



**PORT  
BLAKELY**

**HABITAT CONSERVATION PLAN  
FOR THE JOHN FRANKLIN EDDY  
FORESTLANDS**

Clackamas County, Oregon  
January 2023



## EXECUTIVE STATEMENT

At Port Blakely, we envision a future where forestry is embraced as a source of sustainable forest products, providing materials to build carbon-friendly communities, while protecting ecosystem functions relevant to water quality, carbon sequestration, and wildlife habitat. To realize this future, we seek collaboration to perpetuate a common good, benefiting both people and the environment. In spring 2016, we began discussions with federal and state agency partners with the intent of developing a Habitat Conservation Plan (HCP) and Stewardship Agreement (SA) for our forest ownership located in Clackamas County, Oregon, an area of approximately 30,000 acres. Finalizing these agreements and watching them come to life represent a significant step towards achieving this future, one we can all be proud of.

### About Port Blakely

Port Blakely has a commitment to sustainability, and the character it takes to implement impactful forest stewardship both environmentally and as a profitable family-owned enterprise. Owned by the same family since the early 20th century, Port Blakely has been involved in forestry in the Pacific Northwest for five generations. The company owns 159,000 acres of forestland in Oregon and Washington, as well as 97,000 acres in New Zealand. Stewardship values and environmental responsibility are part of the fabric of the family. Ensuring the land is managed in a way that is profitable to the owners and responsible to the environment is critical to the goals and values of the company. Often this requires pursuing alternate approaches to the status quo of forest management.

### Why invest in an HCP

Port Blakely understands the presence of species listed as threatened or endangered under the federal Endangered Species Act (ESA) is a reality in Pacific Northwest forestry. Forestland managers must make decisions that affect the availability of suitable habitat on their land and, therefore, the potential for listed species to live there. Under current Oregon forest practice rules, land managers are faced with regulatory restrictions if they have listed species on their land. Unfortunately, this can result in an incentive to eliminate the risk of listed species occupancy by removing habitat or preventing it from developing in the first place. An alternate approach is to develop a federal conservation plan that not only provides benefits to listed species, but also provides long-term regulatory stability for businesses.

Federal conservation plans provide incentives to manage the land in ways that may attract listed species or increase their populations and distribution through measures that contribute to species recovery. In exchange for increasing the biologic viability of the landscape with measures that provide conservation benefits, landowners receive federal authorization that permits incidental 'take' or harm to a listed species should it occur as a result of the landowners' land management activities. We see these plans as mutual agreements that are a win for both business and conservation.

As demonstrated by the successful completion and implementation of two existing federal conservation plans in Washington, Port Blakely has a history of being proactive and collaborative. In 1996, the Company successfully implemented one of the first forestry HCPs in the nation, while in 2009 we entered into a Safe Harbor Agreement (SHA), the first industrial forestry SHA in the Pacific Northwest. In 2020, the Company entered into the

largest forestry SA in Oregon's history. The state-sanctioned SA was developed in a parallel process to the HCP and contains many of the same prescriptions, but it is focused on state forest practice rules rather than the federal ESA. With the addition of our Oregon HCP, the first multi-species forestry HCP in the state, our combined conservation plans encompass ~60% of Port Blakely's land base in the U.S.

### Approach

The forestlands that will be covered under this HCP have been managed by our family-owned company for over 30 years. When we acquired the original land, the landscape was primarily young second-growth plantation forest. During the ensuing three decades, we have voluntarily and patiently cultured and grown the forest far longer and larger than the economic minimums that are standard practice on neighboring industrial tree farms. It is this legacy of sustainable management that provides us the opportunity to pursue an HCP, enabling the continuation of habitat development and protection.

Developing an HCP is a complex process that is expensive and takes years of effort, but the benefits are even greater. For landowners that have a long-term investment in the health and vitality of their forests, HCPs are tools to bridge the gap to regulatory certainty. Now more than ever the regulatory climate in Oregon with respect to forestry is uncertain. With 50 years of regulatory stability that comes with the HCP, we can more dependably predict the long-term value of the estate, which in-turn provides long-term stability and predictability for the owners. The HCP is also designed to increase operational efficiency and management flexibility, allowing us to invest in long-term planning without concern for shifting regulations. Additionally, the HCP has allowed us to implement a management strategy based on the application of best available science. Utilizing science to develop meaningful protective and restorative practices for habitat and ecosystem function is a foundation to the way we envision and apply forest management.

HCPs are voluntary management plans that consider local environmental and human conditions. Our HCP is located approximately 12 miles south of the Portland metro area, near the rural community of Molalla. In 2020, the Portland metro area reached 2.5 million people and it is expected to reach 3 million by 2040. Molalla is an agricultural community that is facing increased pressure from the associated urban expansion. Port Blakely's forestlands are juxtaposed amongst the rural, agriculture interface as well as adjacent to federal forestlands located to the east. To fulfill our business strategy, we work with and rely on the local community, ensuring employment for approximately 20 individuals. As a family-owned forestry company, we are proud to contribute taxes that invest in the viability and sustainability of our local communities. In addition to the contribution we make to rural jobs, the location of our forestlands provides important habitat for species living in the mix of an ever-changing landscape, providing an opportunity for them to live on and disperse between the various habitats. For these reasons, our forestlands play an important role on the landscape in this region and maintaining this land in family-owned forestry is imperative for the benefit of both rural communities and the local fish and wildlife.

As a multi-species HCP, we have proposed a plan that contributes to the habitat needs of many species including both federally listed and unlisted species whose range includes the HCP area. In addition, our HCP measures were designed for our unique landscape conditions. Our forest landscape is primarily comprised of 2<sup>nd</sup> and 3<sup>rd</sup> growth Douglas-fir

stands, some of which were previously managed as agricultural lands and some of which were affected by wildfire in 2020. Approximately 188 miles of streams flow across the ownership, 22% of which are small fish-bearing and 55% of which are small perennial and seasonal nonfish-bearing. Slopes are generally gentle, with steeper slopes occurring adjacent to the larger streams and tributaries that flow through the property. Approximately 680 acres, or 2.2% of the total land base, contain slopes > 70%. Structural features such as standing snags, forest-floor coarse woody debris, and large wood in streams are limited across portions of Port Blakely's HCP landscape based on pre-ownership management and the recent catastrophic wildfires. This condition provides an opportunity to proactively manage the forest to retain and/or create structural features, resulting in increased amounts of habitat for fish and wildlife, and contributing to the recovery of the Covered Species.

Overall, the plan aims to maintain or increase the biodiversity of habitat features across the landscape well beyond what would occur on a typical managed forest landscape. Our HCP takes a comprehensive landscape approach to creating and enriching fish and wildlife habitat through the implementation of specific conservation-focused practices. These practices consider the requirements of critical species and aim to diversify and protect unique and ecologically sensitive habitats. Practices outlined in the agreement include both protective and restorative management activities. In addition to leaving more standing wildlife trees and wider stream buffers than are required under Oregon forest practice rules, the HCP employs protection for nonfish aquatic habitats and unstable slopes. The HCP also proposes novel protective prescriptions such as retaining upland habitat patches, protecting unique ecological features, and retaining legacy features that are relics of past forests. In addition, restorative prescriptions will be implemented that will reestablish habitat features that were reduced as a result of past land management activities. Examples include creating snags for perches and cavity dependent bird and bat species, creating wood piles that could be used as denning sites for Pacific fisher or wolves, and placing large woody debris into small and medium fish-bearing streams to enhance aquatic habitat. Additionally, the plan includes a provision to support local watershed restoration projects through the donation of trees for instream placement, restoration funds, or in-kind staff time. There are many other conservation-focused prescriptions described in the HCP.

Several ESA-listed species are known to occur on or near the HCP lands. The northern spotted owl is known to occur in the vicinity of the Plan area, and it is thought that the listed gray wolf could occur at some point in the future. These listed species, and other unlisted species of concern, have the potential to be affected by our forest management activities when and where they occur on Port Blakely's ownership. The terrestrial habitat conservation strategy focuses on structural features that will provide habitat for spotted owls, wolves, and Pacific fishers, as well as other forest birds, bats, and amphibians. Special provisions are included to protect spotted owl nesting pairs, and den sites for wolves and Pacific fishers.

Currently, four listed salmonid species are known to occur in streams within or adjacent to Port Blakely's ownership, all within the Molalla and Clackamas River watersheds. Our aquatic conservation measures are designed to benefit listed and unlisted fish and stream-associated amphibians by providing substantial riparian buffers, pro-actively managing for large wood recruitment, removing fish passage barriers, and implementing road management best management practices. The implementation of these measures will protect and enhance stream and riparian function by sufficiently shading the streams to

prevent temperature increases, providing for large wood recruitment to benefit fish habitat, and reducing the potential for harmful sediment input.

An important element of the HCP is the ability to acquire additional forestlands and incorporate them into the HCP management and conservation approach. Under the Plan, Port Blakely can add acquired forestlands that meet specific criteria. As much as 25% of the current HCP lands may be added to the HCP area as long as they are nonfederal forestlands, anticipated to be primarily small landowner or industrial forestlands, and that have similar vegetative species and characteristics as the HCP area, i.e., Douglas-fir stands of western Oregon, have the potential to be occupied by Covered Species, within a prescribed boundary defined in the HCP. The conservation strategy described in this HCP will apply to all acquired lands that are brought into the Plan in the future.

In September 2020, the Riverside and Beachie Creek wildfires that burned in western Oregon affected approximately 8,100 acres of the HCP area. The catastrophic wildfires burned with mixed-severity and diminished the quality of fish and wildlife habitat in some areas while increasing the diversity of habitat features in other areas, affecting approximately 28% of the HCP area. The fire-affected stands are located primarily on the easternmost parcels, however, some of the southernmost parcels were also affected.

#### Importance of engagement and collaboration

It is an enormous effort to develop an HCP and we couldn't have done it without the collaboration of our partners and the support of our community. In addition to our federal and state agency partners, we've connected with numerous community entities to introduce ourselves and our practices, as well as to learn their interests and seek their feedback as we developed the HCP. Over the last few years, we've met representatives of the Confederated Tribes of Grand Ronde, non-governmental organizations, and the forest management community, as well as elected officials, neighbors, and community members. We are grateful to be part of the local network and look forward to continuing to grow these and other relationships in the community.

The collaborative spirit in which this conservation plan was developed, respecting the positions and values of diverse stakeholders, the conservation goals for threatened species, and the economic responsibilities of Port Blakely is innovative, forward thinking and an example of collaboration and stewardship. We believe our work, in collaboration with others, will result in a more effective outcome, where we are stronger together and where our efforts to fulfill our mutual goals are amplified.

