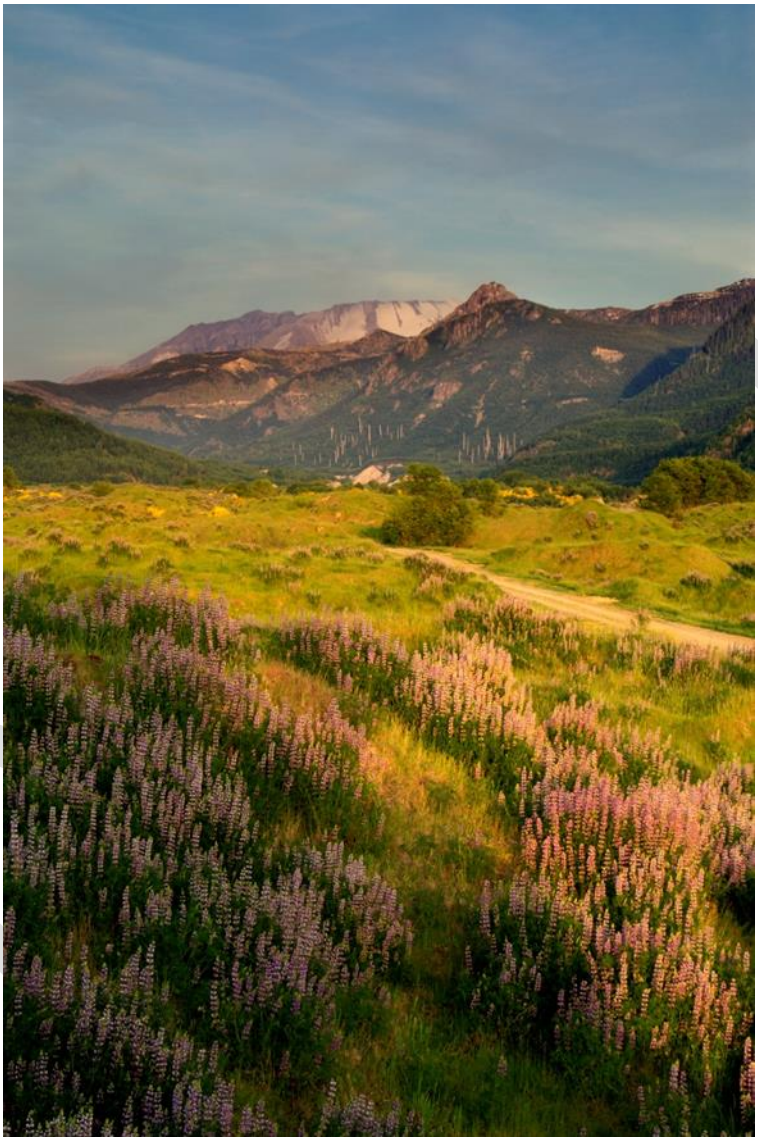

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Table of Contents

List of Acronyms & Abbreviations

DAHP	Washington State Department of Archaeology & Historic Preservation
DNR	Washington State Department of Natural Resources
DPS	Distinct Population Segment
EIA	Ecological Integrity Assessment
EIM	Ecological Integrity Monitoring
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FCF	Fish Collection Facility
IPM	Integrated Pest Management
NRCS	National Resources Conservation Service
PHS	Priority Habitats and Species
RMEF	Rocky Mountain Elk Foundation
RCW	Revised Code of Washington
RCO	Washington State Recreation and Conservation Office
SEPA	State Environmental Policy Act
SGCN	Species of Greatest Conservation Need
SRS	Sediment Retention Facility
SRFB	Salmon Recovery Funding Board
SWAP	State Wildlife Action Plan
USACE	United States Corps of Engineers
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WAC	Washington Administrative Code
WAAC	Wildlife Area Advisory Committee
WDFW	Washington State Department of Fish and Wildlife
WLA	Wildlife Area
WHCWG	Washington Wildlife Habitat Connectivity Working Group
WSDOT	Washington State Department of Transportation
WWRP	Washington Wildlife and Recreation Program

PART 1: Wildlife Area Planning Overview

Introduction

Under state law, the Washington State Department of Fish and Wildlife (WDFW) is charged with "preserving, protecting, and perpetuating" the state's fish and wildlife species, while also providing sustainable recreational opportunities that are compatible with fish and wildlife stewardship. Today, WDFW owns and manages just over one million acres on 33 wildlife areas across Washington, a range that includes nearly all species and habitats present in the state. With the loss of natural habitat posing the single greatest threat to native fish and wildlife, these areas play a critical conservation role. The wildlife area management plan addresses all aspects of resource management and aligns with statewide conservation goals.

The Mount St. Helens Wildlife Area Management Plan was developed by an interdisciplinary team of WDFW staff members with significant public involvement. This included input from the local stakeholder-based Mount St. Helens Wildlife Area Advisory Committee (WAAC), input from other public agencies, and input from other interested citizens gathered from two public meetings.

Wildlife Area Management Planning Framework

Management of these areas is guided by WDFW's mission and strategic plan, as well as by state and federal laws. Each new plan is guided by the Wildlife Area Management Planning Framework (Framework), which summarizes the agency's mission, laws, policies, and approaches to management of fish and wildlife, as well as public use and recreation. The framework summarizes priorities and guidance developed in each of the agency's programs – Fish, Wildlife, Habitat, and Enforcement. Readers are encouraged to review the framework in advance, or as a companion document to this wildlife area plan (http://wdfw.wa.gov/lands/wildlife_areas/management_plans/). The framework provides context for the organization and content of wildlife area plans across the state. WDFW's framework is a living document, and is updated periodically to reflect new agency initiatives, guidance, or directives.

Purpose of the Plan

The purpose of the management plan is to guide management activities occurring on the Mount St. Helens Wildlife Area for the next 10 years. Management goals, objectives, and performance measures are defined in the plan and are consistent with WDFW's mission, strategic plan, and requirements associated with the funds used to purchase the wildlife areas. The plan provides a clear vision of how these lands are managed to a variety of audiences, including WDFW staff members and the public.

Statewide Planning Goals

A complete list of goals, objectives, and performance measures specific to this wildlife area can be found on page 75.

Statewide Wildlife Area Vision

Wildlife areas showcase conservation, recreation, and restoration on public lands, and inspire and engage the citizens of Washington to care for our rich diversity of fish, wildlife, and habitat. These lands:

- Support public values of open space, health and well-being, economic vitality, and community character;
- Are managed collaboratively with interested parties; and
- Reflect each area's unique contribution to the vitality of Washington.

Statewide Planning Goals

Goal 1	Restore and protect the integrity of priority ecological systems and sites. This goal originates from the WDFW Strategic Plan, Goal 1. "Conserve and protect native fish and wildlife." Ecological integrity monitoring on priority sites will be developed as part of implementation of the management plan for each individual wildlife area plan discussed on page 74.
Goal 2	Sustain individual species through habitat and population management actions, where consistent with site purpose and funding. This goal relates to WDFW Strategic Plan, Goal 1. Each individual wildlife area plan will provide a summary of species associated with the wildlife area and will focus on target species for habitat management actions.
Goal 3	Provide fishing, hunting and wildlife related recreational opportunities where consistent with Goals 1 and 2. This goal is consistent with the WDFW Strategic Plan, Goal 2. Each plan will provide a summary of recreation activities associated with the wildlife area, aiming toward balancing recreational activities with species and habitat protection.
Goal 4	Engage stakeholders in consistent, timely and transparent communication regarding wildlife area management activities. This goal relates to Strategic Plan Goal 3, "Promote a healthy economy, protect community character, maintain an overall high quality of life, and deliver high-quality customer service." As described under the public outreach section of this document, public input and involvement is a key component in the development of the management plan through the advisory committee efforts and public meetings. After the plan is adopted, the management plan updates will be reviewed by the wildlife area advisory committee on a biannual basis.
Goal 5	Maintain productive and positive working relationships with local community neighbors, lessee partners and permittees. As part of day-to-day

	business, wildlife area staff members strive to maintain positive working relationships with grazing and agricultural lessees and the local community.
Goal 6	Hire, train, equip, and license, as necessary, wildlife area staff to meet the operation and management needs of wildlife areas. This goal is consistent with Goal 4 of the Strategic Plan, "Build an effective and efficient organization by supporting the workforce, improving business processes, and investing in technology." Specific activities on wildlife areas include attending training and hiring qualified employees.
Goal 7	Maintain safe, highly functional, and cost-effect administration and operational facilities and equipment. This goal is consistent with WDFW Strategic Plan Goal 4. Maintenance of facilities and equipment is a key activity on wildlife areas. Annual reporting is required by WDFW and agencies that provide operations and maintenance funding (e.g. U.S. Fish and Wildlife Service, Pittman Robertson).

Public Outreach and Stakeholder Involvement Process

The agency is committed to a transparent and inclusive public outreach process for all wildlife area management plans. Under the umbrella of the statewide goals listed above, a customized outreach strategy was developed for this area, tailored to local and regional stakeholders, as well as local and out of area visitors and user groups. For this plan, the public process included three elements: 1) public and advisory committee meetings; 2) development and distribution of fact sheets, meeting announcements, and news releases; and 3) solicitation of public comments through phone, email, and the WDFW website. A complete summary of the public outreach activities is included in Appendix H, Public Response Summary, located on the WDFW website at <<link>>.

Plan Organization

The plan is designed for both internal and external audiences, and is organized into four parts. Part I is a good reference for the public and others who are seeking a complete and concise overview of the wildlife area and associated units including size, location, purpose, and other features. It also includes success stories, which showcase conservation, restoration and partnerships with volunteers. Parts II and III cover the wildlife area in more depth, providing a level of detail that serves multiple purposes and audiences, including information to guide management activities in the field, provide justification for grant applications, and document the history, land ownership, stewardship, and recreation activities. Part II concludes with the goals and objectives for the planning area, summarizing the priority actions, owners and timelines for implementation. This section of the plan is the focus of two-year reviews and updates, and provides a roadmap for the job of wildlife area manager and other agency

program staff. Part III is focused on species and habitat management and includes all of the natural environment information including soils, geology, hydrology and climate, climate change approach, as well as the ecological values and specific management areas for species and habitats. Part IV is a compendium of resources and appendices that support different areas of the plan including species and habitat information, weed and forest management, fire response, research and other studies and water access summary.

Welcome to the Mount St Helens Wildlife Area

Wildlife Area Vision

The vision of the Mount St. Helens Wildlife Area is to maximize ecological integrity and social and biological values of the wildlife area and promote a variety of public recreational opportunities.

Success Stories

Streambank Protection and River Channel Stabilization in the Mudflow Unit

Purchased in 1990 to protect wintering elk habitat, the Mudflow Unit has a unique landscape formed by the debris flows from the May 18, 1980 eruption of Mount St. Helens. This eruption, along with several smaller debris flows, sent millions of cubic yards of ash, sand, and rock down the North Fork Toutle River valley, reshaping the area and depositing a large amount of the debris in the unit. The debris is highly erodible, causing channel migration, streambank erosion, and loss of riparian habitat along the North Fork Toutle River. Chronic soil instability has resulted in loss of critical fish and wildlife habitat on the unit; in 1996, a large flood resulted in a loss of several hundred acres of elk habitat. In 2006, WDFW developed a plan to stabilize the riverbank from future damage including a range of projects to stabilize the streambank and improve riparian habitat. Large wood structures were built along the entire length of the unit along the North Fork Toutle River, to protect the riverbank from erosion and minimize channel migration. This has allowed the riparian area to regenerate and create a natural defense to erosion. In 2007, the Cowlitz Tribe built the first of three structures to protect salmon spawning and rearing habitat. With funding from the Recreation Conservation Office (RCO), Capital Projects, and the Lower Columbia Regional Fisheries Enhancement Group, a total of six construction projects have been completed, the latest completed in the fall of 2018. These structures have stabilized over 2.5 miles of riverbank, minimized the chances of future river avulsions (changes in the river's course), and have greatly reduced the loss of critical wintering elk and fish habitat. As demonstrated during a flood event in 2016, the benefits of this project have paid off; less than 10 acres of elk habitat was lost in comparison to the 1996 flood where 400 acres were impacted. At least one more construction project is needed to finish the bank stabilization work on the Mudflow Unit, as well as a few smaller projects to maintain the existing structures. See page 110 in the Habitat Restoration section for more information.

Conserving the Merrill Lake Unit

The Merrill Lake Unit is the most recent acquisition to the Mount St. Helens Wildlife Area. The unit was acquired with funding from the RCO and the Rocky Mountain Elk Foundation (RMEF), and features several pristine waterfalls, ancient lava flows, and old-growth habitat. The previous landowner had planned to develop a resort on the lake, including vacation homes and residences. In 2010, WDFW and RMEF were approached by the new landowner, who was interested in selling the property with the hope of seeing its uniqueness protected and open for the public to enjoy. The 1,400 acres were secured through three different acquisition phases, concluding in 2018. In 2019, 140 acres were acquired to complete the acquisition, and 30 acres were donated from the RMEF. The unit connects with an existing DNR natural area along the eastside of the lake, securing a combined conservation area of 1,593 acres in perpetuity. The unit is being managed for the benefit of fish, wildlife, and public recreation. The effort to buy this property is an example of how WDFW with partners like RMEF, working together for a common goal of securing habitat for the protection of fish, wildlife and for the public.

Rocky Mountain Elk Foundation Volunteers

For over 28 years, Rocky Mountain Elk Foundation volunteers have provided thousands of hours of service to the Mount St. Helens Wildlife Area. Volunteer activities include establishing and maintaining elk forage areas, planting of trees and shrubs, removing invasive weeds, picking up litter, building tree cages, constructing and maintaining riverbank stabilization structures, and assisting with elk translocations. This relationship demonstrates the value of volunteerism on the wildlife area, and the importance of long-term partners in conservation.

Although hundreds of people have volunteered to help on the wildlife area over the years, two in particular deserve special recognition. The first is Rodger Wallace, who over the past five years has helped coordinate volunteer work parties on the Mudflow and Merrill Lake units, and has contributed over 1,000 hours of service. Rodger plans and schedules the work events, recruits volunteers, and promotes RMEF and WDFW accomplishments. He encourages families and youth to get outdoors, and has a campout at each event to make it more accessible for people to travel and stay for the entire time. With other RMEF members, he volunteers at other wildlife areas, including Blue Mountains and Oak Creek. With Rodger's help, volunteer participation has increased dramatically on the wildlife area. Over the course of Rodger's time on the wildlife area, volunteer participation has increased over five times the previous average of 200 hours per year.

The second volunteer is Mike Bratten, who has been volunteering on the wildlife area since the early 1990s. Over the years, Mike has contributed thousands of hours to enhance elk habitat on the Mudflow Unit. He has helped mentor high school kids with projects on the unit including

planting and protecting trees, fertilizing and seeding meadows, removing invasive weeds, and repairing equipment. He is a successful grant writer, his efforts leading to multiple Aquatic Lands Enhancement Account (ALEA) grants that have helped to fund projects on the Mudflow Unit. Mike and Rodger's dedication and commitment are deeply appreciated by WDFW.

Wildlife Area Description

This section describes each of the 18 units of the Mount St. Helens Wildlife Area, including: Abernathy, Altoona, Cedar Creek, Carnine, Duck Lake, Eagle Island, Fisher Island, Hoffstadt, Jenny Creek, Merrill Lake, Mudflow, Nelson, Nellie Corser, units in the vicinity of Silver Lake (Hall Road and Canal Road units), Two Forks, and White Island (Figure 1). Information in this section includes an overview of property locations and acreage, resource management, recreation and public use, and landownership and management. For the introduction, the unit descriptions will begin with units that receive the focus of management on the wildlife area, Mud Flow, Hoffstadt, and Merrill Lake. The remaining units will be organized geographically from north to south, and east to west.

Summary of wildlife area and vicinity

The Mount St. Helens Wildlife Area covers land in Clark, Cowlitz, Skamania, and Wahkiakum counties in southwest Washington. The area encompasses 9,702 acres, with units ranging in size from 20 acres to 3,800 acres, and varying in elevations from sea level to 1,800 feet. The three largest units of the Mount St. Helens Wildlife Area are: Merrill Lake (1,593 acres), Mudflow (2,773 acres), and Hoffstadt (3,816 acres). The primary focus on these areas is elk habitat enhancement, but they also support ESA listed salmonids, which is a high priority for WDFW management. These units also illustrate the diverse mechanisms that are used to acquire land by the agency including partnerships with the Rocky Mountain Elk Foundation and funding through the Recreation Conservation Office.

The wildlife area units include several habitat types, and are managed for a multitude of species including: deer, elk, waterfowl, band-tailed pigeons, small game, Columbia white-tailed deer, fish, amphibians, and reptiles. Habitat types reflect the varied elevation range and include tidal mudflats, wetlands, riparian, old-growth forest, early seral mixed forest, ancient lava flows and volcanic deposits, and open grasslands. The Mudflow and adjacent Hoffstadt units are the two largest units of the wildlife area and together comprise more than 6,500 acres. The units receive the most attention from a wildlife management perspective and provide some of the most critical winter range habitat for a portion of the Mount St. Helens Elk Herd. Many of the units support salmonid rearing and spawning habitats for threatened or endangered fish species. All of the units are open to the public except for the Carnine Unit, which has no public access. The Mudflow Unit has a seasonal closure and is closed to all public access from December 1 through April 30 each year to protect the Mount St. Helens Elk Herd.

GENERAL WILDLIFE AREA INFORMATION

Size	-	**9,702**
Acquisition Dates	-	1933 - 2016
Acquisition Funding	-	Recreation Conservation Office – Washington Wildlife and Recreation Program, Aquatic Lands Enhancement Account; Wildlife Funds; State Appropriation; Rocky Mountain Elk Foundation; U.S. Fish and Wildlife Service – Dingell Johnson, Pittman Robertson; Wildlife Funds; Ducks Unlimited
Location	-	Township: 10N Range: 3E; Township: 9N Range: 3E; Township: 10N Range: 2E; Township: 7N Range: 4E; Township: 10N Range: 1E; Township: 9N Range 1E; Township: 8N Range: 3W; Township: 8N Range: 5W; Township: 8N Range: 4W; Township: 5N Range: 1E; Township: 5N Range: 2E; Township: 4N Range: 1E; Township: 9N Range: 1W; Township: 2N Range: 6E
Elevation	-	Sea level – 1,850 ft
Recreational Opportunities	-	Hunting, fishing, wildlife viewing, horseback riding, hiking, birding and photography, wildlife viewing, boating

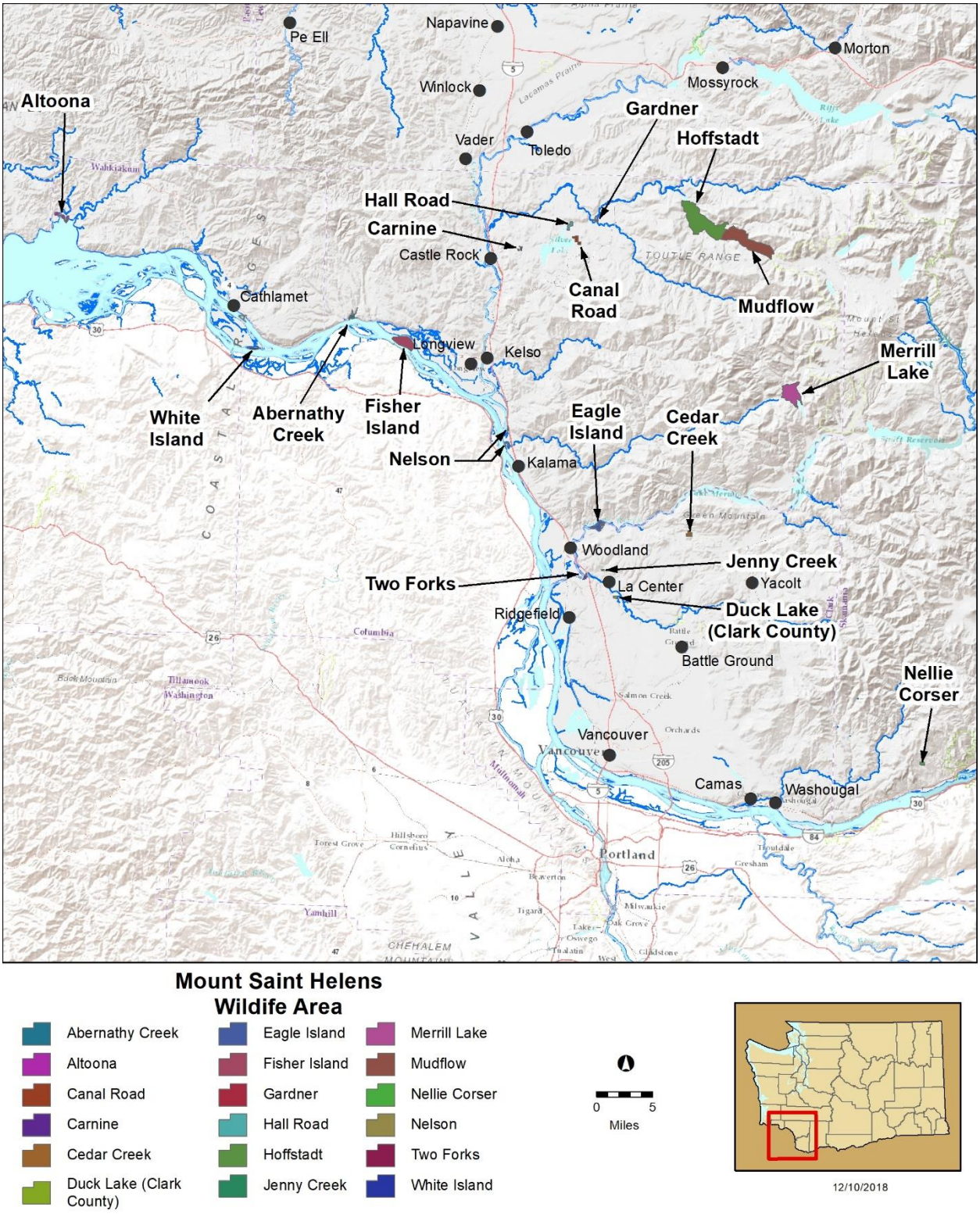

Figure 1. Mount St. Helens Wildlife Area Vicinity.

Mudflow Unit

Mudflow Unit Summary

Size	-	**2,773 acres**
Acquisition Dates	-	1989, 1995
Acquisition Funding	-	State Wildlife Funds, Recreation Conservation Office – Washington Wildlife and Recreation Program, State Appropriation; Rocky Mountain Elk Foundation
Location	-	Township: 10N Range: 3E Sections: 28-35 Township: 9N Range: 3E Sections: 1-4
Elevation	-	1,150 - 1,300 ft
Recreational Opportunities	-	Hunting, wildlife viewing, horseback riding
Access	-	**Driving Directions** From Interstate 5 at Castle Rock turn east on Highway 504. The area is approximately 30 miles east of Castle Rock south of the highway along the North Fork of the Toutle River. The unit is approximately 1.5 miles south of the highway on the valley floor. **Parking/Restroom Information** There is parking located along the pull outs of Highway 504, but there are no public driving routes down onto the wildlife area from the highway. There are no restroom facilities. **Other Information** The unit is open to the public May 1 to November 30.

In 1989, Weyerhaeuser transferred the Mudflow Unit (Figure 2) to WDFW with funds from RCO and RMEF. Debris flows from Mount St. Helens eruptions formed the unit's unique landscape of hummocks and highly erodible soils. The area is set in an open meadow-like landscape with scattered trees and shrubs, along with several small seasonal ponds.

The 2,773-acre Mudflow Unit is located in northeast Cowlitz County, approximately 20 miles east of Toutle. The Hoffstadt Unit lies to the west of the unit, and to the east is the Mount St. Helens National Volcanic Monument. Weyerhaeuser owns most of the property to the north, while DNR manages everything to the south.

State Highway 504 (Spirit Lake Highway) is the most popular access to the unit. Visitors access the unit on the south side of the North Fork Toutle River through a series of Weyerhaeuser and DNR roads, but there are no roads that provide direct access to the unit. Weyerhaeuser prohibits motorized access through the 3100 Road south of the highway.

This unit is affected by the United States Army Corps of Engineers (USACE) Sediment Retention Structure (SRS), which spans the North Fork Toutle River (see figure 4). The SRS traps sediment on the upriver side of the structure originating from the 1980 eruption, to reduce potential flooding of downstream communities and lessen sediment deposition in navigation channels of the Columbia River. The SRS also prevents nearly all upriver migration by anadromous species. To allow adult salmonids native to the watershed to continue upriver migrations, a Fish Collection Facility (FCF) was constructed just downriver from the SRS. WDFW staff operate the FCF and transport natural-origin adult coho salmon, steelhead and sea-run cutthroat trout above the SRS to release sites on Alder, Bear and Pullen creeks, and a new site planned to be used soon on Deer Creek (tributary creeks to the North Fork Toutle River). Bear and Deer creeks flow through this unit.

The agency originally established this unit to protect critical elk winter range. The Mudflow Unit is located entirely within the Loo-Wit Game Management Unit (GMU 522), where all hunting is restricted except for limited elk hunting by permit only. The area is very popular in the spring for collecting shed elk antlers. WDFW restricts all public access into the unit from December 1 to April 30 to reduce disturbance and energy demands on wintering elk. The agency has implemented several projects to restore and enhance riparian elk foraging habitat.

Primary management objectives for this unit include:

- Seek funding and construction opportunities to stabilize the river bank along the wildlife area (1C).
- Continue collaborative efforts to strategize landscape scale management with partners and other stakeholders (1D).
- Develop a plan to monitor the habitat impacts of increased sediment from the SRS modifications on the wildlife area by 2025 (1G).
- Develop strategy for riparian/wetland restoration projects to benefit fish and wildlife species (4B).
- Monitor and protect fisher denning areas when verified on the wildlife area (4C).
- Develop and implement habitat management activities for game species with partners (4H).
- Implement seasonal closures annually to limit disturbance to wildlife (4I).
- Work with stakeholders and partners to leverage funding to identify and implement fish habitat restoration efforts (5B).
- Continue high priority salmonid recovery efforts by maintaining current anadromous adult fish release sites above the SRS and explore options for new release sites on tributaries to the North Fork Toutle River (5C).
- Post dog regulations where appropriate (6C).
- Develop a plan to address camping on the wildlife area (6D).

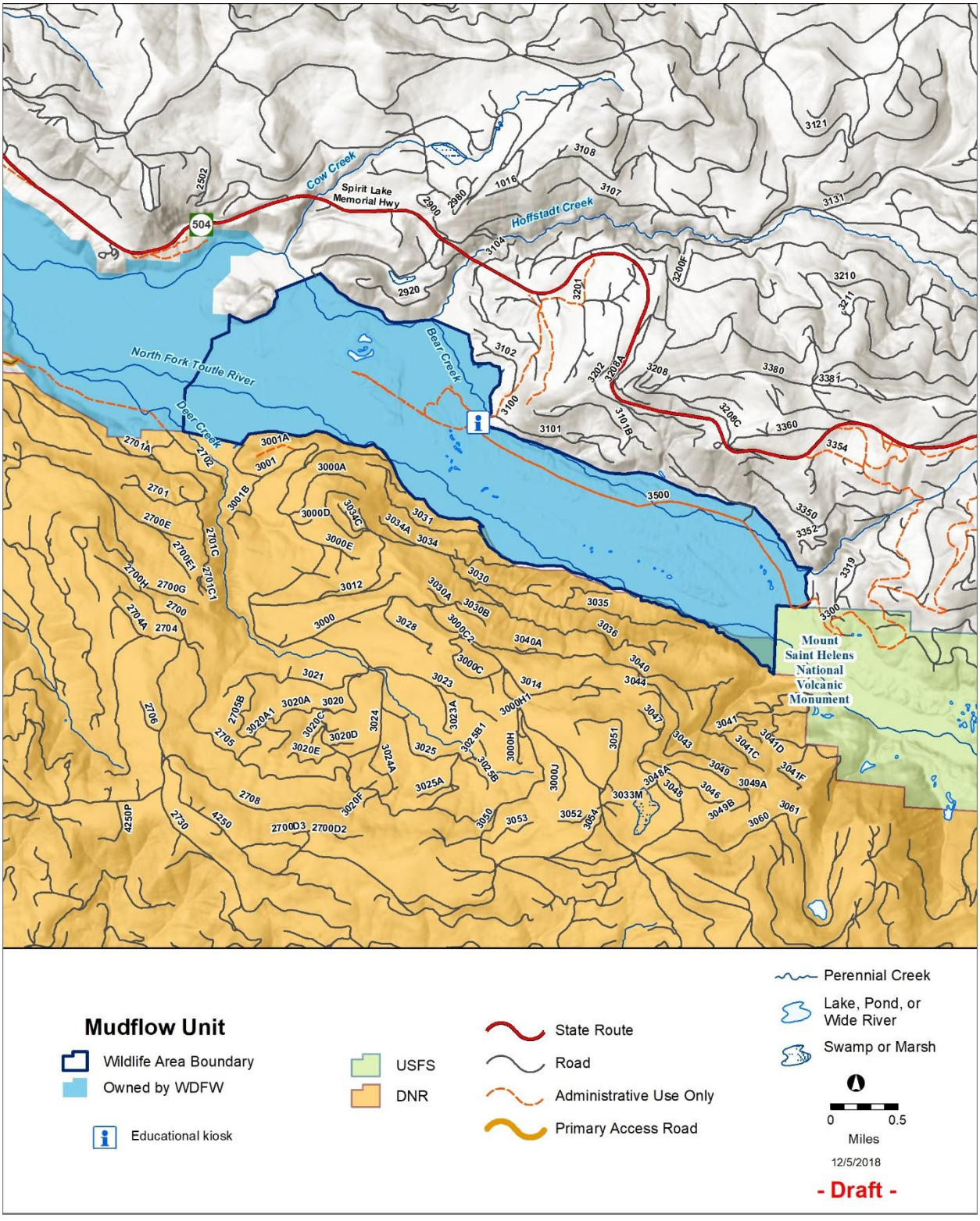

Figure 2. Mudflow Unit

Hoffstadt Unit

Hoffstadt Unit Summary		
Size	-	**3,816 acres**
Acquisition Dates	-	2009
Acquisition Funding	-	State Appropriation
Location	-	Township: 10N Range: 2E Section: 14, 15, 22-27, 36
Elevation	-	1,000 - 1,250 ft
Recreational Opportunities	-	Hunting, hiking, birding and photography
Access	-	**Driving Directions** Access to unit properties on the south side of the North Fork Toutle River: From Castle Rock drive east on Highway 504/Spirit Lake Highway 10 miles to the town of Toutle, and turn east on South Toutle Road. Drive approximately four miles on South Toutle Road and turn south onto Weyerhaeuser 4100 Road. Drive to the 4200 Road and take it to gain access to the southern portion of the Hoffstadt Unit using several different road options. These roads do not require an access permit from Weyerhaeuser. Access to unit properties on the north side of the North Fork Toutle River: From Castle Rock drive east on Highway 504/Spirit Lake Highway approximately 25 miles. The unit does not border the highway and a Weyerhaeuser Access Permit may be required to access this portion of the Hoffstadt Unit.

In 2009, the Washington Department of Transportation transferred the Hoffstadt Unit to WDFW. Debris flows from Mount St. Helens eruptions form the unit's unique landscape. Forested habitat comprises much of the area outside the debris flow and floodplain. Although most of this forest is dense young Douglas fir and red alder stands, the unit has scattered old-growth forest with trees upwards of 1,000 years old. To improve forest habitat, the agency commercially thinned approximately 300 acres in 2018, and pre-commercially thinned another 150 acres. A couple old homesteads bordered by meadows and old orchards remain in the unit along with a WDFW rearing pond along Alder Creek, which is no longer in use. Similar to the Mudflow unit, the Hoffstadt Unit is also affected by the USACE SRS. Alder and Pullen creeks flow through the unit; both are sites where adult coho salmon, steelheads and sea-run cutthroat trout are released after capture at the downstream Fish Collection Facility33333.

The 3,816-acre Hoffstadt Unit is in northeast Cowlitz County, along the North Fork Toutle River, approximately 20 miles east of Toutle. It is the largest unit in the Mount St. Helens Wildlife Area. The Mudflow Unit lies just east of Hoffstadt, while Weyerhaeuser and DNR property surrounds the rest of the unit.

Access to the unit is from the Weyerhaeuser and DNR road systems in the Mount St. Helens Tree Farm. Since WDFW does not have a public easement access across these properties, some access points require a Weyerhaeuser Access Permit. Vehicles are restricted to open roads and no off-road vehicles are allowed.

The unit is primarily managed for elk. Elk hunting is allowed in GMUs 520, 524, and 556. Hunting within Toutle GMU (556) is restricted to special permit only.

Primary management objectives for this unit include:

- Seek funding for construction opportunities to stabilize the river bank along the wildlife area (1C).
- Continue collaborative efforts to strategize landscape scale management with partners and other stakeholders (1D).
- Work with partners (USACE) to develop a plan to monitor the habitat impacts of increased sediment from the Sediment Retention Structure modifications on the wildlife area by 2025 (1G).
- Coordinate with DNR and the county to address road management on the wildlife area, including potential road closures to reduce impacts to habitat and species (3A).
- Develop strategy for riparian/wetland restoration projects to benefit fish and wildlife species (4B).
- Monitor and protect fisher denning areas, if and when they occur on the wildlife area (4C).
- Develop and implement habitat management activities for game species with partners (4H).
- Work with stakeholders and partners to leverage funding to identify and implement fish habitat restoration efforts (5B).
- Continue high priority salmonid recovery efforts by maintaining current anadromous adult fish release sites on tributaries to the North Fork Toutle River above the SRS and exploring options for new release sites (5C).
- Develop a plan to address camping on the wildlife area.

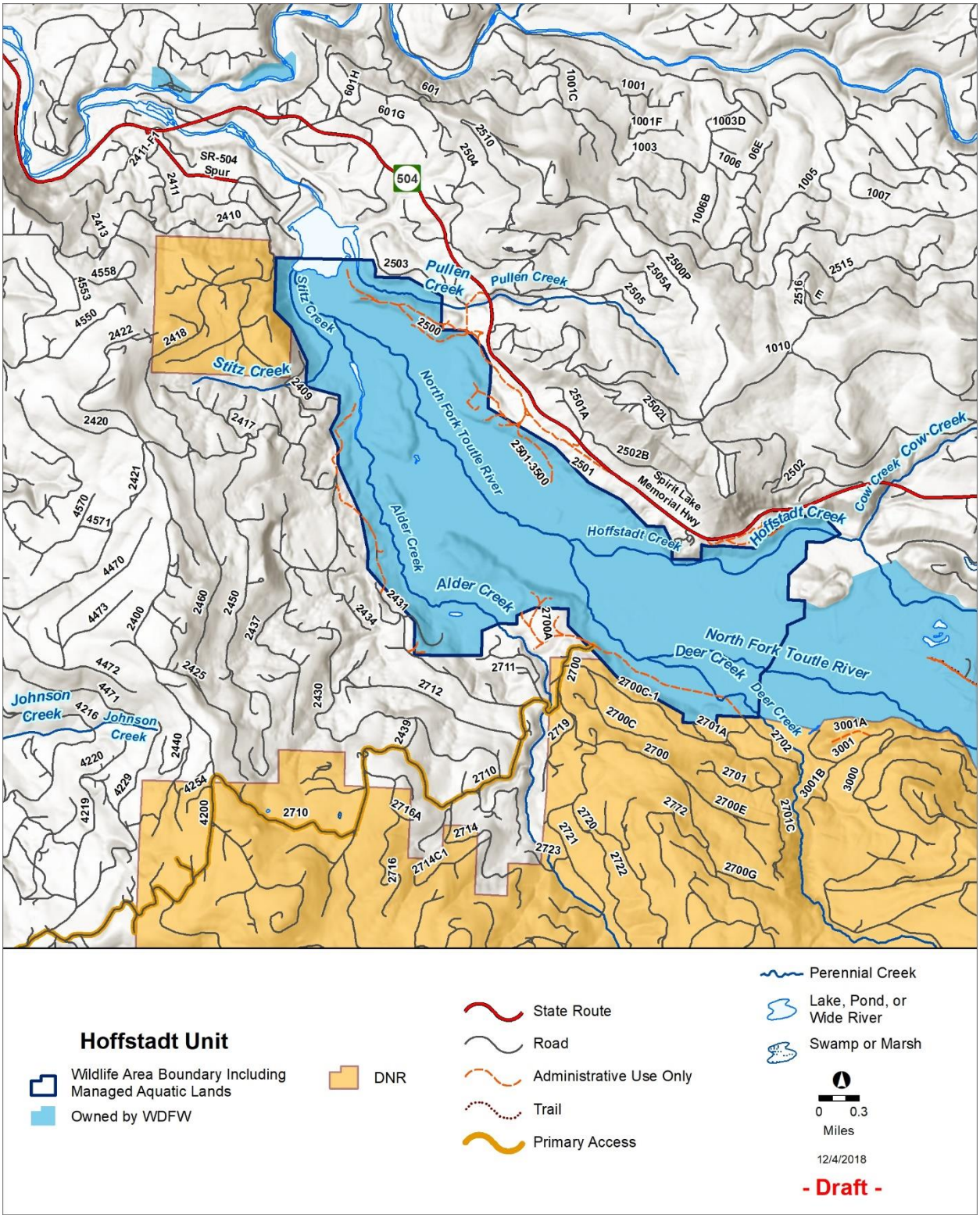

Figure 3. Hoffstadt Unit.