# Table of Contents

LIST OF ACRONYMS .....	xiii
GLOSSARY .....	xv
Section 1 Introduction.....	1
1.1 Overview and Background.....	1
1.2 Purpose and Need.....	5
1.3 Plan Area/Permit Area .....	7
1.3.1 Plan Area .....	7
1.3.2 Permit Area .....	9
1.4 Permit Duration.....	9
1.5 Alternatives to the Taking .....	9
1.5.1 Take-Avoidance Alternative.....	11
1.5.2 Forest Practices Plus Best Management Practices Alternative.....	11
1.6 Coordination with Federal and State Agencies .....	11
1.7 Summary of Relevant Laws and/or Regulations.....	11
1.7.1 Federal Endangered Species Act .....	12
1.7.2 National Environmental Policy Act.....	13
1.7.3 National Historic Preservation Act .....	14
1.7.4 Migratory Bird Treaty Act.....	14
1.7.5 Bald and Golden Eagle Protection Act.....	14
1.7.6 Relevant State Laws and Regulations .....	15
Section 2 Project Description and Covered Activities .....	17
2.1 Project Description.....	17
2.1.1 Location and Landscape Context of HCP Lands .....	17
2.1.2 Adjacent Landowners .....	19
2.2 Covered Activities .....	19
2.2.1 Timber Harvest Under Current Forest Practices Rules .....	20
2.2.2 Silviculture.....	34
2.2.3 Road Management Under Current Forest Practice Rules.....	38
Section 3 Covered Species .....	43
3.1 Listed Species .....	47
3.1.1 Chinook Salmon – Lower Columbia River Fall-Run .....	47
3.1.2 Chinook Salmon – Upper Willamette River.....	51

3.1.3 Coho Salmon – Lower Columbia River.....	54
3.1.4 Steelhead – Lower Columbia River .....	59
3.1.5 Steelhead – Upper Willamette River.....	63
3.1.6 Bull Trout – Columbia River Distinct Population Segment .....	66
3.1.7 Gray Wolf.....	71
3.1.8 Northern Spotted Owl.....	74
3.2 Unlisted Species.....	79
3.2.1 Pacific Lamprey .....	79
3.2.2 Cascades Frog.....	82
3.2.3 Coastal Tailed Frog.....	83
3.2.4 Cascade Torrent Salamander .....	85
3.2.5 Oregon Slender Salamander.....	86
3.2.6 Western/Pacific Pond Turtle .....	88
3.2.7 Northern Goshawk .....	90
3.2.8 Pacific Fisher .....	92
3.2.9 Townsend’s Big-eared Bat .....	95
3.2.10 Migratory Tree-roosting Bats (Hoary and Silver-haired Bats).....	99
3.2.11 Myotis Bats (Fringed, Long-eared, and Long-legged Bats).....	101
3.3 Plant Species .....	104
3.3.1 Listed Plant Species in Clackamas County .....	104
Section 4 Environmental Setting and Biological Resources.....	105
4.1 Environmental Setting.....	105
4.1.1 Climate.....	105
4.1.2 Topography/Geology.....	106
4.1.3 Hydrology/Streams, Rivers, and Drainages.....	107
4.1.4 Water Quality/Water Quantity.....	107
4.1.5 Existing Land Use .....	109
4.2 Biological Resources .....	111
4.2.1 Vegetation.....	111
4.2.2 Fish and Aquatic Habitat .....	112
4.2.3 Wildlife and Terrestrial Habitat .....	124
Section 5 Potential Biological Impacts.....	126
5.1 Direct and Indirect Impacts .....	126
5.1.1 Aquatic Species .....	126
5.1.2 Terrestrial Species .....	153



5.1.3 Plant Species .....	167
Section 6 Conservation Program.....	168
6.1 Salmonid Recovery Plan Actions Recommended for LCR and UWR ESUs and DPSs Pertinent to the HCP Area .....	169
6.2 Biological Goals and Objectives.....	172
6.3 Measures to Avoid, Minimize, and Mitigate Take .....	179
6.3.1 Streams and Riparian Ecosystem Functions .....	179
6.3.2 Upland Habitat and Ecosystem Functions .....	194
6.3.3 Timber Harvest.....	198
6.3.4 Road Management.....	217
6.3.5 Species-specific Nest and Den Site Conservation Measures.....	222
6.3.6 Summary of Conservation Program.....	224
6.4 Monitoring .....	225
6.4.1 Compliance Monitoring.....	225
6.4.2 Biological/ Effectiveness Monitoring .....	225
6.5 Adaptive Management Strategy .....	227
6.6 Reporting.....	227
6.6.1 Changed Circumstances .....	228
6.6.2 Funding.....	228
Section 7 Take of Covered Species and Impacts of the Take to Covered Species Populations .....	229
7.1 Aquatic Species .....	231
7.1.1 Listed Anadromous Salmonids .....	231
7.1.2 Bull Trout.....	245
7.1.3 Pacific Lamprey.....	249
7.1.4 Cascades Frog.....	252
7.1.5 Coastal Tailed Frog .....	254
7.1.6 Cascade Torrent Salamander.....	256
7.1.7 Western Pond Turtle .....	259
7.2 Terrestrial Species.....	260
7.2.1 Gray Wolf .....	261
7.2.2 Pacific Fisher.....	264
7.2.3 Townsend's Big-eared Bat .....	266
7.2.4 Migratory Tree-roosting Bats .....	268
7.2.5 Myotis Bats.....	270

7.2.6 Northern Spotted Owl.....	271
7.2.7 Northern Goshawk .....	275
7.2.8 Oregon Slender Salamander.....	277
7.3 Effects to Critical Habitat .....	279
7.3.1 Listed Salmon Species Critical Habitat.....	279
7.3.2 Listed Terrestrial Species Critical Habitat.....	279
Section 8 Changed and Unforeseen Circumstances .....	280
8.1 Changed Circumstances .....	280
8.1.1 Windstorms.....	281
8.1.2 Ice Storms.....	282
8.1.3 Small and Low Severity Fires.....	283
8.1.4 Douglas-fir Bark Beetle and Disease Infestations.....	284
8.1.5 Disease.....	285
8.1.6 Moderate Climate Change Trends .....	286
8.1.7 New Species Listing.....	287
8.2 Unforeseen Circumstances .....	290
8.2.1 Flooding .....	291
8.2.2 Drought.....	291
8.2.3 Earthquakes.....	292
8.2.4 Volcanic Eruption .....	293
8.2.5 Economic Downturn .....	294
8.2.6 Catastrophic Wildfires .....	294
8.2.7 Climate Change .....	295
Section 9 Funding.....	296
9.1 Costs and Budget for the Conservation Program and Plan Implementation.....	296
9.2 Funding Sources .....	296
9.3 Funding Mechanisms.....	297
9.4 Funding Assurances.....	297
Section 10 Permit/HCP Implementation .....	298
10.1 No Surprises.....	298
10.2 Permit Term.....	298
10.3 Occupation of Non-covered or Newly-listed Species.....	298
10.4 Land Transactions .....	298
10.5 Rights to Terminate and Relinquish the ITP.....	300
10.6 Dispute Resolution .....	301

10.7 Modifications and Amendments .....	301
Section 11 References .....	303
11.1 Literature Cited .....	303
11.2 Personal Communications .....	331
11.3 List of Preparers, Contributors, and Advisors .....	331
Appendix A Covered Lands (Legal Descriptions) .....	334
Appendix B Summary of Conservation Program Measures .....	335
Appendix C Comparison of HCP Conservation Measures and Oregon Forest Practice Statutes/Rules.....	336

## LIST OF TABLES

Table 2-1. Acreage of Port Blakely forested age-classes in the HCP area in Year 2022 (post-fire).....	18
Table 2-2. Oregon Department of Forestry Riparian Management Area widths by stream size and type*.....	28
Table 3-1. Covered fish and wildlife ESA-listed species with the potential to occur on Port Blakely's HCP forestlands. ....	44
Table 3-2. Covered fish and wildlife species of concern with the potential to occur on Port Blakely's HCP forestlands. ....	45
Table 4-1. Miles of known fish and nonfish-bearing streams by stream type, including SSBT streams, and percent of total stream miles on the HCP ownership. ....	114
Table 6-1. Number of fish passage barriers previously removed and number of miles of fish habitat re-connected on the current HCP ownership by ESU.....	183
Table 6-2. Number of fish passage barriers to be removed by barrier type and number of miles of fish habitat to be re-connected on the current HCP ownership by ESU. ...	183
Table 6-3. Annual habitat restoration contribution based on ownership acres. ....	193
Table 7-1. Miles of fish streams by stream type within the LCR ESU <sup>1</sup> (Oregon Portion) and on the current HCP ownership <sup>2</sup> within the ESU. ....	243
Table 7-2. Miles of nonfish streams by stream type within the LCR ESU <sup>1</sup> (Oregon Portion) and on the current HCP ownership <sup>2</sup> within the ESU. ....	243
Table 7-3. Miles of fish streams by stream type within the UWR ESU <sup>1</sup> and on the current HCP ownership <sup>2</sup> within the ESU. ....	244
Table 7-4. Miles of nonfish streams by stream type within the UWR ESU <sup>1</sup> and on the current HCP ownership <sup>2</sup> within the ESU. ....	245
Table 7-5. Critical habitat stream miles by species within the ESU and HCP lands. ....	279
Table 8-1. Changed circumstances checklist. ....	287

**LIST OF FIGURES**

Figure 1-1. Port Blakely HCP Project Location in Clackamas County, Oregon. .... 2

Figure 1-2. Port Blakely HCP Ownership and Adjacent Ownerships in Clackamas County, Oregon. .... 3

Figure 1-3. Port Blakely HCP Ownership and 2020 Wildfire Fire Heat Perimeter (Riverside Wildfire to the North and Beachie Creek Wildfire to the South). .... 4

Figure 1-4. Port Blakely Initial Plan/Permit Area Lands with 0.5-mile Distance of Influence Buffer. .... 8

Figure 1-5. Boundary of Potential Acquisition Lands. .... 10

Figure 2-1. Acreage of current Port Blakely forest age-classes in the HCP area projected by decade\* to occur under current Oregon Forest Practices Rules..... 31

Figure 3-1. Lower Columbia River and Upper Willamette River Chinook Salmon ESUs and Critical Habitat in Relation to Current HCP Lands. .... 48

Figure 3-2. Lower Columbia River Coho Salmon ESU and Critical Habitat in Relation to Current HCP Lands. .... 55

Figure 3-3. Lower Columbia River and Upper Willamette River Steelhead DPS’ and Critical Habitat in Relation to Current HCP Lands..... 60

Figure 3-4. Bull Trout NEP Distribution and Habitat Use in Relation to Current HCP Lands (ODFW 2018a). .... 69

Figure 3-5. Wolf Management Zones and Current Federal ESA Status in Oregon (ODFW 2019b). .... 72

Figure 3-6. Current Distribution of Known Wolves in Oregon (ODFW 2019b)..... 74

Figure 3-7. Current and Historic Pacific Lamprey Distribution in Relation to the HCP Area. 81

Figure 3-8. West Coast Distinct Population Segment of Fishers in Oregon. .... 94

Figure 4-1. Clackamas County Forest Land Ownerships..... 110

Figure 4-2. Current Forest Age-class Distribution on HCP Lands. .... 113

Figure 4-3. Known Fish and Nonfish Streams on the Current HCP Lands – Northeast Ownership. .... 116

Figure 4-4. Known Fish and Nonfish Streams on the Current HCP Lands – East Ownership. .... 117

Figure 4-5. Known Fish and Nonfish Streams on the Current HCP Lands – South Ownership. .... 118

Figure 4-6. Known Fish and Nonfish Streams on the Current HCP Lands – West Ownership. .... 119

Figure 4-7. Known Sensitive and Unique Habitats on the Current HCP Lands – Northeast Ownership ..... 120

Figure 4-8. Known Sensitive and Unique Habitats on the Current HCP Lands – East Ownership. ....	121
Figure 4-9. Known Sensitive and Unique Habitats on the Current HCP Lands – South Ownership. ....	122
Figure 4-10. Known Sensitive and Unique Habitats on the Current HCP Lands – West Ownership. ....	123
Figure 6-1. Spotted owl foraging and dispersal habitat acres and percent, currently and anticipated to occur in the HCP by decade* over the Permit term. ....	205
Figure 6-2. Forest age-class distribution currently and projected by decade* during the Permit term. ....	207
Figure 6-3. Forest Age-classes at Start of the HCP Term. ....	208
Figure 6-4. Forest Age-classes at End of Year 10 of the HCP Term. ....	209
Figure 6-5. Forest Age-classes at End of Year 20 of the HCP Term. ....	210
Figure 6-6. Forest Age-classes at End of Year 30 of the HCP Term. ....	211
Figure 6-7. Forest Age-classes at End of Year 40 of the HCP Term. ....	212
Figure 6-8. Forest Age-classes at End of Year 50 of the HCP Term. ....	213

## LIST OF ACRONYMS

BGEPA	Bald and Golden Eagle Protection Act
BO	Federal Agency Biological Opinion
BLM	Bureau of Land Management
BMP	Best Management Practice
CWD	Coarse Woody Debris
DBH	Diameter at Breast Height
DIP	Demographically Independent Population
DPS	Distinct Population Segment
EA	Environmental Assessment
EDT	Ecosystem Diagnosis and Treatment
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FPA	Oregon Forest Practice Administrative Rules and Forest Practices Act
FPHCP	Washington Forest Practices Habitat Conservation Plan
FR	Federal Register
GIS	Geographic Information System
HCP	Habitat Conservation Plan
IPM	Integrated Pest Management
ITP	Incidental Take Permit
IUCN	International Union for the Conservation of Nature
LWD	Large Woody Debris
MBTA	Migratory Bird Treaty Act
MPG	Major Population Group
NEP	Nonessential Experimental Population
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRF	Nesting, Roosting, Foraging

NRM	Northern Rocky Mountains
OAR	Oregon Administrative Rules
OCS	Oregon Conservation Strategy
ODEQ	Oregon Department of Environmental Quality
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
OESP	Oregon Endangered Species Act
OFP	Oregon Forest Practices (Rules)
ORS	Oregon Revised Statutes
OWPR	Oregon Water Protection Rules
RD	Relative Density
RMA	Riparian Management Area
RMP	Resource Management Plan
RMU	Regional Management Unit
SA	Stewardship Agreement
SAPR	Stream-Adjacent Parallel Road
SMA	Special Management Area
SOC	Species of Concern
SSBT	Salmon, Steelhead and Bull Trout
State	State of Oregon
TPA	Trees Per Acre
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
VSP	Viable Salmon Populations
WLC TRT	Willamette-Lower Columbia Technical Recovery Team
WNS	White Nose Syndrome
WQMP	Water Quality Management Plan



## **GLOSSARY**

Anadromous fish - Fish whose life history involves adult breeding in freshwater followed by variable residence in freshwater by the juveniles and migration to the marine environment and maturation prior to their return to freshwater to breed.

Basal Area (BA) - The summed cross-sectional area of tree boles in a stand expressed per unit area (e.g., square feet per acre).

Best Management Practices (BMPs) - Term used for management practices or prescriptions designed to protect the environment; recommended measures that, if implemented as part of a proposed action, would, to the extent practicable, avoid, minimize, and mitigate for adverse effects of that proposed action on the relevant species.

Bio-den – Term used to describe the creation of residual woody piles composed of larger and smaller debris pieces, with the intention of creating woody features and potential den sites across the HCP landscape.

Diameter at Breast Height (DBH) - The diameter of a tree about 4.5 feet above the ground on the uphill side.

Dispersal habitat – Forested stands intermixed across the landscape with tree densities and canopy closures that allow spotted owls to move through the stands over short distances, protected from avian predators.

Economic rotation-age - the forest stand harvest age of approximately 39 years based on factors such as markets and growth rates that factor into net present value (NPV) calculations, i.e., comparing economic benefits of harvest against the cost of holding the timber for additional years.

Equipment Limitation Zone (ELZ) - Area of land adjacent to a stream or wetland where the operation of any wheeled or tracked equipment is prohibited.

Fish-bearing - Used to refer to streams that support native fish.

Foraging habitat – Forested stands with spotted owl dispersal habitat characteristics that also have diverse woody features/structures that provides roosting opportunities and facilitates the use by spotted owl prey species thus, also, providing foraging opportunities.

Habitat Conservation Plan (HCP) - This plan.

Incidental take - Take that has occurred incidental to an otherwise lawful activity.

Incidental Take Permit (ITP) - Permit issued to an HCP applicant pursuant to the ESA that allows for take of a Covered Species.

Intermittent stream - A stream whose surface flow does not persist continually throughout the entire calendar year.

Large Woody Debris (LWD) - Woody debris that is the structural component of stream habitat; typically, a minimum size of 4 inches diameter and 6 feet in length.

Legacy structures - Old growth green trees, snags, and downed logs either intentionally or incidentally left after previous timber harvests or that have survived stand-replacing natural disturbance (fire, insects, disease).

Native fish – All fish native to Oregon including anadromous salmonids and freshwater fish.

Parties - Port Blakely and the Federal Permitting Agencies; including NOAA National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS), who are directly involved in the development, approval, and implementation of the HCP.

Perennial stream – A flowing stream that does not go dry any time of year of normal rainfall. Includes the intermittent dry portions of the perennial channel below the upper most point of perennial flow.

Permit – the Incidental Take Permit.

Port Blakely (or the Company) – Port Blakely’s U.S. Forestry division.

Riparian habitat – The zone of vegetation between aquatic and upland environments that is dependent on the existence of a perennial, intermittent, or ephemeral water source. Soil and vegetation in riparian areas have distinct characteristics and functions that make them different from surrounding areas, e.g., adjacent uplands.

Riparian Management Area (RMA) – HCP lands in Port Blakely’s HCP area associated with streams or wetlands that are a reserved buffer of trees and associated understory vegetation; may contain a managed zone and/or a no-harvest zone.

Salmonids – Fish species of the salmon family, four of which are covered by this HCP: Chinook (*Oncorhynchus tshawytscha*), coho (*Oncorhynchus kisutch*), steelhead (*Oncorhynchus mykiss*), and bull trout (*Salvelinus confluentus*).

Services – NMFS and USFWS, collectively.

Special Management Areas (SMAs) - Areas containing unique habitat features or landforms that have high conservation value including, but not limited to, potentially unstable slopes, forested wetlands, meadows, and rocky features such as cliffs, outcrops, talus slopes, and caves. These features and/or landforms are priority areas for leave tree retention that will be retained as reserves for the term of the Permit.

State – The state of Oregon and any of its relevant agencies.

Stream buffer – Same as RMA, i.e., the vegetative zone retained adjacent to streams that may be managed, left intact with a no-harvest zone, or a combination of both.

Stream-Adjacent Parallel Roads (SAPR) – Roads within any stream RMA that is aligned parallel to the general direction of a stream for more than 300 feet on any one side.

Take - To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

Unstable slope - A hill slope having such physical characteristics that may cause it to “fail” structurally and initiate a landslide.

Windthrow - Trees felled or blown over by wind; also commonly referred to as “blowdown”.

## SECTION 1 INTRODUCTION

### 1.1 Overview and Background

The forestlands that will be covered under this HCP have been managed by our family-owned company for over 30 years. When we acquired the original land, the landscape was primarily young second-growth plantation forest. During the ensuing three decades, we have voluntarily and patiently cultured and grown the forest far longer and larger than the economic minimums that are standard practice on neighboring industrial tree farms. It is this legacy of sustainable management that provides us the opportunity to pursue an HCP, enabling the continuation of habitat development and protection.

Port Blakely owns and manages 30,859 acres of commercial forestland in Clackamas County, Oregon (Figure 1-1). This property, known as the John Franklin Eddy Forestland, is located in the central part of the county from the north county line to the south county line, west of the Cascades range (Figure 1-2). Prior to approval of this habitat conservation plan (HCP), the lands were being managed according to Oregon Department of Forestry (ODF) Forest Practice Administrative Rules and Forest Practices Act (Forest Practices Rules or OFP Rules) (Oregon Administrative Rules (OAR) 629-600 through -680) (ODF 2018a).

Owned by the same family since the early 20th century, Port Blakely has been involved in forestry in the Pacific Northwest for five generations. The company owns 159,000 acres of forestland in both Oregon and Washington, as well as 97,000 acres in New Zealand. Stewardship values and environmental responsibility are part of the fabric of the family and the company. Maintaining the land in family forestry is significant in today's business environment. Ensuring the land is managed in a way that is profitable to the owners and responsible to the environment is critical to the goals and values of the company. Often this requires pursuing alternate approaches to the status quo of forest management. This is especially true as a result of the catastrophic wildfires of late-summer 2020 that burned with varying intensity approximately 8,100 acres of Port Blakely's forestland in Clackamas County (Figure 1-3). Managing these lands for economic return, and fish and wildlife habitat, under an HCP will be challenging but Port Blakely has the expertise to accomplish these goals.

The presence of species listed as threatened or endangered under the Federal Endangered Species Act (ESA) of 1973, as amended (16 United States Code [U.S.C.] 1531 et seq.) is a reality in Pacific Northwest forestry. Forestland managers must make decisions about their land that affects the availability of suitable habitat and, therefore, the potential for those species to persist there. Under current Oregon forest practice rules, land managers are faced with regulatory restrictions affecting timber harvest if they have listed species on their land. This can result in an incentive to eliminate the risk of listed species occupancy by removing habitat or preventing it from developing in the first place. An alternate approach is to develop a federal conservation plan that not only provides benefits to listed species, but also provides long-term regulatory stability for businesses.

Federal conservation plans provide incentives to manage the land in ways that may attract listed species or increase their populations and distribution through measures that contribute to species recovery. In exchange for increasing the biologic viability of the landscape with measures that provide conservation benefits, landowners receive federal authorization



Figure 1-2. Port Blakely HCP Ownership and Adjacent Ownerships in Clackamas County, Oregon.