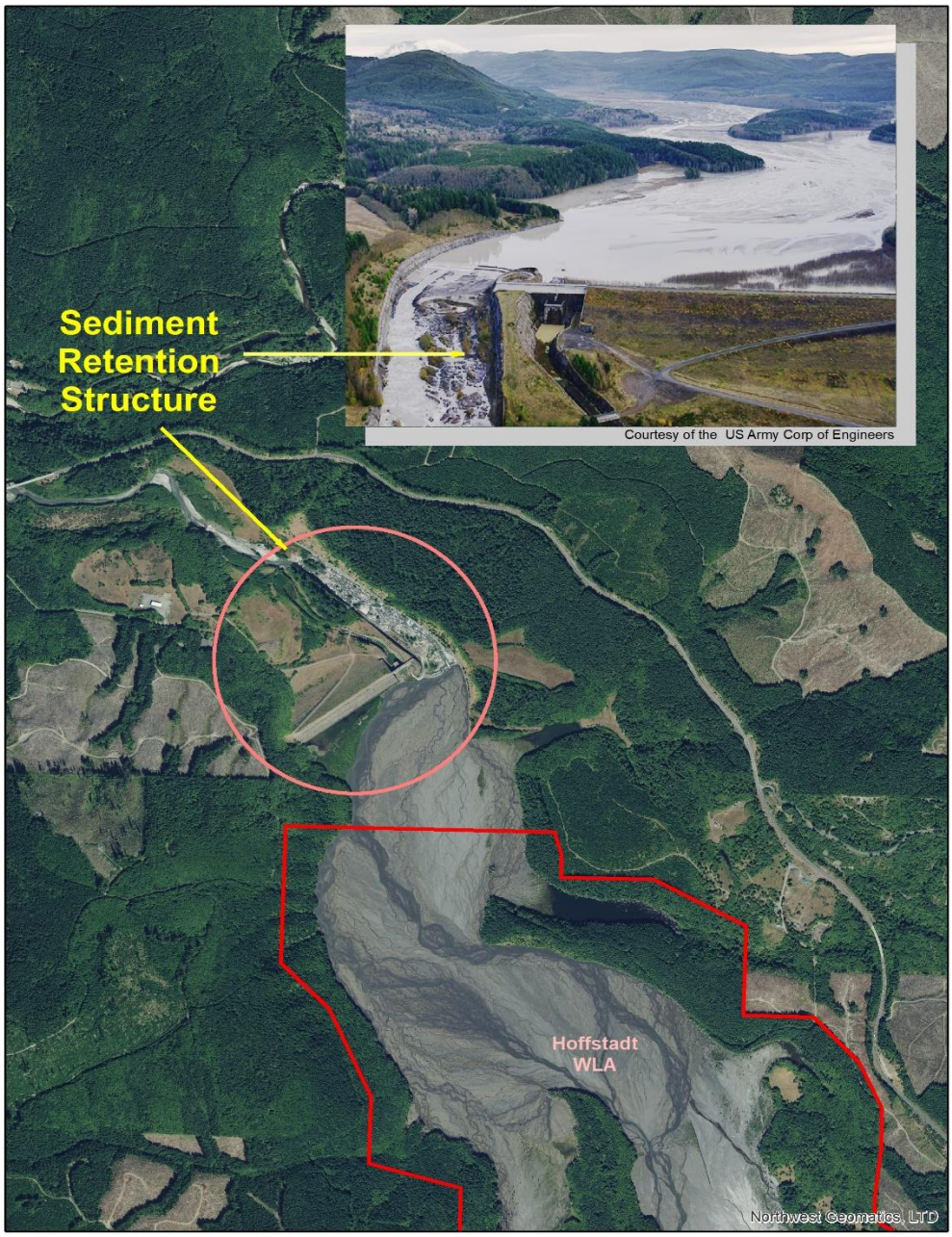

Figure 4. Sediment Control Structure.

Merrill Lake Unit

WILDLIFE AREA INFORMATION		
Size	-	**1,593 acres**
Acquisition Dates	-	2015, 2016, 2019
Acquisition Funding	-	Recreation Conservation Office – Washington Wildlife and Recreation Program; Rocky Mountain Elk Foundation
Location	-	Township: 7N Range: 4E Section: 5, 6, 7, 8, 17
Elevation	-	1,400 – 1,850 ft
Recreational Opportunities	-	Hunting, hiking, limited camping, biking, horseback riding, photography
Access	-	**Driving Directions** From Interstate 5, take exit 21 in Woodland and head east 27 miles on State Highway 503 towards Cougar. Turn north on U.S. Forest Service Road 81 towards Merrill Lake and Kalama Horse Camp, drive seven miles to a large, gated pullout on west side of road. This is the old Weyerhaeuser 7500 Road. **There is no vehicle access onto the Merrill Lake Unit.** **Parking/Restroom Information** There are several small pullouts along USFS Road 81 and one larger parking area at the gated road into the unit. Only non-motorized access is allowed onto the Merrill Lake Unit. There are no restroom facilities onsite.

The Merrill Lake Unit is the newest acquisition to the Mount St. Helens Wildlife Area, acquired with funds from RCO and the Rocky Mountain Elk Foundation. Outstanding features on the unit include ancient lava flows, trees casts (molds created when lava flowed around the trees), lodgepole pine forest, large springs, waterfalls, and large old-growth trees. The unit is a mix of mature forest and areas recently harvested and replanted with Douglas fir.

The 1,593-acre unit is in Cowlitz County north of the town of Cougar. It lies along the northern shores of Merrill Lake, though the agency neither owns nor maintains the lake. The property also lies adjacent to DNR and private timber lands. Access to the unit is from the U.S. Forest Service (USFS) 81 or the 7200 RD Weyerhaeuser line. The agency prohibits public motorized access on roads within the unit.

WDFW manages the Merrill Lake Unit primarily for elk and black-tailed deer and plans to carry out forest health management activities to improve habitat for these and other species. The

lake has a self-sustaining coastal cutthroat trout population and is periodically stocked with other species of trout for fishing.

Kalama River Falls is a popular destination. The unit has one of the two "designated" trails on the wildlife area. The Kalama River Falls Trail is open to the public for hiking and mountain bike riding, but is primarily an equestrian trail (maintained by the Back Country Horsemen). The trail originates at the Kalama Horse Camp and terminates at Kalama River Falls. The department permits camping in designated areas (within 75-100 feet) along the USFS 81 Road.

Primary management objectives for this unit include:

- Continue collaborative efforts to strategize landscape scale management with partners and other stakeholders (1D).
- Promote diversity of early and late successional forest habitat by identifying planned areas for forest treatment for the next 10 years (2A).
- Coordinate with DNR and the county to address road management on the wildlife area, including potential road closures to reduce impacts to habitat and species (4A).
- Monitor and protect fisher denning areas if and when they occur on the wildlife area (4C).
- Develop and implement habitat management activities for game species with partners (4H).
- Develop a plan to address camping on the wildlife area (6D).
- Maintain annual lake fishing opportunities at the wildlife area (6E).

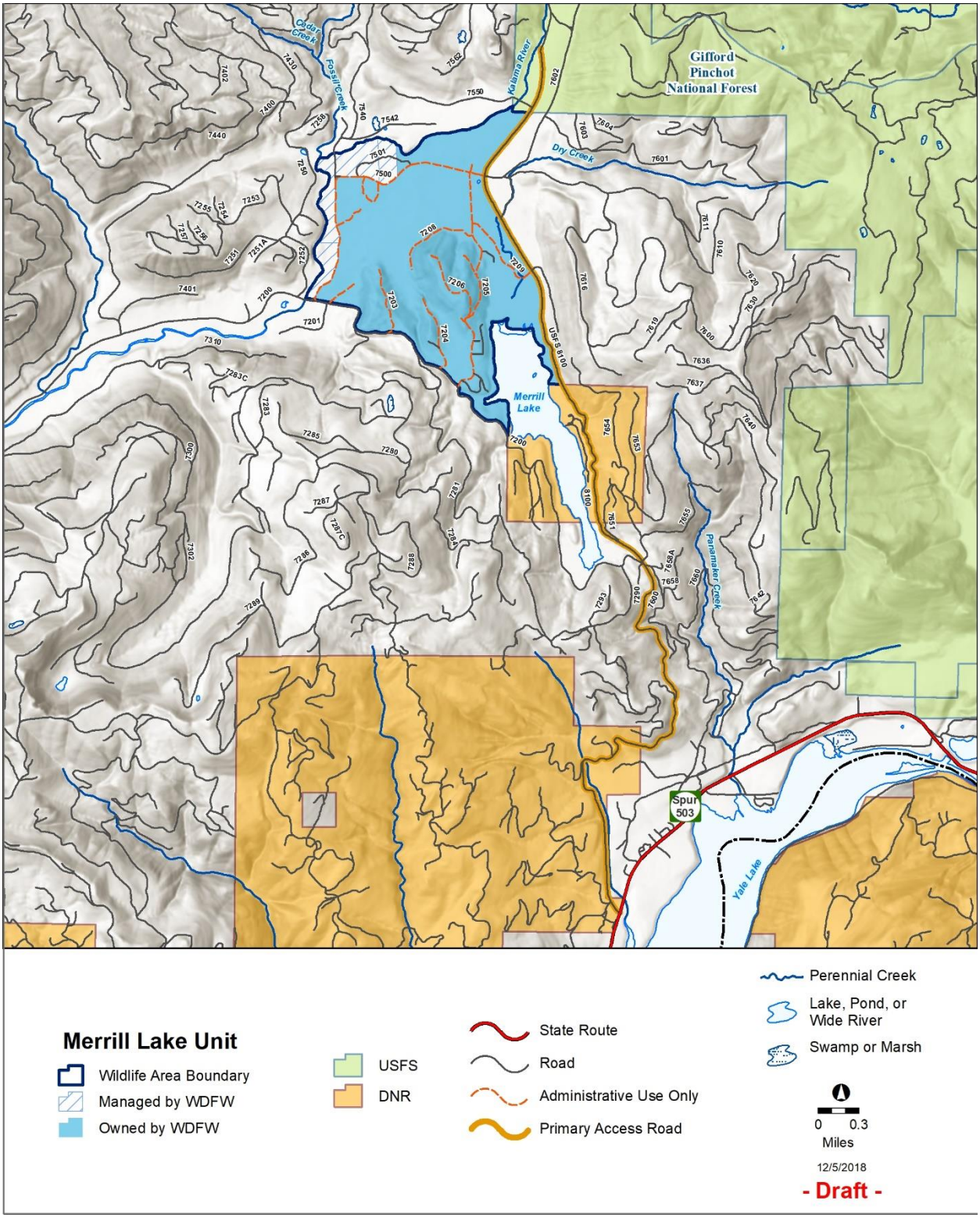

Figure 5. Merrill Lake Unit.

Gardner

Gardner Unit Summary		
Size	-	**43 acres**
Acquisition Dates	-	1968
Acquisition Funding	-	Recreation Conservation Office
Location	-	Township: 10N Range: 1E Sections: 20,29
Elevation	-	450 ft
Recreational Opportunities	-	Fishing and wildlife viewing
Access	-	**Driving Directions** From State Route 504 in the town of Toutle turn south onto S. Toutle River Road and travel about 1/2 half mile. Access is through Harry Gardner Park on north side of the road.

In 1968, the Gardner Unit was purchased with funding from RCO. The entire unit is in the floodplain of the Toutle River and was covered by the debris flow from the eruption of Mount St. Helens. The unit is mostly loose rock and volcanic ash, with some scrub shrub riparian vegetation. The Toutle River in this area is an important migration pathway and spawning area, and provides rearing habitat for anadromous salmonids. Two separate fish restoration projects have been constructed in the area, in which engineered logjams were installed to reduce erosion along the riverbank and river channel migration. The project areas were also planted with trees and shrubs to establish riparian habitat along the river.

The 43-acre unit is located at the confluence of the North and South Fork Toutle rivers near Toutle in Cowlitz County, and adjacent to Harry Gardner Park. The park is operated by Cowlitz County Parks and Recreation and offers both overnight camping and day use recreation. Overnight camping is not allowed on the WDFW property.

Primary management objectives for this unit include:

- Seek funding and construction opportunities to stabilize the river bank along the wildlife area (1C).
- Conduct salmonid monitoring annually (5A).
- Work with stakeholders and partners to leverage funding to identify and implement fish habitat restoration efforts (5B).

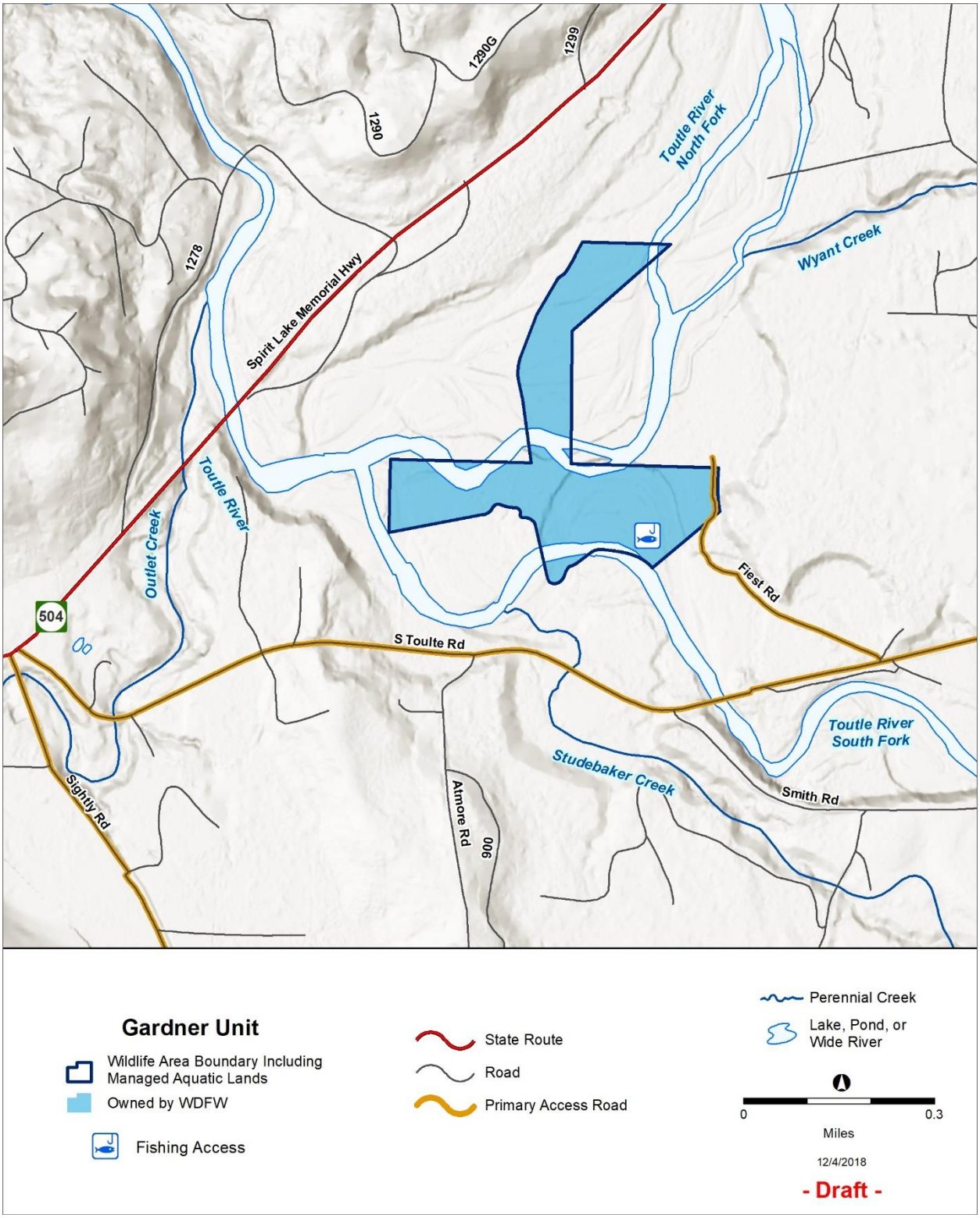

Figure 6. Gardner Unit.

Silver Lake Units

This section describes the Silver Lake Units of the Mount St. Helens Wildlife Area, which include the Hall Road and Canal Road units.

Hall Road

Hall Road Unit Summary		
Size	-	**132 acres**
Acquisition Dates	-	1952, 1956, 1964, 1966,
Acquisition Funding	-	U. S. Fish and Wildlife Service – Dingell Johnson
Location	-	Township: 10N Range: 1W Sections: 25,26
Elevation	-	450 - 500 ft
Recreational Opportunities	-	Hunting and fishing
Access	-	The site straddles State Route 504 at about MP 10 in Cowlitz County. Most of the site is within Silver Lake.

The Hall Road Unit was acquired between 1952 and 1966 in four separate purchases with funds from the U.S. Fish and Wildlife Service (USFWS). The unit habitat is characterized by wetland and riparian forest.

The 132-acre Hall Road Unit is located along the northern shore of Silver Lake west of the town of Toutle in Cowlitz County. The area is located on both the north and south side of State Route 504, and between Silver Lake and Hall Road on the south side of the highway. On the north side of the highway, part of the unit was a community baseball field which is now in the process of being removed. The unit has a small parking area on the north side of the highway. There are no boat launch facilities, but canoes and kayaks are launched from alongside the highway into the lake.

The unit is managed for waterfowl, songbirds, wading birds, and black-tailed deer. WDFW annually stocks rainbow trout at Silver Lake and manages warm water species including bass, crappie, carp, and other species. The unit is adjacent to many small acreage residences.

Primary management objectives for this unit include:

- Maintain annual lake fishing opportunities (6E).

Canal Road

Canal Road Unit Summary		
Size	-	**141 acres**
Acquisition Dates	-	1955, 1956, 1966
Acquisition Funding	-	USFWS – Dingell Johnson
Location	-	Township: 9N Range: 1E Section: 6
Elevation	-	500 ft
Recreational Opportunities	-	Hunting, fishing and boating
Access	-	**Driving Directions** Lega

The Canal Road Unit was acquired through three separate purchases in 1955, 1956, and 1966 with funds from the USFWS. The unit consists of wetlands, riparian habitats, and the open water of Silver Lake, and has been managed for waterfowl, wetland habitat, and fishing access.

The 141-acre unit is located in eastern Cowlitz County along the eastern side of Silver Lake, south of Toutle. The unit is partially bisected by Canal Road in the eastern portion of the unit. WDFW annually stocks Silver Lake with rainbow trout and also manages warm water species including bass, crappie, carp, and other species. Waterfowl hunting is popular. There is no boat launch at this site, but some people launch kayaks and canoes along Canal Road to access the interior of this unit. There is no parking area at this unit, however, Cowlitz County property nearby provides a parking area.

Primary management objectives for this unit include:

- Maintain annual lake fishing opportunities (6E).

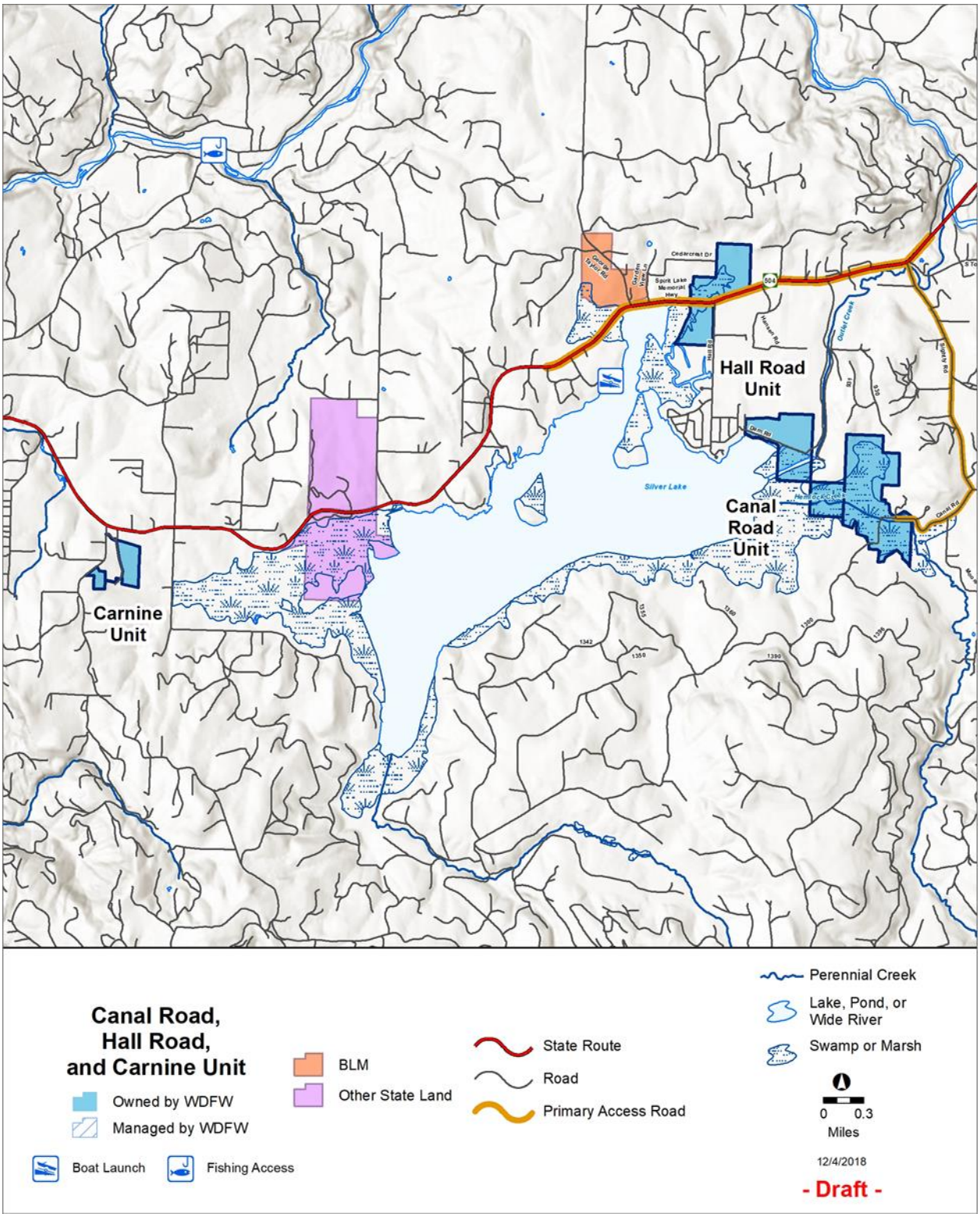

Figure 7. Silver Lake Units.

Carnine Unit

WILDLIFE AREA INFORMATION		
Size	-	**37 acres**
Acquisition Dates	-	1980
Acquisition Funding	-	Donation
Location	-	Township: 9N Range: 1W Section: 6
Elevation	-	800 ft
Recreational Opportunities	-	None
Access	-	No public access.

The Carnine Unit was donated in 1980 with the intent to provide public access for hiking and nature viewing. However, there is currently no public or WDFW access, and no hunting is allowed. The Carnine Unit includes two parcels totaling 37 acres overlooking Silver Lake, west of the town of Toutle in Cowlitz County. The parcels are forested and provide habitat for black-tailed deer, and numerous songbird species amongst rural residential developments. The parcels are landlocked by private properties, and even though WDFW holds legal easements across these properties, the landowners are unwilling to allow public access. If this cannot can be provided, the agency intends to surplus the property, returning them to the grantors estate.

Primary management objectives for this unit include:

- The Carnine and Nelson units are potential candidates for surplus; work with Real Estate Services to implement (8A).

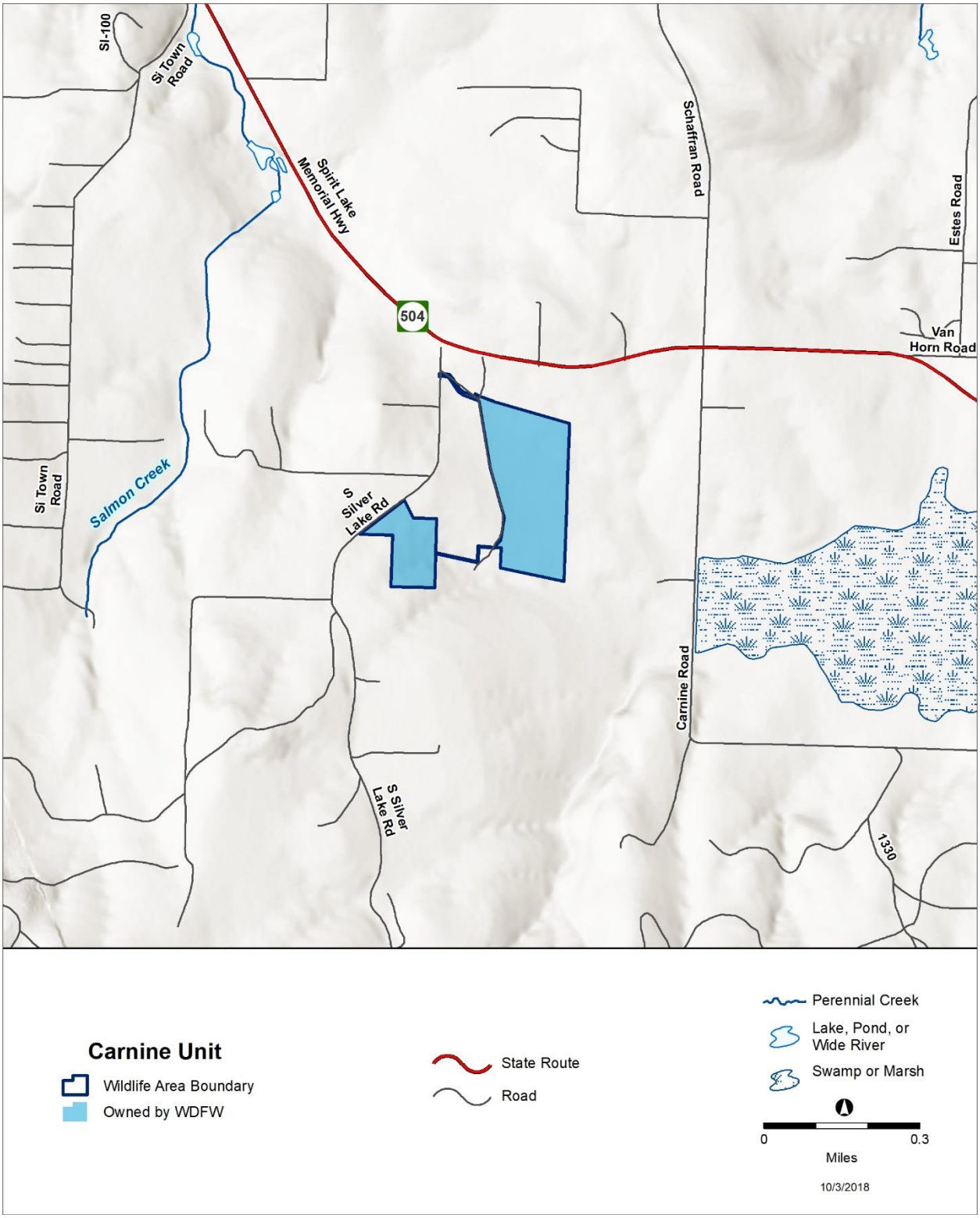

Figure 8. Carnine Unit.

Fisher Island

Fisher Island Unit Summary		
Size	-	**259 acres**
Acquisition Dates	-	1996, 1997
Acquisition Funding	-	Recreation Conservation Office – Washington Wildlife and Recreation Program
Location	-	Township: 8N Range: 3W Sections: 20,21,22
Elevation	-	0-15 ft
Recreational Opportunities	-	Hunting and fishing
Access	-	Access by boat from the Willow Grove boat launch on the Columbia River. The island is just upstream from the ramp.

Fisher Island, accessible only by boat, is a 259-acre unit in the Columbia River, downstream of Longview in Cowlitz County. The unit also includes Hump Island, southwest of Fisher Island. The agency acquired the unit in 1996 and 1997 with funding from RCO. The Willow Grove Boat Launch, operated by Cowlitz County Parks and Recreation, is the closest boat launch. The agency maintains Fisher Island as a forested floodplain. Adjacent to the unit is a large sheltered wetland owned by DNR. Both the unit and the DNR wetland are open to public access and hunting. Due to its close proximity to Longview, the wetland area is a very popular waterfowl hunting spot. The island is also habitat for the federally threatened Columbian white-tailed deer.

Primary management objectives for this unit include:

- Develop strategy for riparian/wetland restoration projects to benefit fish and wildlife species (4B).
- Implement recommendations from the Population and Habitat Viability Assessment for the Columbian White-tailed Deer (4D).
- Work with stakeholders and partners to leverage funding to identify and implement fish habitat restoration efforts (5B).

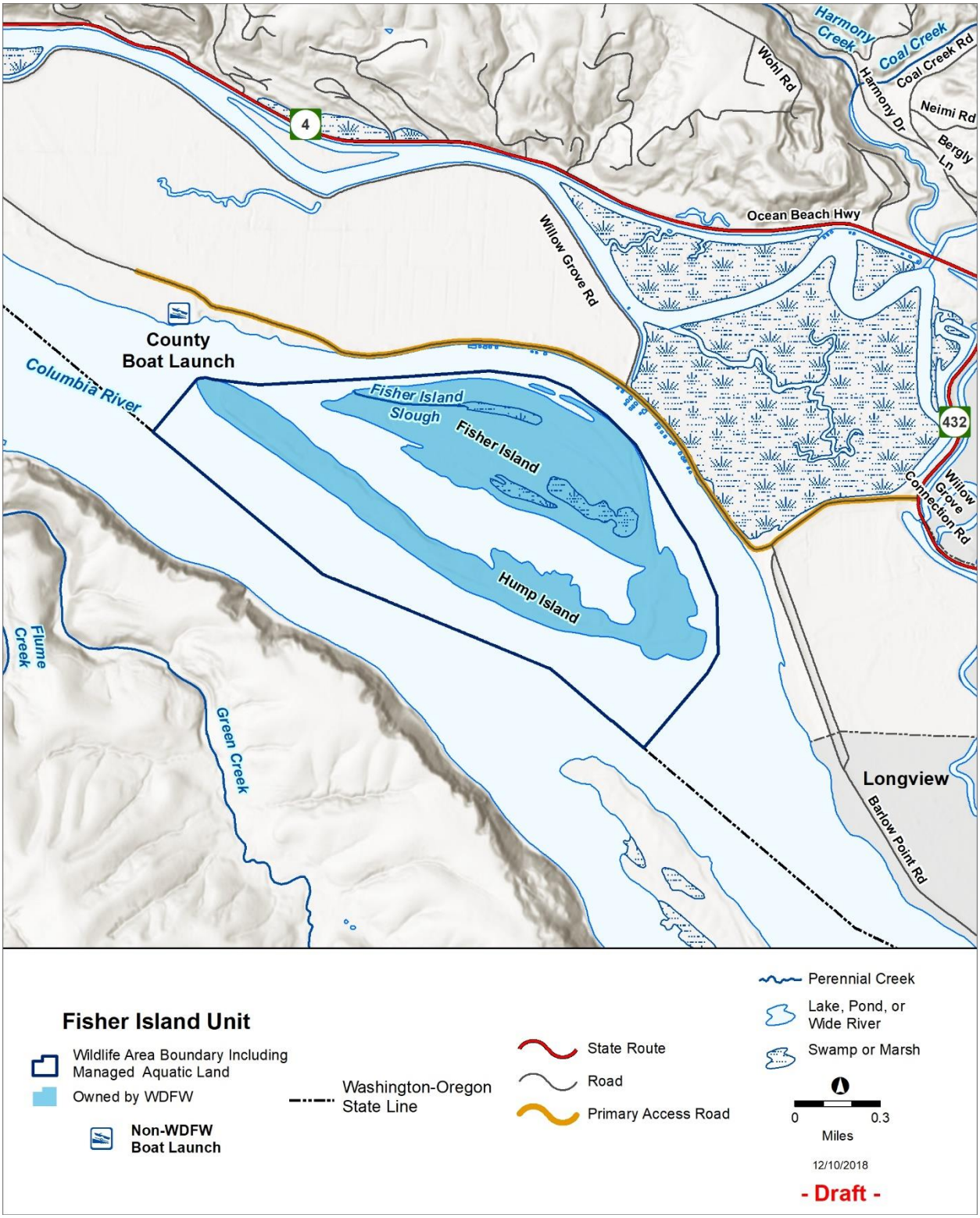

Figure 9. Fisher Island Unit.

Abernathy Creek Unit

Abernathy Creek Unit Summary		
Size	-	**101 acres**
Acquisition Dates	-	1933
Acquisition Funding	-	Cowlitz County transfer
Location	-	Township: 8N Range: 4W Sections: 3,10
Elevation	-	0 – 100 ft
Recreational Opportunities	-	Hunting and fishing
Access	-	10 miles west of Longview along State Route 4

The Abernathy Creek Unit was a transfer in 1933 from the Cowlitz Game Commission. The 101-acre unit is located west of Longview in Cowlitz County, upstream of the confluence of Abernathy Creek and Columbia River. The unit is a mix of riparian and mature upland forest habitat along Abernathy and Cameron creeks. The area is adjacent to Abernathy Creek Road on the east, and Cameron Creek Road on the west, and the Columbia River to the south. Abernathy Creek is one of three creeks in the area comprising the Lower Columbia Intensively Monitored Watershed project. Several salmon enhancement projects have occurred on the unit, including construction of engineered logjams, placement of large woody debris, reconnection of side channels, and riparian plantings.

The unit provides fishing access to Abernathy Creek as well as the Columbia River. The unit is open to hunting as well, but due to its proximity to roads and its relatively small size, hunters should use extreme caution while using firearms in this area.

Primary management objectives for this unit include:

- Develop strategy for riparian/wetland restoration projects to benefit fish and wildlife species (4B).
- Conduct salmonid monitoring annually (5A).
- Work with stakeholders and partners to leverage funding for identifying and implementing fish habitat restoration efforts (5B).

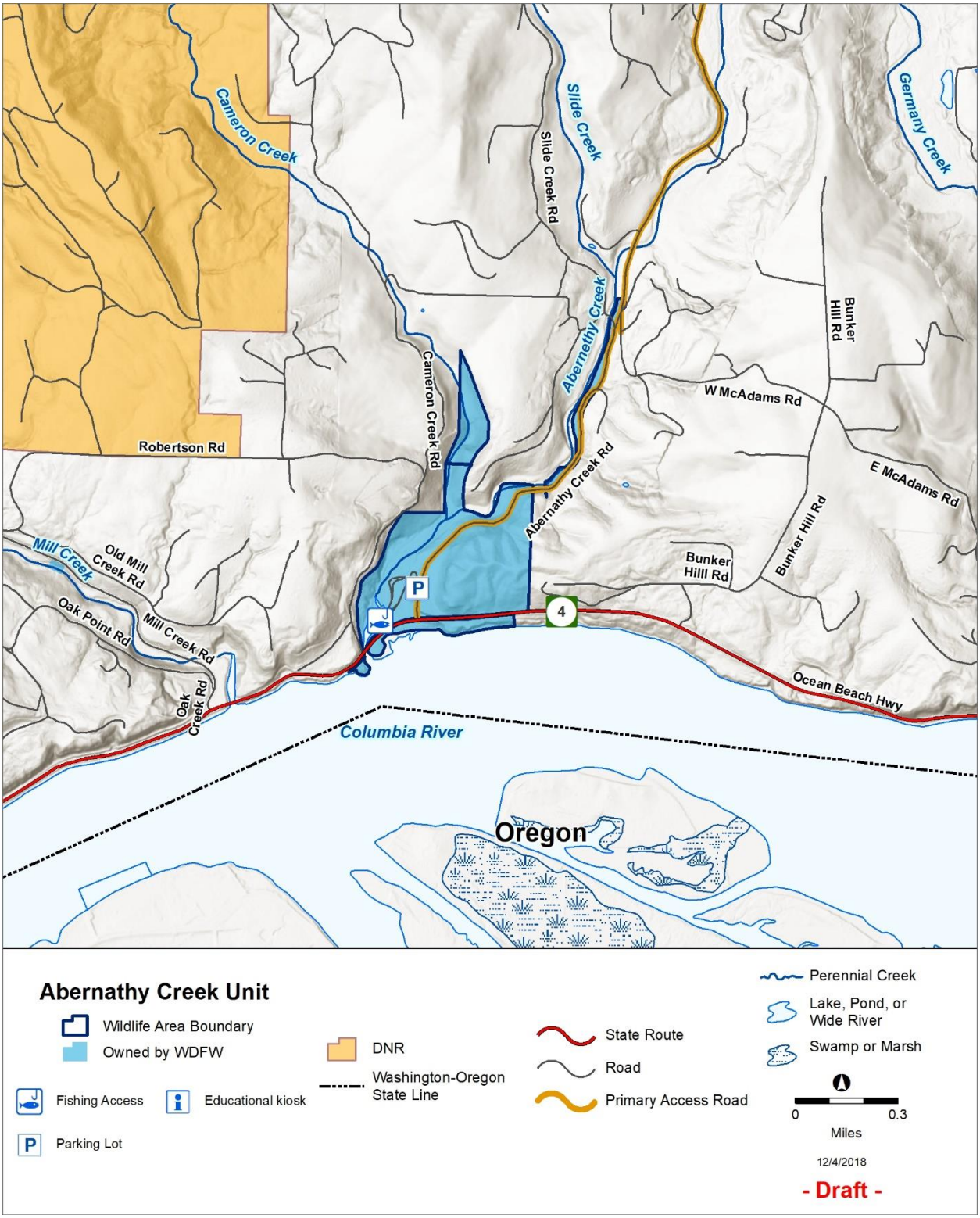

Figure 10. Abernathy Unit.