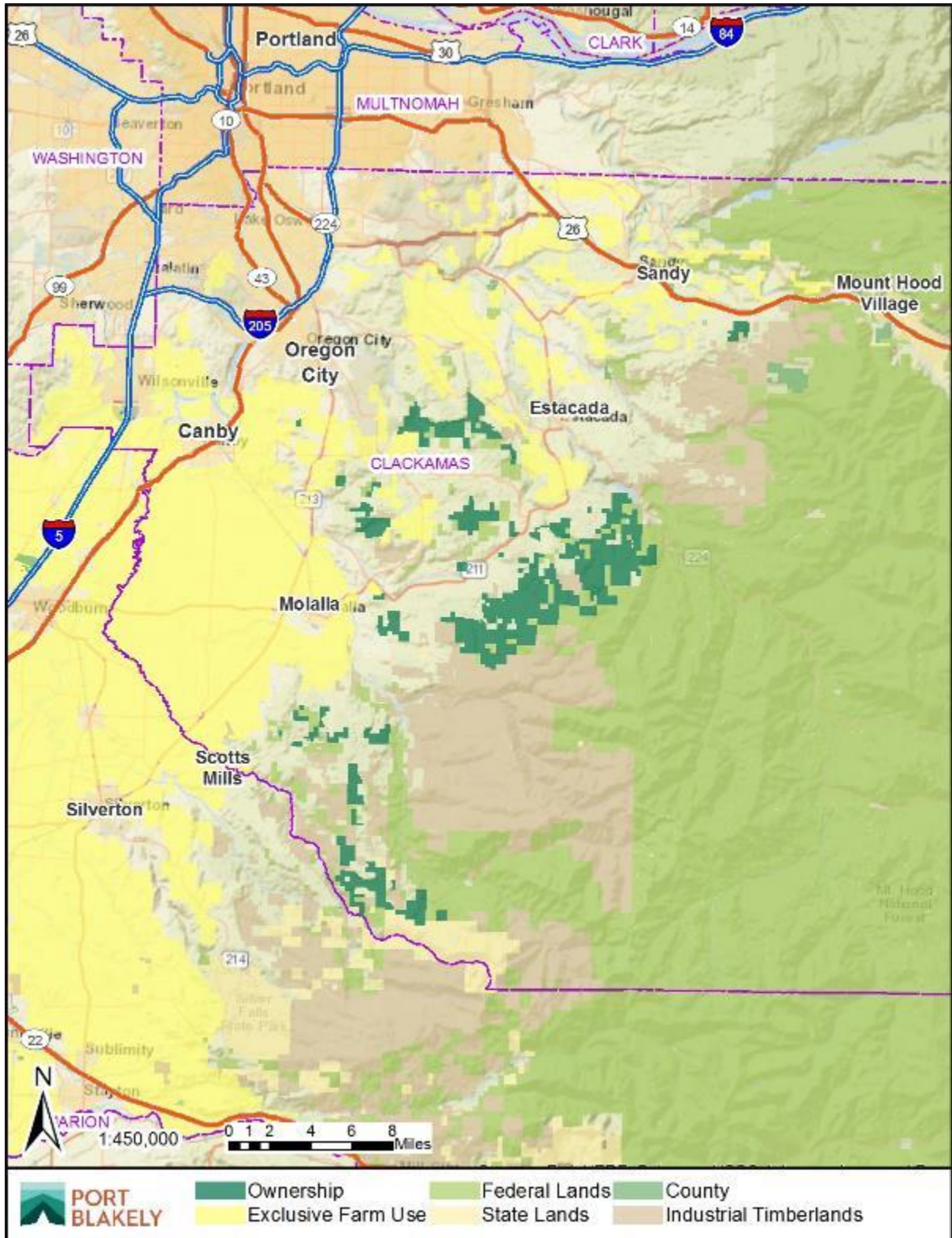
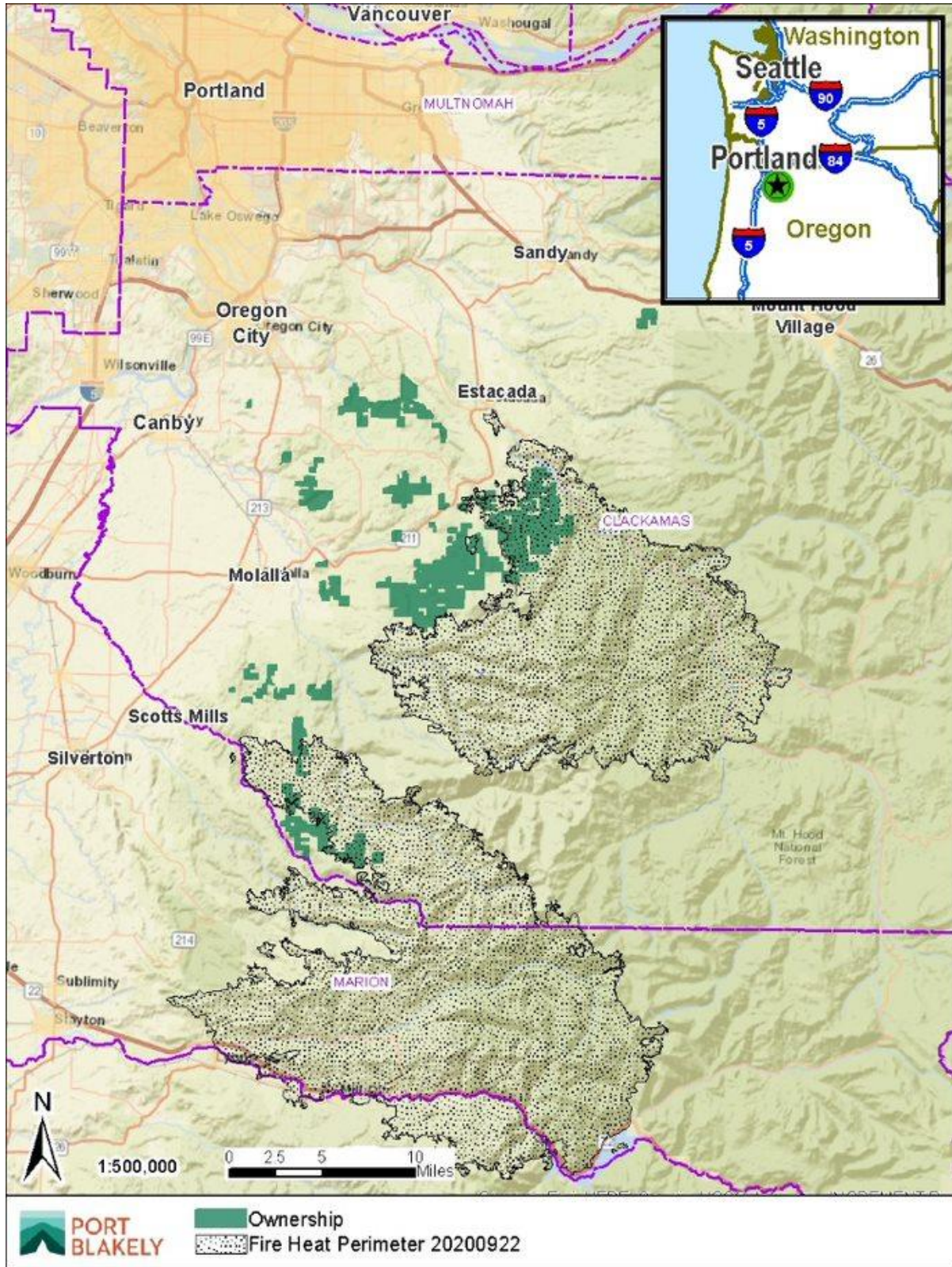


Figure 1-3. Port Blakely HCP Ownership and 2020 Wildfire Fire Heat Perimeter (Riverside Wildfire to the North and Beachie Creek Wildfire to the South).



allowing incidental ‘take’ or harm to a listed species. We see this as a mutual gain that is a win for both business and conservation that ensures the ability to manage our forestland predictably over the long-term.

As demonstrated by the successful completion and implementation of two federal conservation plans in Washington, Port Blakely has a history of being proactive and collaborative. In 1996, the Company successfully implemented one of the first forestry HCPs in the nation, while in 2009 we entered into a Safe Harbor Agreement (SHA), the first industrial forestry SHA in the Pacific Northwest. In 2020, the Company entered into the largest forestry SA in Oregon’s history. The State-sanctioned SA was developed in a parallel process to the HCP and contains many of the same prescriptions, but it is focused on state forest practices rules rather than regulatory requirements of the federal ESA. With the addition of our Oregon HCP, the first multi- species forestry HCP in the state, our combined conservation plans encompass 60% of Port Blakely’s land base in the U.S.

Currently, four salmonid species listed as threatened under the ESA are known to occur in streams within or adjacent to Port Blakely’s ownership. These species include Chinook (*Oncorhynchus tshawytscha*), coho (*Oncorhynchus kisutch*), steelhead (*Oncorhynchus mykiss*), and bull trout (*Salvelinus confluentus*). At least one ESA-listed terrestrial species, the northern spotted owl (*Strix occidentalis caurina*) (spotted owl), is also known to occur in the vicinity of Port Blakely’s forestlands and has the potential to be affected by our forest management activities should this species occupy Port Blakely’s ownership at some point in the future. Due to the uncertainty of potentially changing Federal, as well as State, regulations relative to the status of species under the ESA, whether listed or proposed for listing, Port Blakely is seeking to secure regulatory certainty to ensure we can viably manage our forestlands over the long-term to balance the economic, social, and environmental benefits produced by our forest management activities.

As such, Port Blakely is submitting this HCP (or Plan) to NOAA National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) under section 10(a)(1)(B) of the ESA which is expected to fulfill the requirements of an application for incidental take permits (ITP or Permit). Under the HCP, Port Blakely will conduct our forest management activities and implement conservation measures (collectively, Covered Activities) that are expected to provide net conservation benefits to the species addressed in the HCP (Covered Species). This Plan and Permit, if approved, will allow Port Blakely to conduct future forest management activities in a predictable manner with the knowledge that future federal actions under the ESA will not result in additional restrictions to these activities. Upon acceptance of this HCP, NMFS and USFWS will issue to Port Blakely ITPs for listed species; and will add to these ITPs any subsequently listed species associated with habitats on the Plan area, effective concurrent with the listing, provided they are addressed by the HCP.

## **1.2 Purpose and Need**

Developing an HCP is a complex process that is expensive and takes years of effort, but the benefits are even greater. For landowners that have a long-term investment in the health and vitality of their forests, HCPs are tools to bridge the gap to regulatory certainty. With 50 years of regulatory stability that comes with the HCP, we can more dependably predict the long-term value of the estate, which in-turn provides long-term stability and predictability for

the owners. The HCP is also designed to increase operational efficiency and management flexibility, allowing us to invest in long-term planning without concern for shifting regulations. Additionally, the HCP has allowed us to implement a management strategy based on the application of best available science. Utilizing science to develop meaningful protective and restorative practices for habitat and ecosystem function is a foundation to the way we envision and apply forest management.

HCPs are voluntary management plans that consider local environmental and human conditions. Our HCP is located approximately 12 miles south of the Portland metro area, near the rural community of Molalla. In 2020, the Portland metro area reached 2.5 million people and it is expected to reach 3 million by 2040. Molalla is an agricultural community that is facing increased pressure from the associated urban expansion. Port Blakely's forestlands are juxtaposed amongst the rural, agriculture interface as well as adjacent to federal forestlands located to the east. To fulfill our business strategy, we work with and rely on the local community, ensuring employment for approximately 20 individuals. As a family-owned forestry company, we are proud to contribute taxes that invest in the viability and sustainability of our local communities. In addition to the contribution we make to rural jobs, the location of our forestlands provides important habitat for species living in the mix of an ever-changing landscape, providing an opportunity for them to live on and disperse between the various habitats. For these reasons, our forestlands play an important role on the landscape in this region and maintaining this land in family-owned forestry is imperative for the benefit of both rural communities and the local fish and wildlife.

Consistent with Port Blakely's commitment to stewardship forestry, this HCP has been prepared to meet the requirements of the ESA. An HCP is needed because forest management activities have the potential to result in take of listed species that currently inhabit or may inhabit the Permit area in the future. Pursuant to Section 10(a)(1)(b) of the ESA, NMFS and USFWS may authorize incidental take by a non-federal entity through the issuance of an ITP. In support of an application for an ITP, the applicant must prepare an HCP. This document establishes the methods and measures of success required to meet the conservation needs of listed species that could be impacted by the Covered Activities. Importantly, it also provides a stable and predictable operating and regulatory environment and preserves Port Blakely's ability to pursue our forest management plan objectives with assurances from NMFS and USFWS that incidental take of Covered Species is authorized. The purpose of the HCP is to:

- Quantify the potential impacts that the Covered Activities may have on the Covered Species which includes listed as well as unlisted species;
- Address the potential take of the Covered Species addressed in the HCP by setting forth measures that are intended to ensure that any such take will be incidental;
- Ensure that the impacts of the take will, to the maximum extent practicable, be minimized and mitigated, including provisional procedures to deal with changed and unforeseen circumstances;
- Ensure that mitigation for impacts to listed species and unlisted species addressed in the HCP that cannot be avoided will result in a net benefit to the Covered Species;
- Ensure that adequate funding for implementation of the HCP will be provided; and
- Ensure that the take of the Covered Species will not appreciably reduce the likelihood of the survival and recovery of these species in the wild.



The objective of the conservation strategy proposed in this HCP is to assure NMFS and USFWS that any incidental take (as defined in the ESA) resulting from Port Blakely's forest management activities, is minimized and mitigated to the maximum extent practicable, and that such takings will not appreciably reduce the likelihood of the survival and recovery of the affected species populations in the wild. This objective not only applies to incidental take of species listed at present, but to incidental take of currently unlisted species, addressed in the HCP, that may be listed during the life of the Plan.

Notwithstanding the catastrophic wildfires of late-summer 2020, Port Blakely's forest management objective is to maintain growth and production of forest products so that maximum quality and yield is sustained over the long term. This is to be accomplished while accommodating the habitat needs for fish and wildlife species that currently occur or may occur on the company's managed forestlands. When a listed species occurs that requires specific habitat management or conservation, it is more efficient and effective for Port Blakely to accommodate the listed species' habitat needs in a way that also accommodates habitat needs of other species that might be impacted — especially those that may become listed in the future, i.e., other Covered Species. This is the basis for a multiple-species HCP.