White Island Natural Area Preserve

White Island Natural Area Preserve Summary		
Size	-	**186 acres**
Acquisition Dates	-	1960
Acquisition Funding	-	State Wildlife Funds
Location	-	Township: 8N Range: 5W Section: 29,30
Elevation	-	5-15 ft
Recreational Opportunities	-	Hunting, fishing, wildlife viewing
Access	-	The unit can only be accessed by boat and the Puget Island water access site provides a boat launch to the site.

White Island is a 186-acres unit accessible only by boat. The department acquired the unit in 1960 with State Wildlife Funds. It later was designated a Natural Area Preserve for its undisturbed black cottonwood-willow riparian habitat, freshwater wetland, and presence of federally endangered Columbian white-tailed deer.

This Columbia River island is in Wahkiakum County south of Cathlamet, just upstream of Puget Island. A narrow slough separates White Island from Puget Island. Hunting, fishing, hiking, and other day-use recreation is allowed, but camping is prohibited. Over time, the land area has increased from past dredge spoils around the western shoreline of the Columbia River. These are not included in the natural area boundary. Puget Island is home to the largest Columbian white-tailed deer population, and deer often travel between the two islands.

Primary management objectives for this unit include:

- Implement recommendations from the Population and Habitat Viability Assessment for the Columbian White-tailed Deer (4D).
- Implement the strategy to monitor and manage the White Island Natural Area by July, 2019 (7D).

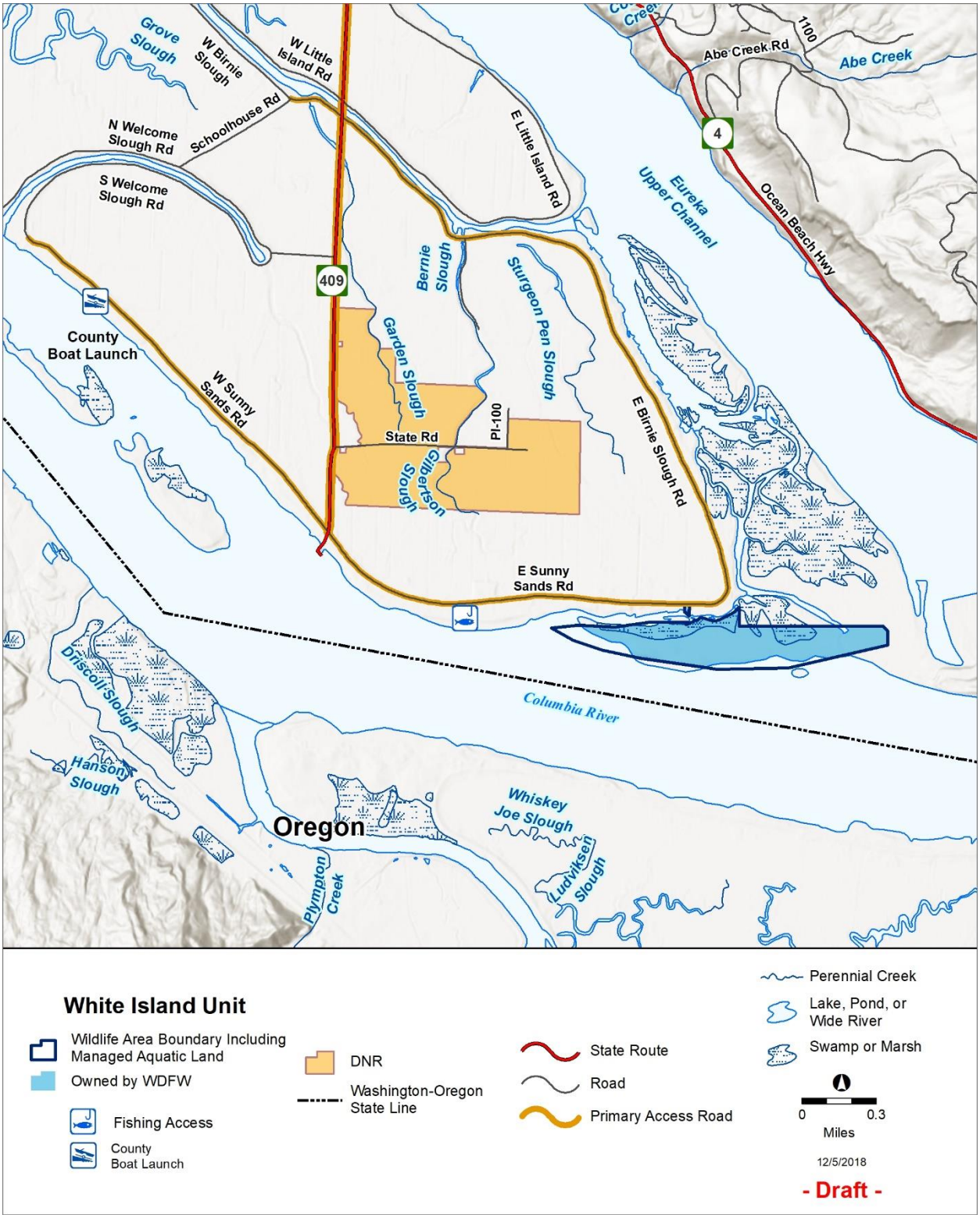

Figure 11. White Island Unit.

Altoona Unit

Size	-	177 Acres
Acquisition Dates	-	1991, 2012
Acquisition Funding	-	U. S. Fish and Wildlife Service – Coastal Wetland; Recreation Conservation Office – Washington Wildlife and Recreation Program, Salmon Recovery Funding Board
Location	-	Township: 10N Range: 8W Section: 32
Elevation	-	0 - 50 ft AMSL
Recreational Opportunities	-	Fishing, hunting and boating
Access	-	**Driving Directions** Route 1 to the tidelands and Oneida Boat Launch: From Skamokawa, travel west 18 miles on State Highway 4 to Oneida Road. Turn south on Oneida Road and drive two miles to the Oneida Access Site and boat launch. The tideland parcel starts half-mile downstream on Deep River. Route 2 to the eastern-most, upland sitka spruce parcel: From State Highway 4 in Wahkiakum County, turn south onto Mill Pond Road. Go about half-mile then turn left onto Miller Point road and travel about a quarter-mile to the site.

The Altoona Unit was acquired in 1991 and 2012 with a mix of RCO, Salmon Recovery Funding Board, and USFWS funding and includes two land parcels, one tidelands, a mudflat parcel and a water access site for a total of 177 acres located in Wahkiakum County. The eastern-most parcel is a 25-acre Sitka spruce forest located off of Miller Point Road. The larger parcel is 95 acres of tidelands and mudflats located south of Miller Point along the shoreline of Grays Bay between the Deep and Grays rivers, and is only accessible by boat.

The western parcel along Deep River is a 57-acre unit located along Oneida Road, and the Oneida Access Site is within this unit. This access site was acquired to provide fishing access and a boat launch to fisheries in the Columbia River Estuary. The boat launch gets high use during the sturgeon and salmon seasons. The launch is also used by boaters and waterfowl hunters for access to Grays Bay. The area supports a large population of wintering waterfowl. All of the units are open to the public year round and provide hunting opportunities for black-tailed deer and waterfowl.

Primary management objectives for this unit include:

- Develop a strategy to address Oneida county road issues/access by 2020 (6F).

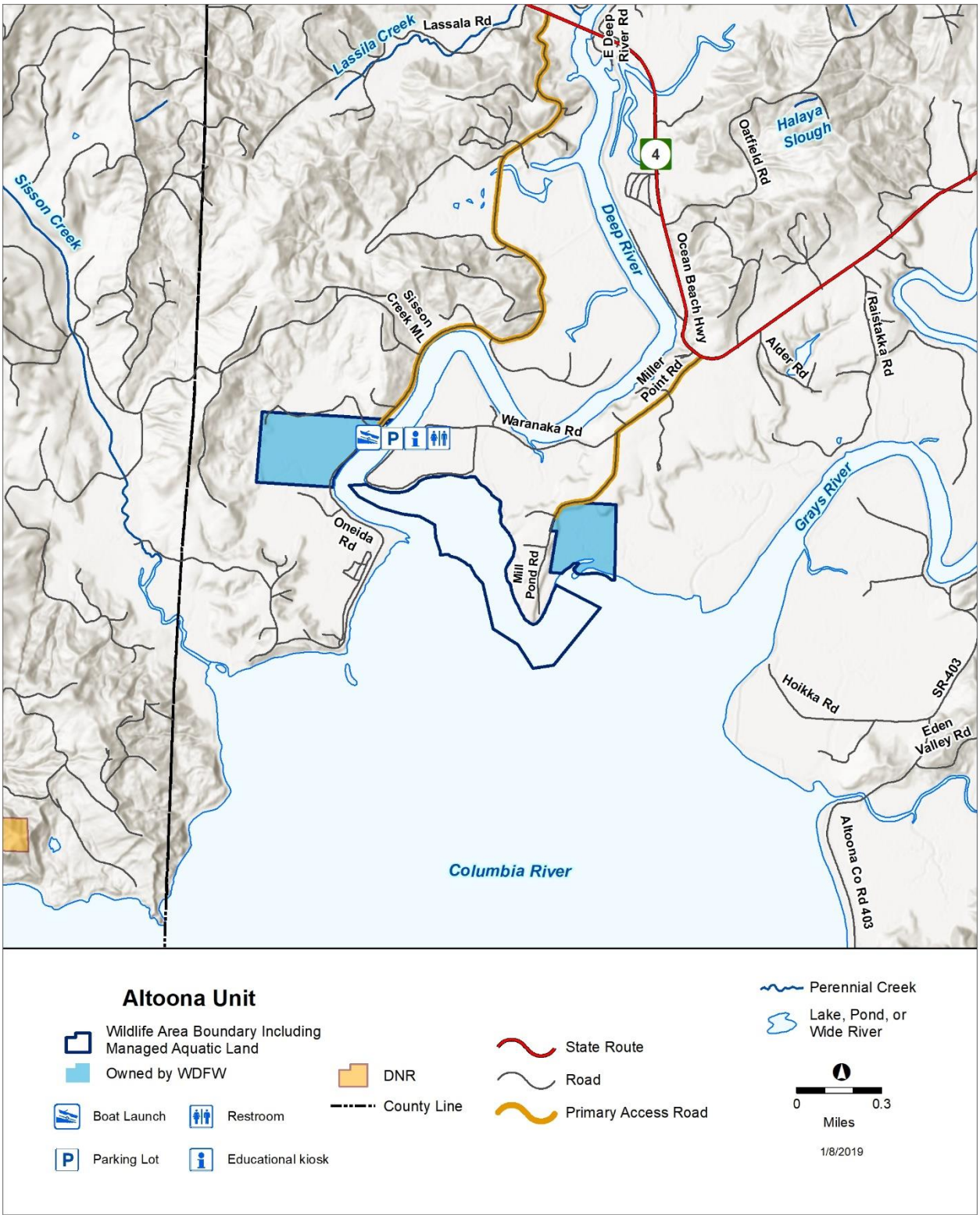

Figure 12. Altoona Unit.

Nelson Unit

Size	-	55 Acres
Acquisition Dates	-	1982
Acquisition Funding	-	Port of Kalama mitigation
Location	-	Township: 7N Range: 1,2W Sections: 25,30
Elevation	-	0 - 15 ft AMSL
Recreational Opportunities	-	Hunting
Access	-	Very small site at downstream tip of the Port of Kalama area. Accessible only by boat.

The Nelson Unit was acquired in 1982 as mitigation for Port of Kalama development. The unit contains two separate parcels for a total of 20 acres located on the Columbia River, and a 35-acre lease with the Port of Kalama along the Kalama River just upstream of the confluence with the Columbia River. The unit is located in western Cowlitz County, west of the Kalama River and Interstate 5. Access to the 20-acre parcel on the Columbia River is boat only, and the 35-acre parcel is accessed off of Sportsman's Loop Road. Both parcels are managed as wetland habitat for fish and wildlife, including waterfowl. The 20-acre parcel is open to hunting, but hunting is not allowed in the leased 35-acre parcel.

Primary management objectives for this unit include:

- Work with stakeholders and partners to leverage funding for identifying and implementing fish habitat restoration efforts (5B).

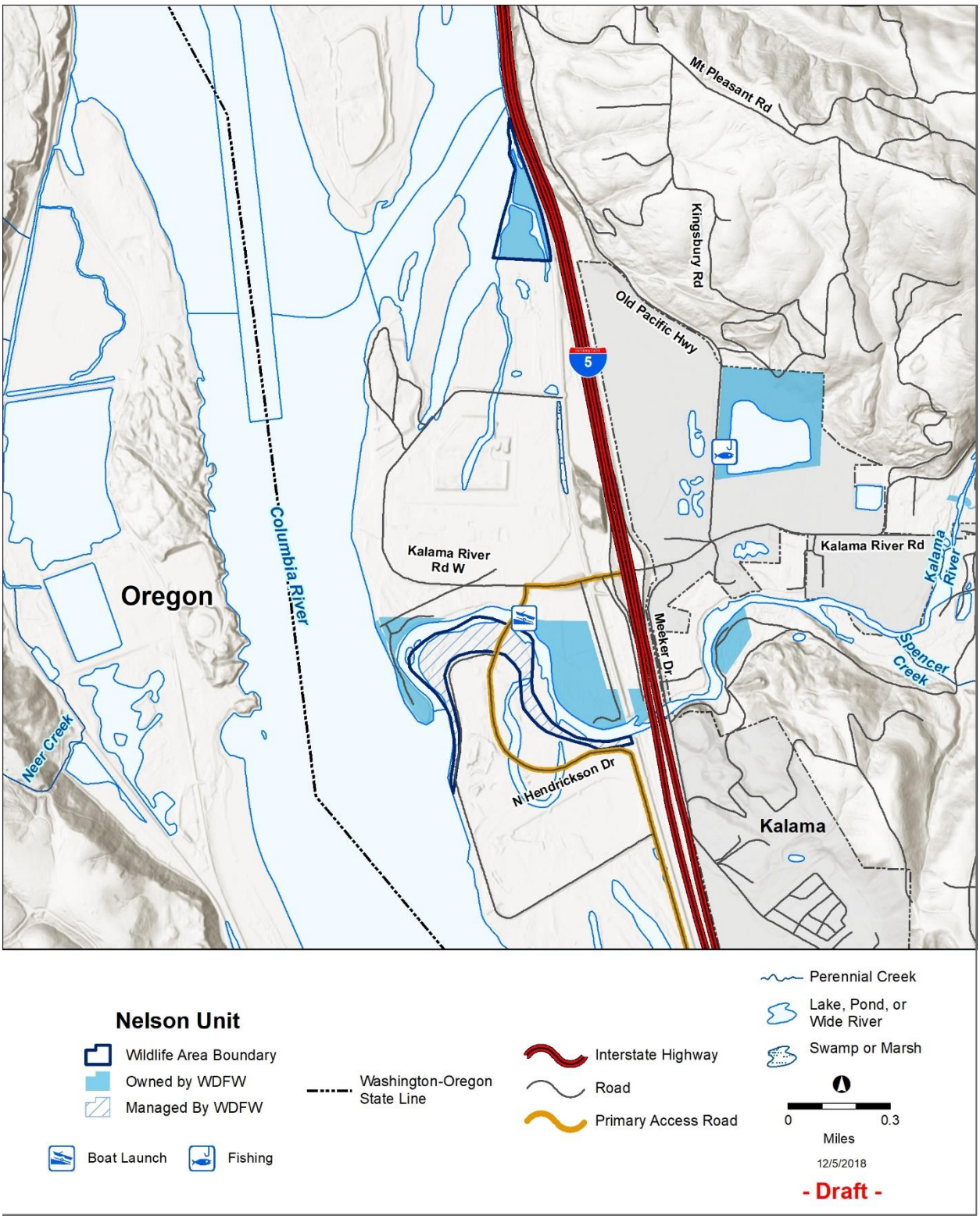

Figure 13. Nelson Unit.

Cedar Creek Unit

WILDLIFE AREA INFORMATION		
Size	-	**139 acres**
Acquisition Dates	-	1955, 1960, 1962
Acquisition Funding	-	USFWS – Pittman Robertson, State Wildlife Funds, Donation
Location	-	Township: 5N Range: 2E Section: 11
Elevation	-	300-750 ft
Recreational Opportunities	-	Hunting, hiking and wildlife viewing
Access	-	From the west: Interstate 5 exit 21 (Woodland Cougar exit), turn east onto Highway 503, then south on NW Hayes Rd, which will cross the North Fork of the Lewis River. Continue east on NW Hayes Rd. which becomes Cedar Creek Rd. About 12 miles from Woodland the wildlife area will be on the east side of the road just before Cedar Creek Road crosses Cedar Creek and joins with Pup Creek RD. From the south: Take 503 north from the Vancouver area through Farger Lake. Turn north onto 166th, which becomes 167th. Turn west onto NE 379th which becomes NE 164th, which becomes NE Reid Rd. which becomes NE Munch Rd. At the intersection of NE Munch Rd and Cedar Creek Rd. turn east onto Cedar Creek Rd. Go about .5 miles and the wildlife area will be on the east side of the road just before Cedar Creek Road crosses Cedar Creek. **Parking/Restroom Information** There is a small pull out by the gate to the wildlife area. There are no restrooms.

The Cedar Creek Unit was acquired in 1955, 1960, and 1962 for the conservation of band-tailed pigeon habitat, with funding from the U.S. Fish and Wildlife Service Pittman Robertson Act and State Wildlife Funds. The 139-acre unit is located in northern Clark County, east of Woodland and west of Amboy. The unit is located off of Cedar Creek Road east of the intersection with Pup Creek Road on the south side of Cedar Creek. The unit consists of open fields, mature red alder and Douglas fir forests, and mineral springs (provide dietary mineral supplements) essential for band-tailed pigeons. Black-tailed deer are present year-round, and elk often over winter on the site.

The unit is a popular place to hunt band-tailed pigeons, and receives moderate use during deer seasons. It is located within the Battle Ground Game Management Unit (GMU 564), where rifle use is prohibited. The unit has been enhanced for band-tailed pigeons and other wildlife through the planting of native fruit bearing trees for birds, as well as providing cover for other species. These tree plantings were funded by the State Migratory Bird Stamp, and as mitigation for county road upgrades in the area. Cedar Creek is an important migratory pathway, spawning area, and juvenile rearing habitat for anadromous salmonids.

Primary management objectives for this unit include:

- Promote diversity of early and late successional forest habitat by identifying planned areas for forest treatment for the next 10 years (2A).
- Develop strategy for riparian/wetland restoration projects to benefit fish and wildlife species (4B).
- Maintain and enhance habitat conditions at mineral sites (4F).
- Maintain and enhance foraging habitat for band-tailed pigeons (4G).
- Develop and implement habitat management activities for game species with partners (4H).
- Work with stakeholders and partners to leverage funding for identifying and implementing fish habitat restoration efforts (5B).
- Conduct salmonid monitoring annually (5A).

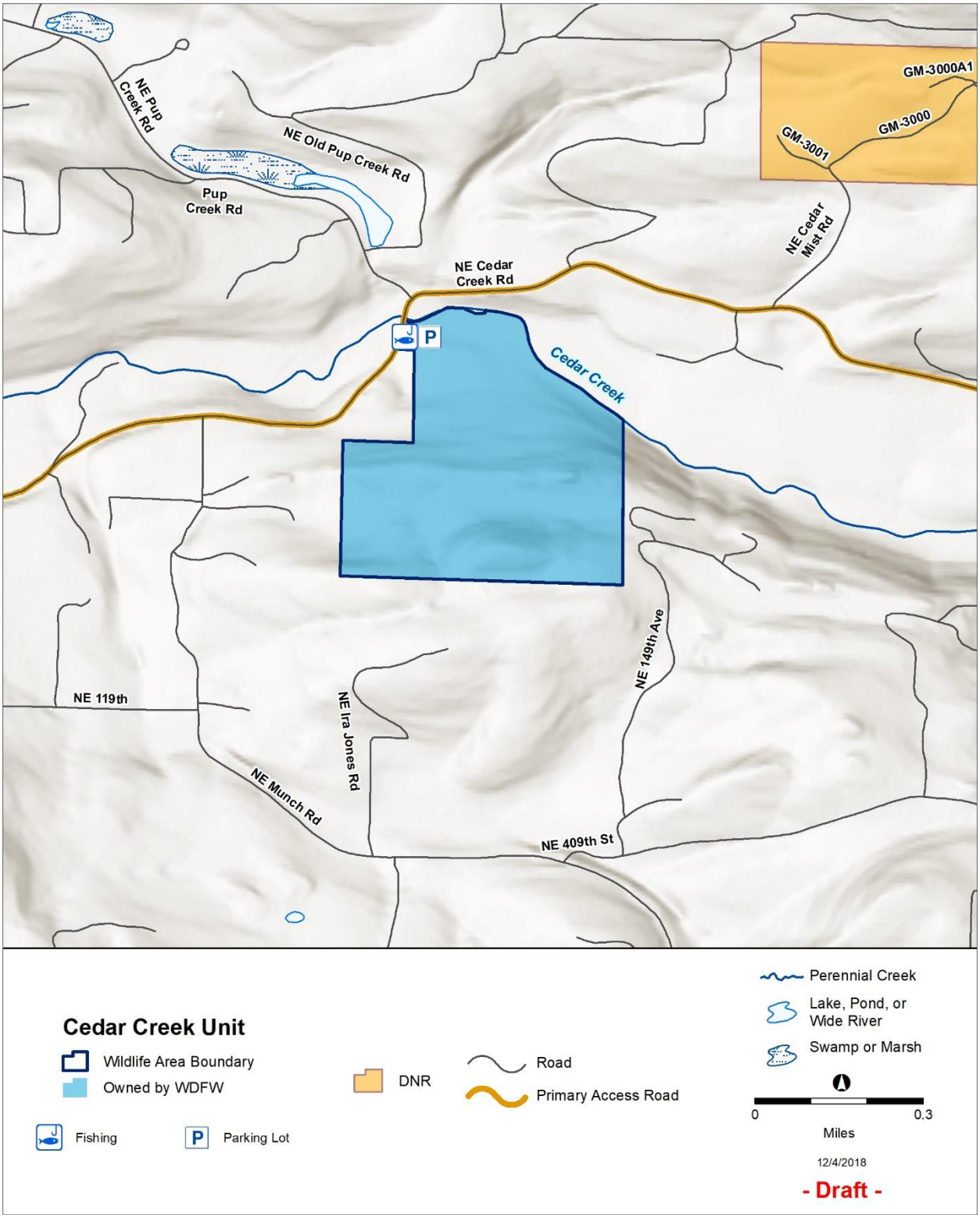

Figure 14. Cedar Creek.

Eagle Island Unit

WILDLIFE AREA INFORMATION

Size	-	**279 acres**
Acquisition Dates	-	2011
Acquisition Funding	-	Recreation Conservation Office – Salmon Recovery Funding Board, Aquatic Lands Enhancement Account
Location	-	Township: 5N Range: 1E Section: 4, 8, 9
Elevation	-	20-40 ft
Recreational Opportunities	-	Hunting and fishing
Access	-	**Driving Directions** This unit is only accessible by boat or by wading across the river from the Island Boat Ramp during low flow periods in the summer. The Island Boat Ramp is located approximately 5 miles east of Woodland along Lewis River Road/State Highway 503. Launching a boat during low flow periods at the Island Boat Ramp is not advised due to the shallow depth of the river adjacent to the launch area. **Parking/Restroom Information** There is a large parking lot at the Island Boat Ramp and restrooms. Overnight parking is not permitted. The access site is maintained by PacifiCorp.

The Eagle Island Unit was acquired in 2011, through a grant from RCO, and is located along the North Fork Lewis River in both Clark and Cowlitz counties, approximately five miles east of Woodland. Access to the island is by boat. The 279-acre unit consists of mature floodplain, riparian forest, and open meadow. The area is managed for side channel and riparian habitat for salmonids, as well as habitat for black-tailed deer, waterfowl, songbirds, and birds of prey. Anadromous native fish use this area for migration, juvenile rearing, and spawning. The unit serves as a potential band-tailed pigeon enhancement site. Several fish habitat enhancement projects have taken place in this unit, and those boating along the island are advised to use caution as a number of logjam structures have been built along the shoreline and into the river adjacent to the island. Restoration of the upland portion of the island began in 2018, with the removal of over 100 acres of Scotch broom to improve wildlife habitat.

Boaters should note that the boat launch at the WDFW Eagle Island Access Site (maintained by PacifiCorp) is not useable during much of the year, as the area around the bottom of the ramp is filled in with rock and gravel, making the water levels very shallow.

Primary management objectives for this unit include:

- Maintain and enhance foraging habitat for band-tailed pigeons (4G).
- Develop and implement habitat management activities for game species with partners (4H).
- Conduct salmonid monitoring annually (5A).
- Work with stakeholders and partners to leverage funding to identify and implement fish habitat restoration efforts (5B).

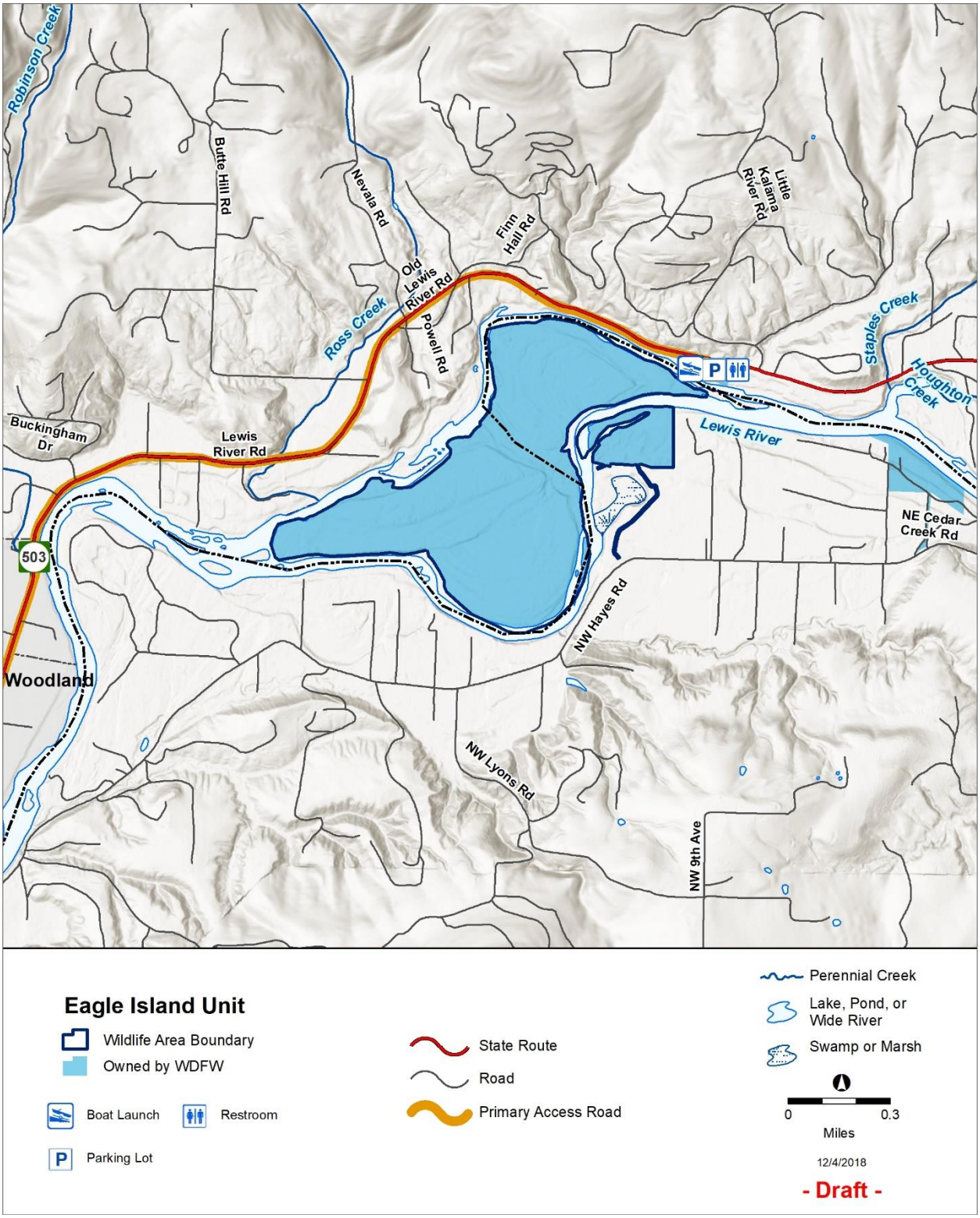

Figure 15. Eagle Island Unit.

Jenny Creek Unit

WILDLIFE AREA INFORMATION		
Size	-	**20 acres**
Acquisition Dates	-	1959
Acquisition Funding	-	USFWS – Pittman Robertson
Location	-	Township: 5N Range: 1E Section: 33
Elevation	-	200-300 ft
Recreational Opportunities	-	Hunting
Access	-	**Driving Directions** From I-5 North, take Exit 21 (Woodland), turn north 1 block, to East CC St. and go over bridge. Turn south onto NW Pacific Highway and go 4 miles to NW Bolen St. Turn east onto NW Bolen St. and go 0.25 miles and turn north onto NW 14th Ave. Go 0.30 miles on NW 14th Ave. There is a parking area on the eastside of the road at the top of the hill.

The Jenny Creek Unit was acquired in 1959 with USFWS Pittman Robertson funding to protect habitat for band-tailed pigeons, who use the mineral spring on site. The 20-acre parcel is located north of La Center in Clark County. The unit is a mix of open fields and forest. A primary management objective of the unit is to restore the spring, which is no longer functioning due to sedimentation and the establishment of non-native vegetation. Restoration activities, including vegetation control to improve ponding and planting of fruit bearing trees, are underway with funding from the State Migratory Duck Stamp Program.

There is a small dirt parking area in the northwest corner of the parcel, located off of NW 14th Avenue, which turns to mud during the rainy season. Jenny Creek is a narrow stream with deep cut banks and there are no crossings or bridges to get from the parking area to the east side of the stream. Hunting is allowed. This area is within the Battle Ground GMU (GMU 564), which is prohibits use of riffles.

Primary management objectives for this unit include:

- Develop strategy for riparian/wetland restoration projects to benefit fish and wildlife species (4B).
- Maintain and enhance habitat conditions at mineral sites (4F).
- Maintain and enhance foraging habitat for band-tailed pigeons (4G).

- Develop and implement habitat management activities for game species with partners (4H).

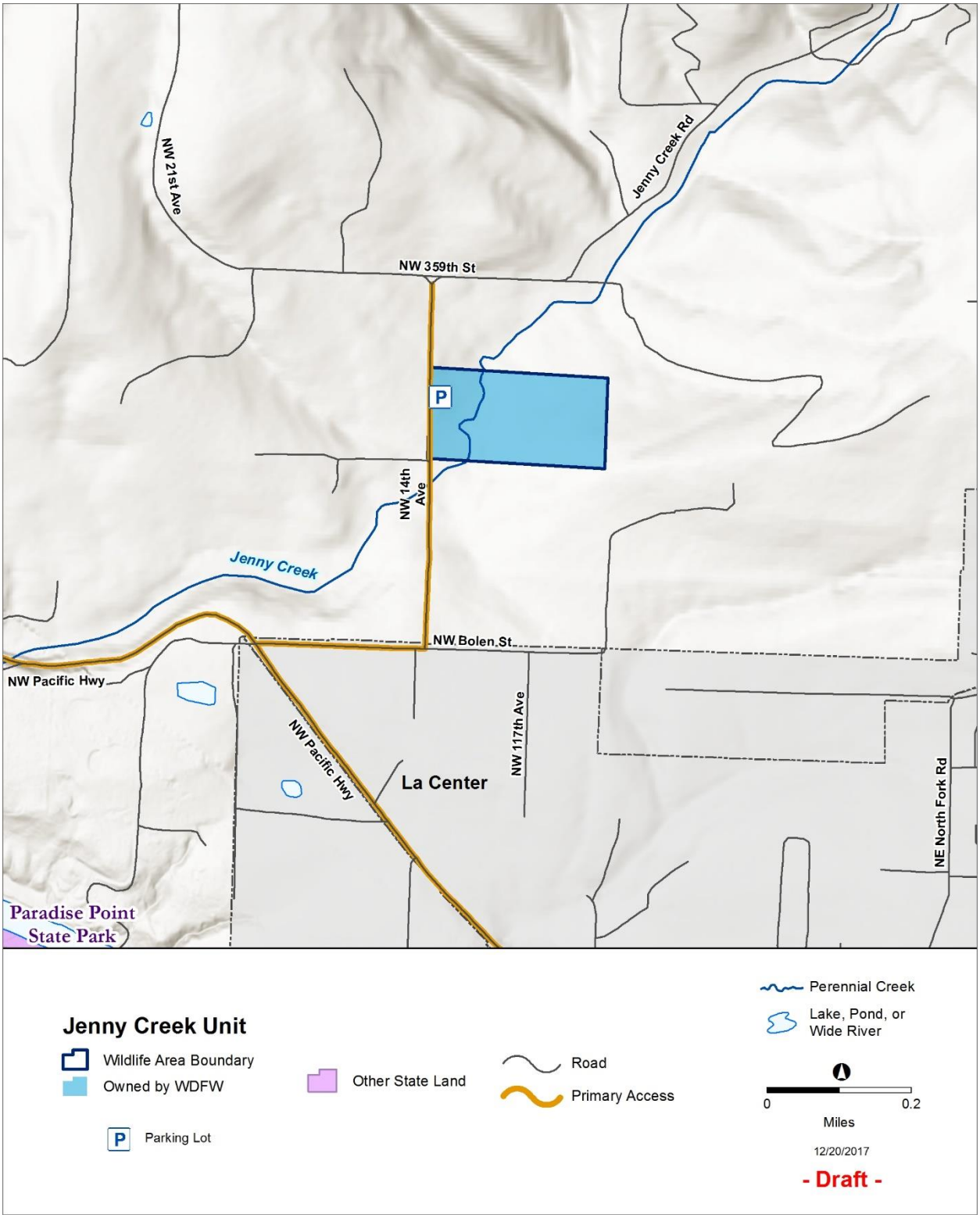

Figure 16. Jenny Creek Unit.

Two Forks Unit

WILDLIFE AREA INFORMATION		
Size	-	**49 acres**
Acquisition Dates	-	1990, 2016
Acquisition Funding	-	Recreation Conservation Office – Washington Wildlife and Recreation Program
Location	-	Township: 5N Range: 1E Section: 32
Elevation	-	10-25 ft
Recreational Opportunities	-	Hunting, wildlife viewing and fishing
Access	-	**Driving Directions** From the town of Woodland, cross the Lewis River and travel south on NW Pacific Highway about two miles to Toenjes Rd. Turn right. Site is about 1/4 mile on right just after crossing under Interstate 5. **Parking/Restroom Information** The Two Forks water access site provides walk-in access only.

The Two Forks Unit was acquired in 1990 with funding from RCO, in addition to an in-holding parcel acquired in 2016 as a land exchange with Clark County Utilities for the use of an easement. The 49-acre unit is located at the confluence of the North and East forks of the Lewis River in northwest Clark County, west of Interstate 5 and south of Woodland. Access to the unit is off of Toejnes Road, with a small parking area directly below the Interstate 5 overpass. Habitat consists of mature black cottonwood riparian forest primarily managed for songbirds. Habitat exists for Columbian white-tailed deer, and they may expand their range into this area in the future. The East and North forks of the Lewis River in this area serve as migratory pathways and juvenile rearing habitat for anadromous salmonids. The unit provides fishing access to both rivers. Hunting is allowed, with waterfowl and black-tailed deer being the primary game species. This unit is also located within the Battle Ground GMU (GMU 564), which rifle use is prohibited.

Primary management objectives for this unit include:

- Implement recommendations from the Population and Habitat Viability Assessment for the Columbian White-tailed Deer (4D).

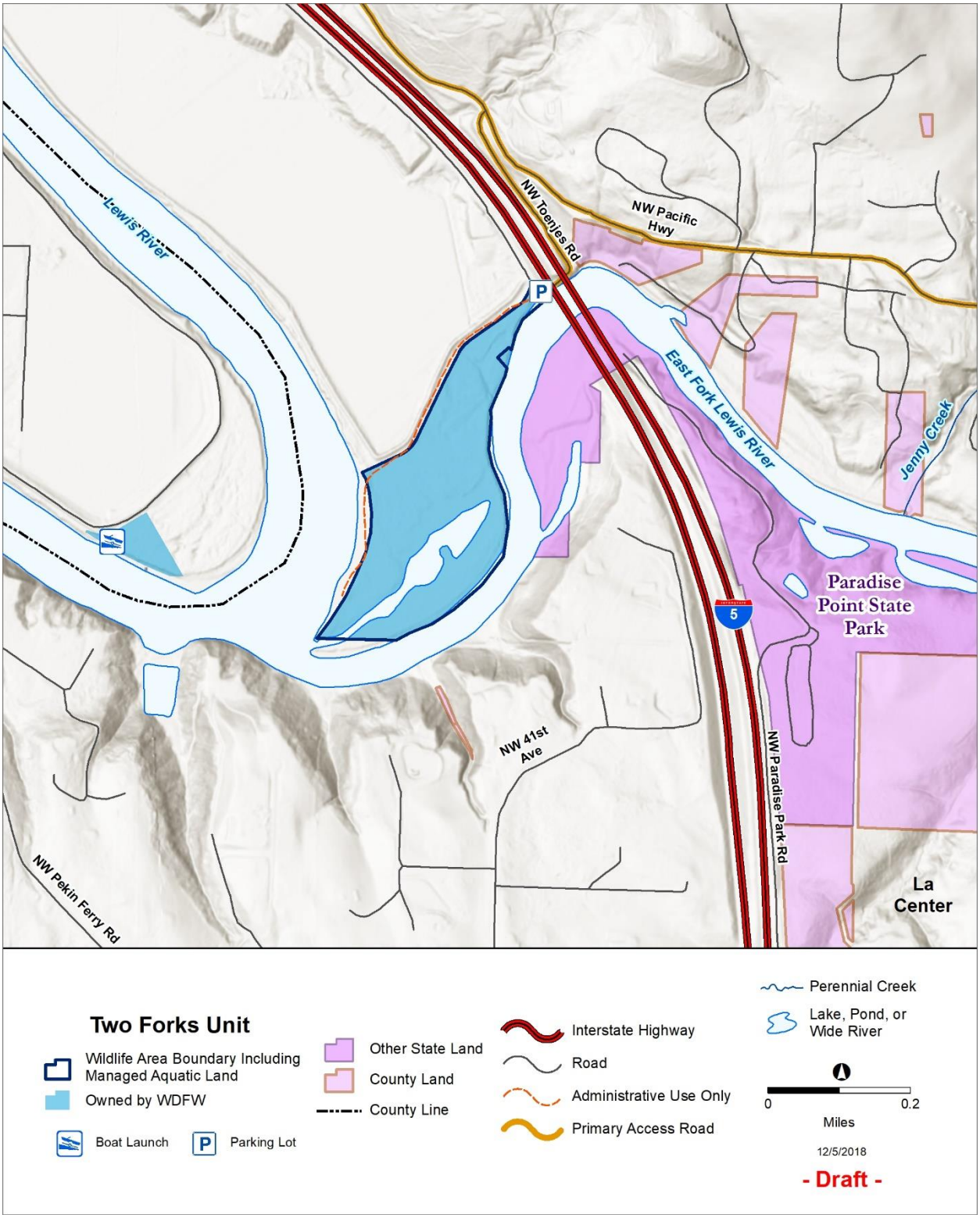

Figure 17. Two Forks Unit.

Duck Lake Unit

WILDLIFE AREA INFORMATION		
Size	-	**39 acres**
Acquisition Dates	-	1994
Acquisition Funding	-	Ducks Unlimited
Location	-	Township: 4N Range: 1E Section: 11
Elevation	-	20 ft
Recreational Opportunities	-	Hunting
Access	-	Accessible only by boat. About 2 miles upstream from the LaCenter Bridge on the East Fork Lewis River then a short walk across County Park lands to the site (not marked).

The Duck Lake Unit was acquired in 1994 with funding from Ducks Unlimited. The 39-acre unit is located in the floodplain of the East Fork Lewis River, upstream of La Center in Clark County. The unit provides wetland habitat for waterfowl, wading birds, songbirds, and juvenile salmonids during high flow events. The area is best accessed by boat from the East Fork Lewis River. Visitors can access the Duck Lake Unit on foot by crossing Clark County Legacy lands, which border the unit. The unit is open to hunting, however, hunting is prohibited on surrounding Clark County land. Several old drainage ditches are adjacent to and within the unit and visitors should use caution when accessing the unit.

The primary management objective for this unit include:

- Work with stakeholders and partners to leverage funding for identifying and implementing fish habitat restoration efforts (5B).

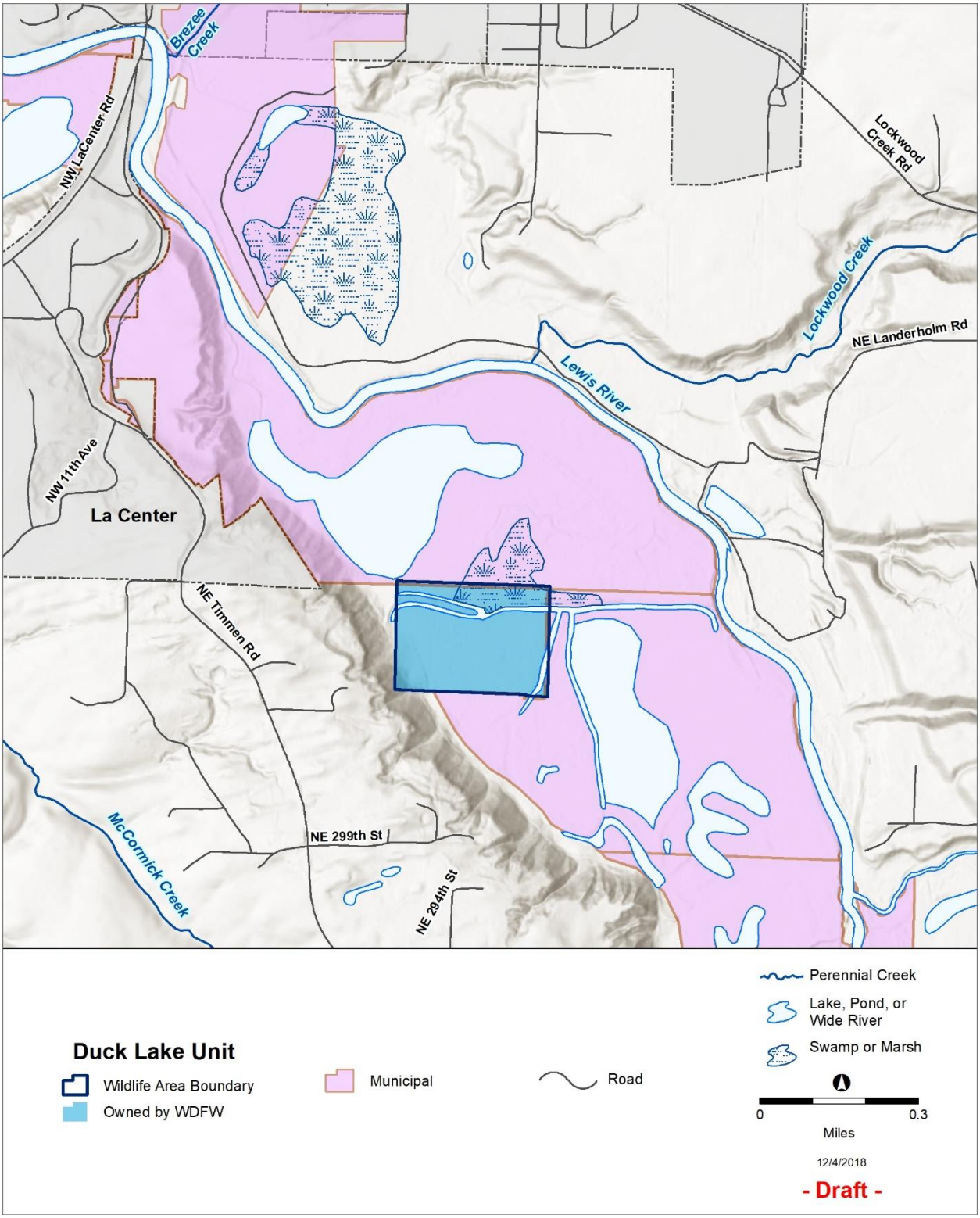

Figure 18. Duck Lake Unit.

Nellie Corser Unit

WILDLIFE AREA INFORMATION		
Size	-	**58 acres**
Acquisition Dates	-	1969
Acquisition Funding	-	Recreation Conservation Office, Donation
Location	-	Township: 2N Range: 6E Sections: 20,21
Elevation	-	950 - 1,150 ft
Recreational Opportunities	-	Hiking, birding, photography, and hunting
Access	-	**Driving Directions** From State Route 14 just west of the Skamania Store, turn north up hill on Duncan Creek Road, go 3 miles across bridge stay left on dirt road. Roadside parking about 1/4 mile from end of pavement.

The Nellie Corser Unit was acquired in 1969 by a donation and funding from RCO. The 58-acre unit is located north of State Highway 14 at the end of Duncan Creek Road in southern Skamania County along the Columbia River Gorge National Scenic Area. The unit consists of mature conifer forest and includes a 1.5-mile loop trail on the property that takes hikers through the forest with spectacular views of cascading waterfalls on Duncan Creek. The area is managed as late successional forest habitat (mature forest with large trees and abundant understory in openings and around the edges, including large snags). Hunting is allowed on the unit; overnight camping is prohibited.

Primary management objectives for this unit include:

- Monitor and protect fisher denning areas if and when they occur on the wildlife area (4C).

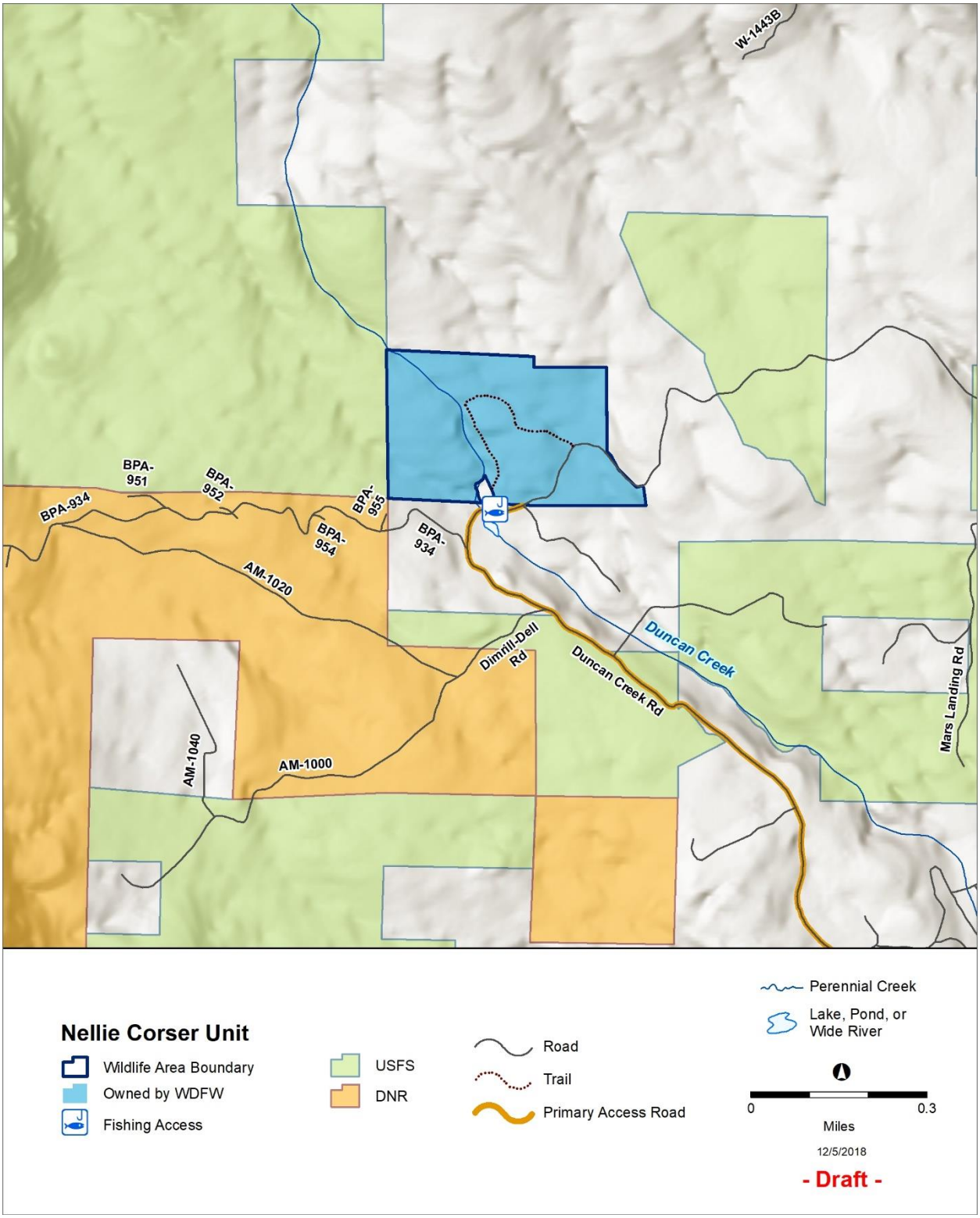

Figure 19. Nellie Corser Unit.

PART II: Wildlife Area Management and Planning

Land Ownership and Management

Acquisition History, Funding, and Purpose

Funding from the following state, federal, and non-governmental organizations was used to acquire properties in the wildlife area: Recreation and Conservation Office (RCO) – Washington Wildlife and Recreation Program (WWRP) – Salmon Recovery Funding Board, Aquatic Lands Enhancement Account (ALEA); State Wildlife Fund; U.S. Fish and Wildlife Service (USFWS) – Pittman Robertson, Dingell Johnson; Ducks Unlimited, and Rocky Mountain Elk Foundation. Several of the units were also land donations and land exchanges.

Even though the agency established the Mount St. Helens Wildlife Area in 1989 when WDFW acquired the Mudflow Unit, Abernathy Creek was transferred in 1933 from the Cowlitz Game Commission, which makes it the oldest unit in the wildlife area. WDFW acquired other units from the 1950s through 2016 to protect critical habitat (e.g. mineral spring sites for band-tailed pigeons) and provide access for hunting and fishing.

As opportunities arise, WDFW is adding to the wildlife area, with the Merrill Lake Unit being the most recent acquisition. Consistent with the agency mission, which includes protecting and conserving fish and wildlife and their habitats and providing recreation compatible with conservation, the department looks for opportunities to acquire lands where it is consistent with the agency's land acquisition policy. WDFW only purchases lands from willing landowners. Table 1 describes the wildlife area purchase history for each unit of the wildlife area.

Table 1. Acquisition History for the Mount St. Helens Wildlife Area.

Unit	Acres	Purchase Date	Grant Source	Purpose
Abernathy	101	1933	Cowlitz Game Commission Transfer	Fishing and hunting access
Altoona	120	1991, 2012	USFWS – Coastal Wetland; RCO – Washington Wildlife and Recreation Program, Salmon Recovery Funding Board	Fishing access
Canal Road	141	1955-1966	USFWS – Dingell Johnson	Fishing access

Carnine	37	1980	Donation	Hiking and wildlife viewing
Cedar Creek	139	1955-1962	USFWS – Pittman Robertson, State Wildlife Funds, Donation	Protects mineral springs for band-tailed pigeons.
Duck Lake	39	1994	Ducks Unlimited	Waterfowl and wading birds conservation
Eagle Island	279	2011	RCO – Salmon Recovery Funding Board, Aquatic Lands Enhancement Account	Conservation of floodplain and riparian forest for salmonids. Provides habitat for black-tailed deer, waterfowl, songbirds, and birds of prey.
Fisher Island	259	1996, 1997	RCO – Washington Wildlife and Recreation Program	Conservation of forested floodplain/wetland habitat, Columbian white-tailed deer presence and provides hunting and fishing.
Gardner	43	1968	RCO	Protection of riparian habitat for salmonids and provide compatible outdoor recreation.
Hall Road	132	1952-1966	USFWS – Dingell Johnson	Fishing access
Hoffstadt	3,816	2009	State Appropriation	Land transfer with the Washington State Department of Transportation (WSDOT) for the construction of the Sediment Retention Structure.
Jenny Creek	20	1959	USFWS – Pittman Robertson	Protects mineral springs for band-tailed pigeons.
Merrill Lake	1,453	2015, 2016	RCO – Washington Wildlife and Recreation Program; Rocky Mountain Elk Foundation	Conservation of old-growth and riparian habitat for elk, black-tailed deer, black bear, grouse, songbirds, spotted owl, bald eagle, salamanders, steelhead, and coastal cutthroat trout.
Mudflow	2,773	1989, 1995	Wildlife Funds, RCO – Washington Wildlife and Recreation Program, State Appropriation; Rocky Mountain Elk Foundation	Provides critical winter range habitat for elk.

Nellie Corser	58	1969	RCO, Donation	Conservation of mature conifer forest – late successional forest habitat and recreation.
Nelson	55	1982	Port of Kalama	Mitigation for the Port of Kalama development.
Two Forks	49	1990, 2016	RCO – Washington Wildlife and Recreation Program	Conservation of mature black cottonwood riparian habitat primarily used for songbirds, and provides off channel rearing habitat for salmonids.
White Island	186	1960	State Wildlife Funds	Designated as a Natural Area Preserve for undisturbed black cottonwood-willow riparian and Columbian white-tailed deer.

Operating Funds

Leases

At the Mount St. Helens Wildlife Area, WDFW manages 35 acres of the Nelson Unit on behalf of the Port of Kalama. This property is mitigation for Port of Kalama development. WDFW manages the property consistent with the management objectives of the area, and all WDFW rules and regulations apply even though the ownership is in the Port's name.

Easements

Easements are rights held by an entity other than WDFW on wildlife areas which allow others to cross or use a portion of the land for a specific purpose. At this wildlife area, several units have utility (Bonneville Power Administration for the Nellie Corser Unit) and road easements, as well as easements that allow adjoining landowners to cross WDFW property for access to their property. Local utility easements occur on the Abernathy, Cedar Creek and Jenny Creek units.

Water Rights

WDFW has one active water right at the wildlife area. It is located on the Eagle Island Unit and is planned for supplying water to a chum salmon spawning channel, part of a planned restoration project on the North Fork Lewis River. Other rights on or adjacent to some of the units are held by neighboring landowners. Past water rights held by WDFW have been terminated due to inactivity.

Management Setting

Administration and Staffing

The Mount St. Helens Wildlife Area is located within WDFW's Region 5, which is headquartered in Ridgefield. WDFW's Lands Division operates all wildlife areas and access sites. Supervision at the regional level is provided by the regional Wildlife Program manager. The wildlife area has two permanent staff members, a wildlife area manager and an assistant manager. The Mount St. Helens Wildlife Area manager also manages the Shillapoo Wildlife Area. The assistant manager at Mount St. Helens is dedicated full time to this area.

Facilities and Maintenance

The regional office serves as the base for wildlife area staff members and provides equipment storage for the wildlife area. With 18 units spread across the geographic area, staff travel a good part of the day to manage different area units.

Compared to other WDFW wildlife areas, where fences mark property lines and keep cattle from trespassing, Mount St. Helens has very few fences. Only the Cedar Creek and Jenny Creek units have fences, which require periodic maintenance. On these two units, wildlife area staff members monitor and repair fences, as needed, to be a good neighbor. Washington State requires landowners to control livestock on their own property, it is a violation to allow livestock to graze on state lands without a lease agreement.

The wildlife area has very few facilities. The Altoona Unit is the most developed with a boat launch, vault toilet, storage building, and parking area, which requires regular mowing and weed control. These facilities are managed by WDFW wildlife and water access staff.

Road Management

Access to the Mount St. Helens Wildlife Area units includes county, state, federal, and privately owned routes. Each entity maintains their roads consistent with their respective operations and rules, and roads are open on a seasonal, annual, or an as needed basis. WDFW closes most of its roads on the wildlife area to motorized access to minimize disturbance to wildlife, and to protect roads from to damage during the rainy season when roads are more susceptible to damage from heavy vehicle use. Closed roads are open to non-motorized users year-round, except in areas where they are annual seasonal closures to all public access on the Mudflow Unit to protect wintering elk from disturbance. A few roads within the Hoffstadt Unit are open to motorized access year-round, but in some areas, users may need to purchase a Weyerhaeuser Access Permit to gain access. For more information, see this link: (https://www.weyerhaeuser.com/recreational-access/northwest-region/).

WDFW manages and maintains their roads on an as needed basis. Administrative access is for management activities including wildlife area operations and maintenance. WDFW regularly checks forest roads to ensure they meet DNRs Forest Road Standards. Road maintenance includes cleaning culverts, cleaning and/or installing water-bars, grading, placing gravel on road surface, and litter removal. WDFW's Capital Assets and Management Program perform major repairs and maintenance.

Local Land Use Compliance

The Mount St. Helens Wildlife Area falls under the jurisdiction of Cowlitz, Clark, Skamania, and Wahkiakum counties, and land use must be consistent with county Comprehensive Plans, Natural Resource Ordinances, Critical Areas Ordinances, and Shoreline Master Plans. Table 2 describes the relationship of these land use regulations to the wildlife area land, which are consistent with the current uses on WDFW lands.

Forestry is the dominant land use surrounding the wildlife area. Commercial forestland makes up over 90 percent of the Toutle basin and 96 percent in the Kalama basin. The U.S. Forest Service manages Mount St. Helens National Volcanic Monument, which encompasses much of the upper basin around the wildlife area. The State of Washington owns, and the Washington State Department of Natural Resources (DNR) manages, the beds of all navigable waters within the subbasin (Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan 2010). Agriculture and residential activities occur in the valley bottoms.

Table 2. Mount St Helens Wildlife Area Units and Regulatory Designations.

Wildlife Area Unit	County	Comprehensive Plan Land Use Designation and Zoning*	Shoreline Management Plan Designation**
Abernathy Creek	Cowlitz County	Economic Resource Land – Forest, Rural	Rural Conservancy
Altoona	Wahkiakum County	N/A	Conservancy, Rural, Natural
Canal Road	Cowlitz County	Remote	Rural Conservancy, potential associated wetland
Carnine	Cowlitz County	Rural	N/A
Cedar Creek	Clark County	Parks/Open Space, Parks/Wildlife Refuge	Rural Conservancy Resource Land

Duck Lake	Clark County	Agriculture, AG-20	Rural Conservancy Resource Land
Eagle Island	Clark County	Forest Tier 2, Forest-40	Natural, Aquatic
Fisher Island	Cowlitz County	Remote	Rural Conservancy, Natural, potential associated wetland
Gardner	Cowlitz County	Smallhold, suburban	Rural Conservancy, Natural,
Hall Road	Cowlitz County	Suburban, Rural, Urban, Remote	Rural Conservancy
Hoffstadt	Cowlitz County	Remote	Rural Conservancy, potential associated wetland
Jenny Creek	Clark County	Parks/Open Space, Parks/Wildlife Refuge	N/A
Merrill Lake	Cowlitz County	Economic Resource Land – Forest	Rural Conservancy, Natural, potential associated wetland
Mudflow	Cowlitz County	Remote	Rural Conservancy, potential associated wetland
Nellie Corser	Skamania County	SMA – Forest	Conservancy
Nelson	Cowlitz County	Remote	Rural Conservancy, High Intensity, potential associated wetland
Two Forks	Clark County	Agriculture, AG-20	Rural Conservancy Resource Land, Aquatic
White Island	Wahkiakum County	N/A	Conservancy

* Clark County: https://gis.clark.wa.gov/mapsonline/
Cowlitz County: http://www.co.cowlitz.wa.us/index.aspx?NID=1309
Skamania County: http://www.skamaniacounty.org/community-development/homepage/planning-division/
Wahkiakum County: https://www.co.wahkiakum.wa.us/
** Cowlitz County SMP as locally adopted May 29, 2018, pending approval by Washington Department of Ecology

Cultural Resources

State and federal law requires the protection of cultural, geological, and other non-renewable resources. Such resources may not be removed unless determined to be beneficial to wildlife, habitat, or scientific or educational purposes. WDFW coordinates with appropriate agencies and tribes for the protection of such resources if any activity affects cultural, archaeological, or

historic resources. This includes the removal of various rock formations, Native American artifacts, plants, seeds, and other items.

Enforcement

Fish and wildlife officers are general authority peace officers deployed to six regions throughout the state. They are responsible for enforcing a myriad of laws and regulations related to health and public safety, dangerous wildlife/human conflicts, fish and wildlife protection, hunting and fishing license regulations, habitat protection, and commercial fish and shellfish harvest. In addition, they enforce federal laws, Oregon state statutes, and county ordinances through memorandums of agreement. Fish and wildlife officers conduct boating law enforcement on state and federal waters, and law enforcement in state and federal parks and forestlands. Because of their unique capabilities, assets, and jurisdiction, the officers are often called upon by emergency management agencies to respond to natural disasters and other critical incidents, as well as perform public safety and search and rescue duties.

The Mount St. Helens Wildlife Area is scattered throughout the patrol area of Region 5 in Southwest Washington. Region 5 has an enforcement captain who oversees and directs the operation of three separate detachments. Each detachment is comprised of a sergeant and up to five officers. Through field operations aimed at preventing illegal activities, WDFW fish and wildlife officers engage the recreating public in several different ways including officer/enforcement presence, education, partnership, and community involvement.

The Mount St. Helens Wildlife Area requires fish and wildlife officers to use a variety of patrol techniques. In addition to their normal patrol vehicle, officers also patrol these lands by boat, foot, and aircraft. During these patrols, officers have the authority to enforce all laws and regulations related to the protection of the state's wildlife and lands, including poaching, destruction of sensitive areas by vandalism or illegal off road vehicles, unlawful dumping of household garbage, littering, illegal fires, and other illegal activities. Fish and wildlife officers do as much to educate and inform the public about the reasons for the laws as they do in enforcing them. They also work closely with WDFW biologists and local land stewards in order to anticipate where and when a problem may occur.

Laws and regulations governing the use and activities permitted on WDFW lands are located in in RCW Title 77 as well as WAC 220.

Stewardship and Volunteerism

The Mount St. Helens Wildlife Area offers a wide variety of volunteer activities for the public, including scientific data collection, facility maintenance, and mentor programs. The work

provided by these volunteers is much appreciated and essential to the ability of the wildlife area to provide critical services. Please contact the wildlife area manager directly for more information about how you can become involved.

The Mount St. Helens Wildlife Area works with two to four volunteer parties every year to enhance elk winter habitat on the Mudflow or Merrill Lake units, usually between March and June. The work parties are typically two-day events that offer overnight camping on or near the wildlife area. Volunteers plant trees, construct and install tree cages, and seed and control invasive weeds. There are always opportunities for new volunteers. All events are published on the WDFW's CERVIS website (https://wdfw.wa.gov/about/volunteer/).

Recreation

WDFW wildlife areas provide fishing, hunting, wildlife viewing, and other recreation opportunities consistent with the agency's mission, statewide wildlife area planning goals, and the funding sources for each property. Public use is influenced by the character of the landscape, access, wildlife and fish species present, seasonal considerations, and engagement with interested and affected stakeholders from the local community. WDFW has the authority to limit and does restrict some recreation activities in order to protect resources, preserve quality of experiences and infrastructure, and address the safety of personnel and the public. The agency seeks to promote public enjoyment of fish, wildlife, and agency managed lands while managing and perpetuating these resources for future generations.

People come to Mount St. Helens Wildlife Area to recreate in a variety of ways but the primary recreation use is dictated by the agency mission and funding sources of the properties, which support elk, deer and waterfowl hunting and a variety of fishing opportunities. Washington's population is growing, putting more pressure on wildlife areas across the state, including Mount St. Helens. With more people comes a more diverse range of recreation interests, which can lead to conflicts between different users (e.g. hunters and bird watchers). Recreational use can impact natural resources, which in turn can affect the opportunity for and quality of recreational experiences. WDFW is developing a Statewide Recreation Strategy to address these issues, which may lead to more detailed guidance on how to balance recreational use and wildlife and habitat protections. In the meantime, public use is dictated by the public conduct rules and area-specific rules as described in Table 3.

The Mount St. Helens Wildlife Area offers a wide variety of habitats and recreational opportunities. Although the units are spread out across four counties, many are clustered into geographical areas which can be grouped by similar recreational activities. The first set of units

are located near Woodland (Lewis River drainage), including the Two Forks, Duck Lake, Eagle Island, Cedar Creek, and Jenny Creek units, which offers a variety of recreational opportunities as illustrated in Table 3. The units are open year-round to public access and provide access to fishing, wildlife viewing, and hunting. Duck Lake on the East Fork of the Lewis River is most notable for waterfowl hunting, while the other four units are likely visited the most when hunters are in pursuit of black-tailed deer. The Cedar Creek Unit is popular during the band-tailed pigeon hunting season, as there are mineral springs located on the unit that attract large numbers of pigeons. All of these units are within the Battle Ground Game Management Unit (GMU 564), where rifle use is prohibited. The Eagle Island and Two Forks units also provide fishing access during the salmon season. All of these units are walk-in access only and all border or are entirely surrounded by private property.

Located around Toutle and Silver Lake, the second set of units include Hall Road, Canal Road, Gardner, and Carnine units. The Carnine Unit has no public access due to it being landlocked by private property, and hence has no public recreation opportunities. Both the Canal Road and Hall Road units are along the shores of Silver Lake. Each of these units offers fishing for warm-water species, boating access, and waterfowl hunting opportunities. Wildlife viewing is common here as is hunting and the Hall Road Unit is known for black-tailed deer and occasional elk. The Gardner Unit is located at the confluence of the North and South Fork Toutle Rivers, and offers fishing for salmon and steelhead, as well as swimming and picnicking. The unit is located next to Harry Gardner Park, which is operated by Cowlitz County and offers camping and day-use recreation activities.

The Nelson, Fisher Island, Abernathy Creek, White Island, and Altoona units are located along the lower reaches of the Columbia River. The primary recreational activities for these units are fishing, hunting, and boating. All of these units offer opportunities for waterfowl hunting, and Abernathy Creek, Fisher Island, and the upland parcels of Altoona also offer hunting for black-tailed deer. Access to the Nelson, Fisher Island, White Island, and the tideland parcel of Altoona can only be reached by boat. The Oneida Access is located within the western most parcel of the Altoona Unit. This site is very popular during sturgeon and fall salmon fishing seasons, and parking is limited. Parking is not allowed on the pavement of Oneida Road, which is enforced by the Wahkiakum County law enforcement.

The Nellie Corser Unit is the only unit of the wildlife area located in Skamania County. Recreation on this unit is primarily hiking, wildlife viewing, and hunting for black-tailed deer. The cascading waterfalls of Duncan Creek are popular, offering spectacular views after a heavy rainfall, and attract many visitors. There is a small unmarked parking area at the trailhead, which takes visitors to Duncan Creek and the waterfalls via a 1½ mile loop trail. This unit is adjacent to private, U.S. Forest Service, and Department of Natural Resource lands.

Merrill Lake is the newest unit on the wildlife area and offers many recreational opportunities. During the warmer and drier months of the year, hiking, mountain biking, and horseback riding are popular activities, especially to see the Kalama Falls. The falls are also popular for kayaking when the river flows are favorable, in the winter and spring months, after a heavy rainfall or increase in snow melt. The area is very popular for elk hunting. The Forest Service road leading to the unit is not maintained or plowed during the winter months, and often the unit is unreachable due to snow cover on the road. There are no motorized public vehicles allowed within this unit. A trail from the Kalama River Horse Camp traverses the unit, leading visitors to the falls.

The Hoffstadt Unit is the largest unit on the wildlife area, and offers limited motorized access year-round. This unit is most popular during deer and elk seasons, but in order to access some portions of this area a Weyerhaeuser Vehicle Access Pass is required. All of the streams in this unit and the North Fork of the Toutle River are closed to fishing. Shed hunting is another popular recreation activity during the spring months.

The Mudflow Unit is the most popular unit on the wildlife area. It has the highest concentration of wintering elk in the Toutle River Valley, and can easily be viewed from the Spirit Lake Highway. To protect the elk from disturbance, the unit is closed to all public access annually from Dec. 1 through April 30. This unit is part of the Loo-wit Game Management Unit (GMU 522), where hunting is restricted except for special permit elk hunting. The unit is closed to all public motor vehicle access, except during the limited Disabled Hunter elk hunting periods. This unit is a popular place for shed hunting in the spring. Horseback riding is popular as well. Although visitors need to cross Weyerhaeuser property to access the unit, an access permit from Weyerhaeuser is not required as long as they access is via the 3100 RD. All waters within this unit are closed to fishing to protect endangered salmonids, except for a couple of isolated ponds that contain warm-water fish species in the northwestern end of the area.

Trails

There are two designated trails at the Mount St. Helens Wildlife Area – the Merrill Lake Trail and the Duncan Creek Trail. Trails are open to all non-motorized use, including walkers and horseback riders. The Merrill Lake Trail is roughly two miles long and is primarily used as an equestrian trail. It originates at the Kalama Horse Camp of U.S. Forest Service property,` and terminates at the Kalama River Falls, and is maintained by the Back Country Horseman Association. The Duncan Creek Trail is located at the Nellie Corser Unit and includes a 1.5-mile loop trail that takes visitors along Duncan Creek and to views of numerous cascading waterfalls. WDFW performs minimal maintenance including litter removal, weeds control, and occasional removal of large downed trees that have fallen across the path.

Table 3. Recreation Use on the Mount St. Helens Wildlife Area.

Wildlife Area Unit	Primary Hunting Focus	Other Hunting Opportunities	Fishing Opportunities	Other Recreation	Restrictions	Education/ Interpretation	Parking and other facilities
Abernathy	None	Black-tailed deer, Waterfowl	Salmon, steelhead, trout (Abernathy Creek and Columbia River)	Hiking, wildlife viewing	No ORV No camping	None	Parking area along Abernathy Creek Rd. at pullout
Altoona	Waterfowl	Elk	Salmon, steelhead, trout, sturgeon, warm water species		No ORV Camping allowed at Oneida Water Access Site.	Kiosk at boat launch	Parking lot (~15 vehicles), boat launch and toilet at Oneida Water Access Site.
Canal Road	Waterfowl (Silver Lake)		Crappie, perch, bass, trout, catfish, carp	Wildlife viewing, canoeing, kayaking	No camping	None	None
Carnine	None	None	None	No Public Access	No Public Access	None	None
Cedar Creek	Band-tailed pigeon	Black-tailed deer	Salmon, steelhead, trout	Hiking, wildlife viewing	No ORV No Camping Firearm restricted	None	Parking at pull out along Cedar Creek Road
Duck Lake	Waterfowl		None	Wildlife viewing	No Camping, boat in only	None	None

Eagle Island	Black-tailed deer	Waterfowl	Salmon, steelhead, trout (North Fork Lewis River)	Kayaking, canoeing, wildlife viewing	No Camping, firearm restricted unit. Boat in only (river can be waded at low flows to cross from the island boat ramp to Eagle Island)	Kiosk at the boat ramp	Parking (~20 vehicles) and restrooms at the boat ramp
Fisher Island	Waterfowl	Black-tailed deer	Salmon, steelhead, trout, sturgeon, warm water fish species(Columbia River)	Boating, kayaking, wildlife viewing	No Camping, boat in only	None	None
Gardner	None	None	Trout, steelhead, coho, chinook (North fork Toutle River)	Hiking and swimming	No ORV	Gardner	None
Hall Road	Waterfowl (Silver Lake)	Black-tailed deer and elk	Crappie, perch, bass, trout, catfish, carp	Hiking, wildlife viewing, canoeing, kayaking	No ORV No camping	None	Parking area adjacent to SR 504
Hoffstadt	Elk	Black-tailed deer	None. The North Fork Toutle River and	Hiking, mountain biking, wildlife	No ORV No Camping	None	None

			all tributaries above the SRS are closed to fishing.	viewing, photography, shed antler hunting, horseback riding			
Jenny Creek	Black-tailed deer	Band-tailed pigeon	None	Hiking, wildlife viewing	No ORV No Camping Firearm restricted unit	None	Small parking area along NW 14th Ave.
Merrill Lake	Elk	Black-tailed deer, black bear	Trout (Merrill Lake – catch and release, fly fishing only). Salmon and steelhead in (Kalama River – no fishing between the 6600 Rd Bridge and Kalama Falls).	Hiking, wildlife viewing, horseback riding	No ORV Limited camping along USFS 81 RD,	None	Parking along USFS 81 Rd.
Mudflow	Elk	None. Due to the GMU restrictions, only limited	Limited warm water fishing in isolated ponds. The	Hiking, wildlife viewing, mountain biking, horseback	No motorized vehicles. No Camping	Kiosk at the bottom of the 3100 RD by the entrance to the unit. Small reader	None

		elk hunting is allowed.	North Fork Toutle River and all tributaries above the SRS are closed to fishing	riding, photography, shed antler hunting	Winter Closure from Dec. 1 through April 30	board at the intersection of SR 504 and Weyerhaeuser 3100 RD	
Nellie Corser	Black-tailed deer		None	Hiking, wildlife viewing	No ORV No camping	None	None
Nelson Units	Waterfowl		Salmon, steelhead, trout, warm water fish species (Columbia and Kalama rivers)	Boating, wildlife viewing	No Camping, boat in only	None	None
Two Forks	Black-tailed deer	Waterfowl	Salmon, steelhead, trout (North and East Fork Lewis Rivers)	Hiking, wildlife viewing	No ORV No Camping Firearm restricted unit	None	None
White Island	Waterfowl	None	Salmon, steelhead, trout, sturgeon, warm water species (Columbia River)	Kayaking, boating, wildlife viewing	No camping, boat in only. The agency permits campfires, but only on the beach using driftwood as fuel, and	None	None

					they must be 50 feet away from established vegetation and driftwood. WDFW prohibits the cutting of live or standing dead material on the island.		

Research and other studies

Consistent with WDFW's mission to preserve, protect, and perpetuate fish, wildlife, and habitat, WDFW supports independent studies to achieve wildlife area objectives. Appendix F describes past studies which have occurred on the wildlife area, including studies for elk, salmon and steelhead, and sediment management from the Mount St. Helens eruptions.