### **1.3 Plan Area/Permit Area**

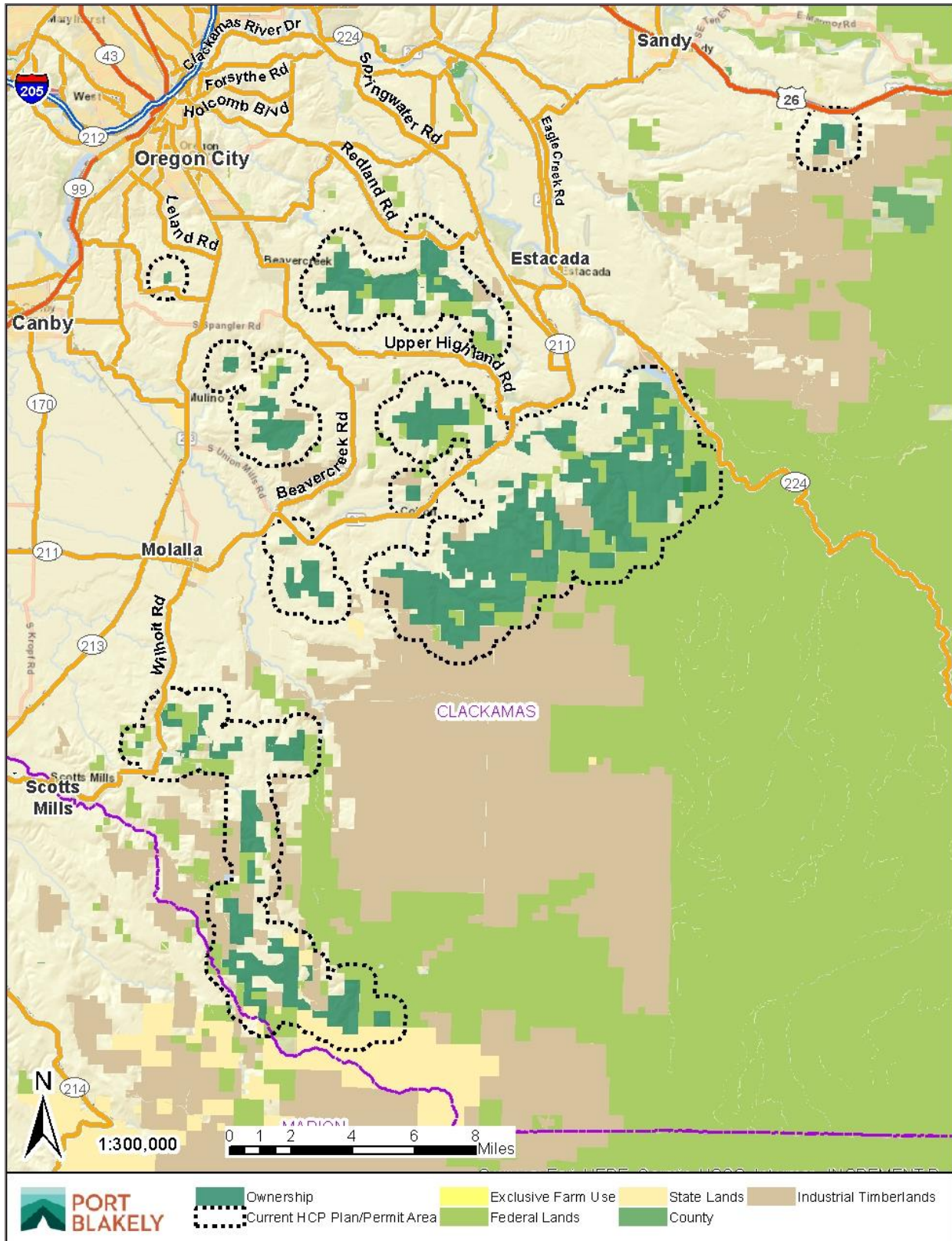
The Plan area for the HCP includes all areas that may be influenced by HCP implementation, i.e., forest management activities. The Permit area includes Port Blakely's HCP forestlands where the Covered Activities and the resultant potential take may occur. These are described below.

#### **1.3.1 Plan Area**

The John Franklin Eddy Forestland is comprised of 29,553 acres of commercial forest stands and 1,306 acres of non-forest land, i.e., buildings, powerlines, roads, and rock pits, totaling 30,859 acres distributed across 110 Sections within six Townships in Clackamas County, Oregon. The legal descriptions of the John Franklin Eddy Forestlands are provided in Appendix A Covered Lands (Legal Descriptions).

The Plan area, or HCP area, includes the geographic boundaries of all areas that may be influenced by implementation of the HCP regardless of ownership, political boundaries, or whether take is likely to occur. For this HCP, the Plan area refers to Port Blakely's forestlands in Clackamas County, Oregon, and other ownerships within one half-mile of Port Blakely's forestlands where aquatic and terrestrial Covered Species, described in Section 3, may be affected by HCP Covered Activities (Figure 1-4). A one half-mile distance of influence from Covered Activities to streams beyond Port Blakely's ownership is considered reasonable because data is limited that suggests influences from Covered Activities could occur farther downstream and because of numerous factors that affect stream temperatures and their ability to equilibrate after upstream disturbances to riparian vegetation (Dent and Walsh 1997, Krueger et al. 2019, Leinenbach et al. 2013, Poole and Berman 2001, Robison et al. 1999). A one half-mile distance of influence from Covered Activities to terrestrial lands beyond Port Blakely's ownership is based on recommendations for disturbance restrictions to terrestrial Covered Species from land management activities (CDW 2008, ODFW 2019a, USFWS 1998a, USFWS 2013, USFWS 2017b). One half-mile buffers on all parcels increases the Plan area by almost 3 times the current acreage of 30,859 to 92,530 acres.

Figure 1-4. Port Blakely Initial Plan/Permit Area Lands with 0.5-mile Distance of Influence Buffer.



In addition, this initial Plan area shown in Figure 1-4 may be expanded to include future forestland acquisitions. For purposes of defining future Plan area forestlands, we estimate that the current ownership may be increased by as much as 25% of the HCP area of influence (92,530 acres) with nonfederal and nonstate forestlands, anticipated to be primarily small landowner or industrial forestlands, that have similar vegetative species and characteristics as the HCP area, i.e., Douglas-fir stands of western Oregon in the Potential Acquisitions Land area and have the potential to be occupied by Covered Species (Figure 1-5). The conservation strategy described in this HCP will apply to all acquired lands that are brought into this HCP in the future. The procedure and criteria for adding lands within the Potential Acquisitions Land area is described in Section 10.4. Thus, the potential acquisition land area within the LCR and UWR ESUs are bounded by the Columbia River to the north, the Douglas-fir zone to the east (ODF 1996), the Upper Willamette River ESU boundary to the south, and I-5 to the west. This results in an additional 23,133 acres of parcels, including half-mile buffers, to the Plan area. The actual anticipated acquisition acreage will be 7,714 acres. Thus, the total Plan area, including the potential addition of lands as described, is 115,662 acres.

### **1.3.2 Permit Area**

The Permit area is the geographic area where the impacts of the Covered Activities occur for which ITP coverage is requested. The Permit area for this HCP consists of Port Blakely's HCP forestlands where the forest management and conservation measures (Covered Activities) will occur, as well as the additional stream miles and terrestrial acres influenced by implementation of the Covered Activities (Figure 1-4). It also includes additional lands acquired in the Potential Acquisitions Land area managed under the HCP provisions (Figure 1-5). Thus, the Permit area is the same as the total Plan area including future acquisitions.

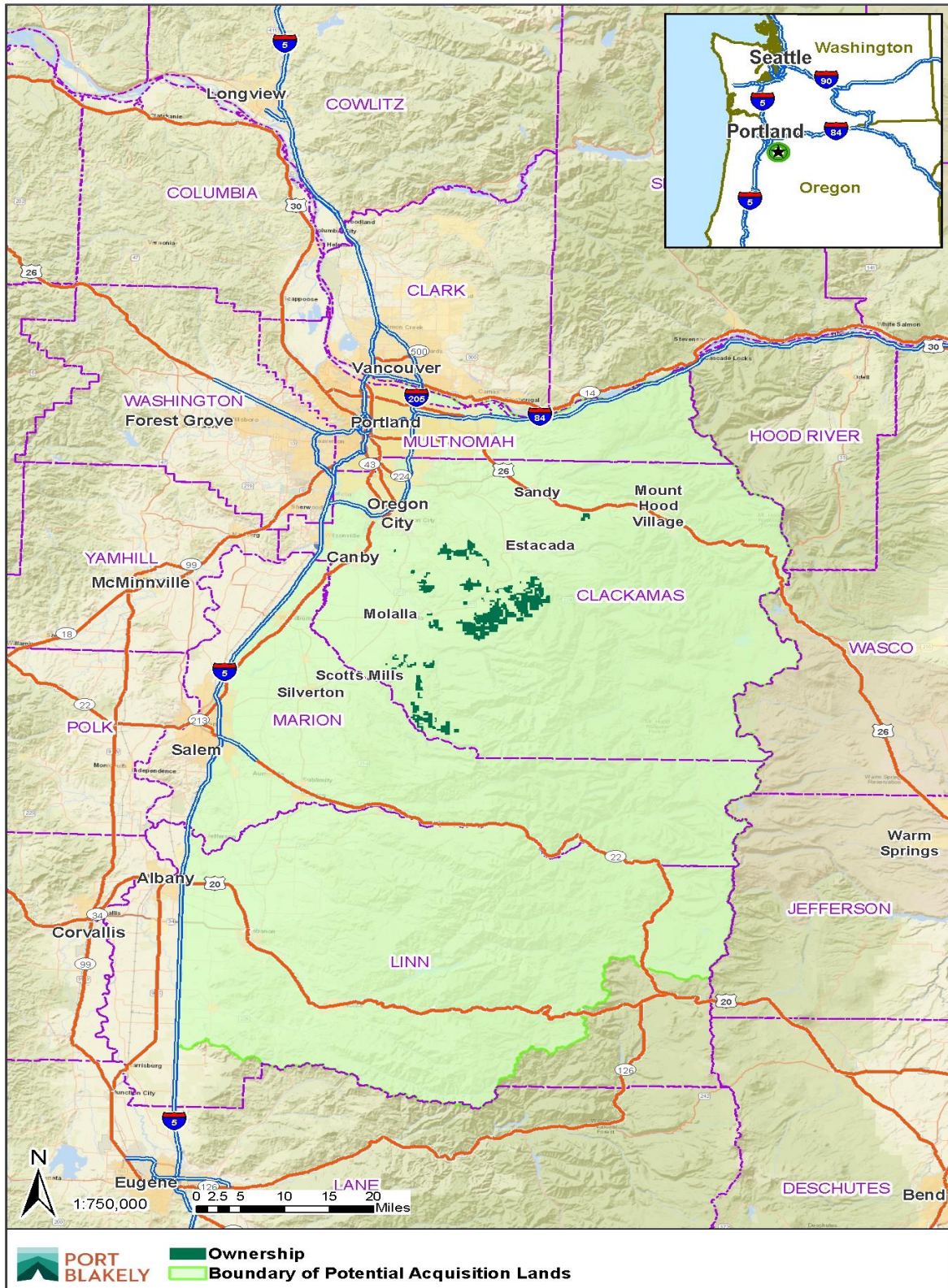
### **1.4 Permit Duration**

Port Blakely will minimize and mitigate impacts of incidental take by managing the Plan/Permit area under the provisions of this HCP for 50 years (until 2073). Thus, the term of the Permit sought is 50 years.

### **1.5 Alternatives to the Taking**

Consideration of alternatives to the proposed taking are expected to "...focus on significant differences in project design that would avoid or reduce the take" (HCP Handbook, USFWS and NOAA Fisheries 2016). For aquatic and terrestrial forest habitat on commercial forestlands, managed for a sustainable revenue, alternatives to reducing the habitat functions (resulting in take) are limited. Although a spotted owl pair is known to occur near the ownership to the south and an estimated wolf use area is located northeast of the ownership, these listed species are not known to occur on the ownership (Coe 2019, ODFW 2019b). Thus, no alternative to the taking of listed terrestrial species was considered because there is no take occurring. However, two additional alternatives with respect to potential take of aquatic species, i.e., listed salmon, were considered. These alternatives, and the reason(s) why they are not being pursued, are briefly described below.

Figure 1-5. Boundary of Potential Acquisition Lands.



### **1.5.1 Take-Avoidance Alternative**

Port Blakely considered the alternative of adopting a take avoidance strategy for listed salmonid species (the only listed species known to occur on the ownership) and found the option to be unsustainable from the perspective of short-term financial risks and long-term financial uncertainty. That is, the amount of timber that would be required to be left in fully functional riparian zones, i.e., similar to the 300-foot no-harvest buffers of the Northwest Forest Plan, that likely result in no adverse effects, is economically infeasible (USDA & USDI 1993). Riparian buffer set-asides would be approximately two to three times wider than the proposed HCP. The reduced amount of harvestable timber would seriously impede Port Blakely's ability to remain sustainable in a highly competitive industry and, thus, this alternative to the proposed taking was not pursued.

### **1.5.2 Forest Practices Plus Best Management Practices Alternative**

Port Blakely currently implements best management practices (BMPs) while conducting forest management activities under OFP Rules. The BMPs are voluntary efforts Port Blakely elects to implement to minimize impacts on listed fish species and their habitat which include road construction and maintenance activities designed to reduce sediment input to streams and improve fish passage. Under this alternative, Port Blakely would commit to implementing BMPs for the ITP term. Although continued implementation of a BMP alternative would not likely result in increased costs, it would not necessarily avoid incidental take. Rather, it would simply reduce the potential for take. This approach would not ensure adequate protection for listed salmonids or their critical habitat, and take could occur incidentally during forest management activities without ESA take coverage. This alternative would also not provide the regulatory assurances Port Blakely is seeking and, thus, this alternative to the proposed taking was not pursued.

### **1.6 Coordination with Federal and State Agencies**

To support collaboration with key stakeholders, Port Blakely has made every effort to be open and transparent about our HCP development process and documentation. Port Blakely has taken steps to engage relevant Federal and State agencies in our HCP development process. We believe in the importance of “communicating early and often” to facilitate and streamline coordination and information exchange, working to ensure all concerned parties are on the same page. Port Blakely has met numerous times with technical and policy staff from multiple agencies, including NMFS, USFWS, ODF, and Oregon Department of Fish and Wildlife (ODFW) through in-person meetings and Plan area site visits to maximize the opportunities to coordinate and collaborate.

### **1.7 Summary of Relevant Laws and/or Regulations**

Port Blakely understands that an ITP is valid so long as the HCP is in compliance with all relevant Federal, State, and local laws, regulations, and ordinances. We acknowledge our responsibility for ensuring that the HCP and implementation of the Covered Activities will comply with applicable Federal, state, and local laws, regulations, and ordinances. Several of the more pertinent regulatory requirements are discussed below.

### 1.7.1 Federal Endangered Species Act

The U.S. Congress enacted the ESA to protect plants and animals in danger of, or threatened with, extinction. The NMFS and USFWS are responsible for implementing the ESA for those species under their respective jurisdictions. The ESA and its implementing regulations in Title 50 of the Code of Federal Regulations (CFR) Parts 17 and 222, for USFWS and NMFS, respectively, prohibit the take of any fish or wildlife species that is federally listed as threatened or endangered without prior approval pursuant to either Section 7 or Section 10 of the ESA.

Section 3 of the ESA defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct” (16 United States Code [USC] § 1532 (19)). USFWS defines “harm” as “...an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering” (50 CFR 17.3). The NMFS definition of “harm” is very similar but adds more specific terms related to fish. It is “...an act which actually kills or injures fish or wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering” (50 CFR 222.102).

The USFWS defines the term “harass” as “an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering” (50 CFR 17.3). On October 21, 2016, NMFS issued “Interim Guidance on the Endangered Species Act Term Harass”, employing a similar definition (USFWS and NOAA Fisheries. 2016).

Section 7(a)(2) of the ESA requires each Federal agency to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat (16 USC § 1536 (a)(2)). If the actions of a Federal agency are not likely to jeopardize the continued existence of any endangered or threatened species but could adversely affect the species or result in a take, the action must be addressed under Section 7 of the ESA (16 USC § 1536 (a)(2)).

Section 9 of the ESA prohibits the “take” of threatened and endangered species. Take includes the actions described above by NMFS and USFWS for listed fish and wildlife species, respectively.

Section 10 of the ESA allows non-federal entities, under certain terms and conditions, to incidentally take ESA-listed species that would otherwise be prohibited under Section 9 of the ESA. When a non-Federal landowner or other non-Federal entity wishes to proceed with an activity that is legal in all other respects but may result in the incidental taking of a listed species, an ITP, as defined under Section 10 of the ESA, is required. Incidental take is defined as take that is “incidental to, and not the purpose of, the carrying out of an otherwise lawful activity” (50 CFR 17.3). Under Section 10, a Federally approved HCP is required to accompany an application for an ITP to demonstrate that all reasonable and prudent efforts

have been made to avoid, minimize, and mitigate for the effects of the potential incidental take.

The NMFS and USFWS are required to respond to all applicants seeking permits, which would allow incidental take of listed species, if approved. It is necessary for NMFS and USFWS to assure that the HCP and any implementing agreements submitted by the applicant comply with the provisions of the ESA with regard to incidental take prior to issuance of a take permit for federally listed threatened or endangered fish and wildlife species (USFWS and NOAA Fisheries 2016).

To obtain a permit for such take under this provision, an applicant must develop an HCP that meets specific requirements identified in section 10(a)(2)(A) of the ESA and its implementing regulations (50 CFR 222.307 for NMFS and 50 CFR 17.22 and 17.32 for USFWS). A Section 10 permit applicant must specify in the HCP:

- The impact that will likely result from the taking;
- Steps the applicant will take to monitor, minimize, and mitigate such impacts; the funding available to implement such steps; and the procedures to be used to deal with unforeseen circumstances;
- Alternative actions to such taking considered by the applicant and the reasons why such alternatives are not proposed to be used; and
- Other measures that may be required as necessary or appropriate for the purposes of the Plan.

To issue an ITP, NMFS and USFWS must find that (16 USC § 10(a)(2)(B); 50 CFR 222.307(c)(2) for NMFS and 50 CFR 17.22(b)(2) and 17.32(b)(2)) for USFWS:

- The taking will be incidental;
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
- The applicant will ensure that adequate funding for the conservation plan and procedures to deal with unforeseen circumstances will be provided;
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild; and
- The applicant will ensure that other measures as may be required by NMFS and/or USFWS as necessary or appropriate for the purposes of the HCP will be implemented.

### **1.7.2 National Environmental Policy Act**

The National Environmental Policy Act (NEPA) (42 USC §§ 4321 et seq.) requires that Federal agencies analyze and publicly disclose the social, economic, and environmental effects associated with major federal actions (§ 4332). This analysis can take the form of an Environmental Assessment (EA) and/or Environmental Impact Statement (EIS). The issuance of an ITP is a Federal action subject to NEPA compliance. Before deciding whether to approve a proposed HCP and issue an ITP, the NMFS and USFWS will prepare and distribute an (EA) or (EIS) that addresses the direct, indirect, and cumulative effects of the incidental take authorized by permit issuance, and the direct, indirect, and cumulative effects associated with the implementation of mitigation and minimization measures described in the HCP.

### **1.7.3 National Historic Preservation Act**

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (16 USC § 40 et seq.), requires Federal agencies to take into account the effects of their proposed actions on properties eligible for inclusion in the National Register of Historic Places.

“Properties” are defined as “cultural resources,” which includes prehistoric and historic sites, buildings, and structures that are listed or eligible for listing in the National Register of Historic Places. An undertaking is defined as a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency; including those carried out by or on behalf of a federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a Federal agency. The issuance of an ITP is an undertaking subject to Section 106 of the NHPA.

### **1.7.4 Migratory Bird Treaty Act**

The Migratory Bird Treaty Act (MBTA) (16 USC 703 et seq.) makes it unlawful to take, import, export, possess, sell, purchase, or barter any migratory bird, as well as the nests, eggs, and feathers of migratory birds. Nearly all bird species that may occur in Oregon are protected under the Migratory Bird Treaty Act. It is USFWS policy that an ESA Section 10 permit for listed migratory birds is sufficient to relieve the permittee from liability under the MBTA for species covered by the section 10 permit. For the MBTA, this is accomplished by having the permit double as a Special Purpose Permit authorized under 50 CFR 21.27. Migratory birds adequately addressed in the HCP as a Covered Species will be covered under the MBTA by the ITP.

### **1.7.5 Bald and Golden Eagle Protection Act**

The Bald and Golden Eagle Protection Act (BGEPA) was enacted in 1940 (before the ESA) to conserve eagles. In 2009, the USFWS amended the BGEPA implementing regulations to allow for, under certain circumstances, the permitting of incidental take of bald and golden eagles. Issuance of a take permit under the BGEPA requires a determination that the take is compatible with the preservation of eagles, which the USFWS defines to mean that the taking is consistent with the goal of stable or increasing breeding populations.

USFWS will only issue permits for eagles where the take is associated with, but not the purpose of, the activity, and it cannot practicably be avoided. Therefore, permit applicants need to include all practicable measures they plan to use to avoid the potential for take and explain how any anticipated take of eagles from Covered Activities cannot practicably be avoided. Permit applicants will also need to include appropriate measures to support a determination that the Plan will achieve the BGEPA’s standard of maintaining stable or increasing breeding populations.

Applicants can choose to include bald and golden eagles on the ITP for an HCP. Doing so also confers take authorization under the BGEPA (50 CFR 22.11) without the need for a separate permit. However, when making permit decisions, USFWS must consider whether the permit issuance criteria under both ESA and BGEPA will be met by the conservation measures included in the HCP. Additional information on the permitting requirements for authorizing the take of eagles under BGEPA can be found in the permit regulations (50 CFR 22.26) and the USFWS 2009 permit rule (74 FR 46835). In general, combining the



requirements of BGEPA and ESA is more efficient than applying for two separate permits. USFWS staff can reference the May 10, 2011 memorandum entitled “Use of Endangered Species Act Section 10 Permits to Provide Bald and Golden Eagle Act Authorization for Incidental Take of Bald Eagles and Golden Eagles.”

### **1.7.6 Relevant State Laws and Regulations**

*State Forest Practices Act* – The Oregon Forest Practices Act was designed to provide protection to forest soils, fisheries, wildlife, water quality and quantity, air quality, recreation, and scenic beauty. At the same time, the FPA was intended to allow the maintenance of a viable forest products industry by regulating forest practices such as timber removal, road construction and maintenance, reforestation, and the use of forest chemicals. Anyone proposing timber harvest or other related activities on state or private lands in Oregon must submit a forest practices application to the ODF.

The Oregon FPA identifies forest practices as any operation conducted on or pertaining to forestland, including but not limited to: (a) reforestation of forestland; (b) road construction and maintenance; (c) harvesting of forest tree species; (d) application of chemicals; (e) disposal of slash; and (f) removal of woody biomass. The rules specifically state that compliance with the OFP Rules does not substitute for or ensure compliance with the ESA and nothing in the rules imposes any state requirement to comply with the ESA. Landowners and operators are advised that federal law prohibit a person from taking certain threatened or endangered species, which are protected under the ESA.

Forest management operations must submit to the State Forester a written plan as required by ORS 527.670(3) before conducting any operations requiring notification under OAR 629-605-0140, including those operations within (1) 300 feet of a specific site involving threatened or endangered wildlife species, or sensitive bird nesting, roosting, or watering sites; as listed in a document published by the Department of Forestry titled “Cooperative Agreement between the Board of Forestry and the Fish and Wildlife Commission, March 28, 1984” ; or (2) 300 feet of any resource site identified in OAR 629-665-0100 (Sensitive Bird Nesting, Roosting and Watering Resource Sites on Forest Lands), OAR 629-665-0200 (Threatened and Endangered Species that use Resource Sites on Forest Lands), or OAR 629-645-0000 (Significant Wetlands), or (3) 300 feet of any nesting or roosting site of threatened or endangered species listed by the USFWS or by the Oregon Fish and Wildlife Commission by administrative rule. Written plans required under OAR 629-605-0170 must contain a description of how the operation is planned to be conducted in sufficient detail to allow the State Forester to evaluate and comment on the likelihood that the operation will comply with the Forest Practices Act or Administrative Rules.

Forest landowners may also prepare and submit a Stewardship Agreement which is a written agreement between a landowner and ODF that ensures the implementation of a management plan meeting the intent of ORS 541.423. Under this statute, the State Forester is delegated full authority by the Board of Forestry to implement the provisions of ORS 541.423 and 527.736(4), including but not limited to review of management plans and preparation and approval of stewardship agreements. The statute and rules provide the means for the Departments of Forestry and Agriculture to implement a voluntary and flexible conservation incentives program that recognizes and rewards agricultural, forest, and other landowners who choose to exceed regulatory criteria for conservation, restoration, and

improvement of fish and wildlife habitat or water quality while managing land to meet their objectives. Stewardship Agreements will be long-term and consider conservation from a property wide perspective, rather than at the scale of single localized projects.