Wildlife Area Goals, Objectives and Monitoring

Goals, Objectives and Performance Measures

This plan sets management priorities for the Mount St. Helens Wildlife Area for the next 10 years. The goals, objectives, and performance measures in this plan were developed by an interdisciplinary team of regional and headquarters staff members, with input from the Mount St. Helens Wildlife Area Advisory Committee, the public, and other agency personnel. They are consistent with WDFW's Mission and Strategic Plan. The objectives listed in this plan may or may not be fully funded, and in many cases successful outcomes will be dependent on additional funding.

Monitoring and Adaptive Management

Wildlife area objectives should be evaluated annually based on the associated performance measures. On a biennial planning cycle basis, the Mount St. Helens Wildlife Area manager will lead the review, reporting, and revision, of objectives and performance measures as

appropriate. Staff members will develop recommendations for each two-year update with help from the wildlife area advisory committee and regional district team. Such reporting will allow the manager, the staff, and the regional office to modify tasks and timelines as necessary to meet the associated objective. Further, over the term of the plan (10 years), performance will evaluate the funding level required to maintain the capacity needed to successfully manage the wildlife area.

Table 4. Mount St. Helens Wildlife Area Goals, Objectives and Performance Measures.

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
1	Maintain or improve the ecological integrity of priority sites.	A. Establish an ecological integrity baseline and associated goals for ecological systems of concern/priority systems by 2024.	All	1. Baseline established (y/n); 2. EI goals established (y/n).	Ecological integrity Monitoring Team	- Work with WLA manager to design monitoring plan to achieve objective A over 10-year planning term. - Conduct data collection to determine baseline within 5-year planning term. - Provide EI baseline report to WLA manager prior to start of subsequent 10-year planning term. - Work with WLA manager to establish EI goals.
		B. Implement weed management plan annually.	All	1. # acres inspected; 2. # acres treated; 3. Produce annual weed control report.	WLA Manager	- Annually develop work plan in coordination with Assistant Manager. - Complete annual reporting requirements.
		C. Seek funding for construction opportunities to stabilize the river bank along the wildlife area.	Mud Flow, Hoffstadt, Gardner	1. # of grants written; 2. # of structures built.	WLA Manager	- Apply for grants as opportunity arise.
		D. Continue collaborative efforts to strategize landscape scale management with partners and other stakeholders.	Hoffstadt, Mud flow, Merrill Lake	# of new partner projects.	WLA Manager	- Meet and work with partners and neighboring landowners to accomplish landscape scale management goals. -Stakeholders include county weed control, USFS,DNR, National Monument. - As opportunities arise on other units.
		E. Continue to pursue opportunities to expand wildlife area as opportunities arise.	All	1. # available properties; 2. # grant applications completed; 3. Public access secured (y/n).	WL Regional Program Manager/ Lands Agent/WLA Manager	- Mudflow and Hoffstadt units are the priority acquisitions, with the main goal of securing public access. - Coordinate with partners, programs, Regional Director and Regional Lands Agent to identify project areas. - Seek grant funding for acquisitions. - Implement awarded grants.
		F. Identify priorities for conducting rare plant surveys on the wildfire area by 2019.	All	Priorities identified (y/n).	WLA Manager	- Utilize volunteers to conduct rare plant survey with Rare Care and/or other volunteers. Survey done 2-3 years ago… plant? Include results in plan. - Priorities include Abernathy, Merrill Lake, Hall Road units.
		G. Work with partners (USACE) to develop and implement a	Mud Flow, Hoffstadt	1. Changes monitored (y/n).	WLA Manager/	- Work with District Team to monitor changes on the Hoffstadt Unit and develop a plan to improve habitat conditions.

		plan to monitor the habitat impacts of increased sediment from the Sediment Retention Structure modifications on the wildlife area by 2035.			WL District Bio/ Fish Program/Habitat Program	
2	Improve ecological integrity of forests while maintaining and/or improving habitat for wildlife.	A. Identify planned areas for forest treatment for the wildlife area for the next 10 years.	Hoffstadt, Merrill Lake, Cedar Creek	1. # acres non-commercial treatment completed; 2. # of acres of commercial treatment; 3. # acres of prescribed broadcast burning completed; 4. # acres of reforestation.	WLA Manager/ Forester/WL District Biologist/ Habitat Program	- Layout, permitting, implementation, and oversight of contract and WDFW crews for planned projects. - Draft and submit grant applications to fund projects. - Submit requests for other state funding as available to fund projects.
3	Manage roads to minimize harmful impacts to fish and wildlife.	A. Coordinate with DNR to address road management on the wildlife area including potential motorized vehicle road closures to reduce impacts to habitat and species.	Mud Flow, Merrill Lake, Hoffstadt	# of roads closed.	WLA manager	- In coordination with DNR, identify impacts and benefits for and priority areas for closures, or reducing impacts. - Coordinate response to emergency and seasonal road closures. - Develop signage - RMAP stay up to standards for roads - Use closed roads as trails, as feasible
		B. Implement closures to limit disturbance to wildlife and impacts to habitat as well as manage recreation.	Mud Flow	Permanent closures implemented (y/n).	WLA manager	- Post signs of road closures and work with Enforcement to monitor compliance. Closed to all public access (December 1 – April 30)
4	Achieve species diversity at levels consistent with healthy ecosystems.	A. Coordinate, or participate in, species habitat and population management actions on wildlife areas consistent with recovery plans, management plans, agency and program priorities, and available funding.	All	1. # of species for which population management actions are implemented annually; 2. # of species for which habitat management actions are implemented annually.	WL District Biologist/WLA Manager	- District biologist coordinates with Diversity and Game staff from HQ during annual work plan efforts to identify new activities and document prior years' efforts. - Consider specific climate sensitivity for individual SGCN before implementing habitat management.
		B. Develop riparian/wetland restoration projects to benefit fish and wildlife species.	Mud Flow, Abernathy, Jenny Creek, Cedar Creek,	# of acres of riparian/wetland restoration completed.	WLA Manager/Habitat Program/Fish Program	- Inventory areas in which riparian/wetland restoration would be beneficial. - Develop potential restoration project areas and seek funding opportunities.

			Hoffstadt, Fisher Island			
		C. Opportunistically combine searches for amphibian SGCNs with other planned activities, when feasible and when the activities occur in known suitable habitat for one or more SGCN.	Abernathy, Cedar Creek, Gardner, Hoffstadt, Mud Flow, Merrill Lake, Nellie Corser	1. # activities where opportunistic surveys were conducted. 2. # of new verified occurrences/ populations.	WL District Biologist	- Identify planned activities that occur in the ecosystems that represent suitable habitat for one or more of these species. - Consult with Wildlife Diversity Division's amphibian species lead to identify opportunities to incorporate opportunistic searches within specific planned activities.
		D. Monitor and protect fisher denning areas when verified on the wildlife area.	Mud Flow, Hoffstadt, Merrill Lake, Nellie Corser	# of sites monitored.	WL District Biologist/ WLA Manager	- Use remote cameras or other methods to monitor success of known or suspected fisher dens in coordination with Diversity Division Species Lead and Wildlife Area Manager. - Assure that WLA Management activities, i.e. forestry, road work, aerial spraying, etc. do not negatively impact fisher den locations in coordination with Diversity Division Species Lead and District Wildlife Biologist.
		E. Implement recommendations from the Population and Habitat Viability Assessment for the Columbia White Tailed Deer.	Fisher Island, Two Forks, White Island	Recommendations implemented (y/n).	WL District Biologist/WLA Manager	- Guidelines are currently in development - Anticipate efforts to manage these areas for enhanced habitat for CWTD. - Activities could include weed treatments, plantings, vegetation management.
		F. Document wolf sightings as they occur on the wildlife area.	All	Wolf sightings documented (y/n).	WL District Biologist/Conflict Supervisor	- Work with Conflict Staff to document viable wolf sightings per public and WDFW reports. - Work with Carnivore Section Staff to Set cameras , conduct captures and employ other methods as needed to verify individuals and wolf packs presence based on sightings/reports.
		G. Maintain and enhance habitat conditions at mineral sites.	Cedar Creek, Jenny Creek	1. # of sites maintained; 2. # of sites enhanced.	WLA Manager /WL District Biologist	- Clear vegetation as needed to encourage/maintain pigeon use. - Control noxious and invasive weeds onsite. - Monitor spring ponding areas to ensure mineral water is available on the surface for pigeons.
		H. Maintain and enhance foraging habitat for band-tailed pigeons.	Cedar Creek, Jenny Creek, Eagle Island	# of acres enhanced.	WLA Manager/ WL District Biologist	- Plant native fruit bearing trees. - Control noxious and invasive weeds.
		I. Conduct band-tailed pigeon monitoring annually, as directed by the USFWS.	Cedar Creek	Annual surveys conducted (y/n).	WL District Biologist	- Conduct annual survey per instruction from Migratory Bird Section. - Submit data to Migratory Bird Section for inclusion in statewide data set and submission to U.S. Fish and Wildlife Service.
		J. Develop and implement habitat management activities for diversity and game species with partners.	All	1. # of acres enhanced; 2. # of acres restored;	WLA Manager/ WL District Biologist	- Seek additional funding to enhance diversity and game species habitats. - Continue to restore and enhance the upland areas of Eagle Island. - Continue to improve forage on the Mudflow and Hoffstadt Units for elk. - Implement habitat management activities as funding allows on all units

				3. # of acres maintained.		
		K. Implement seasonal closures annually to limit disturbance to wildlife.	Mud Flow	Seasonal closures annually implemented (y/n).	WLA Manager	- Post signs of seasonal closure and work with Enforcement to monitor compliance of winter closure. Closed to all public access (December 1 – April 30)
		L. Conduct annual elk mortality surveys.	Mud Flow	Annual surveys conducted (y/n).	WL District Biologist	- Conduct annual survey during final 2 weeks of April.
5	Maintain and restore riparian and instream habitat for steelhead, chinook, and coho.	A. Conduct salmonid monitoring annually.	Cedar Creek, Abernathy, Eagle Island, Gardner	Annual surveys conducted (y/n).	District Fish Biologist	- Plan and conduct surveys of spawning salmon and steelhead annually in portions of rivers below anadromous barriers. - Upload relevant population data to agency website. - Analyze trends relative to recovery goals for each population.
		B. Work with stakeholders and partners to leverage funding to identify and implement fish habitat restoration efforts.	Abernathy, Eagle Island, Hoffstadt, Mud Flow, Nelson, Gardner, Cedar Creek, Duck Lake, Fisher Island	1. # of projects implemented; 2. # miles of shoreline restored; 3. # of acres restored.	Habitat & Fish Programs/ WLA Manager	- Develop an inventory of sites suitable for restoration by 2021. - Communicate with entities interested in enhancement (RFEGs, District Team) regarding salmon recovery/riparian restoration goals. - Support efforts to develop projects, secure funding, and complete permitting. - Support efforts to implement restoration projects when funding is secured. - Monitor results. - Prescribe adaptive management needs.
		C. Continue high priority salmonid recovery efforts by maintaining current anadromous adult fish release sites above the Sediment Retention Structure (SRS) and explore options for new release sites on tributaries to the North Fork Toutle River.	Mud Flow, Hoffstadt	1. Maintain current fish release sites (y/n); 2. Additional fish release sites identified as needed (y/n).	Fish Program	- Truck coho salmon and steelhead from Fish Collection Facility to current release sites above the SRS, when fish recruit to the trap throughout the year (may discontinue or add more sites depending on river conditions and other factors). -Rebuild fish facility in coordination with Governor's office to improve WDFW's ability to collect and transport fish upriver.
6	Support and maintain appropriate recreation opportunities.	A. Participate in additional recreational planning and development of projects with partners.	All	# of projects.	WLA Manager	- Work with partners and neighboring landowners to help develop recreational opportunities, i.e. trails, boat launches, parking areas.
		B. Manage for ADA specific recreational access, ADA opportunities (e.g. hunting) on units **where feasible**.	All	# of projects implemented.	WLA Manager-	- Continue to provide elk hunting opportunities on the Mudflow Unit for hunters with disabilities. - Include assess sites if and when feasible
		C. Post dog regulations on the Mud Flow Unit.	Mud Flow	# of signs posted (y/n).	WLA Manager	- Continue to restrict dogs on the Mudflow Unit to limit disturbances to wildlife.

		D. Explore opportunities to address camping on the wildlife area.	Mud Flow, Hoffstadt, Merrill Lake	Plan developed and implemented (y/n).	WLA Manager	- Work with District Team to develop potential camping areas, and provide additional opportunities where feasible.
		E. Maintain annual lake fishing opportunities at Mount St Helens WLA.	Silver Lake, Merrill Lake, Kress Lake	Lakes stocked annually (y/n), fish surveys conducted (y/n).	Fish Program	- Ensure lakes are stocked appropriately in terms of timing, number and species. - Monitor native stocks and adapt regulations based on results at sustainable level - Silver/Kress stocked annually, Merrill Lake stocked intermittently with catchable size rainbow trout – Fishing season is currently 4th Saturday in April through October 31st
		F. Develop and implement a strategy to address Oneida county road issues/access by 2025.	Altoona	1. Strategy developed (y/n); 2. Funding acquired (y/n); 3. Project implemented (y/n).	Access Manager/ Wahkiakum County/Enforcement/ WLA Manager	- Meet with County and Enforcement to explore solutions and potential funding opportunities.
		G. Implement sign recommendations that comes from of the Lands Showcase effort.	All	1. Funding secured (y/n); 2. # of signs installed.	WLA Manager/Enforcement	- Check with Enforcement, for priority areas that need improved signage. - Post appropriate signs at each wildlife area unit
7	Offer multiple and varied opportunities for stakeholder participation and engagement.	A. Coordinate and maintain a Wildlife Area Advisory Committee.	--	# of meeting(s) per year.	WLA Manager	- Setup meeting time and place based on group members' availability. - Draft agenda with attention to group interest and time constraints. - Hold meeting and collect group comments and recommendations for consideration relative to future management actions (proposed or ongoing). - Include meeting notes in wildlife area management plan updates and website
		B. Expand the membership of the WAAC to include the full range of stakeholders/ interest groups.	--	# of new WAAC members.	WLA Manager	- Expand during public outreach SEPA process - Seek new membership on the WAAC, and include new stakeholder groups.
		C. Coordinate communication with community groups about current wildlife area management activities, education and scientific research.	--	# of presentations/outreach conducted.	WLA Manager/ WL District Biologist	- Provide information to local organizations, through presentations at local communities, events, meetings, Interpretive signs/kiosks.

		D. Implement the strategy to monitor and manage the White Island Natural Area by July, 2019.	White Island	1. Annual monitoring conducted (y/n); 2. Weed control conducted (y/n); 3. Trash removed (y/n). 4. Coordinate with DNR (y/n).	WLA Manager/Enforcement	- Inspect the natural area annually - Remove any unlawful structures and garbage from the natural area. - Coordinate with DNR's natural area staff to ensure the natural area complies with requirements.
8	Maintain safe, highly functional, and cost effective administrative facilities and equipment.	A. Annually inspect fencing, gates and WLA boundaries; repair and replace as needed and as funding allows.	All	1. # miles of fencing inspected and repaired; 2. # of gates inspected and repaired; 3. # of miles of fence replaced; 4. # of miles boundaries inspected.	WLA Manager	- Inspect fence annually following hunting season. - Complete repairs, as needed. - Boundaries will be inspected for encroachment.
		B. Assess whether units on the wildlife area are potential candidates for consolidation (e.g. donation stipulations, land transfers and surplus, etc).	Carnine, Nelson	Assessment complete (y/n).	WLA Manager/Lands Agent	- Review the original intent of acquisition. Replacement lands maybe necessary depending on funding source.

Part III. Species and Habitat Management

Physical Characteristics

Geology, Soils and Hydrology

The Toutle basin encompasses approximately 513 square miles in portions of Lewis, Cowlitz, and Skamania counties. The basin is within WRIA 26 of Washington State. The Toutle enters the Cowlitz at RM 20, just north of the town of Castle Rock. Elevations range from near sea level at the mouth to over 8,000 feet at the summit of Mount St. Helens. The Toutle drains the north and west sides of Mount St. Helens and flows generally westward towards the Cowlitz. The watershed contains three main drainages: the North Fork Toutle, the South Fork Toutle, and the Green River. Most of the North and South Fork were impacted severely by the 1980 eruption of Mount St. Helens and the resulting massive debris torrents and mudflows (Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan 2010).

The Columbia River estuary has formed over geologic time by the forces of glaciation, volcanism, hydrology, and erosion and accretion of sediments. Circulation of sediments and nutrients throughout the estuary are driven by river hydrology and coastal oceanography. Sea levels have risen since the late Pleistocene period, which has submerged river channels and caused deposition of coarse and fine sands (Marriott et al. 2002).

The Columbia River is a significant natural feature that affects geology, soils, hydrology at much of the Mount St. Helens Wildlife Area. In the Columbia River, tidal impacts in water level have been observed as far upstream as Bonneville Dam during low flow. Reversal of river flow has been measured as far upstream as Oak Point, and intrusion of salt water is typically to Harrington Point at the minimum regulated monthly flow, although at lower daily flows saltwater intrusion can extend past Pillar Rock (Neal 1972). The lowest river flows generally occur during September and October, when rainfall and snowmelt runoff are low. The highest flows occur from April to June, resulting from snowmelt runoff. High flows also occur between November and March, caused by heavy winter precipitation. The discharge at the mouth of the river ranges from 100,000 to 500,000 cubic feet per second (cfs), with an average of about 260,000 cfs. Historically, unregulated flows at the mouth ranged from 79,000 cfs to over 1 million cfs, with average flows about 273,000 cfs (Neal 1972, Marriott et al. 2002). The estuarine shoreline in both Washington and Oregon consists primarily of rocky, forested cliffs or low elevation, gently sloping floodplain areas. The topography of the riverine portion of the two ecological provinces does not vary considerably (Marriott et al. 2002).

The Kalama River subbasin is a 205-square mile watershed extending from the southwest slopes of Mount St. Helens to the Columbia River, where it enters at RM 73.1. The watershed is bordered by the Toutle and Coweeman basins to the north and the North Fork Lewis basin to the south. The headwaters are in Skamania County although 99 percent of the basin lies within

Cowlitz County. The elevation ranges from sea level at the Columbia River to near 8,000 feet on Mount St. Helens. Past eruptions of Mount St. Helens and associated lahars (a type of mudflow or debris flow composed of a slurry of pyroclastic material, rocky debris, and water) have shaped the landscape of the basin over the past 20,000 years. The lahars left unconsolidated deposits creating slope stability concerns in the steep upper watershed (USFS 1996).

The Lower North Fork Lewis drainage encompasses approximately 102 square miles. The lower 12 miles of the mainstem flow through a broad alluvial valley characterized by agriculture and residential uses. This section is extensively channelized. Tidal influence extends to approximately RM 11. The Lewis basin has developed from volcanic, glacial, and erosional processes. Mount St. Helens and Mt. Adams have been a source of volcanic material as far back as 400,000 years. More recent volcanic activity, including pyroclastic flows and lahars, have given rise to the current landscape. Over steepened slopes as a result of glaciation, combined with the abundance of ash, pumice, and weathered pyroclastic material, have created a relatively high potential for surface erosion throughout the basin (USFS 1996).

Climate

The Toutle basin has a typical northwest maritime climate. Summers are dry and warm and winters are cool, wet, and cloudy. Mean annual precipitation is 61 inches at Kid Valley (North Fork Toutle). Most precipitation occurs between October and March. Snowfall predominates in the higher elevations around Mount St. Helens and rainfall predominates in most of the remaining, lower elevation portion of the basin.

The climate conditions vary across the Lower Columbia Estuary subbasin. In general, coastal areas receive more precipitation and experience cooler summer temperatures and warmer winter temperatures than inland areas. In the lower part of the subbasin, climate data has been collected in Astoria, Oregon, since 1953 (WRCC 2003). Total average annual precipitation is 68 inches, ranging from 1.04 inches in July to 10.79 inches in December. January is the coldest month in Astoria, with an average maximum temperature of 48.2°F and an average minimum temperature of 36.5°F. August is the warmest month, with an average maximum temperature of 68.7°F and an average minimum temperature of 52.8°F.

The Kalama basin experiences a maritime climate with cool, wet winters and dry, warm summers. Mean annual precipitation is 68 inches at the Kalama Falls Hatchery and is over 120 inches in the upper subbasin (WRCC 2003). The bulk of the precipitation occurs from the first of October through March.

The Lower North Fork Lewis basin climate is typified by mild, wet winters and warm, dry summers. Mean annual precipitation is 52 inches at Battle Ground, which is along the lower river (WRCC 2003). Precipitation in the upper basin is considerably greater. Although most of

the basin is rainfall dominated, much of the upper basin receives abundant snowfall, with a significant portion of the upper basin in the rain-on-snow zone. The basin is subject to winter freshets and flooding.

Ecological Values

Ecological Systems and Ecological Integrity

WDFW's strategic objectives include protecting and restoring the ecological integrity of critical habitats consistent with DNR's Natural Heritage Program's Ecological Integrity Monitoring (EIM). The agency's statewide goal is to restore and protect the integrity of priority ecological systems and sites. The agency uses Ecological Integrity Assessments (EIA) and EIM to direct and measure achievements towards that goal. Ecological integrity is defined as the ability of a system to support and maintain a community of organisms that has species composition, diversity, and functional organization comparable to those of natural habitats. EIM is a tool to evaluate ecological integrity, and changes to integrity over time, within priority systems and sites on the wildlife areas. Similar to species classifications grouped according to level of threat and potential inability to support sustained populations, habitats are grouped by type, including those that are priorities for preservation and conservation. The complete classification system, including descriptions of all ecological systems, can be found online at http://file.dnr.wa.gov/publications/amp_nh_ecosystems_guide.pdf and summarized in the framework.

The planning process for the Mount St. Helens Wildlife Area identified seven National Ecological Systems of Concern to manage for ecological integrity. Table 5 summarizes the National Ecological Systems of Concern for the wildlife area, taken from DNR's Natural Heritage Program website, listed above.

Additionally, Appendix A contains the list of Species of Greatest Conservation Need (SGCN) believed to be present on the wildlife area and their relationships with ecological systems of concern. Actions associated with ecological integrity are included in the goals and objectives section (page 75), and include determining a baseline for ecological integrity and devising a monitoring plan to evaluate progress over time for each of these systems.

Table 5. Ecological Systems of Concern on the Mount St Helens Wildlife Area.

Ecological System of Concern	Units	Acres	Description
North Pacific Hardwood Conifer Swamp	Abernathy Creek, Altoona, Canal Road, Carnine, Cedar Creek, Duck	551.3	This ecological system is dominated by coniferous or hardwood trees in poorly drained environments with slowly moving or stagnant surface water. Primarily found in the lowlands up to 1,500 feet elevation

	Lake, Eagle Island, Fisher Island, Gardner, Hall Road, Merrill Lake, Mudflow, Nelson, White Island		but also occur in montane environments west of the Cascades. These swamps mostly occur as small-patches in glacial depressions, river valleys, around the edges of lakes and marshes, or on seepage slopes. Groundwater or streams and creeks which do not experience significance overbank flooding are major hydrological drivers. Accumulation of organic matter (woody peat or muck) can be important in some occurrences.
North Pacific Lowland Riparian Forest and Shrubland	Abernathy Creek, Altoona, Canal Road, Carnine, Cedar Creek, Eagle Island, Fisher Island, Gardner, Hall Road, Hoffstadt, Jenny Creek, Merrill Lake, Mudflow, Nelson, Two Forks, White Island	2,232.17	Riparian forests and shrublands found throughout low elevations west of the Cascades. These forests and tall shrublands are linear in character, occurring on low-elevation, alluvial floodplains that are confined by valleys and inlets or lower terraces of rivers and streams. Annual flooding is a key ecological processes which results in a diversity of patch types such as woodlands, shrublands, wet meadows, and marshes.
Temperate Pacific Freshwater Emergent Marsh	Abernathy Creek, Canal Road, Duck Lake, Fisher Island, Hall Road, Hoffstadt, Merrill Lake, Mudflow, Nelson, Two Forks, White Island	337.57	This small patch ecological system is found at all elevations below timberline throughout the temperate Pacific Coast. However, the dynamic hydrological regimes, high nutrient status, and relatively warm growing season of lowlands in western Washington make this system more abundant at lower than at higher elevations. These semi-permanently to permanently flooded wetlands are dominated by emergent herbaceous species, mostly tall graminoids with some forbs.

Temperate Pacific Freshwater Mudflat	Altoona	38.7	Freshwater, sparsely vegetated mud to extensive sods of herbaceous vegetation, which occur primarily in seasonally flooded shallow mudflats on floodplains. These mudflats area most commonly found along the Lower Columbia River.
North Pacific Hypermaritime Western Red-Cedar Western Hemlock Forest	Altoona	0.22	Open, scrubby, or closed forests located in the hypermaritime climatic areas along the Washington's outer coast. These forests are dominated by *Thuja plicata* and *Tsuga heterophylla.* The system is part of the coastal temperate rain forests of North America. Where these forests are best developed they occur in a mosaic with forested wetlands, peatlands, and Sitka spruce forests. The system occurs on low, gentle relief appearing mostly below 1,970 feet elevation and usually within 15 miles of the outer coast.
North Pacific Intertidal Freshwater Wetland	Altoona, Fisher Island, Nelson, White Island	127.42	Tidally influenced, freshwater herbaceous and woody wetlands. These wetlands occur in narrow strips to more extensive patches along tidally-influenced portions of rivers along Washington's coastal margin, Columbia River, Chehalis River, and smaller streams exposed to tides.
North Pacific Maritime Coastal Sand Dune and Strand	Fisher Island, Nelson, White Island	51.15	Coastal active or stabilized dunes and sandsheet. In their natural state these are dominated by short to medium-tall grasses, sedges, or forbs, often with abundant bare sandy or gravelly surface exposed.

Habitat Connectivity

A statewide connectivity analysis carried out by the Washington Wildlife Habitat Connectivity Working Group has looked for patterns of habitat connectivity among large landscapes. Because the Mount St. Helens Wildlife Area is mostly small units scattered across four counties,

the statewide analysis is not at a fine enough scale to assess priorities for maintaining connectivity on the wildlife area. However, a local group recently began a finer scale connectivity analysis of western Washington that will cover most of the wildlife area. This work includes modeling now under way in Oregon using methods similar to Washington's Columbia Plateau Connectivity Project (see https://waconnected.org/columbia-plateau-ecoregion/). Once complete, it should be at a fine enough scale to guide many more activities in western Washington than the statewide analysis.

Amphibians may be the most sensitive group of species affected by to habitat fragmentation on the wildlife area. Southwest Washington is the most diverse region for Species of Greatest Conservation Need (SGCN) amphibians in comparison to other areas in the state, and their low mobility makes them particularly vulnerable to fragmented habitat. While little is known about key factors contributing to the long-term persistence of amphibians in the region, maintaining connectivity among neighboring populations and sub-populations is important. Amphibians in the region that travel to and from spring breeding sites, such as western toads, are most vulnerable. Management to enhance riparian and wetlands habitat in the wildlife area may help improve the important function of these habitats (e.g., travel corridors) for regional amphibian populations.

The USACE Sediment Retention Structure prevents nearly all upriver migration by anadromous fish species above the location on the North Fork Toutle River. To allow adult salmonids native to the watershed to continue upriver migrations, WDFW staff transport natural-origin adult coho salmon, steelhead, and sea-run cutthroat trout miles above the SRS to release sites on Alder, Bear, and Pullen creeks, with a new site planned on Deer Creek (tributary creeks to the North Fork Toutle River). It is assumed that these fish spawn in the creeks, and offspring rear in the vicinity of these creeks and migrate downstream through the SRS spillway. However, surveys of spawning adults and migrating juveniles are currently not conducted, therefore the overall impact of the SRS on these fish populations is unknown. The continual build-up of fine sediment behind the SRS eliminated spawning habitat in the North Fork Toutle for miles upriver, and also greatly reduces the viability of volitional passage (fish migration around a dam through an upstream fish ladder or downstream bypass system) in the braided and shallow river channels traversing the sediment plain. WDFW is working with USACE and other partners to balance the competing needs of reducing downstream sediment transport below the SRS to protect public safety and property, with habitat connectivity for fish and wildlife in this area. In the short-term, this will likely include improving WDFW's current facility for collecting fish migrating upriver at the SRS as well as increasing sites for fish transport above the sediment plain. A long-term goal to further improve fish habitat connectivity, that will require significant investment from USACE and others, is the potential for developing a volitional fish passage option at the SRS and river restoration above the SRS.

Species Management

WDFW's mission is to preserve, protect, and perpetuate fish, wildlife, and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities. The agency carries out this mission according to state and federal laws (including the Endangered Species Act or ESA) and funding requirements (from property acquisition and/or funds used for ongoing operations and maintenance), which direct many management activities on WDFW's wildlife areas. Other guidance comes from statewide plans for species and/or habitats, and other scientific approaches recommended by internal and external parties (e.g. The Washington State National Heritage Program's Ecological Integrity Assessments). Management actions may also be influenced by collaborative work undertaken with tribal governments and other conservation organizations, land trusts, other land management organizations, academic research programs, and even the specific interests of volunteers if they fit within WDFW's mission, budget, and wildlife area goals.

Consistent with WDFW's mission, the agency manages species on wildlife areas for two primary purposes: 1) conservation and protection to manage sustainable populations, and 2) provision of recreational and commercial opportunities.

The Wildlife Area Management Planning Framework describes how species are classified – including species listed at the state or federal level as threatened or endangered, and other species of conservation concern that are included in WDFW's designation of Species of Greatest Conservation Need (SGCN). SGCN species are described in the 2015 State Wildlife Action Plan (https://wdfw.wa.gov/conservation/cwcs/). The framework also incorporates goals from WDFW's Game Management Plan, which includes protecting, sustaining, and managing hunted wildlife, providing stable, regulated recreational hunting to all citizens, protecting and enhancing wildlife habitat, and minimizing adverse impacts to residents, other wildlife, and the environment. The wildlife area plan integrates these plans and priorities, and, in the goal and objectives section (page 75), defines specific actions to achieve them.

The Mount St. Helens Wildlife Area supports a wide variety of game and diversity species, including mammals such as black-tailed deer, Columbian white-tailed deer, both Roosevelt and Rocky Mountain elk, beavers, coyotes, bobcats, cougars, and black bears. Bird species that may be encountered are band-tailed pigeons, bald eagles, red-tailed hawks, western meadowlarks, ruffed grouse, mallards, wood ducks, common nighthawks, kestrels, and common ravens. The diverse ecosystems of the wildlife area are also home to the western toad, Pacific tree frog, rough-skinned newt, common garter snake, northwestern garter snake, and northern alligator lizard. There is one documented species of reptile, the ring-necked snake (SGCN), and eight mollusks classified as SGCN (Table 6) that may occur on the wildlife area.

The Mount St. Helens Wildlife Area is also home to federally threatened species that include: Columbian white-tailed deer, marbled murrelet, northern spotted owl, streaked horn lark, yellow-billed cuckoo, Oregon spotted frog, bull trout, chinook, green sturgeon, chum, coho, eulachon, and steelhead. Two federal species of concern include peregrine falcon and river lamprey. Twelve state listed species and 20 state candidate species may occur on the wildlife area (Table 4). All 18 units combined provide habitat for 55 Species of Greatest Conservation Need. There are also 52 Priority Habitats and Species (PHS). PHS are habitats and species determined by WDFW to be priorities for conservation and management (Table 4). The list of Priority Habitats is available in Appendix A.

Table 6. State and Federal Conservation Status, SGCN inclusion, WDFW Priority Habitats and Species (PHS) Criteria and priority areas for species that may occur on the Wildlife Area Units.

Common Name	Scientific Name	Federal/State Status/SGCN	PHS Criteria	PHS Priority Area	Wildlife Area Unit
Birds					
American white pelican	*Pelecanus erythrorhynchos*	ST/SGCN			Altoona, White Island, Fisher Island
Bald eagle	*Haliaetus leucocephalus*	SGCN			Mudflow, Merrill Lake, Altoona, Abernathy, Hall Road, Gardner, Nelson, Canal Road, Eagle Island, Fisher Island, Hoffstadt, White Island
Band-tailed pigeon	*Columba fasciata*	SGCN	3	Regular concentrations, occupied mineral sites	Cedar Creek, Jenny Creek, Hoffstadt, Eagle Island
Barrow's goldeneye	*Bucephala islandica*	SGCN			Fisher Island
Cavity nesting ducks			3	Breeding areas	Altoona, Abernathy, Eagle Island, Fisher Island, Merrill Lake, Nelson, Two Forks
Common loon	*Gavia immer*	SS/SGCN	2, 3	Breeding Sites, Migratory Stopovers, Regular Concentrations	Merrill Lake
Cinnamon teal	*Spatula cyanoptera*	SGCN			White Island, Eagle Island, Duck Lake

					Altoona, Two Forks Jenny Creek
Dusky Canada goose	*Branta canadensis occidentalis*	SGCN			Altoona, Fisher Island, White Island, Duck Lake
Sooty grouse	*Dendragapus obscurus*		3	Breeding areas, regular concentrations	Hoffstadt, Merrill Lake, Mudflow
Golden eagle	*Aquila chrysaetos*	SC/SGCN	1	Breeding Areas, Foraging Areas	Mudflow
Great blue heron	*Ardea herodias*		2	Breeding areas	Fisher Island, White Island
Harlequin duck	*Histrionicus histrionicus*	SGCN	2,3	Breeding areas, regular concentrations	Merrill Lake
Marbled murrelet	*Brachyramphus marmoratus*	FT/ST/SGCN	2	Breeding areas	Abernathy, Altoona
Northern goshawk	*Accipiter gentilis*	SC	1	Breeding areas, foraging areas	Nellie Corser, Merrill Lake
Northern spotted owl	*Strix occidentalis*	FT/SE/SGCN	1	Any occurrence	Hoffstadt, Merrill Lake, Mudflow, Nellie Corser
Oregon vesper sparrow	*Pooecetes gramineus affinis*	SC/SGCN	1	Any occurrence	White Island, Altoona
Peregrine falcon	*Falco peregrinus*	FSC			All
Pileated Woodpecker	*Dryocopus pileatus*	SC	1	Breeding areas	Probably all the Units except Nelson, and Fisher Island
Purple Martin	*Progne subis*	SGCN			Nelson, Altoona, White Island, Hoffstadt, Fisher Island
Sandhill Crane (greater)	*Grus canadensis*	SE/SGCN	1	Breeding areas, regular concentrations, migration staging areas	Probably not likely but if it showed up they would be at Fisher Island, Altoona
Slender-billed white-breasted nuthatch	*Sitta carolinensis aculeata*	SC/SGCN	1	Any occurrence	Eagle Island, Two Forks, Duck Lake, Jenny Creek
Sooty Grouse	*Dendragapus fuliginosus*		3	Breeding areas, regular concentrations	Mudflow, Hoffstadt, Merrill Lake,

Streaked horned lark	*Eremophila alpestris strigata*	FT/SE/SGCN	1	Any occurrence	White Island, Fisher Island
Trumpeter Swan	*Cygnus buccinator*		2,3	Regular concentrations	Altoona, Nelson, Fisher Island
Tundra Swan	*Cygnus columbianus*		2,3	Regular concentrations	Altoona, Nelson, Fisher Island
Waterfowl concentrations			2,3	Significant breeding areas, regular concentrations in winter	Fisher Island, Hall Road, Hoffstadt, Nelson, Duck Lake, Eagle Island, Canal Road, White Island, Altoona
Western bluebird	*Sialia mexicana*	SGCN			All
Western Grebe	*Aechmophorus occidentalis*	SC/SGCN	1,2	Breeding areas, regular concentrations, migratory stopovers, regular occurrences in winter	Nelson, Altoona, Fisher Island, White Island
Western screech-owl	*Megascops kennicottii*	SGCN			Hall Road, Nelson Fisher Island, Merrill Lake, Abernathy, Nellie Corser, Gardner, Altoona Jenny Creek, Hoffstadt, Mudflow
Yellow-billed cuckoo	*Coccyzus americanus*	FT/SE/SGCN	1	Any occurrence	Potential to occur at Two Forks, Fisher Island
Fish					
Bull trout	*Salvelinus confluentus*	FT/SC/SGCN	1,2,3	Any occurrence	Eagle Island, Fisher Island, Nelson, White Island
Lower Columbia Chinook salmon ESU	*Oncorhynchus tshawytscha*	FT/SC/SGCN	1,2,3	Any occurrence	Abernathy, Altoona, Canal Road, Cedar Creek, Eagle Island, Fisher Island, Gardner, Hoffstadt, Merrill Lake, Nelson, Two Forks, White Island

Columbia River Chum Salmon ESU	*Oncorhynchus keta*	FT/SC/SGCN	1,2,3	Any occurrence	Abernathy, Altoona, Cedar Creek, Duck Lake, Eagle Island, Fisher Island, Gardner, Nelson, Two Forks, White Island
Lower Columbia Coho salmon ESU	*Oncorhynchus kisutch*	FT/SGCN	2,3	Occurrence	Abernathy, Altoona, Canal Road, Cedar Creek, Duck Lake, Eagle Island, Fisher Island, Gardner, Hoffstadt, Mudflow, Nellie Corser, Nelson, Two Forks, White Island
Cutthroat trout	*Oncorhynchus clarki*		3	Any occurrence	Abernathy, Altoona, Canal Road, Cedar Creek, Eagle Island, Fisher Island, Gardner, Hoffstadt, Merrill Lake, Mudflow, Nellie Corser, Nelson, Two Forks, White Island
Eulachon (southern DPS)	*Thaleichthys pacificus*	FT/SC/SGCN	1, 2, 3	Regular Concentrations	Altoona, Eagle Island, Fisher Island, Abernathy, Nelson, Two Forks, White Island
Green sturgeon (Southern DPS)	*Acipenser medirostris*	FT/SGCN	1,2,3	Any occurrence	Fisher Island, White Island
Pacific lamprey	*Enosphenus tridentatus*	SGCN	3	Occurrence	Abernathy, Altoona, Canal Road, Cedar Creek, Eagle Island, Fisher Island, Gardner, Hoffstadt, Two Forks, White Island
Pink salmon	*Oncorhynchus gorbuscha*		2,3	Any occurrence	Fisher Island, White Island
Rainbow Trout	*Oncorhynchus mykiss*		3	Occurrence, migration	Abernathy, Altoona, Canal Road, Cedar Creek, Eagle Island, Gardner, Hoffstadt,

					Merrill Lake, Mud-flow, Two Forks
River lamprey	*Lampetra ayresii*	FSC/SC/SGCN	1	Occurrence	
Sockeye salmon	*Oncorhynchus nerka*		1,2,3	Any occurrence	Eagle Island, Fisher Island, White Island
Lower Columbia Steelhead DPS	*Oncorhynchus mykiss*	FT/SC/SGCN	1,3	Any Occurrence	Abernathy, Altoona, Canal Road, Cedar Creek, Duck Lake, Eagle Island, Fisher Island, Gardner, Hoffstadt, Merrill Lake, Mudflow, Nelson, Two Forks, White Island
White sturgeon	*Acipenser transmontanus*	SGCN	2,3	Any occurrence	Eagle Island, Fisher Island, Two Forks, White Island
Mammals					
Amerian pika	*Ochotona princeps*	SGCN			Mudflow, Hoffstadt, Merrill Lake, Nellie Corser
Columbian white-tailed deer	*Odocoileus virginianus*	FT/SE/SGCN	1	Regular concentrations	White Island, Two Forks, Fisher Island
Fisher	*Pekania pennanti*	FC/SE/SGCN	1	Any occurrence	Mudflow, Nellie Corser, Merrill Lake (future)
Gray wolf	*Canis lupus*	FE/SE/SGCN	1	Regular Occurrences	Future
Hoary bat	*Lasiurus cinereus*	SGCN			All
Mountain goat	*Oreamnos americanus*		3	Breeding areas, regular concentrations	Mud Flow, Hoffstadt, Merrill Lake
Mule deer and black-tailed deer	*Odocoileus hemionus*		3	Breeding areas, migration corridors, regular winter concentrations	Hoffstadt, Mudflow, Nellie Corser, Fisher, Two Forks, Merrill Lake, Cedar Creek, Jenny Creek, Eagle Island, White Island, Hall Road, Abernathy

Pacific marten	*Martes caurina caurina*	SGCN	3	Regular occurrence	Merrill Lake, Hoffstadt, Nellie Corser
Rocky Mountain Elk	*Cervus elaphus nelsoni*		3	Calving areas, migration corridors, and regular concentrations in winter	Canal Road, Hall Road, Hoffstadt, Merrill Lake, Mudflow
Roosevelt elk	*Cervus canadensis roosevelti*		3	Calving areas, migration corridors, regular concentrations in winter, and foraging areas along coastal waters	Abernathy, Altoona
Silver haired bat	*Lasionycteris noctivagans*	SGCN			All
Townsend's big-eared bat	*Corynorhinus townsendii*	SC/SGCN	1,2	Any occurrence	Merrill Lake
Western spotted skunk	*Spilogale gracilis*	SGCN			All
Amphibians					
Cascade torrent salamander	*Rhyacotriton cascadae*	SC/SGCN	1	Any occurrence	Hoffstadt, Mudflow, Merrill Lake, Nellie Corser
Columbia torrent salamander	*Rhyacotriton kezeri*	SGCN			Abernathy
Cope's giant salamander	*Diacamptodon copei*	SGCN			Abernathy, Nellie Corser, Merrill Lake, Hoffstadt, Mudflow
Dunn's Salamander	*Plethodon dunni*	SC/SGCN	1	Any occurrence	Abernathy
Larch Mountain salamander	*Plethodon larselli*	SS/SGCN	1	Any occurrence	Nellie Corser, Merrill Lake
Oregon spotted frog	*Rana pretiosa*	FT/SE/SGCN	1	Any occurrence	Duck Lake
Van Dyke's salamander	*Plethodon vandykei*	SC/SGCN	1	Any occurrence	Merrill Lake
Western toad	*Bufo boreas*	SC/SGCN	1	Any occurrence	Merrill Lake, Mudflow, Nellie Corser, Cedar Creek, Gardner

Reptiles					
Ringneck snake	*Diadophis punctatus*	SGCN			Altoona, White Island, Abernathy, Fisher Island, Eagle Island, Two Forks, Jenny Creek, Duck Lake, Cedar Creek, Nellie Corser
Insects					
Pacific clubtail	*Gomphus kurillis*	SC/SGCN	1	Any occurrence	
Mollusks/Bivalves					
Barren juga	*Juga hemphilli hemphilli*	SGCN			Nellie Corser
Bluegray taildropper	*Prophysaon coeruleum*	SC/SGCN	1	Any occurrence	
California floater	*Anodonta californiensis*	SC/SGCN	1, 2	Any occurrence	
Crowned tightcoil	*Pristiloma pilsbryi*	SGCN		-	
Dalles hesperian	*Vespericola depressa*	SGCN		-	
Olympia pebblesnail	*Fluminicola virens*	SGCN		-	
Oregon megomphix	*Megomphix hemphilli*	SGCN		-	
Puget Oregonian	*Cryptomastix devia*	SGCN		-	

Abbreviations: State endangered (SE), State threatened (ST), State Sensitive (SS), State Candidate for listing (SC), Federal endangered (FE), Federal candidate (FC), Federal species of concern (FSC); Species of Greatest Conservation Need (SGCN); Evolutionarily Significant Unit (ESU); Distinct Population Segment (DPS)

Game Species Overview & Management

The Mount St. Helens Wildlife Area supports many game species that provide varied recreational opportunities. Elk and black-tailed deer are priority big game species along with black bear and cougar. Small game species include band-tailed pigeons, sooty and ruffed grouse, waterfowl, coyotes, and bobcats. Summaries of their distribution and management are included below. WDFW's 2015-2021 Game Management Plan (https://wdfw.wa.gov/publications/01676/) details management objectives and goals for each of these species. The overall goals support sustaining populations and providing recreation opportunities.

Hunting is an important recreational focus on the Mount St. Helens Wildlife Area and each unit offers a different set of hunting opportunities. Hunting seasons (dates and harvest restrictions) are species specific within the state and across regions, with seasons and regulations evaluated and updated each year. The specific regulations pertaining to individual species and hunting seasons are found on WDFW's website (http://wdfw.wa.gov/hunting/regulations/). Additional information on harvest history and population status are located in WDFW Game Harvest Reports (https://wdfw.wa.gov/hunting/harvest/) and WDFW Game Status and Trend Reports (https://wdfw.wa.gov/publications/).

The Game Management Units (GMUs) associated with the Mount St. Helens Wildlife Area include:

- GMU 568 (Washougal): Nellie Corser Unit
- GMU 564 (Battle Ground): Duck Lake (Clark County) Unit, Two Forks Unit, Jenny Creek Unit, Cedar Creek Unit, Eagle Island Unit, and Nelson Unit
- GMU 504 (Stella): Fisher Island Unit
- GMU 530 (Ryderwood): Abernathy Creek Unit and White Island Unit
- GMU 506 (Willapa Hills): Altoona Unit
- GMU 550 (Coweeman): Canal Road Unit, Hall Road Unit, and Gardner Unit
- GMU 520 (Winston): Gardner Unit and Hoffstadt Unit
- GMU 556 (Toutle): Hoffstadt Unit
- GMU 524 (Margaret): Hoffstadt Unit and Mudflow Unit
- GMU 522 (Loo-wit): Mudflow Unit
- GMU 560 (Lewis River): Merrill Lake Unit

Across the wildlife area units, a range of management activities promote stable populations of game species. Primary to that objective is the protection of core wildlife habitat created with the establishment of the wildlife area. Ongoing efforts include weed management, habitat restoration, road management, forest restoration, and fencing.

Black-tailed Deer

Black-tailed deer (*Odocoileus hemionus columbianus*) range throughout western Washington (WDFW 2016, Rue, 1997) and are potentially found on all units of the Mount St. Helens Wildlife Area. Black-tailed deer inhabit a variety of habitat types, from coastal dunes to alpine

grasslands. Forests and shrublands are the most significant habitat type supporting black-tailed deer populations (Nelson, et. al. 2008). Accordingly, the Hoffstadt, Merrill Lake, Cedar Creek, Nellie Courser, Jenny Creek, and Eagle Island units provide the most significant black-tailed deer habitat among the units making up the Mount St. Helens Wildlife Area.

Black-tailed deer are a relatively small ruminant, with adult females and males weighing approximately 125 and 175 pounds respectively (Brown, 1961). They require a high quality diet and select from a large variety of vegetation to meet their nutritional needs. Their preference includes browsing on the leaves, buds, and twigs of shrubs and deciduous trees as well as grazing on grasses and flowering plants (forbs) (Nelson, et. al. 2008, Rue, 1997 and Brown, 1961). Additional foods include the buds of conifer trees, mushrooms, acorns, berries, fruit, sedges, and various agricultural crops. The food resources favored by black-tailed deer are most abundant on early serial habitats, including those recently affected by fire, timber harvest, windfall, mechanical treatments, and forest disease outbreaks. In spite of the abundance of food produced following disturbances, black-tailed deer also inhabit older forest stands where forest complexity, especially breaks in the forest canopy, allow sunlight to reach the forest floor and produce forage.

Black-tailed deer home ranges are often less than one square mile. Studies have found that some black-tailed deer inhabit even smaller areas with home range sizes averaging only 0.135 square miles (Rice 2012). Some black-tail deer in western Washington can exhibit migratory behavior (Rice 2012). McCorquodale found that seasonal movements from higher elevation ranges in summer to lower winter ranges was typical among Klickitat county deer (McCorquodale 1999). The black-tailed deer that inhabit the various units of the Mount St. Helens Wildlife Area are commonly year-round residents of these areas.

Black-tailed deer are prey to cougars, wolves, black bears, bobcats, and coyotes (WDFW 2016). Wolves are currently absent from western Washington habitats, including all of the Mount St. Helens Wildlife Area units (WDFW et. al. 2018). Cougars are the most significant predator on adults while the full suite of predators can prey upon fawns.

Black-tailed deer inhabiting the units of the Mount St. Helens Wildlife Area are included in two different deer management zones. Black-tailed deer found west of Interstate 5 are in the Willapa Hills Black-tailed Deer Management Zone, while those east of Interstate 5 are in the South Cascade Mountain Black-tailed Deer Management Zone. See the annual Game Status and Trend Report at: (https://wdfw.wa.gov/publications/search.php?Cat=Hunting&SubCat=Game%20Harvest,%20Status%20and%20). This report includes trends for a discussion of population status, harvest, and habitat trends within each of these Management Zones.

Elk

Elk *(Cervus elaphus)* range throughout large portions of western Washington State (WDFW 2016, Toweill and Thomas, 2002) and inhabit a variety of habitat types in western Washington, including forests, wetlands, alpine areas, shrublands, and agricultural areas. Consequently, elk can be found on all units of the Mount St. Helens Wildlife Area. Elk inhabiting units of the Mount St. Helens Wildlife Area located west of Interstate 5 are associated with the Willapa Hills Elk Herd (WDFW 2014), while those located east of Interstate 5 are associated with the Mount St. Helens Elk Herd (WDFW 2006). See the department's annual Game Status and Trend Reports (https://wdfw.wa.gov/hunting/) for more information related to population status, harvest, habitat trends, and other management issues within each of these elk herd areas.

Elk are a medium-sized ruminant with adult females weighing approximately 600 pounds and males ranging from 700-800 pounds (Thomas and Toweill 1982). Elk are able to digest a large variety of plant types to meet their nutritional needs, preferring grasses and flowering plants (forbs) as well as leaves, buds, and twigs of shrubs (Toweill and Thomas, 2002). Additional foods include the buds of conifer trees, mushrooms, acorns, berries, fruit, sedges, and various agricultural crops. Food selection changes along with seasonal differences in plant phenology and is a combined function of plant availability and elk preference (Thomas and Toweill 1982). The food resources favored by elk are most abundant within early seral habitats, including those recently affected by fire, timber harvest, windfall, mechanical treatments, and forest disease outbreaks. Elk habitat models developed by the U.S. Forest Service Pacific Northwest Research Station identify the best elk habitat as having open forest canopy, relatively flat topography, and relatively short distances to cover (U.S. Forest Service 2018).

The Mudflow and Hoffstadt units provide the most significant elk habitat within the Mount St. Helens Wildlife Area. These units are most important during winter. Annual counts of elk using the Mudflow and Hoffstadt units have exceeded 800 individuals (WDFW 2018a). The combination of available winter forage (dried grasses), security (from winter closures to public access), gentile topography, solar radiation, and low elevation (approximately 1,200 feet) make the Mudflow and Hoffstadt units critical winter habitat for a significant portion of the Mount St. Helens Elk Herd.

Elk are prey to cougars, wolves, black bears, and grizzly bears (WDFW 2016). Wolves and grizzly bears are currently absent from western Washington habitats, including all of the Mount St. Helens Wildlife Area units (WDFW et. al. 2018 and WDFW 2016). Cougars are the most significant predator on adult elk, while both cougars and black bears prey upon calves.

The portions of the Mudflow and Hoffstadt units of the Mount St. Helens Wildlife Area encompass a portion of Elk Area 5099 where limited elk hunting permits are available. See the annual Big Game Hunting Seasons and Regulations Pamphlet for further details at: https://wdfw.wa.gov/hunting/regulations/

Band-tailed pigeon

The Pacific Coast subspecies of band-tailed pigeon (*Patagioenas fasciata monilis*) breeds in Washington and winters in California. They are habitat generalists, but primarily inhabit coniferous forests, traveling long distances based on food availability. Their diet includes buds, flowers, and fruits of deciduous trees and shrubs, especially oak, madrone, elderberry, dogwood, cherry, cascara, and huckleberry, varying seasonally and by location. They typically nest in conifers within closed-canopy conifer or mixed hardwood-conifer stands. In the summer, adults frequently visit natural springs and water bodies high in sodium where they drink and peck at the soil between long periods of roosting in nearby trees. In Washington, these mineral sites are found in estuarine and inland environments, but WDFW knowledge of inland sites is limited. The Cedar Creek and Jenny Creek units both have inland mineral spring sites and the one at Cedar Creek is currently in use by band-tailed pigeons. The mineral spring sites are protected and also maintained by removing encroaching vegetation. A mineral site survey is conducted annually by WDFW staff members on the Cedar Creek Unit. Mineral site surveys are used as the official index for the Pacific Coast population of band-tailed pigeons. They determine management thresholds and hunting season closure thresholds. Cedar Creek and Jenny Creek units provide opportunity for hunting; typically, the band-tailed pigeon season is open for nine days in September at both units.

Diversity Species Overview & Management

The Mount St. Helens Wildlife Area supports a variety of diversity species (species not hunted). Diversity species include SGCN, PHS, and federally and state listed species. Included in this are Columbian white-tailed deer, which are a federally threatened and state endangered species that WDFW manages on this wildlife area. The following section summarizes recovery actions for these species.

Columbian White-tailed Deer

Columbian white-tailed deer (*Odocoileus virginianus leucurus*) (CWTD) is the westernmost subspecies of white-tailed deer. The Lower Columbia River population is listed as threatened by the USFWS and Endangered by Washington. Formerly widespread and numerous across its range, the Lower Columbia population now occurs in relatively low numbers in a highly

restricted range (Figure 20). In 2017, the USFWS estimates the Lower Columbia population (which has increased in recent years) is just over 1,000 deer.

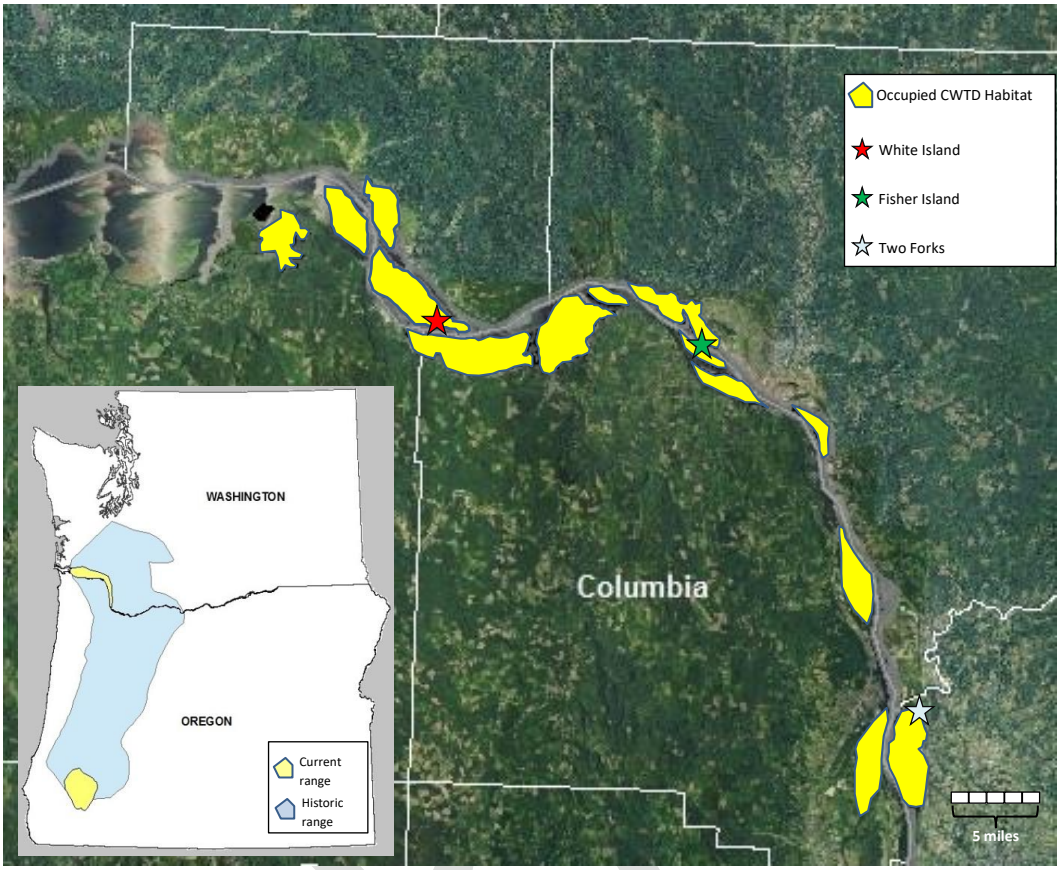

Figure 20. Columbian White-tailed Deer Range.

Columbian white-tailed deer occupy the White Island, Fisher Island, and Two Forks units. Populations at Fisher Island and Two Forks are the result of translocations. Deer were translocated to Fisher Island between 1999 and 2006. Despite that effort, the Fisher Island population has not grown, likely because the island is too wet and small to support a larger population. On Two Forks, deer dispersed from deer translocated to Ridgefield National Wildlife Refuge in 2013 and 2014. Unlike Fisher Island and Two Forks, deer on White Island are naturally occurring and move freely from Puget Island (the largest subpopulation in the Lower Columbia), which is separated from White Island by a narrow slough.

Each of these three units hold characteristics that attract Columbian white-tailed deer. White Island in particular is designated a Natural Areas Preserve partly for its importance to CWTD. Both the Fisher Island and White Island units are made up of freshwater wetlands, sandy shoreline, and black cottonwood (*Populus trichocarpa*) - willow (*Salix* spp.) floodplain forest. Though the wet conditions of all three units make them less than ideal deer habitat, deer use the units given available forage and CWTD preference for deciduous forest.

Though none of the units is large enough to support more than a handful of CWTD, improvements to these sites could enhance conditions for CWTD. On White Island, invasive plants have overrun a large portion of the southern half of the island. Efforts to remove Himalayan blackberry and Scotch broom, the primary invasive plants, could help improve CWTD habitat. The same holds true for the other units. Besides invasive plant removal, enhancing forage and cover could also improve conditions for CWTD on the wildlife area. The department should also work with partners to expand occupied Columbian white-tailed deer habitat by investigating acquisition opportunities. Securing suitable uplands connected to occupied sites could help in recovery given the negative impacts of flooding and climate change on deer in isolated floodplains.

Amphibians and Reptiles

The widely dispersed and diverse habitats of the Mount St. Helens Wildlife Area make it difficult to identify the presence or absence of any specific given species of amphibian or reptile. The lack of any formal inventory or survey of these species on the wildlife area compounds the problem. In fact, few incidental records are available to conclude species presence or assess habitat suitability. Table 7 lists amphibian and reptile species likely to occur on the Mount St. Helens Wildlife Area based on the presence of suitable habitat.

Formal inventories are important to identify populations that may require management on the units of the Mount St. Helens Wildlife Area. Informal submissions of incidental observation forms (ideally with photo vouchers) are also useful. Staff members can fill out and submit these forms at https://wdfw.wa.gov/viewing/observations/sgcn/ while members of the public can use the Washington Herp Atlas to help in identifying individuals and submitting observations. Onsite evaluations of habitat suitability can also be important for identifying potential amphibian and reptile habitat to find ideal locations for species surveys.

Other Diversity Species

Several Species of Greatest Conservation Need (SGCN) not highlighted in the brief descriptions above also occur on the wildlife area (Appendix A). These species are important to track through periodic surveys when feasible.

Only a handful of non-game SGCNs have been verified on the wildlife area. However, other non-game SGCNs likely also occur. Below is a list (Table 7) of SGCNs that have not been documented on the Mount St. Helens Wildlife Area but that have the potential to occur. These species merit consideration in this plan because the wildlife area contains suitable habitat (WDFW 2015). This list only includes vertebrate SGCNs. Because invertebrate surveys occur much less frequently than those for vertebrates, one can reasonably assume that this list would be longer if it included invertebrate SGCNs.

Species that are potentially on the wildlife area (Table 7) may be considered for future wildlife area surveys. Although resources may not make it possible or feasible to pre-plan surveys for each of these species, staff members and volunteers can still opportunistically combine searches with other planned activities, particularly when an activity occurs in known suitable habitat (see Chapter 4 in WDFW 2015). Beyond surveys, the agency may eventually get involved in active management or recovery of non-game SGCNs that occur or could potentially occur on the wildlife area. Recovery may include looking for suitable places to translocate and reintroduce animals. When appropriate, the wildlife area may play a role in efforts like this for some SGCNs identified.

Table 7. Vertebrate species of greatest conservation (SGCN) need that are associated with ecosystems that occur on the Mount St. Helens Wildlife Area.

	Species of Greatest Conservation Need	Ecosystem SGCN is **closely** associated with on wildlife area	Ecosystem SGCN is **generally** associated with on wildlife area
Amphibians	Cascade Torrent Salamander *	X	
	Cope's Giant Salamander *		X
	Dunn's Salamander *	X	
	Larch Mountain Salamander *		X
	Oregon Spotted Frog	X	X
	Van Dykes Salamander *		X
	Western Toad *		X
Birds	Barrow's Goldeneye		X
	Cinnamon Teal	X	
	Dusky Canada Goose		X
	Purple Martin *		X
	Short-eared Owl		X
	Slender-billed white-breasted nuthatch *		X
	Western Screech Owl		X
Mammals	Fisher		X
	Gray Wolf		X
	Hoary Bat		X
	Pacific Marten		X
	Silver-haired Bat		X
	Townsend's Big-eared Bat *		X
	Western Spotted Skunk		X
Reptiles	Ringneck Snake *		X
	Western Pond Turtle *		X

* WSDM database occurrences present within 20 miles of one or more of the wildlife area's units.

Fish Species Management

The ESA-listed species present within some of the Mount St. Helens Wildlife Area units include: steelhead (*Oncorhynchus mykiss*), coho salmon (*O. kisutch*), chum salmon (*O. keta*), chinook salmon (*O. tshawytscha*), and bull trout (*Salvelinus confluentus*). Management of salmon, steelhead and sturgeon fisheries in the mainstem Columbia River is determined by Washington and Oregon, and treaty tribes. Management of Columbia River tributary rivers, streams, and lakes in southwest Washington is determined by WDFW. Hatchery production of steelhead, coho salmon, and chinook salmon occurs on most large tributaries to the lower Columbia River (hatchery programs also operate for chum). Recreational harvest of hatchery-origin steelhead, coho salmon, and chinook salmon is allowed during set seasons based on run size, hatchery needs, and ESA limits (e.g., impacts on natural-origin population). Commercial fisheries for hatchery and natural-origin coho salmon, and chinook salmon may occur near Fisher Island and White Island based on run sizes and ESA limits. A limited recreational fishery for natural-origin chinook salmon may be allowed in Eagle Island, Two Forks, Fisher Island, or White Island units based on run sizes and ESA limits. Targeting or harvesting bull trout is not allowed in southwest Washington. Recreational harvest fisheries for hatchery and natural-origin rainbow and cutthroat trout occur in most rivers and streams during set seasons; however, hatchery rainbow trout are released in few streams, and currently the only cutthroat releases occur in the Cowlitz River. Lakes in southwest Washington are managed by WDFW for a combination of 'put-and-take' hatchery trout fisheries, wild trout, and non-native sport species, where appropriate.

Fish Species Presence in Wildlife Area Units

The narrative below describes Mount St. Helens Wildlife Area anadromous and resident species for each unit of the Mount St. Helens Wildlife Area. Unit descriptions were grouped wherever possible if similar fish species assemblages occurred.

Altoona Unit

The Altoona Unit includes lower Columbia River off channel areas near the river mouths of Deep and Grays rivers in the lower Columbia River. A host of resident and migratory fish species may be found in these units depending on season and other factors. Anadromous native species that may be found here include: chinook, coho, and chum salmon, sea-run cutthroat trout, lamprey (pacific, brook and/or river species), eulachon, and sturgeon (green and white species). Anadromous fish returning to these areas may include hatchery-origin chinook, coho, and steelhead from long-running hatchery programs in the vicinity, including Grays, Elochoman, and Deep rivers (WDFW net pens), as well as coho and steelhead raised at the WDFW Grays River Hatchery. Other anadromous fish found in this unit would be natural-origin, unless they stray into the creeks from hatchery programs in other basins. Anadromous species primarily use these wildlife area units for adult migratory pathways and juvenile rearing, although adult sturgeon and cutthroats may feed in these areas as well. Resident species found here may

include several native species (e.g. rainbow trout, cutthroat trout, northern pikeminnow), as well as a variety of non-native species.

Abernathy Unit
Abernathy unit includes the lower reaches of Abernathy and Cameron creeks, tributaries to the lower Columbia River. These creeks are part of the Intensively Monitored Watersheds program, a collaborative effort between WDFW and other agencies to evaluate the benefits of habitat restoration projects on anadromous salmonids. Regular WDFW surveys are conducted in these creeks to count juvenile and adult salmonids. Anadromous native species that use this unit for migration, spawning, and juvenile rearing include: chinook, coho, and chum salmon, as well as steelhead, sea-run cutthroat trout, and lamprey (pacific, brook and/or river species). A long running USFWS hatchery program on Abernathy Creek released steelhead until the program was recently eliminated. Other anadromous fish found in this unit would be natural-origin, unless they stray into the creeks from hatchery programs in other basins. Resident species found here may include several native species (e.g. rainbow trout, cutthroat trout, northern pikeminnow), as well as a variety of non-native species.

Carnine Road
This unit does not include fish bearing waters.

Duck Lake Unit
This unit includes a small tributary to the East Fork Lewis River. Anadromous native species that may use this area for spawning and juvenile rearing include: chinook, coho, and chum salmon, as well as steelhead and sea-run cutthroat trout. Resident species may include several native species (e.g. rainbow trout, cutthroat trout, northern pikeminnow), as well as a variety of non-native species.

Eagle Island and Two Forks Units
These two units are within the Lewis River. WDFW surveys for spawning chinook salmon are currently conducted annually from Eagle Island upriver to Merwin Dam. Anadromous native species that use this area for migration, juvenile rearing, and spawning include: chinook, coho, chum, and sockeye salmon, steelhead, sea-run cutthroat trout, eulachon, lamprey (pacific, brook and/or river species), and sturgeon (green and white species). Anadromous fish found in these units may include hatchery-origin chinook, coho, and steelhead from WDFW/PacifiCorp's long running Lewis River Hatchery, Merwin Hatchery, and Speelyai Hatchery programs. Other anadromous fish found in this unit would be natural-origin, unless they stray into the area from hatchery programs in other basins. Resident species found here may include several native species (e.g. rainbow trout, cutthroat trout, northern pikeminnow), as well as a variety of non-native species. Another resident species that may be found here on occasion is bull trout. A population of bull trout exists in the upper Lewis River basin, primarily feeding, spawning, and rearing in areas above Merwin Dam; however, some individuals may occur below Merwin Dam on these wildlife area units.

Fisher Island and White Island Units

These units are off-channel areas within the mainstem Columbia River. A host of resident and migratory fish species may be found in these units depending on season and other factors. Anadromous native species that may be found here include: chinook, coho, chum, sockeye (O. nerka) and pink (O. gorbuscha) salmon, steelhead, sea-run cutthroat trout (O. clarki), eulachon (Thaleichthys pacificus), pacific lamprey (Lampetra tridentata), brook lamprey (Lampetra planeri), and/or river lamprey (Lampetra ayresii), green sturgeon (Acipenser medirostris), and white sturgeon (Acipenser transmontanus). Anadromous fish found in these units may include hatchery-origin chinook, coho, chum, sockeye, steelhead, and sea-run cutthroat from a variety of hatchery programs in the Columbia River Basin. Natural-origin salmon may belong to Lower Columbia River, Middle Columbia River, Upper Columbia River, or Snake River Evolutionary Significant Units (ESUs). Natural-origin steelhead may belong to Southwest Washington, Lower Columbia River, Middle Columbia River, Upper Columbia River, or Snake River ESUs. Non-native anadromous species that may be found in these areas include American shad (Alosa sapidissima). Anadromous species primarily use these wildlife area units for adult migratory pathways and juvenile rearing, although adult sturgeon and cutthroat may feed in these areas as well. Resident species found here may include several native species: rainbow trout (O. mykiss), cutthroat trout, northern pikeminnow (Ptychocheilus oregonensis), and others, as well as a variety of non-native species.

Gardner Unit

This unit includes portions of the North Fork and South Fork Toutle rivers near the confluence. Annual WDFW surveys are conducted in these areas to count adult spawning salmonids. Anadromous native species that use this area for migration, spawning, and juvenile rearing include: chinook and coho salmon, steelhead, sea-run cutthroat trout, and lamprey (pacific, brook, and/or river species). Anadromous fish in this unit may include hatchery-origin chinook and coho salmon from WDFW's long-running North Toutle Hatchery program (on the Green River) or hatchery-origin steelhead from an acclimation pond program on the South Fork Toutle River. Other anadromous fish found in this unit would be natural-origin, unless they stray into the creeks from hatchery programs in other basins. Resident species found here may include several native species (e.g. rainbow trout, cutthroat trout, northern pikeminnow), as well as a variety of non-native species.

Hall Road and Canal Road Units

This unit borders on Silver Lake and includes a portion of Hemlock Creek, a Silver Lake tributary. WDFW conducts electrofishing and net surveys of Silver Lake on an intermittent basis and conducts spawning ground surveys for salmon and steelhead in Hemlock Creek, also on an intermittent basis. Anadromous native species that use Silver Lake for migration and juvenile rearing include: coho salmon, steelhead, and potentially chinook. Coho and steelhead are known to spawn in Hemlock Creek, while chinook may also spawn in the creek. These anadromous species also use Silver Lake for juvenile rearing. Silver Lake is stocked annually by WDFW with rainbow trout and also supports a variety of non-native sport fishing species.

Hoffstadt and Mudflow Unit

These units include a portion of the North Fork Toutle River, above the USACE Sediment Retention Structure. WDFW transports natural-origin adult coho salmon, steelhead, and sea-run cutthroat trout above the SRS to release sites on Alder, Bear, and Pullen creeks. Additional release sites may be developed in the future. Resident species may include several native species (e.g., rainbow trout, cutthroat trout, northern pikeminnow), as well as a variety of non-native species.

Jenny Creek Unit
This unit includes a small tributary to the East Fork Lewis River. Resident species found may include several native species (e.g. rainbow trout, cutthroat trout, northern pikeminnow), as well as a variety of non-native species.

Merrill Lake Unit
This unit includes the upper reaches of the Kalama River and borders Merrill Lake. Summer steelhead can be found in the upper reaches of the Kalama River, as well as resident species such as rainbow trout and cutthroat trout. Merrill Lake has been stocked every several years with a variety of trout species, including: cutthroat trout, rainbow trout, brook trout, and brown trout. There is currently a self-sustaining population of cutthroat trout in Merrill Lake, and trout may be stocked into the lake in the future.

Nellie Corser Unit
This unit includes a portion of Duncan Creek, a tributary to a small lake that drains directly to the Columbia River. A weir constructed near the mouth of Duncan Creek prevents migration of anadromous fish further upriver. However, adult coho, steelhead, and cutthroat trout are transported by WDFW above the weir to allow migration to spawning grounds. Resident species found here may include several native species (e.g. rainbow trout, cutthroat trout, northern pikeminnow), as well as a variety of non-native species.

Nelson Unit
This unit includes the mouth of the Kalama River. Anadromous native species that use the Kalama River mouth area for migration and juvenile rearing include: chinook, coho, and chum salmon, as well as steelhead, sea-run cutthroat trout, and lamprey (pacific, brook and/or river species). Anadromous fish in this unit may include hatchery-origin chinook and coho salmon, as well as steelhead from long running hatchery programs at WDFW's Kalama Falls and Fallert Creek. Other anadromous fish found in this unit would be natural-origin, unless they stray into the creeks from hatchery programs in other basins. Resident species found here may include several native species (e.g. rainbow trout, cutthroat trout, northern pikeminnow), as well as a variety of non-native species.

Habitat Management

This section provides a description of habitat management activities that occur on the Mount St. Helens Wildlife Area, including forest management, weed management, fire management and history, habitat restoration, and natural areas.

Forest Management

Forest Overview

Forests occur primarily on three units of the wildlife area: Hoffstadt, Merrill Lake, and Cedar Creek. Two forest types occur in all three units: North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest and the North Pacific Maritime Dry-Mesic Douglas-fir-Western Hemlock Forest. The range of forest types identified in the Mount St. Helens Forest Management Plan is described in greater detail in the WDFW Statewide Forest Management Plan (http://wdfw.wa.gov/publications/01616/).

Most of the disturbance to forested ecosystems on the Mount St. Helens Wildlife Area has been from intensive timber management activities that occurred prior to WDFW ownership. These units were generally managed to maximize fiber production, using the standard logging "industry" model. The result has been an abundance of early seral stand conditions and limited mid to late seral stand conditions outside of land managed by the U.S. Forest Service.

Other disturbance factors on the landscape have resulted in minimal impact to forests on the wildlife area. Stand replacement fires are infrequent, with a typical fire return interval of 500 years or more. Insect and disease problems do occur, but most outbreaks have not reached epidemic levels. Grazing by ungulates can damage young trees but grazing on grasses and shrubs can actually benefit young stands. In general, impacts from these other disturbance factors have had no significant impact on stand development.

Management Approach

WDFW will actively manage suitable forests on the Mount St. Helens Wildlife Area, where feasible, to create a mosaic of successional classes on the wildlife area. This will include commercial and pre-commercial thinning operations intended to accelerate transition into mid and late successional stand conditions. Patch cuts will be used in dense thickets of red alder to create early successional openings for the establishment of browse species.

Most of the ownerships surrounding the Mount St. Helens Wildlife Area are never allowed to develop beyond a mid-successional stand condition. By creating a mosaic of stand conditions, the wildlife area can provide more diverse habitat that is generally lacking in the Toutle River drainage. Management decisions should consider both site–specific and landscape-wide, cross-ownership needs.

Suitable Management Areas and Potential Projects

Much of the forested areas of the Mount St. Helens Wildlife Area, previously managed using the industry model, are over-stocked and in need of thinning. In younger stands (5 to 15 years in age), this will be accomplished through pre-commercial thinning. In older stands (25 to 40

years in age), this will be accomplished through commercial thinning. Those stands that are currently on a trajectory to reach desired future conditions, with little or no benefit to be achieved from active management, are low priorities for the current planning cycle. Also, those stands with feasibility issues may be excluded from consideration in the current planning cycle. Issues that may preclude active management include, but are not limited to, access problems, operability concerns, habitat concerns, economic constraints, and regulatory restrictions.

Where active management is appropriate, the primary goals for forest management include:

1. Thin stands to maintain or improve growth rates.
2. Improve habitat conditions for multiple wildlife species, with emphasis placed on priority habitats and species.
3. Improve forest health to create healthy, resilient stands.
4. Improve ecological integrity ratings.
5. Create stand conditions that are more resilient to the anticipated effects of climate change.

Approximately 771 acres of forest management treatments are proposed on the Mount St. Helens Wildlife Area over the next 10 years (Table 8). This includes approximately 256 acres of commercial thinning and 160 acres of pre-commercial thinning on the Hoffstadt Unit, and approximately 355 acres of pre-commercial thinning on the Merrill Lake Unit. Work on all three projects is anticipated to be completed by 2020. The main objectives are to reduce stand density, improve growth rates, stimulate browse growth, and improve habitat.