## SECTION 2 PROJECT DESCRIPTION AND COVERED ACTIVITIES

### 2.1 Project Description

The HCP covers Port Blakely's forestland holdings in Clackamas County, as well as future holdings that may be acquired in adjacent counties within the Potential Land Acquisitions Boundary shown in Figure 1-5, with stands that have varying histories and mixed age-classes. It acknowledges adjacent land uses and attempts to maximize benefits while minimizing impacts. The project, i.e., forest management on industrial forestlands, includes implementation of the range of standard forestry management practices conducted under the Forest Practices Rules described below (OAR 629-600 through 629-680). In addition, the project includes conservation measures described in the Conservation Program (Section 6) that will be implemented in accordance with the company's commitment to sound stewardship forestry, i.e., sustainable forest management practices that provide predictable revenue over the long-term while conserving Covered Species and their habitats. The conservation measures will be implemented using the same forest management techniques as approved and regulated by OFP Rules with the inclusion of commitments to implement measures that result in more woody features than required, silvicultural techniques that accelerate habitat development, wider riparian buffers, reduction of risk of road-related sediment input to streams, and species-specific protections.

#### 2.1.1 Location and Landscape Context of HCP Lands

Port Blakely's John Franklin Eddy Forestlands encompasses 29,553 forested acres in Clackamas County, in the vicinity of Molalla, Oregon. The current ownership is comprised of discontinuous parcels of commercial forestland distributed across 110 Sections within six Townships in the central part of the county at the western edge of the Cascade Mountain Range. Port Blakely purchased the majority of the property (27,271 acres) in 1987 from Times Mirror and inherited the existing road infrastructure. The ownership is surrounded by and/or intermixed with small towns, residential areas, private lands managed for forestry or agriculture, other commercial forestlands, and state and federal lands composed primarily of forestlands. Lands within the Potential Land Acquisitions Boundary are similarly comprised of a variety of ownerships, primarily urban, agricultural and forestry. Lands acquired in the future and requested to be included in the HCP and covered by the Permit must be similar to the current ownership. That is, they will be nonfederal and nonstate forestlands, e.g., small landowner or industrial forestlands, within the LCR and UWR ESUs, i.e., within the Potential Land Acquisitions Boundary shown in Figure 1-5, and have vegetative, species, and landscape characteristics similar to the current HCP lands, as described below.

Port Blakely's forest stands are comprised primarily of Douglas-fir (*Pseudotsuga menziesii*) with a small amount of white wood (true firs, western hemlock, Sitka spruce, and several pine species), hardwoods (red alder, cottonwood, maple, oak and ash) and a limited number of western red cedar. The forested stands are field surveyed (cruised) to identify proportions of species, amount of associated basal area, and potential forest health concerns. The age structure is diverse and was fairly evenly distributed prior to the late-summer 2020 catastrophic wildfires that affected approximately 8,100 acres in the eastern and southern parcels of the HCP area with fire of varying intensities of heat. The current age-class distribution post-fire is shown in Table 2-1.

**Table 2-1. Acreage of Port Blakely forested age-classes in the HCP area in Year 2022 (post-fire).**

<b>Age Class</b>	<b>Forested Acres</b>	<b>% of Forested</b>
0-10	9,701	33%
11-20	3,214	11%
21-30	2,452	8%
31-40	3,284	11%
41-50	5,085	17%
51+	5,818	20%
<b>Forested Total</b>	<b>29,553*</b>	<b>100%</b>

\*Forested acreage does not include non-habitat land-use areas such as roads, buildings, powerlines, rail lines and rock pits. Total forested acreage differs from total HCP lands by 1,306 acres.

A portion of Port Blakely’s forestlands located in eight separate parcels throughout the HCP area were previously managed for agricultural purposes, e.g., Christmas tree farms, orchards, and pastures. These parcels, totaling 2,496 acres (8% of the HCP area), have been converted back to commercially managed forestlands. The remainder of the forestland has sustained at least two harvest rotations, i.e., is either second or third growth, managed under past forest practices regulations with limited requirements to retain woody features. The catastrophic wildfires of late-summer 2020 also changed the condition of forest stands on the easternmost and southernmost parcels of HCP areas. While the majority of the affected lands are anticipated to be a complete loss, that is minimal tree survival is anticipated to occur, some areas are expected to survive. All areas where survivability was poor to nonexistent have been salvage logged and reforested, effectively moving the affected acres into age-class 0-10 (Table 2-1).

Given these conditions, the distribution of legacy structures to provide diversity and complexity across the landscape is less than current forest conservation standards. This is true for both terrestrial forest habitat in the uplands and riparian habitat along streams and wetlands. Structural features such as standing snags, older trees, forest-floor coarse woody debris, and large wood in streams are uncommon across much of Port Blakely’s HCP area landscape. What remains are managed stands that have matured from previous agricultural conditions with few legacy features, stands harvested two or three times under current OFP Rules, and stands that burned at various intensities during the 2020 wildfires. This landscape condition provides a unique opportunity for Port Blakely to make long-term commitments to proactively manage our commercial forestlands to increase these features and habitat for listed fish and wildlife, thus, doing our part in contributing to the recovery of the Covered Species.

### **2.1.2 Adjacent Landowners**

Port Blakely's ownership in Clackamas County is inter-mixed with small town residential properties, private landowners that engage in forestry and agriculture activities, and state and Federal forestlands. These lands are bordered on the north primarily by small private forest and agriculture landowners, on the east by Federal lands, i.e., Bureau of Land Management (BLM) and U.S. Forest Service (USFS), to the southeast by Weyerhaeuser, to the south by Federal and State lands, and to the southwest and west by private forests, agriculture lands, and urban areas (cities and towns) (Figure 1-2).

### **2.2 Covered Activities**

Covered Activities include baseline forest management activities conducted under Forest Practices Rules, and conservation measures that comprise the Conservation Program described in Section 6. The conservation measures will be accomplished with the same forest management activities as required under the OFP Rules but with long-term commitments to implement sediment-reducing road management activities and retain more woody structures and wider riparian buffers that result in larger amounts of enhanced, higher quality fish and wildlife habitat than under baseline conditions.

The following forest management activities are currently being implemented on Port Blakely's forestlands. Covered Activities are those forest management activities necessary to conduct timber management and harvest using safe, flexible, and efficient methods, according to the OFP Rules. The following baseline Covered Activities, i.e., standard OFP Rules required to be implemented with or without the HCP, are listed here and described in detail below.

- Timber harvest
  - Regeneration (even-age) harvest
  - Pre-commercial thinning
  - Stand recovery and natural disturbances harvest (salvage)
- Silviculture
  - Site preparation (debris clearing, piling, and burning)
  - Reforestation (planting)
  - Fertilization
  - Disease, insect, and animal damage control
  - Mechanical vegetation control
- Road management
  - Road construction and maintenance
  - Abandonment and deactivation
  - Quarrying (rock pits)

The discussion that follows describes the forest management activities Port Blakely conducts according to OFP Rules (OAR 629-600-100 through OAR 600-680-800). Under the HCP, Port Blakely will continue to implement these forest practices requirements but with the inclusion of commitments to implement long-term conservation measures discussed later in the document (Section 6), to provide a net conservation benefit to the Covered Species. Thus, the HCP Covered Activities are standard commercial forest practices conducted in a sustainable and enhanced manner that results in more trees, species

diversity, and fish and wildlife habitat remaining on the landscape than would be on the landscape without the HCP.

### **2.2.1 Timber Harvest Under Current Forest Practices Rules**

Timber harvest is conducted according to “Harvest” rules described in OAR 629-630-000 through OAR 629-630-0800. These rules address skidding and yarding practices, felling, landings, drainage systems, and harvesting on steep and landslide-prone slopes. Upland leave trees and riparian buffers are an integrated part of conducting timber harvest. Snag and leave tree requirements are described in ORS 527.676 while stream and wetland buffer requirements are described in the Water Protection Rules (OAR 629-635 through OAR 629-660). Forest stands that have been subject to a catastrophic environmental event (such as wildfire, insect, disease, or windthrow) are managed under alternate prescriptions as described in OAR 629-642-0600(3).

Under OFP, Port Blakely employs a forest management regime to ensure the proper growth and health of a conifer-dominated forest are met. The regime involves growing stands until ready for regeneration harvest, i.e., approximately 40 years of age, and may include limited mid-rotation management determined by factors such as stand density and steepness of slopes. The specific elements of this management regime are:

- Plant and monitor trees until “free to grow”; controlling competing vegetation as needed;
- Evaluate the need for mid-rotation management, i.e., pre-commercial thinning;
- Monitor stand health and damage, salvaging opportunistically to recover value; and
- Conduct regeneration harvest of mature, conifer-dominated stands.

Under this management regime, forests will grow and develop until they reach the quality desired for final harvest. Management activities increase the value of individual trees growing within the forest. Timber quality is improved by creating stand conditions that promote radial growth while limiting the retention of green limbs.

Forestlands are managed using even-aged and uneven-aged harvest strategies. Even-aged management, i.e., regeneration harvest, is the primary harvest strategy when trees in forest stands reach the desired size. Uneven-aged management consists of pre-commercial thinning, commercial thinning, and recovery treatments using conventional logging methods and equipment. It is conducted early in the forests lifecycle or as needed to grow high-quality forest products. Salvage operations consisting of even-aged management is considered where natural events cause damage to forest trees and threaten forest health.

#### **2.2.1.1 Regeneration Harvest Under Current Forest Practice Rules**

Port Blakely conducts regeneration harvest classified in the OFP Rules as a “Harvest Type 3” which is defined as an operation that requires reforestation and retention of wildlife leave trees (OAR 629-600-0100). Forested stands generally will reach regeneration harvest condition in the HCP area, typically with a diameter at breast height (DBH) range of 12-18 inches, by an age of 39 years old. Even-age harvest unit size usually does not exceed 120 acres under the OFP Rules (ORS 527.740); however, provisions allow for a harvest size of up to 240 acres (ORS 527.750). Under the OFP Rules, Port Blakely’s typical harvest unit size does not exceed 120 acres. Under this regime, annual harvests range from 1,000 to

1100 acres but is variable depending on availability of eligible stands and prevailing market conditions.

Forest stands that reach the economic rotation age, i.e., 39 years of age, are selected for regeneration harvest. Stands are examined for health, species composition, and wood quality to match the existing market conditions. When a final selection is made, the stand is placed on the harvest plan. Several harvest systems might be used during regeneration harvests depending on topography and soil conditions. Ground-based equipment may include logging shovels, skidders, crawlers, or forwarders, some of which may be tethered or cable-assisted (anchored with cable) on steep slopes. Normally on slopes less than 35%, felling is by mechanical means. Due to potential soil compaction, the use of skidders and crawlers is minimized, and generally used in units with long skidding reaches (i.e., greater than 800 feet), where other equipment would not be economical.

On slopes greater than 35%, hand felling, and bucking or cable-assisted felling, occurs using crews of 2 to 5 people. Cable systems are employed with landings positioned to optimize logging system efficiencies and resource protection. Regardless of which logging system is used to fell and yard trees, they typically are piled at landings and loaded onto log trucks that deliver the log loads to their destination via the forest road and public road systems. Regeneration harvest of an average unit consisting of 60 acres typically takes approximately 40 days, but the time may vary by a few days depending on conditions such as the logging system used, slope and weather.

The conditions under which specific elements of the OFP Rules pertinent to conducting regeneration timber harvest in western Oregon are summarized below. The purpose of the harvesting rules is to establish standards for forest practices that will maintain the productivity of forestland, minimize soil and debris entering waters of the state, and protect wildlife and fish habitat. These practices are currently being conducted and will continue under the HCP albeit with commitments to grow stands older than the economic rotation age, manage stands for structural diversity, retention of more leave trees and wider riparian buffers, and implementing road construction and maintenance measures that are beneficial to Covered Species.

*Skidding and Yarding* (OAR 629-630-0100) - Adhere to the following conditions:

- 1) Select a logging method and type of equipment appropriate to the given slope, landscape, and soil properties to minimize soil deterioration and to protect water quality.
- 2) Avoid ground-based yarding on unstable, wet, or easily compacted soils unless operations can be conducted without damaging soil productivity through soil disturbance, compaction, or erosion.
- 3) Locate skid trails where side-casting is kept to a minimum.
- 4) Locate skid trails on stable areas to minimize the risk of material entering waters of the state.
- 5) Avoid excavating skid trails on slumps or slides.
- 6) Limit cable logging to uphill yarding whenever practical but when downhill cable yarding is necessary, use a layout and system which minimizes soil displacement.