Table 8: Planned Forest Treatment Projects within the next 10 years.

Unit	Performance measure (Acres Treated)	Task	Anticipated Completion Date
Hoffstadt Unit	~ 256 Acres	Commercial Thinning	2019
Hoffstadt Unit	~ 160 Acres	Pre-Commercial Thinning	2019
Merrill Lake Unit	~ 355 Acres	Pre-Commercial Thinning	2020

Fire History and Management

Historically, fire return intervals (frequency of fire per habitat type) on the west side of the Cascade Mountains ranged widely depending on habitat types. Habitats on the Mount St. Helens Wildlife Area likely did not have wildfires often, with the lowest interval likely being around 50 years in the lowland oak forest/prairie and 300+ years in the mid to higher elevation Douglas fir and western hemlock forest. Due to fire suppression over the past century, habitat types may have been altered, but not to a great extant compared with areas on the east side of the Cascades where fire was more common. Fire suppression is being employed effectively and promptly on the lands on and around the wildlife area due to the areas being more populated and to lessen the loss of timber on industrial forest. Although fires were not common historically on the west side of the state, they were often very large when they occurred. Most fires around the wildlife area are human caused and remain small. Over the past several years, only one small fire of less than an acre has occurred on one of the units. This fire was on the shoreline of Merrill Lake in 2017, and was caused by a campfire.

Fire Management

Since the wildlife area is spread out across four counties and multiple fire districts, in the event of wildland fires, no single entity is responsible for responding. Wildland fires on the Mount St. Helens Wildlife Area would initially be responded to by county fire districts, DNR, or the U.S. Forest Service. The units impacted by urban growth would be within county fire districts, while the more rural districts like Merrill Lake, Hoffstadt, and Mudflow units would have DNR and U.S. Forest Service respond. Please refer to Appendix C for fire districts and fire protection information.

Weed Management

Managing weeds is a significant part of the Mount St. Helens Wildlife Area workload. The goal is to establish and maintain diverse native plant communities that support fish and wildlife populations. Invasive plants and noxious weeds can impact high quality native plant communities and convert them to low quality monocultures that reduce wildlife value. The weed management plan (see Appendix B) identifies species, timing, and management practices to control weeds. See Table 9 for a list of weeds of primary concern on the wildlife area. The goal of a weed control plan is to maintain or improve the habitat for fish and wildlife, meet

legal obligations, and reduce spread to adjacent private lands. Virtually all of the units of the wildlife area require weed management, and Table 8 below list the weeds of primary concern.

Table 9. Weeds of primary concern on the Mount St. Helens Wildlife Area.

State designation	Weed Species
Class A	No known Class A weeds
Class B	Mouse-ear Hawkweed, Yellow Hawkweed, Meadow knapweed, Purple loosestrife, Japanese Knotweed, Scotch broom
Class C	English ivy, English holly, reed canary grass, Canada thistle, Himalayan blackberry

Habitat Restoration

Restoration efforts on the Mount St. Helens Wildlife Area are focused on forest management, riparian, upland, and salmon restoration activities. Forest restoration activities were discussed previously in the Forest Management Section (Appendix G). The following section will provides an overview of upland, riparian and salmon restoration projects on the wildlife area.

Upland Restoration

Upland habitat restoration has occurred on the Mudflow, Cedar Creek, Jenny, Creek, and Eagle Island units. These projects have involved removing non-native invasive weeds, planting beneficial grasses and forbs, and planting trees and shrubs for the benefit of wildlife. Efforts on the Mudflow Unit involved controlling Scotch broom and enhancing beneficial forage by fertilizing, seeding, and harrowing for restoring wintering elk habitat. Projects at the Cedar Creek and Jenny Creek units have focused on restoration and enhancement of band-tailed pigeon habitat by removing non-native invasive vegetation, the planting of native fruit bearing trees, and clearing vegetation around the mineral spring sites to facilitate better access for pigeons. These projects have been funded through the State Migratory Bird Fund, which comes from the selling of State Migratory Bird Permits. Currently there is a multi-year project on the Eagle Island Unit to restore the upland floodplain habitat for black-tailed deer, waterfowl, band-tailed pigeons, mourning doves, and songbirds. This includes removing Scotch broom and other invasive weeds to allow beneficial forage and trees to become established. Funding for this project has been provided by the State Migratory Bird Fund, the Wildlife General Fund, and PacifiCorps mitigation funding.

Riparian Restoration

The purpose of riparian restoration projects on the Mount St. Helens Wildlife Area is to restore salmon habitat and protect and enhance elk habitat. The next section describes several projects that have been implemented on the wildlife area. For more information, see the following links: (https://www.lcfrb.gen.wa.us/sport) and (https://www.rco.wa.gov).

Abernathy Creek Cameron Site

The Cowlitz Indian Tribe added large wood jams, excavated off-channel habitat, and installed native plants in lower Abernathy Creek to improve spawning and rearing habitat conditions for winter steelhead and Lower Columbia coho, chinook, and chum. The riparian planting increased plant diversity in the project area. The log jams created suitable habitat for spawning and off-channel and side channel habitat development. The project was completed in 2018 and funded by Recreation Conservation Office – Salmon Recovery Funding Board (SRFB).

Abernathy Creek Cameron Site. Photo by the Cowlitz Indian Tribe.

Eagle Island Site A

The Eagle Island Site A project was completed in 2014 with the goal being to enhance existing side channel habitat to provide critical rearing habitat necessary for the survival and recovery of salmonid species in the North Fork of the Lewis River. The project area is located just

downstream in the south channel of the upper extent of Eagle Island in an approximately 1,200-foot long side channel. The project increased the quantity and quality of rearing and holding habitat for salmon species through the construction of numerous large woody debris (LWD) jams. The structures provide cover and refuge from high flows, promote the formation of scour pool habitat, and increase overall habitat complexity within the reach. In addition, riparian treatments included the removal of invasive species and installation of native woody vegetation to restore riparian area functions and improve habitat values for resident and migratory wildlife. Project partners included the Cowlitz Indian Tribe and the Lower Columbia Fish Recovery Board (LCFRB). The project was funded by the Salmon Recovery Funding Board (SRFB) and the Lewis River Aquatics Coordination Council.

Eagle Island Sites B and C

The Eagle Island Sites B and C project was completed in 2016 and had two goals: 1) to enhance existing side-channel habitat, and 2) return to function former side-channel habitat to provide critical rearing habitat necessary for the survival and recovery of salmonid species on the North Fork Lewis River. The project area, in total, stretched across approximately 2,700 feet of the right bank of the South Channel of the North Fork Lewis River. Site B addressed 820 feet of side channel, while Site C enhanced 1,229 feet. The project dramatically increased the quantity and quality of rearing and holding habitat for salmon species through the construction of numerous large woody debris (LWD) jams. Similar to the Site A project, these structures provide cover and refuge from high flows, promote the formation of scour pool habitat, and increase overall habitat complexity within the reach. In addition, riparian treatments included the removal of invasive plant species and installation of native woody vegetation to restore riparian area functions and improve habitat values for resident and migratory wildlife. Partners included the Cowlitz Indian Tribe and LCFRB. The project was funded by SRFB and the Lewis River Aquatics Coordination Council.

Eagle Island Sites B and C. Photo by Cowlitz Indian Tribe.

Cedar Creek Reach 1 Restoration

The Cedar Creek Reach 1 project is located 4.5 miles downstream of Merwin Dam at the confluence of Cedar Creek and North Fork Lewis River. The project addressed in-stream and riparian habitat conditions along 2,500 feet of floodplain property in Cedar Creek used by ESA-listed populations of salmon. The project excavated 2,000 feet of new side channel to increase spawning habitat, installed large wood structure to increase rearing habitat, and restored five acres of riparian habitat to decrease summer water temperatures. The project was funded by SRFB, the Lower Columbia Regional Fish Enhancement Group, and the Lewis River Aquatics Coordinating Council. The project was completed in 2015.

Mudflow Unit Riverbank Stabilization Projects

Between 2006 and 2018 there have been a total of six projects to stabilize the channel of the North Fork Toutle River in the Mudflow Unit. The intent of the projects is to reduce erosion, stabilize the river channel, and protect riparian and upland areas that are crucial wintering elk habitats, as well as aquatic habitats for salmonids. These projects came about after several high river flow events caused significant erosion and losses of almost 500 acres of wildlife habitat, and threatened to significantly impact spawning and rearing habitats for ESA-listed salmonids in nearby Bear and Hoffstadt creeks. As a result, more than 2.5 miles of riverbank have been protected and hundreds of wildlife acres preserved. Funding for the projects have been from a combination of sources, including RCO and State Capitol Funds.

The stabilization projects have included the construction of dozens of large wood structures. These wood structures were installed to slow bank erosion and allow forest regeneration on the riverbanks and the recovery of riparian habitats. Restoring the riparian habitat is the long-term strategy in protecting wildlife and aquatic habitats in the area. Lateral log wall structures

were installed to move the main channel away from eroding banks, and small logjams were installed to increase floodplain roughness, fostering a more stable river channel. Three lateral structures were also built to stop river avulsions that were threatening salmonid habitats in Bear and Hoffstadt creeks. Trees and shrubs were planted in the riparian areas to speed recovery and increase bank stability of uplands.

Pile dike structure. Photo by Daren Hauswald

Pile Dike Construction Mudflow Unit – Photo by Daren Hauswald

North and South Fork Toutle River Confluence Restoration, Gardner Unit

There have been two projects at the confluence of the North and South Fork Toutle rivers to restore the riparian areas and protect aquatic habitats for salmonids. Both of the projects were initiated and installed by the Lower Columbia Regional Fish Enhancement Group (LCRFEG). The first project preserved 6.5 acres of existing off-channel habitat and beaver ponds, 3,500 feet of side channel, a 15-acre vegetated island, and 20 acres of streambank by installing engineered logjams and floodplain roughness strictures. The structures protect the riverbank from erosion and stabilize channels, which will allow for the recovery of the riparian area. The second project was to replant the riparian areas with more than 50,000 trees and shrubs to provide shading, cover, complexity, and stability in the areas in the vicinity of the confluence. Both of these restoration projects occurred on the Gardner Unit, as well as Cowlitz County Park and private properties. Funding for both projects was provided by RCO and Tacoma Power mitigation funding.

Engineered logjams and riparian plantings at the confluence of the North and South Fork Toutle Rivers.

White Island Natural Area Preserve

Natural area preserves are defined by RCW 79.70 as areas of land or water which have retained their natural character, although not necessarily completely natural and undisturbed, or which are important in preserving rare or vanishing flora, fauna, geological, natural historical, or similar features of scientific or educational value. The Washington Department of Natural Recourses manages the majority of natural areas in Washington. The White Island Unit is one of six natural area preserves owned and managed by WDFW. White Island received this designation because of its high quality black cottonwood and willow riparian forest and tidal wetland habitats, as well as for the Columbian white-tailed deer that use the island. The island remains in a natural and historic state primarily due to lack of livestock grazing. It is open to the public for fishing and waterfowl hunting. WDFW prohibits construction of permanent structures and off road vehicle use. The agency permits campfires, but only on the beach using driftwood as fuel, and they must be 50 feet away from established vegetation and driftwood. WDFW prohibits the cutting of live or standing dead material on the island. The agency manages this natural area for natural ecological and geological processes, while preventing encroachments (e.g., residential) that directly or indirectly prevent these processes. Wildlife area staff members should annually monitor White Island to determine if any management actions are necessary and coordinate with the Department of Natural Resources as appropriate. WDFW will manage habitat on White Island to ensure it retains the features that originally led to its designation as a natural area.

Climate Change Approach

Purpose

The primary purpose of this section is to evaluate the potential impacts of projected changes in climate on the Mount St. Helens Wildlife Area and highlight opportunities to mitigate or prepare for those impacts. This section also summarizes work by the wildlife area planning team to review the management objectives (see Goals and Objectives section), and make changes as appropriate to ensure that objectives are robust to future changes.

This work is consistent with the directives of a 2017 WDFW policy titled "Addressing the Risks of Climate Change," which states that WDFW will "manage its operations and assets so as to better understand, mitigate, and adapt to impacts of climate change."

Projected Climate Change Impacts

Continued increases in average annual and seasonal Pacific Northwest temperatures are projected as a result of global warming, as well as increases in extreme heat. Warming is projected to continue throughout the 21st century. For the 2050s relative to 1950-1999, temperature is projected to rise +5.8°F (range: +3.1 to +8.5°F) for a high greenhouse gas scenario (RCP8.5). Much higher warming is possible after mid-century. Lower emissions of greenhouse gases will result in less warming. Warming is projected for all seasons. The warming projected for summer is slightly larger than for other seasons (CIG 2013).

Other key impacts are highlighted below:

Forest Impacts: Forests in the northwest will also likely be affected by climate-driven changes in disturbance regimes, such as wildfire (Littell, J.S. et al. 2010), insect outbreaks (e.g., mountain pine beetle; Logan et al. 2003), disease (e.g., Swiss needle cast; Black et al. 2010), and drought (van Mantgem et al. 2009; Knutson and Pyke 2008). Climate is projected to become unfavorable for Douglas-fir over 32 percent of its current range in Washington by the 2060s, relative to 1961-1990, under a medium greenhouse gas scenario. Dryer, warmer conditions are likely to increase the annual area burned by forest fires. This is because projected decreases in summer precipitation and increases in summer temperatures would reduce moisture of existing fuels, facilitating fire, while earlier snowmelt should lead to earlier onset of the fire season (Littell, J.S. et al., 2010).

Aquatic Impacts: Warming streams, declining summer flows, and increasing flood risk are all expected to negatively affect cold water fish populations such as salmon (Battin, J. et al., 2007) and trout (Wenger, S.J. et al., 2011). Climate plays a crucial role in salmon ecology at every stage of their life cycle, but the relative importance of climatic factors differs between salmon

species and stocks (Mantua et al. 2009). With climate change, factors such as flooding and thermal connectivity will change in space and time, influencing different aspects of salmon life history stages. This will be beneficial for some salmon stocks and detrimental for others (Zimmerman, M. pers comm).

Impacts to Wildlife Area Resources

Species and Ecological Systems of Concern with High Vulnerability to Climate Change

The following table shows the Species of Greatest Conservation Need (SGCN) on the Mount St. Helens Wildlife Area that have been ranked by the climate vulnerability assessment to have a moderate-high vulnerability to climate change, and with high confidence in the data. Note that only SGCN were considered in this assessment and it does not include climate sensitivities for other species that may be associated with the wildlife area.

Table 10. Species on Mount St. Helens Wildlife Area with Moderate-High Overall Vulnerability and High Confidence (WDFW 2015).

SGCN	Vulnerability Rank		Potential Climate Change Impacts
Lower Columbia Chinook Salmon ESU	Moderate – High	In general, chinook salmon appear sensitive to warmer water temperatures, low flows, and high flows.	- Increased freshwater temperatures - Lower summer flows - Increased winter/spring flood events
Lower Columbia River Steelhead DPS	Moderate – High	The survival of steelhead embryos or recently emerged fry may be sensitive to the timing and magnitude of spring runoff rather than the fall and winter aspects of flow regimes. Steelhead may also exhibit some sensitivity to warming water temperatures.	- Altered spring runoff timing and amount/magnitude - Increased water temperatures - Lower summer flows
Eulachon (southern DPS)	Moderate – High	Eulachon are vulnerable to climate-driven changes in both their oceanic rearing and freshwater spawning habitat. Eulachon exhibit site fidelity to specific spawning rivers, limiting the opportunity for adults and juveniles to move in response to	- Altered runoff timing and magnitude

		changing nearshore-rearing and spawning habitat conditions.	- Increased water temperatures (fresh and ocean)
Pacific Lamprey	Moderate – High	Pacific lamprey exhibit physiological sensitivity to warming water temperatures. All life stages of Pacific lamprey are likely vulnerable to shifting flow regimes due to reduced snowpack, earlier snowmelt, and shifting precipitation regimes.	- Increased freshwater temperatures - Lower summer/fall flows - Increased winter flood events - Altered fire regimes
River Lamprey	Moderate – High	Little is known about river lamprey vulnerability to climate change (particularly in Washington), but they likely have vulnerability similar to that of Pacific lamprey because they exhibit similar freshwater and marine life history stages (spawning, rearing, and migration), although they typically occupy larger rivers at lower elevations.	- Increased water temperatures (fresh and ocean) - Lower summer/fall flows - Increased winter flood events
Cascade Torrent Salamander	High	Cascade torrent salamanders are likely highly sensitive to climate change due to their deposition on unattached eggs in low flow habitats, their inability to tolerate desiccation and specialized habitat requirements.	- Increased temperatures - Changes in precipitation - Reduced snowpack Shifts from snow to rain - Earlier snowmelt
Dunn's Salamander	Moderate – High	Dunn's salamander is surface active a temperatures higher than its co-occurring lungless salamander congeners and its distribution going no further north than the Willapa Hills ecoregion partly reflects that. Few nest sites have been described, but the few found are concealed, so it likely that the few found represent the most accessible portion of typical nesting locations.	- Increased temperatures - Changes in precipitation - Reduced snowpack - Earlier snowmelt
Oregon Spotted Frog	Moderate – High	Very limited information is available regarding the sensitivity of the Oregon spotted frog to climate change. Its main sensitivity is likely to be due to changes in pond and wetland habitat.	- Increased temperatures - Changes in precipitation - Altered hydrology
Columbian White-tailed Deer	Moderate	There is significant risk to Columbian White-tailed Deer and an increased probability of habitat loss in low-lying, tidally influenced riparian areas along the	- Increased flooding - Sea level rise - Increased extreme precipitation events

		Columbia River in the face of sea level rise projections.	- Increased disease outbreak

*Vulnerability to climate change was determined by an evaluation of inherent sensitivity to climatic variables, as well as an assessment of the likelihood of change in key climate variables important for each species. Confidence in each ranking was also assessed, based on the extent and quality of reference material and information.

Making the Goal and Objectives of the Wildlife Area Plan Climate Resilient

Mount St. Helens Wildlife Area goals and objectives potentially affected by climate change, or those with a "climate nexus," are listed below. Opportunities to build resilience to climate change are summarized for each objective, and are also integrated into the final list of objectives available on page __.

Goal 1: Maintain or improve the ecological integrity of priority sites.

Objectives with a climate nexus	Opportunities to build resilience
A. Establish an ecological integrity baseline and associated goals for ecological systems of concern/priority systems by 2023.	Include climate change and consideration of future conditions in planning efforts and monitoring. Consider Incorporating temperature monitoring in monitoring plan.
C. Seek funding and construction opportunities to stabilize the river bank along the wildlife area.	Include projections for increases in peak flows into scope of project.
D. Continue collaborative efforts to strategize landscape scale management with partners and other stakeholders.	Educate and coordinate with neighbors about changes expected in forestlands.
E. Continue to pursue opportunities to expand wildlife area as opportunities arise.	Consider how climate will affect goals for purchase – specific habitats or habitat needs.
F. Identify priorities for conducting rare plant surveys on the wildfire area by 2019.	Planning exercise – prioritize looking in places more likely to be affected by cc –
G. Develop a plan to monitor the habitat impacts of increased sediment from the Sediment Retention Structure modifications on the wildlife area by 2025.	Include potential changes in peak events, storms, flows

Goal 2: Improve ecological integrity of forests while maintaining and/or improving habitat for wildlife.

Objectives with a climate nexus	Opportunities to build resilience
A. Promote diversity of early and late successional forest habitat by identifying	Manage for resilience to fire. Consider climate change vulnerability of the species that are using late successional forest habitat.

planned areas for forest treatment for the next 10 years	

Goal 4: Achieve species diversity at levels consistent with healthy ecosystems

Objectives with a climate nexus	Opportunities to build resilience
B. Develop strategy for riparian/wetland restoration projects to benefit fish and wildlife species.	Account for changes in stream flow and timing of stream flow. Consider opportunities to increase resilience for species
D. Implement recommendations from the Population and Habitat Viability Assessment for the Columbia White Tailed Deer.	Habitat Viability Assessment includes climate considerations.
G. Maintain and enhance foraging habitat for band-tailed pigeons.	This is primarily a near term action. Fruiting plants (forage for pigeons) are generally drought tolerant.
H. Develop and implement habitat management activities for game species with partners.	Consider species composition. Will there be an increased need to irrigate?

Goal 5: Maintain and restore riparian and instream habitat for steelhead, chinook, and coho.

Objectives with a climate nexus	Opportunities to build resilience
B. Work with stakeholders and partners to leverage funding to identify and implement fish habitat restoration efforts	We should be strategic about where we restore and what specific restoration actions. Can we design for lower flows, and warmer water? Can we prioritize increasing the connections to groundwater? Some restoration actions will also mitigate for future climate impacts.
C. Continue high priority salmonid recovery efforts by maintaining current anadromous adult fish release sites above the Sediment Retention Structure (SRS) and explore options for new release sites on tributaries to the North Fork Toutle River.	New release sites should take into account future conditions.

Goal 7: Offer multiple and varied opportunities for stakeholder participation and engagement.

Objectives with a climate nexus	Opportunities to build resilience

B. Expand the membership of the WAAC to include the full range of stakeholders/ interest groups.	Consider adding climate expertise.
C. Coordinate communication with community groups about current wildlife area management activities, education and scientific research.	Include climate risks and opportunities for restoration to build resilience.

Part IV. References and Appendices

Battin, J. et al., 2007. Projected impacts of climate change on salmon habitat restoration. *Proceedings of the National Academy of Sciences* 104(16): 6720-6725.

Black, B. A., D. C. Shaw, and J. K. Stone. 2010. "Impacts of Swiss Needle Cast on Overstory Douglas-fir Forests of the Western Oregon Coast Range." Forest Ecology and Management 259 (8): 1673-1680. doi: 10.1016/j.foreco.2010.01.047.

Brown, E. R. 1961. The black-tailed deer of western Washington. Biological Bulletin Number 13, Washington State Game Department, Olympia, USA.

Climate Impacts Group. 2013. Washington State of Knowledge Report – Climate Change Impacts and Adaptation to Washington State: Technical Summaries for Decision Makers, Climate Impacts Group. Seattle, WA

Knutson, K. C., and D. A. Pyke. 2008. "Western Juniper and Ponderosa Pine Ecotonal Climate-Growth Relationships across Landscape Gradients in Southern Oregon." Canadian Journal of Forest Research 38 (12): 3021-3032. doi: 10.1139/X08-142.

Littell, J. S., E. E. Oneil, D. McKenzie, J. A. Hicke, J. Lutz, R. A. Norheim, and M. M. Elsner. 2010. "Forest Ecosystems, Disturbance, and Climatic Change in Washington State, USA." Climatic Change 102: 129-158. doi: 10.1007/s10584-010-9858-x.

Logan, J. A., J. Régnière, and J. A. Powell. 2003. "Assessing the Impacts of Global Warming on Forest Pest Dynamics." Frontiers in Ecology and the Environment 1 (3): 130-137. doi: 10.1890/1540-9295(2003)001[0130:ATIOGW]2.0.CO;2.

Lower Columbia Fish Recovery Board. 2010. Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan. Longview, WA.

Mantua, N.J., I. Tohver, and A.F. Hamlet. 2009. Impacts of climate change on key aspects of freshwater salmon habitat in Washington State. Chapter 6 in *The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate,* Climate Impacts Group, University of Washington, Seattle, WA

Marriott, D. and many others. 2002. Draft Lower Columbia River and Columbia River Estuary Subbasin Summary. Prepared for the Northwest Power Planning Council.

McCorquodale, S. M. 1999a. Movements, survival, and mortality of black-tailed deer in the Klickitat Basin of Washington. Journal of Wildlife Management 63:861-871.

Mote and Salathé. 2009. Future Climate in the Pacific Northwest. Chapter 1 in: The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate. Seattle, WA

Neal, V.T. 1972. Physical aspects of the Columbia River and its estuary. pp. 19-40 *In* A.T. Pruter and D.L. Alverson (*eds*.). The Columbia River estuary and adjacent ocean waters. Bioenvironmental Studies. Univ. Wash. Press, Seattle, WA.

Nelson, J., D. Cottam, E. W. Holman, D. J. Lancaster, S. McCorquodale, D. K. Person. 2008. Habitat Guidelines for Black-tailed Deer: Coastal Rainforest Ecoregion. Mule Deer Working Group, Western Association
of Fish and Wildlife Agencies.

Rice, C. 2012. Forest Management and Black-tailed Deer Reproduction, preliminary analysis 2009-11. Unpublished data. Washington State Department of Fish and Wildlife.

Rue, L. L. 1997. The deer of North America. Lyons Press, New York, New York, USA.

Seamans, M. E. 2017. Band-tailed pigeon population status, 2017. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C.

Thomas J.W. and Toweill, D.E. 1982. Elk of North America Ecology and Management. Wildlife Management Institute, Washington DC, USA.

Toweill, D. E. and Thomas, J.W. 2002. North American Elk Ecology and Management. Wildlife Management Institute, Washington DC, USA.

U.S. Corps of Engineers. 1984. Fish and Wildlife Coordinating Act Report. https://usace.contentdm.oclc.org/digital/collection/p16021coll3/id/92/

U.S. Forest Service, Pacific Northwest Research Station. 2018. Elk Nutrition and Habitat Models for a New Century. Found at: https://www.fs.fed.us/pnw/research/elk/index.shtml

U.S. Forest Service. 1996. Lower Lewis River Watershed Analysis. Gifford Pinchot National Forest.

U.S. Forest Service. 1996. Upper Kalama River Watershed Analysis. Gifford Pinchot National Forest.

van Mantgem, P. J., N. L. Stephenson, J. C. Byrne, L. D. Daniels, J. F. Franklin, P. Z. Fulé, M. E. Harmon, A. J. Larson, J. M. Smith, A. H. Taylor, and T. T. Veblen. 2009. "Widespread Increase of Tree Mortality Rates in the Western United States." Science 323 (5913): 521-524. doi: 10.1126/science.1165000.

Washington Department of Fish and Wildlife, Confederated Colville Tribes, Spokane Tribe of Indians, USDA-APHIS Wildlife Services, and U.S. Fish and Wildlife Service. 2018. Washington Gray Wolf Conservation and Management 2017 Annual Report. Washington Department of Fish and Wildlife, Wenatchee, WA, USA.

Washington Department of Fish and Wildlife 2018. Game Status and Trend Reports. Found at: https://wdfw.wa.gov/publications/search.php?Cat=Hunting&SubCat=Game%20Harvest,%20Status%20and%20Trends

Washington Department of Fish and Wildlife 2018. Big Game Hunting Seasons and Regulations. Found at: https://wdfw.wa.gov/hunting/regulations/

Washington Department of Fish and Wildlife 2018a. Game Status and Trend Reports. Found at: https://wdfw.wa.gov/publications/search.php?Cat=Hunting&SubCat=Game%20Harvest,%20Status%20and%20Trends

Washington Department of Fish and Wildlife 2018b. Big Game Hunting Seasons and Regulations. Found at: https://wdfw.wa.gov/hunting/regulations/

Washington Department of Fish and Wildlife 2016. 2015-17 Ungulate Assessment. Found at: https://wdfw.wa.gov/publications/01948/wdfw01948.pdf

Washington Department of Fish and Wildlife (WDFW). 2015. Washington's State Wildlife Action Plan: 2015 Update. Washington Department of Fish and Wildlife, Olympia, WA

Washington Department of Fish and Wildlife 2014. Willapa Hills Elk Herd Plan. Found at: https://wdfw.wa.gov/publications/01592/

Washington Department of Fish and Wildlife 2006. Mt. St. Helens Elk Herd Plan. Found at: https://wdfw.wa.gov/publications/00771/wdfw00771.pdf

Washington Department of Fish and Wildlife 2016. 2015-17 Ungulate Assessment. Found at: https://wdfw.wa.gov/publications/01948/wdfw01948.pdf

Wenger, S.J. et al., 2011. Flow regime, temperature, and biotic interactions drive differential declines of trout
species under climate change. Proceedings of the National Academy of Sciences 108(34): 14175-14180.

Western Regional Climate Center. 2003.

Personal communications

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Appendices

a. Species and Habitat Information
b. Weed Management Plan
c. Fire Response
d. Cultural Resources Summary
e. Public Response Summary
f. Research and Other Studies
g. Forest Management Plan
h. Water Access Sites Table

Appendix A. Species and Habitat Information

Table 11. Mount St Helens Wildlife Area Priority Habitat list by unit.

Unit	Habitat
Abernathy	Cliffs/bluffs Freshwater emergent Freshwater forest/shrub Riverine
Altoona	Cavity nesting ducks Estuarine and marine Freshwater emergent Freshwater forested/shrub Shorebirds concentrations Waterfowl concentrations
Canal Road	Freshwater emergent Freshwater forested/shrub Freshwater pond Riverine Waterfowl concentrations
Carnine	Freshwater forested/shrub
Cedar Creek	Freshwater forested/shrub
Duck Lake	Biodiversity areas Freshwater emergent Freshwater forested/shrub Riverine Waterfowl concentrations
Eagle Island	Freshwater emergent Freshwater forested/shrub Riverine Cavity nesting ducks
Fisher Island	Cavity nesting ducks Freshwater emergent Freshwater forested/shrub Islands Riverine Waterfowl concentrations
Gardner	Freshwater forested/shrub Riverine
Hall Road	Freshwater emergent Freshwater forested/shrub Waterfowl concentrations
Hoffstadt	Freshwater emergent Freshwater forested/shrub Freshwater pond Old-growth mature forest Riverine

	Snags Waterfowl concentrations
Jenny Creek	Riparian/instream
Merrill Lake	Cavity nesting ducks Freshwater emergent Freshwater forested/shrub Lake Riverine Snags
Mud Flow	Freshwater emergent Freshwater forested/shrub Freshwater pond Riverine
Nellie Corser	Riparian/instream
Nelson	Cavity nesting ducks Freshwater emergent Freshwater forested/shrub Riverine Waterfowl concentrations Wetlands
Two Forks	Freshwater emergent Freshwater forested/shrub Riverine
White Island	Biodiversity Freshwater emergent Freshwater forested/shrub Islands Riverine Waterfowl concentrations Wetlands

Appendix B. Weed Management Plan

MOUNT ST. HELENS WILDLIFE AREA WEED CONTROL PLAN

Weed Control Goals

The goal of weed control on the Mount St. Helens Wildlife Area (WLA) is to maintain or improve the habitat for fish and wildlife, meet legal obligations, and protect adjacent private lands.

To these ends, WDFW uses integrated pest (i.e. weed) management (IPM), which is defined in RCW 17.15.010 as "a coordinated decision-making and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet agency programmatic pest management objectives."

At the Mount St. Helens Wildlife Area, WDFW's weed management objectives are:

a) North Fork Toutle River Valley - Survey up to 500 acres annually at the Mudflow and Hoffstadt units to determine weed control requirements in order to maintain and enhance forage for elk wintering in the area. The areas on the valley floor are composed of well-drained gravel, sand and ash from the eruption of Mount St. Helens, which makes establishing preferred elk forage a challenge due to poor soil nutrients and the tendency for drought like conditions. Many areas of the Mudflow Unit are infested with Scotch broom, which outcompetes beneficial elk forage. About 200 acres are treated for Scotch broom annually. Two relatively new weeds to the Toutle Valley and Mudflow Unit are mouse-ear and yellow hawkweed. These weeds appeared about eight years ago and currently staff members monitor control about 500 acres annually for these two species. It is estimated between 200-500 acres require some active management work every year to improve elk forage on the Mudflow Unit. Work volume varies annually due to factors including flooding, channel movement, drought, and other weather conditions.
b) Access sites and roads - Check Oneida and Eagle Island boat launches, and Hall and Canal Road rights-of-way annually for maintenance needs. Weeds such as purple loosestrife, Scotch broom, and Japanese knotweed at access sites and along roads pose a risk of spreading to new areas if not treated and controlled. It is estimated that up to five acres require annual maintenance at each of these sites.
c) Riparian and wetland - Check wetland and riparian areas annually for Japanese knotweed, purple loosestrife, and other weed infestations. The Eagle Island Unit has a knotweed infestation and a coordinated effort with the county weed management and other landowners in the Lewis River Basin is underway to control this highly invasive species in the riparian areas along the river. Knotweed is also present in the Abernathy and Hoffstadt units, and annual control activities occur there as well. Purple loosestrife is present in the Altoona, Eagle Island, Nelson, and Canal Road units, where it is controlled on an annual basis to keep it from spreading. Many of these units have had a substantial reduction in the presence of purple loosestrife since control efforts began. When possible, WDFW plants native trees and shrubs along streams to lower stream temperatures and help shade out invasive weeds.

Weed Species of Concern on MSHWA Area:
Weed species of concern on the wildlife area include but are not limited to: Canada thistle (*Cirsium arvense*), diffuse knapweed (*Centaurea diffusa*), Himalayan blackberry (*Rubus armeniacus*), lesser cattail (*Typha angustifolia*), meadow knapweed (*Centaurea moncktonii*), mouseear hawkweed (*Hieracium pilosella*), yellow hawkweed (*Hieracium caespitosum*), purple loosestrife (*Lythrum salicaria*), reed canarygrass (*Phalaris arundinacea*), Scotch broom (*Cytisus scoparius*), spotted knapweed (*Centaurea maculosa*), English ivy (*Hedera helix),* English holly (*Ilex aquifolium*), and Japanese knotweed (*Fallopia japonica*).

Weeds occurring on the Mount St. Helens Wildlife Area and associated units are listed in Table 12. The table also describes the weed's classification, an estimate of the acreage affected by the weed, how many acres were treated, the relative density of infestation, the general trend the weed infestation has been exhibiting, the control objective and/or strategy for the weed, and which wildlife units have the weed present.

Detailed descriptions and natural history information for each of the above state-listed weed species above can be found at the Washington State Noxious Weed Control Board website http://www.nwcb.wa.gov/search.asp. Information on other species contained in the list can be found at the University of California's IPM Online website: http://www.ipm.ucdavis.edu/PMG/weeds_intro.html.

Weed management information for individual weed species can be found at the PNW Weed Management Handbook link: http://pnwhandbooks.org/weed/control-problem-weeds.

Table 12. Mount St. Helens weed table including the weed class and unit location on the wildlife area.

Weed Species	Cowlitz	Clark	Wahkiakum	Skamania	2017 Estimated Affected Acres	2017 Treated Acres	Annual Trend	Control Objective/ Strategy	Wildlife Area Unit Weed Distribution
Blackberry, Himalayan	C	C	C	C	50	10	Increasing	Control	Mudflow, Hoffstadt, Jenny Creek, Cedar Creek, Eagle Island, Altoona
Broom, Scotch	B	B	B	B	1000	250	Decreasing	Control	Hall Road, Jenny Creek, Mudflow, Hoffstadt, Cedar Creek, Eagle Island
Hawkweed, mouseear	B	B-Des	B-Des	B-Des	200	200	Decreasing	Control	Mudflow
Hawkweed, yellow	B-Des	B-Des	B-Des	B-Des	200	200	Decreasing	Control	Mudflow
Holly, English	C	C	C	C	100	50	Decreasing	Control	Hoffstadt, Nellie Corser, Jenny Creek, Cedar Creek
Ivy, English	C	C	C	C	10	10	Decreasing	Control	Jenny Creek, Cedar Creek, Abernathy, Nellie Corser, Eagle Island
Knapweed, diffuse	B	B-Des	B-Des	B-Des	1	1	Decreasing	Eradicate	Mudflow
Knapweed, meadow	B	B-Des	B-Des	B-Des	10	10	Decreasing	Control	Cedar Creek, Jenny Creek
Knapweed, spotted	B	B-Des	B-Des	B-Des	1	1	Decreasing	Eradicate	Mudflow
Knotweed, Japanese	B	B	B	B	50	20	Increasing	Control	Eagle Island, Abernathy, Hoffstadt
Lesser cattail	C	C	C	C	1	1	Decreasing	Control	Jenny Creek
Loosestrife, purple	B-Des	B-Des	B	B-Des	220	180	Decreasing	Control	Altoona, Canal Road, Eagle Island, Nelson, White Island, Fisher Island
Reed canarygrass	C	C	C	C	50	3	Stable	Control	Jenny Creek, Cedar Creek, Hoffstasdt, Nelson, Altoona, Abernathy, Hall Road, Mudflow
Thistle, Canada	C	C	C	C	40	20	Stable	Control	Mudflow, Hoffstadt, Jenny Creek, Cedar Creek

Weeds listed with a B-Des (Designate) require control per RCW 17.10.

Appendix C. Fire Response

Agency	Units Covered	Contact number
Skamania Co. Fire District 5	Nellie Corser	(509) 427-8187
Clark Co. Fire District 11	Duck Lake (Clark Co.), Jenny Creek	(360) 887-4609
Clark Co. Fire District 2	Two Forks, Eagle Island	(360) 887-4609
Clark Co. Fire District 10	Cedar Creek	(360) 887-4609
Cowlitz Co. Fire District 5	Nelson	(360) 673-2222
Cowlitz Co. Fire District 2	Fisher Island, Abernathy Creek	(360) 578-5218
Wahkiakum Co. Fire District 1	White Island	(360) 795-0707
Wahkiakum Co. Fire District 3	Altoona	(360) 795-0707
Cowlitz County Fire District 3	Carnine, Hall Road, Canal Road, Gardner	(360) 274-0222
WA Department of Natural Resources, Pacific Cascade Region	Hoffstadt, Mudflow, Merrill Lake	(360) 577-2025
U.S. Forest Service, Mount St. Helens National Volcanic Monument	Hoffstadt, Mudflow, Merrill Lake	(360) 449-7800

Department of Fish and Wildlife Contacts. Contact in order listed.

Contact	Phone Number
Daren Hauswald, Wildlife Area Manager	Office: (360) 906-6756
Chad Wildermuth, Wildlife Area Assistant Manager	Office: (360) 906-6770
Sandra Jonker, Regional Wildlife Program Manager	Office: (360) 906-6722

Fire District

Information

Units of the Mount St. Helens Wildlife Area are covered by nine county fire districts (Figure 21). When a wildland fire is reported, the county fire districts are usually the first to respond. If the fire is within the district, county resources will engage in suppression. If the fire is threatening the districts, the county resources will provide suppression efforts until DNR fire resources arrive. Fire district personnel are trained in wildland fire suppression.

Washington Department of Natural Resources
The Mount St. Helens Wildlife Area is located within DNR Pacific Cascade Region. DNR has the primary protection responsibility for state and private forest land. The Mudflow, Hoffstadt, and Merrill Lake units are outside of any county fire district, and DNR has the lead on any wildland fire suppression efforts in these units. DNR will also assist local fire districts with fire suppression efforts if those fires are threatening adjacent forest lands.

U.S. Forest Service
The Mudflow, Merrill Lake, and Nellie Corser units are all adjacent to USFS lands, and USFS is responsible for protection of the adjacent federal land. WDFW and DNR work closely with USFS, and they may be the first to respond to a wildland fire on or adjacent to the wildlife area.

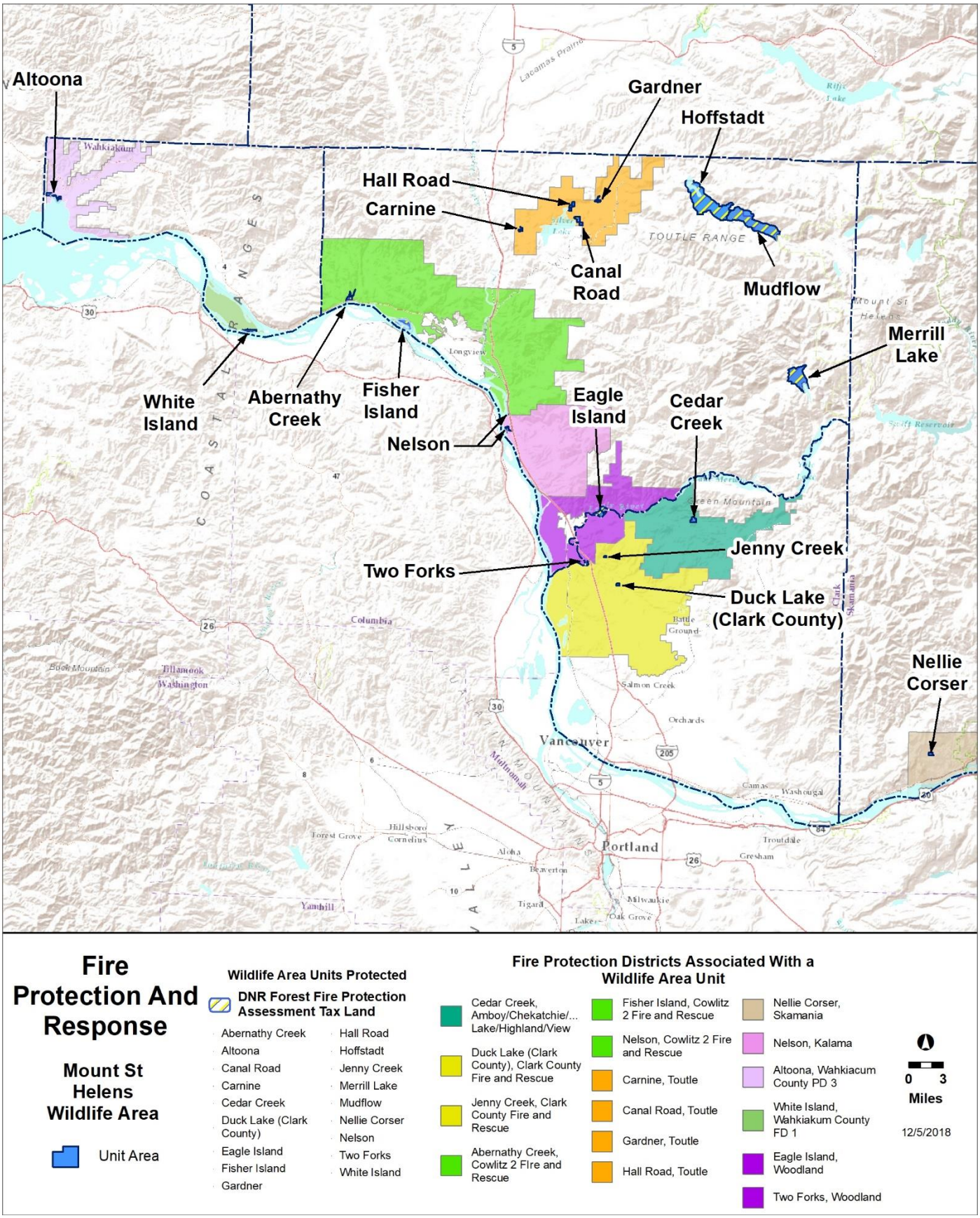


Figure 21. Summary of Fire Protection and Response.

Appendix D. Cultural Resources Summary

Appendix E. Public Response Summary

Appendix F. Research and Other Studies

Researcher	Year	Title	Description
Brock Hoenes, Kristin Mansfield, Kyle Garrison, Ilai Keren, Eric Holman, Nicholle Stephens, Rachel Cook, Brooke George.	In progress	Assessing the potential Effects of treponeme associated hoof disease (TAHD) on elk population dynamics in southwest Washington	Monitored the survival, nutritional condition, reproduction, and movements of adult female elk affected by treponeme-associated hoof disease
Tobias J. Kock, Theresa L. Liedtke, Michael A. Kritter, Russell W. Perry, Dennis W. Rondorf, Dustin R. Hinson, Cleveland R. Steward III and Shannon Wills	2007	Migration behavior of radio-tagged adult coho salmon and steelhead in the upper North Fork Toutle River, Washington	Radio tagged and tracked fish to provide information on the movements and behavior above and below the Sediment Retention Structure, and to evaluate the efficacy of the Fish Collection Facility.
Clayton Kinsel, Pat Hanratty, Mara Zimmerman, Bryce Glaser, Steven Gray, Todd Hillson, Dan Rawding, Steven VanderPloeg (WDFW)	2009	Intensively Monitored Watersheds: 2008 Fish Population Studies in the Hood Canal and Lower Columbia Stream Complexes	Fish studies in areas designated as IMWs (including Abernathy Creek) for monitoring the impacts of habitat restoration on anadromous fish populations.
Theresa L. Liedtke, Tobias J. Kock, and Dennis W. Rondorf (USGS)	2013	Evaluation of the Behavior and Movement Patterns of Adult Coho Salmon and Steelhead in the North Fork Toutle River, Washington, 2005–2009.	Radio tagged and tracked fish to provide information on the movements and behavior above and below the Sediment Retention Structure, and to evaluate the efficacy of the Fish Collection Facility.
J.S Hughes, MJ Greiner, GA McMichael, RA Harnish, EV Arntzen, SA Mckee, CR Vernon, RP Mueller, ES Fischer, JA Vazquez	2014	Fish Presence/Absence and Habitat in Areas Affected by Sediment from Mount Saint Helens, 2013−2014	Researchers at Pacific Northwest National Laboratory (PNNL) evaluated the quality of habitat and life stage use and abundance of Endangered Species Act-listed salmonid species in two North Fork Toutle River (NFTR) tributaries (Alder and Bear creeks).
Andrew Geary and Evelyn Merrill	2014	Succession, herbicides, forage nutrition and elk body condition at Mount St. Helens, Washington. Final research report.	Assessed how elk forage conditions are altered by forest succession, silvicultural herbicides and elk density, and attempted to relate elk body fat and pregnancy to habitats used by elk.
Scott McCorquodale, Eric Holman, Pat Miller, Stefanie Bergh	2014	Mt. St. Helens Elk Population Assessment.	Monitored the survival of adult female elk and branch-antlered bulls. Also used marked elk to facilitate the development of a formal monitoring program for the Mount St. Helens elk herd.

Mount St. Helens Wildlife Area Forest Management Strategy

Introduction

This document accompanies the agency-wide management strategy for WDFW's forests with plan details for the Mount St. Helens Wildlife Area, specifically the Hoffstadt, Merrill Lake, and Cedar Creek units. The statewide strategy includes information that is common to all wildlife areas, like the agency mission, policies, and priorities. Also included in the statewide plan are general descriptions of forest types, management issues associated with them, and directions for identifying suitable management areas and potential projects. As such, this document focuses on site-specific information related to identifying and addressing forest management needs in the Mount St. Helens Wildlife Area.

I. Forest Description

The Mount St. Helens Wildlife Area forests are composed of two ecological systems described by DNR's Field Guide to Washington's Ecological Systems (Rocchio, J. and R. Crawford 2008). The two forested ecosystems, found in all three of the units, include the North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest and the North Pacific Maritime Dry-Mesic Douglas-fir-Western Hemlock Forest (Figures 24, 25, and 26).

Disturbance Processes

Most of the disturbance to forested ecosystems on the Mount St. Helens Wildlife Area has been from intensive timber management activities that occurred prior to WDFW ownership. These units were generally managed to maximize fiber production, using the "industry" model. The result has been an abundance of early seral stand conditions and limited mid to late seral stand conditions outside of land managed by the US Forest Service.

Other disturbance factors on the landscape have resulted in minimal impact to forests on the wildlife area. Stand replacement fires are infrequent, with a typical fire return interval of 500 years or more. Insect and disease problems do occur, but most outbreaks do not reach epidemic levels. Grazing by ungulates can cause damage to young trees but grazing on grasses and shrubs can actually be a benefit to young stands. In general, impacts from these other disturbance factors have no significant impact on stand development.

Current Conditions and Threat Assessment

Ecological Integrity

Insects and disease

Forest insects and diseases present on the Mount St. Helens Wildlife Area are all native. At low levels, these insects and pathogens can provide quality habitat features such as a food source in beetle larvae, snag habitat, and structural diversity. Bark beetles attack trees weakened by drought, physical damage, disease, or overcrowding. Root disease attacks weakened trees primarily through root-to-root contact underground. The Douglas fir beetle is the most common cause of insect mortality, but it is rare for these outbreaks to reach epidemic levels other than those years where we experience extreme drought conditions. The most common root diseases include laminated, *Annosum*, and *Armillaria* root rots.

Many of the young forest stands on the Mount S.t Helens Wildlife Area are overstocked, causing individual trees to be stressed and more susceptible to disease or insect attack. For the most part, these overstocked stand conditions are the result of planting 250 or more trees per acre with the intention of pre-commercially thinning those stands (at 5 to 10 years of age) or commercially thinning those stands (at 25 to 30 years of age). These overstocked young stands will eventually self-thin on their own, but the progression of the stand to mid or late seral stand conditions will be delayed.

Priority Species

WDFW designates certain species and habitat types as priorities for special conservation and management. Some of these priority species and habitats are directly or indirectly associated with forest ecosystems—for instance old growth or mature forest, snags, and logs are all considered priority habitats. The spotted owl, listed as endangered by Washington and threatened by the federal government, is not known to be present on any of the three units of the Mount St. Helens Wildlife Area. However, thinning of young stands to accelerate the successional process to mature forest stand conditions may result in suitable habitat at some point in time. Gray wolves and martens are other priority species that may be expected to use the wildlife area at some point in time, though they have not been officially reported.

Social and Economic Conditions

Recreation

The Mount St. Helens Wildlife Area forests greatly add to the scenic beauty of the land and are highly valued as places for public recreation including hunting, hiking, biking, horse-back riding, camping and wildlife viewing. Nevertheless, current conditions are less than ideal. Dense plantations, as are currently present on much of the forested portions of the wildlife area, result in reduced habitat quality for many species and reduced economic value if the timber is ever harvested. Overstocked stands may provide desirable habitat for species such as the flammulated owl and northern goshawk, but less than ideal foraging habitat for big game species such as deer or elk or other wildlife species which are valued by the public for hunting-based recreation.

Local Economic Opportunities

There exists potential for wildlife area forests to provide limited support to local economies in terms of forestry jobs and raw material for wood products. For example, the Mount St. Helens Thin Project will employ local loggers and help supply local sawmills. This work provides quality family wage jobs to rural communities. This project will stimulate the local economy and generate revenue for the agency that can then be spent on local projects on the wildlife area, such as road improvements to meet Road Management and Abandonment Plan commitments, hand thinning, mastication, or future timber sales. Pre-commercial thinning projects provide employment to local silvicultural contracting companies.

II. Management Approach

WDFW will actively manage suitable forests on the Mount St. Helens Wildlife Area, where feasible, to create a mosaic of successional classes on the wildlife area. This will include commercial and pre-commercial thinning operations intended to accelerate transition into mid and late successional stand conditions. Patch cuts will be used in dense thickets of red alder to create early successional openings for the establishment of browse species.

Most of the ownerships surrounding the Mount St. Helens Wildlife Area are never allowed to develop beyond a mid-successional stand condition. By creating a mosaic of stand conditions, the wildlife area can provide more diverse habitat that is generally lacking in the Toutle River drainage. Management decisions should consider both site–specific and landscape-wide, cross-ownership needs.

Desired Future Conditions

Ecological Integrity

Wildlife area forests will be managed and maintained to meet the priorities and expectations of WDFW's mission to preserve, protect, and perpetuate fish, wildlife, and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities.

On a landscape level, desired conditions would move forests back to their historic ranges of variability for the landscape, as directed in the 2015 Management Strategy for WDFW's Forests. This includes a mosaic of early, mid, and late seral stand conditions. It is assumed that the historic ranges of variability, including species composition, structure, fuel levels, and disturbance regimes provide the most ecological sustainability and therefore the greatest overall benefits to multiple wildlife species. If possible, it would also be desirable to consider the future range of variability in the face of climate change. Temperatures are expected to increase, resulting in decreasing snow packs, earlier spring snow melt, and extended duration of dry summer conditions. This could increase the potential for more frequent wildfires, increase the stress on trees, and further predispose forests to disease and insect infestation that we haven't seen historically. Well managed, healthy forests are more likely to provide the greatest resiliency to the challenges of climate change.

Priority Species

Priority Species and Habitats presence, as outlined in the wildlife area management plan, will be factored into management recommendations on the wildlife area's forests. Balancing the needs of the landscape and ecological integrity, while also increasing the viability of at-risk species and habitats, will guide the management decisions and strategies. Specific details on how to address habitat needs of priority species, at the project level, will be developed during the project design phase of the project with WDFW biologists.

Social and Economic Conditions

WDFW's mission is to "preserve, protect, and perpetuate fish, wildlife, and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities." Desired socio-economic conditions for forest management in the Mount St. Helens Wildlife Area will provide for quality recreational experiences and commercial opportunities while providing quality habitat for multiple species.

Recreation

Forest projects would only temporarily affect recreational use due to short-term closures for safety reasons. The impact of temporary closures will be minimized by doing project work during periods of low use. For example, timber harvest with the Mount St. Helens Thinning Project will be started in the spring and completed before modern firearm deer season. Projects with tree falling or using heavy equipment will be signed to notify and protect the safety of potential recreational users. Long term recreational use will improve with forest road maintenance and/or abandonment as part of the commercial thinning project. Upon completion, thinning projects will result in increased potential for wildlife use as habitat conditions improve.

Suitable Management Areas and Potential Projects

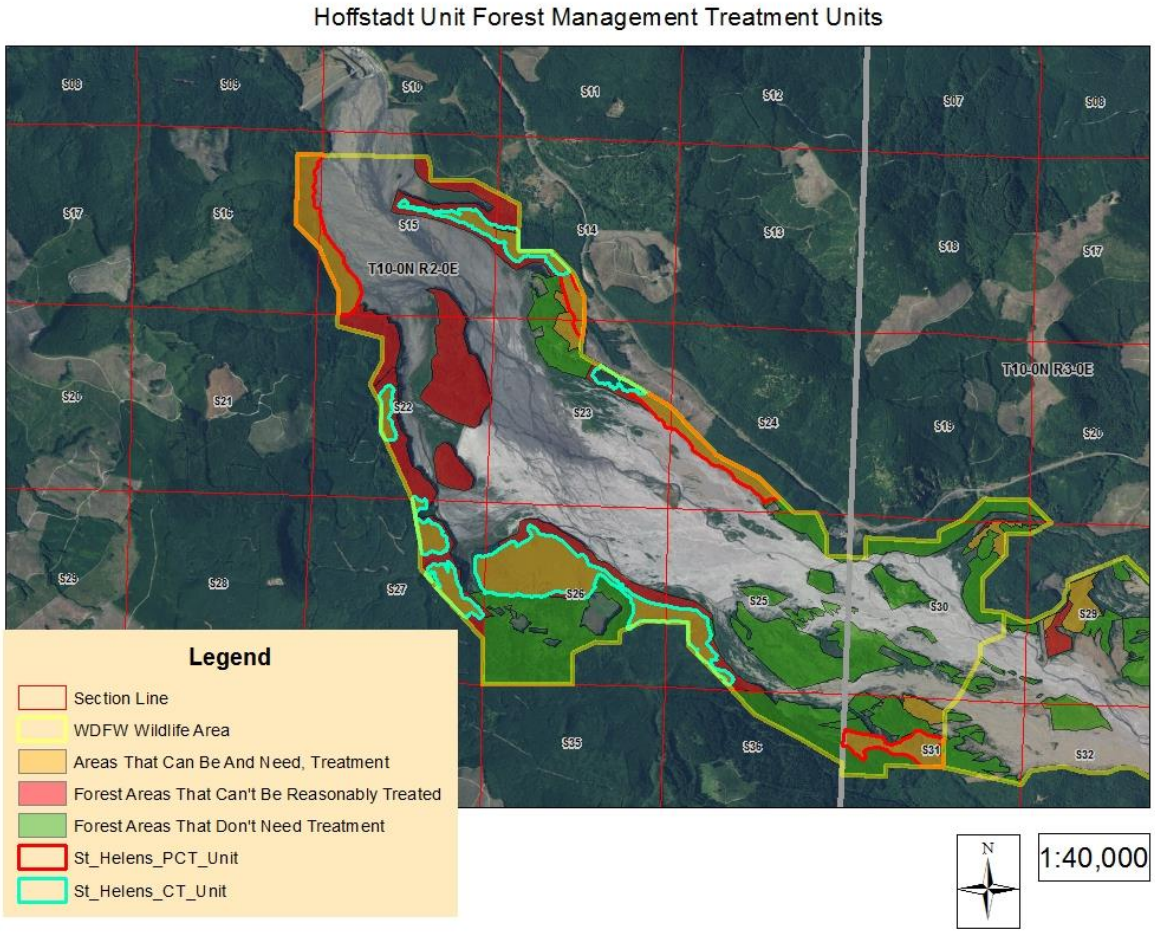
Much of the forested areas of the Mount St. Helens Wildlife Area, previously managed using the industry model, are overstocked and in need of thinning. In younger stands (5 to 15 years in age), this will be accomplished through pre-commercial thinning. In older stands (25 to 40 years in age), this will be accomplished through commercial thinning. Those stands currently on trajectory to desired future conditions, with little or no benefit to be achieved from active management, are low priorities for the current planning cycle. Also, those stands with feasibility issues may be excluded from consideration in the current planning cycle. Issues that may preclude active management include, but are not limited to, access problems, operability concerns, habitat concerns, economic constraints, and regulatory restrictions.

Where active management is appropriate, the primary goals for those management activities will be to:

1. Thin stands to maintain or improve growth rates.
2. Improve habitat conditions for multiple wildlife species, with emphasis placed on priority habitats and species.
3. Improve forest health to create healthy, resilient stands.
4. Improve ecological integrity ratings.
5. Create stand conditions that are more resilient to the anticipated effects of climate change.

Approximately 771 acres of forest management treatments are proposed on the Mount St. Helens Wildlife Area over the next 10 years. This includes approximately 256 acres of commercial thinning and 160 acres of pre-commercial thinning in the Hoffstadt Unit, and approximately 355 acres of pre-commercial thinning in the Merrill Lake Unit. Figures 22 and 23 shows where those treatment units are located. Work on all three of these projects is anticipated to be completed by 2020.

Figures 22 and 23. Map of potential forest management treatments on the Hoffstadt and Merrill Lake units of the Mount St. Helens Wildlife Area in the next 10-year planning cycle. Treatments include commercial thinning (CT) units and pre-commercial thinning (PCT) units. Areas that cannot be reasonably treated include inaccessible lands, lands with management restrictions, and steep slopes inaccessible by ground based equipment. Areas that do not need treatment are presumed to be self-maintaining through natural processes.



Merrill Lake Unit Forest Management Treatment Units

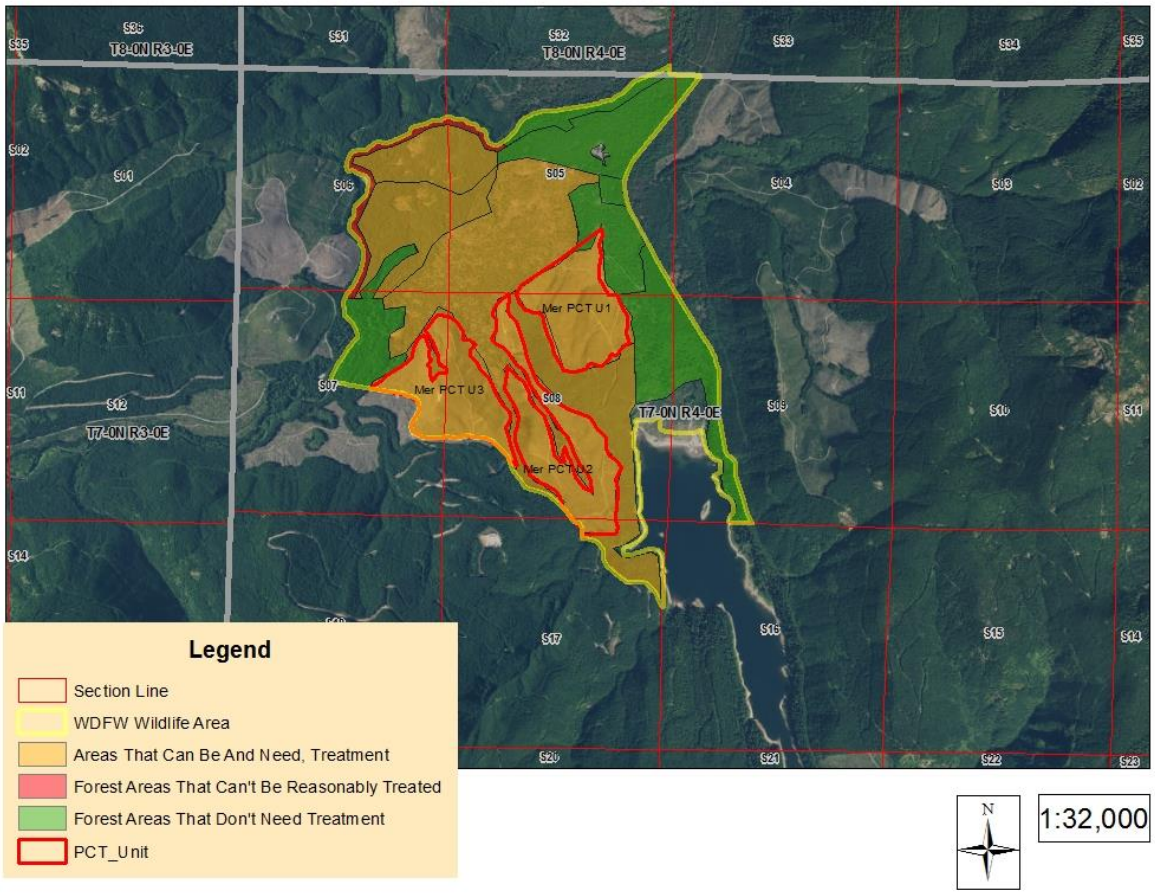
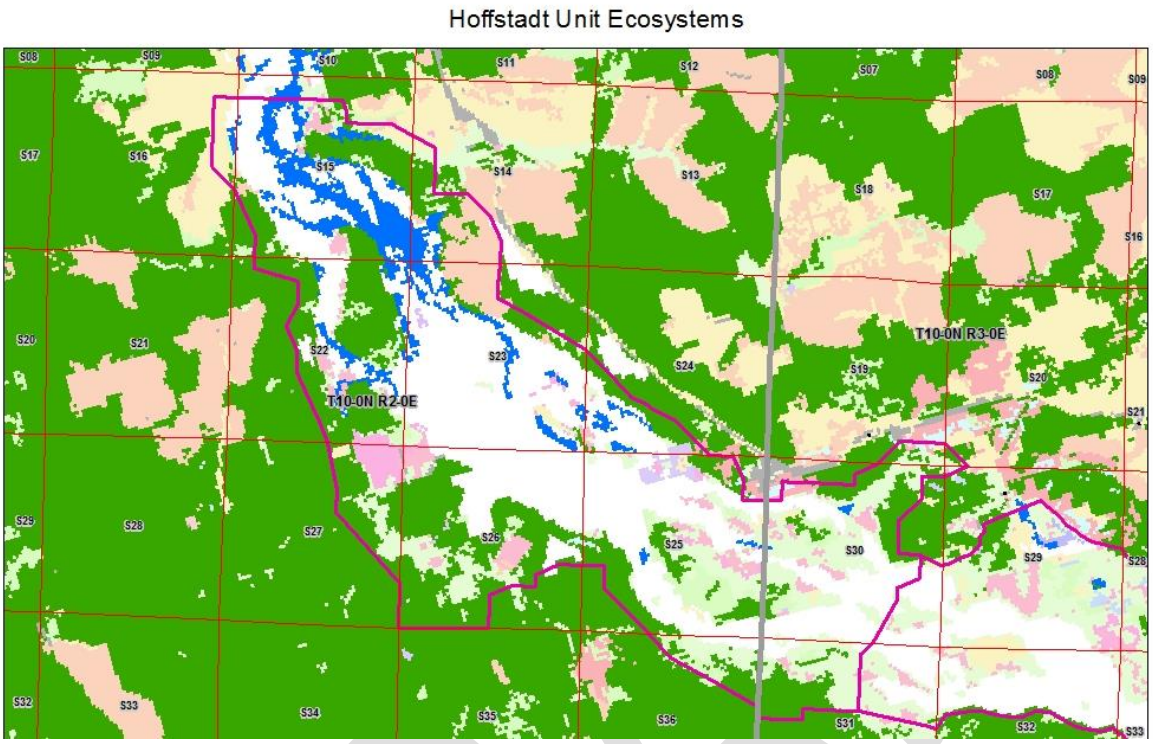


Table 13: Planned Forest Treatment Projects. Projects planned for the next 10-year cycle to meet forest management goals of improving wildlife habitat, increasing ecological resiliency, and improving growth rates. Projects listed are goals only. Planning and implementation will be dependent on funding, markets, timing, weather, and available resources.

Objectives	Unit	Performance measure (Acres Treated)	Task	Anticipated Completion Date
Reduce stand density, improve growth rates, stimulate browse growth, improve habitat	Hoffstadt Unit	~ 256 Acres	Commercial Thinning	2019
Reduce stand density, improve growth rates, stimulate browse growth, improve habitat	Hoffstadt Unit	~ 160 Acres	Pre-Commercial Thinning	2019
Reduce stand density, improve growth rates, stimulate browse growth, improve habitat	Merrill Lake Unit	~ 355 Acres	Pre-Commercial Thinning	2020

Figures 24, 25 and 26. Distribution of forest types based on ecological systems described by the Department of Natural Resources Field Guide to Washington's Ecological Systems (Rocchio, J. and R. Crawford 2008) and satellite imagery (Sayre *et. al*. 2009). Maps show satellite imagery data over the Mount St. Helens Wildlife Area.



Legend

Section Line

Wildlife Area

Forested Ecosystems

North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest

North Pacific Maritime Dry-Mesic Douglas-fir-Western Hemlock Forest

Non-Forested Ecosystems

Harvested Forest-Shrub Regeneration

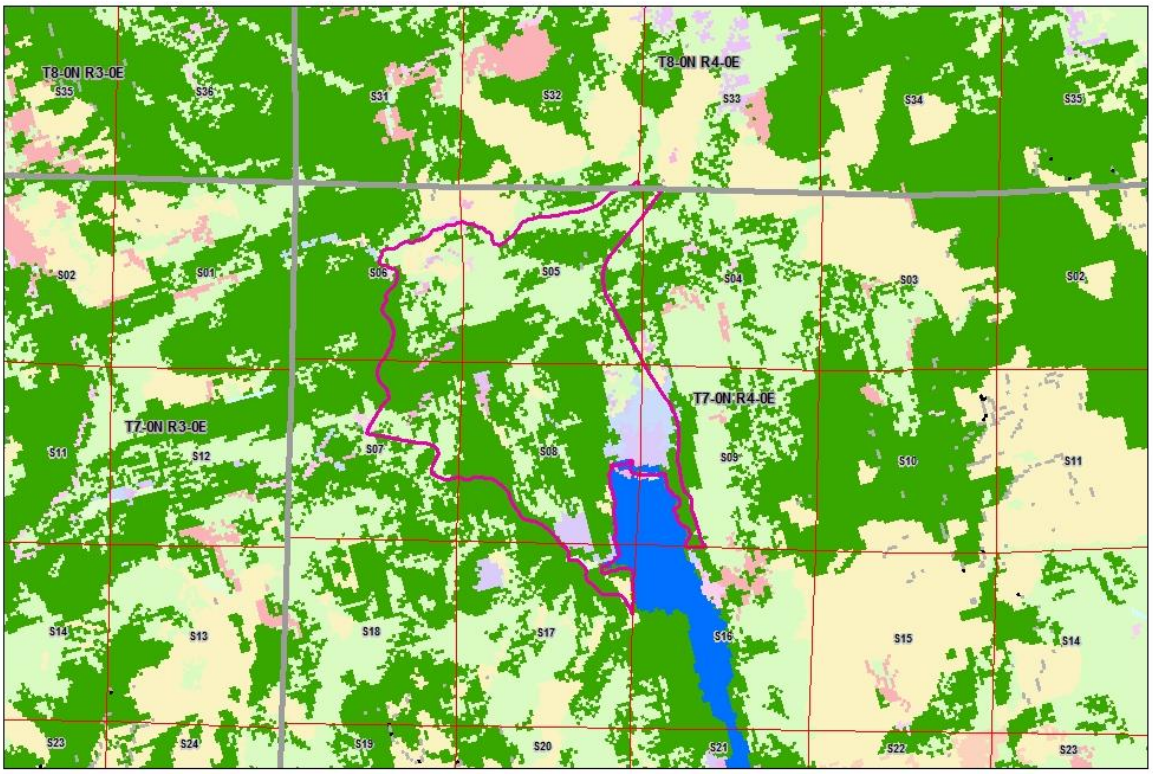
Temperate Pacific Freshwater Emergent Marsh

Open Water

North Pacific Hardwood-Conifer Swamp

North Pacific Shrub Swamp

Merrill Lake Unit Ecosystems



Legend

Section Line

Wildlife Area

Forested Ecosystems

North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest

North Pacific Maritime Dry-Mesic Douglas-fir-Western Hemlock Forest

Non-Forested Ecosystems

Harvested Forest-Shrub Regeneration

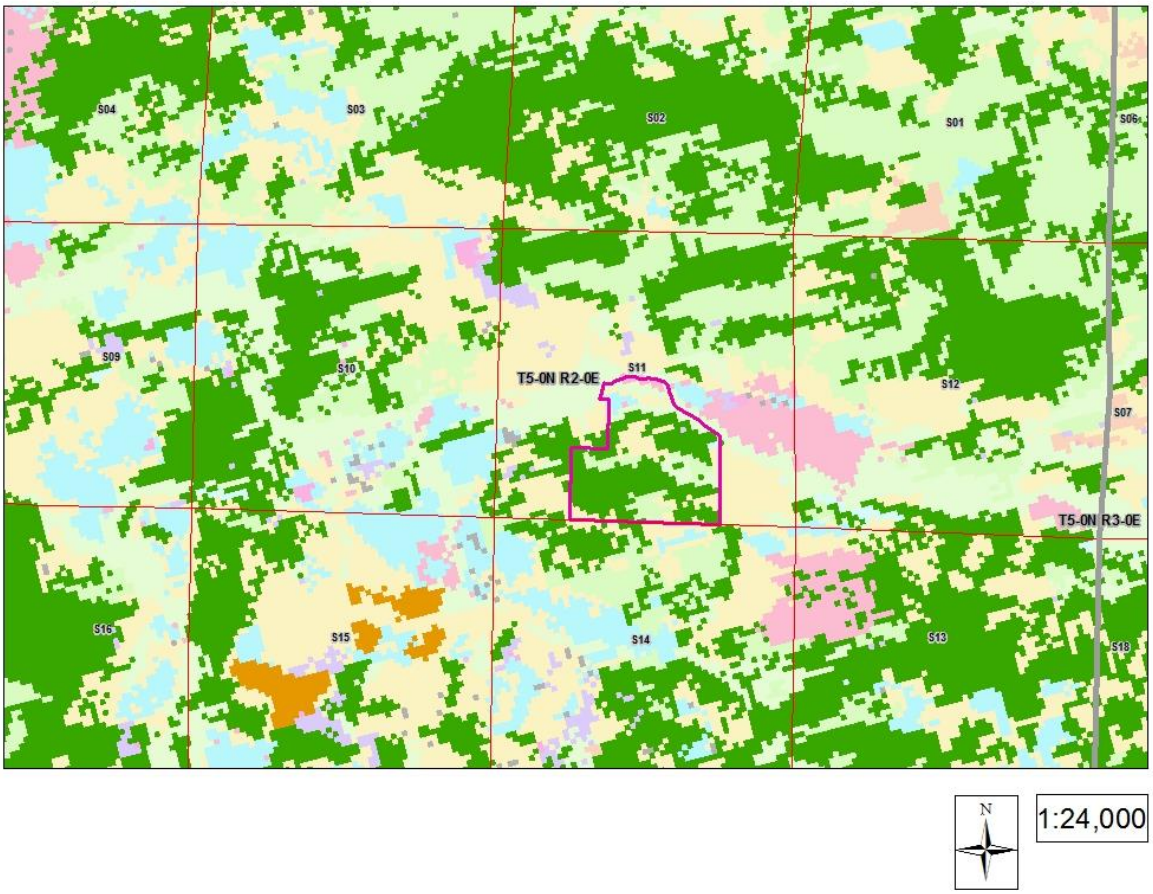
Temperate Pacific Freshwater Emergent Marsh

Open Water

North Pacific Hardwood-Conifer Swamp

North Pacific Shrub Swamp

Cedar Creek Unit Ecosystems



Legend

Section Line

Wildlife Area

Forested Ecosystems

North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest

North Pacific Maritime Dry-Mesic Douglas-fir-Western Hemlock Forest

Non-Forested Ecosystems

Harvested Forest-Shrub Regeneration

Temperate Pacific Freshwater Emergent Marsh

Open Water

North Pacific Hardwood-Conifer Swamp

North Pacific Shrub Swamp

Literature Cited

Rocchio, J. and R. Crawford 2008. Draft Guide to Washington's Ecological Systems. Washington State Department of Natural Resources.

LANDFIRE, 2008, Existing Vegetation Type Layer, LANDFIRE 1.1.0, U.S. Department of the Interior, Geological Survey. Accessed 28 December 2016 at http://landfire.cr.usgs.gov/viewer/. http://www.landfire.gov/

Tveten, R. 2014. Management Strategy for the Washington State Department of Fish and Wildlife's Forests. http://wdfw.wa.gov/publications/01616/wdfw01616.pdf

Appendix I. Water Access Sites Table

					Fishing and Boating Opportunities			Access Facilities				
County	Waterbody	Access	WLA Unit	Public Fishing Easement	Fishing*	Hand launch	Trailered boat launch	Boat Ramp Surface	Toilet (^ = ADA)	ADA Parking	ADA Boat Launch	ADA Dock
Clark	Lewis River	Cedar Creek			•		•	Concrete	•			
Cowlitz	Columbia River	Sportsmen's Club			•	•						
		Woodland Bottoms		•	•	•						
	Cowlitz River	Olequa Creek		•	•		•	Concrete	•	•		
		Toutle			•							
	Kalama River	Beginners' Hole			•				•^	•		
		Fisherman's Loop			•		•	Concrete				
		Hand			•		•	Concrete				
		Modrow Bridge		•	•		•	Concrete	•^	•		
		Prichard			•	•						
	Kress Lake	Kress Lake			•		•	Concrete	•^	•		•
	Lewis River	Island			•		•	Concrete	•^	•		
		Pekin Ferry		•	•		•	Concrete	•^	•	•	•
	Silver Lake	Silver Lake			•		•	Concrete	•^	•		•
	Toutle River	Tower Bridge			•	•						
Wahkiakum	Columbia River	Puget Island			•				•	•		
	Deep River	Oneida	Altoona		•		•	Concrete	•^	•	•	•
	Elochoman River	Beaver Creek		•	•				•^	•		
		Brooks Slough			•		•	Concrete				
		Upper Elochoman		•	•							
	Grays River	Rosburg			•		•	Concrete				
		Satterlund		•	•							

*** Fishing opportunities *on department land*. Refer to current WDFW sport fishing rules, as fishing seasons change and may not occur at all sites.**