*Ground-based Harvesting on Steep or Erosion-Prone Slopes* (OAR 629-630-0150) - The following conditions are required to reduce the potential for erosion from steep or erosion-prone slopes to enter waters of the state:

- 1) Slopes over 60 percent and slopes over 40 percent where soils consist of decomposed granite-type materials, or other highly erodible materials, are considered erosion-prone and subject to the following requirements.
- 2) Methods that avoid development of compacted or excavated trails are the preferred alternative for operating on steep or erosion-prone slopes. If the operation will result in excavated or compacted skid trails, the following sections apply.
- 3) Skid trails located on steep or erosion-prone slopes shall be located at least 100 feet from any stream channels.
- 4) Locate skid trails where water can drain off the skid trail and onto undisturbed soils.
- 5) Do not locate skid trails straight up and down steep or erosion prone slopes for a distance exceeding 100 feet unless effective drainage and sediment filtration can be achieved.
- 6) Install effective cross ditches on all skid roads located on steep or erosion-prone slopes.
- 7) Limit the amount of ground with disturbed soils on steep or erosion-prone slopes as described above to no more than ten percent of the steep or erosion-prone slopes within the operation area.

*Landings* (OAR 629-630-0200) - Adhere to the following conditions:

- 1) Minimize the size of landings to that necessary for safe operation.
- 2) Locate landings on stable areas to minimize the risk of material entering waters of the state.
- 3) Avoid locating landings in riparian management areas. When no feasible alternative landing locations exist, submit a written plan to the State Forester before locating landings in riparian management areas.
- 4) Do not incorporate slash, logs, or other large quantities of organic material into landing fills.
- 5) Deposit excess material from landing construction in stable locations well above the high-water level.

*Drainage Systems* (OAR 629-630-0300) – The following conditions are required to provide and maintain a drainage system for each landing, skid trail, and fire trail that will control and disperse surface runoff to minimize sediment entering waters of the state.

- 1) Construct dips, grade reversals or other effective water diversions in skid trails and fire trails as necessary to minimize soil displacement and to ensure runoff water is filtered before entering waters of the state.
- 2) Drain skid trails with water bars, or other effective means, immediately following completion of the operation and, at all times, during the operation when runoff is likely.
- 3) Establish effective drainage on landings during and after use.

*Harvesting on High Landslide Hazard Locations* (OAR 629-630-0500) - The following conditions are required to prevent timber harvesting-related serious ground disturbance and



drainage alterations on all high landslide hazard locations, and to reference additional requirements when there is public safety exposure below the high landslide hazard location.

- 1) Coordinate with the State Forester to identify high landslide hazard locations and to determine if there is public safety exposure from shallow, rapidly moving landslides and, if so, then practices described in 629-623-0400 through 0800.
- 2) Do not construct skid roads on high landslide hazard locations.
- 3) Do not operate ground-based equipment on high landslide hazard locations.
- 4) Prevent deep or extensive ground disturbance on high landslide hazard locations during log felling and yarding operations.

*Felling and Removal of Slash* (OAR 629-630-0600) - Adhere to the following conditions:

- 1) Fell, buck, and limb trees in ways that minimize disturbance to channels, soils and retained vegetation in riparian management areas, streams, lakes and all wetlands greater than one-quarter acre, and that minimize slash accumulations in channels, significant wetlands and lakes.
- 2) During felling operations:
  - a) When possible, fell all conifer trees away from riparian management areas, streams, lakes, and significant wetlands, except for trees felled for stream improvement projects.
  - b) On steep slopes, use felling practices such as jacking, line pulling, high stumps, whole tree yarding, or stage-cutting as necessary and feasible to prevent damage to vegetation retained in riparian management areas, soils, streams, lakes and significant wetlands.
  - c) When hardwoods must be felled into or across streams, lakes, or significant wetlands:
    - A. Buck and yard the trees to minimize damage to beds, banks and retained vegetation.
    - B. When it can be done consistently with protecting beds and banks, yard hardwood trees or logs away from the water before limbing.
- 3) Minimize the effects of slash that may enter waters of the state during felling, bucking, limbing or yarding by:
  - a) Removing slash from Type F, Type SSBT and Type D streams, lakes, and significant wetlands as an ongoing process (removal within 24 hours of the material entering the stream) during the harvest operation.
  - b) Not allowing slash to accumulate in Type N streams, lakes or wetlands in quantities that threaten water quality or increase the potential for mass debris movement.
  - c) Placing any slash that is removed from streams, lakes, or wetlands above high-water levels where it will not enter waters of the state.

*Yarding; Cable Equipment Near Waters of the State* (OAR 629-630-0700) - Adhere to the following conditions:

- 1) Maintain the purposes and functions of vegetation required to be retained in riparian management areas and minimize disturbance to beds and banks of streams, lakes, all wetlands larger than one-quarter acre, and retained vegetation during cable yarding operations.

- 2) Minimize the yarding of logs across streams, lakes, significant wetlands, and other wetlands greater than one-quarter acre whenever harvesting can be accomplished using existing roads or other practical alternatives.
- 3) Use yarding corridors through retained streamside trees as long as the numbers and widths of yarding corridors are minimized. Submit a written plan to the State Forester when yarding across any of the waters listed below:
  - a) Type F streams;
  - b) Type SSBT streams;
  - c) Type D streams;
  - d) Large or medium Type N streams;
  - e) Lakes; or
  - f) Significant wetlands
- 4) Swing yarded material free of the ground in the aquatic areas and riparian areas when yarding across any of the waters listed below:
  - a) Type F streams;
  - b) Type SSBT streams;
  - c) Type D streams;
  - d) Large or medium Type N streams;
  - e) Lakes; or
  - f) Significant wetlands.
- 5) Conduct cable yarding across streams classified as small Type N or other wetlands greater than one-quarter acre in ways that minimize disturbances to the stream channel or wetland and minimize disturbances of retained streamside vegetation.

*Yarding; Ground-based Equipment Near Waters of the State* (OAR 629-630-0800) - Adhere to the following conditions:

- 1) Maintain the purposes and functions of vegetation required to be retained in riparian management areas, and minimize disturbances to beds and banks of streams, lakes, all wetlands larger than one-quarter acre, and retained vegetation during ground-based yarding operations.
- 2) Do not operate ground-based equipment within any stream channel except as allowed in the rules for temporary stream crossings.
- 3) Minimize the number of stream crossings.
- 4) For crossing streams that have water during the periods of the operations:
  - a) Construct temporary stream crossing structures such as log crossings, culvert installations, or fords that are adequate to pass stream flows that are likely to occur during the periods of use. Structures shall be designed to withstand erosion by the streams and minimize sedimentation.
  - b) Choose locations for temporary stream crossing structures which minimize cuts and fills or other disturbances to the stream banks.
  - c) Minimize the volume of material in any fills constructed at a stream crossing. For any fill for a temporary crossing that is over eight feet deep, submit to the State Forester a written plan that includes a description of how the fills would be constructed, passage of water, and the length of time the fills would be in the stream.
  - d) Design temporary structures so that fish movement is not impaired on Type F or Type SSBT streams.

- e) Remove all temporary stream crossing structures immediately after completion of operations or prior to seasonal runoff that exceeds the water carrying capacity of the structures, whichever comes first, ensuring that fill material is placed where it will not enter waters of the state.
- 5) Remove soil that enters the channels during the yarding operations after completion of the operation or prior to stream flow, whichever comes first, ensuring that fill material is placed where it will not enter waters of the state.
- 6) Construct effective sediment barriers such as water bars, dips, or other water diversion on stream crossing approaches after completion of operations, or prior to rainy season runoff, whichever comes first.
- 7) Conduct machine activity near (generally within 100 feet) streams, lakes, and other wetlands greater than one-quarter acre to minimize the risk of sediment entering waters of the state and preventing changes to stream channels. Locate, construct, and maintain skid trails in riparian management areas consistent with the harvesting rules.
- 8) Minimize the amount of exposed soils due to skid trails within riparian management areas. Do not locate skid trails within 35 feet of Type F, Type SSBT or Type D streams except at stream crossings and provide adequate distances between all skid trails and waters of the state to filter sediment from runoff water.
- 9) Locate and construct skid trails so that when high stream flow occurs water from the stream will not flow onto the skid trail.

*Leave Trees* (ORS 527.676) – Snag and leave tree retention is required when conducting Harvest Type 3 forest management activities as follows:

Snags and downed logs are required to be retained in Harvest Type 3 units that exceed 25 acres in size (ORS 527.676). These structures are expected to contribute to the overall maintenance of wildlife, nutrient cycling, moisture retention and other resource benefits of retained wood. Operators are required to leave, on average, per acre harvested, at least:

- 1) Two snags or two green trees at least 30 feet in height and 11 inches DBH or larger, at least 50 percent of which are conifers; and
- 2) Two downed logs or downed trees, at least 50 percent of which are conifers that each comprise at least 10 cubic feet (cu ft) gross volume and are no less than six feet long. One downed conifer or suitable hardwood log of at least 20 cu ft gross volume and no less than six feet long may count as two logs.

In meeting the requirements of this forest practice, operators have the sole discretion to determine the location and distribution of wildlife leave trees, including the ability to leave snags, trees and logs in one or more clusters rather than distributed throughout the unit and, if specifically permitted by the State Board of Forestry by rule, to meet the wildlife leave tree requirements by counting snags, trees or logs otherwise required to be left in riparian management areas. The number of wildlife trees or snags expected to be retained on an annual basis is 2,000 based on an annual estimated harvest of 1,000 acres. The total volume of down wood retained in harvest units on an annual basis would be 20,000 cu ft.

In addition to the leave tree statutes, there are OFP Rules that require wildlife tree retention in RMAs if ODF determines there will be a benefit to fish. For operations adjacent to fish-bearing streams, up to 25% of the green trees required to be retained may be optionally left

in or adjacent to the RMA of the stream, in addition to trees otherwise required to be left in the RMA. In addition, for operations adjacent to small, nonfish-bearing streams subject to rapidly moving landslides that are likely to deliver to a fish-bearing stream, the operator must leave available green trees and snags within 50 feet of each side of the stream and for a distance of no more than 500 feet upstream from an RMA of a fish-bearing stream (ODF 2018a).

Many Type F streams and those Typed as SSBT, i.e., salmon, steelhead, bull trout, currently need improvement of fish habitat because they lack adequate amounts of LWD in channels, or they lack other important habitat elements. Forest Practices Rule OAR 629-642-0300 provides operators with incentives to conduct stream enhancement projects to create immediate improvements in fish habitat. Operators placing large wood key pieces in streams, as described in OAR 629-642-0200, may qualify for the live tree retention credit for Type F or Type SSBT streams if such placement meets the additional requirements of the rule (ODF 2018a). For each conifer log or downed tree, the operator places in a small Type F stream, or small or medium Type SSBT stream, the (live tree) basal area credit is equal to the basal area of the placed log or tree (ODF 2018a).

*Interim Timber Harvest Requirements for Protecting Northern Spotted Owl Nesting Sites* (OAR 629-665-0210) – When an operation will conflict with protection of a nesting site of the spotted owl, the operator must submit to the State Forester a written plan before commencing the operation. The written plan, at a minimum, must address how the operation will be conducted to provide for the following:

- A 70-acre area of suitable spotted owl habitat encompassing the nest site, to be maintained as suitable spotted owl habitat; and
- Prevention of disturbances resulting from operation activities which cause owls to flush from the nesting site during the critical period of nest use each year, i.e., between March 1 and September 30.

The nesting site includes the tree, when known, containing a spotted owl nest; or when not specifically known, includes an activity center of a pair of adult spotted owls. An activity center is a location determined by the State Forester to have been reliably identified as being occupied by an adult pair of spotted owls, capable of breeding. Such determination must be supported by repeated observation of the owls in close proximity or observation of nesting behavior. There are no other requirements to provide or protect suitable spotted owl habitat where it may exist across the landscape.

Suitable spotted owl habitat includes a stand of trees with moderate to high canopy closure (60 to 80%); a multi-layered, multi-species canopy dominated by large overstory trees (greater than 30 inches in diameter at breast height); a high incidence of large trees with various deformities (e.g., large cavities, broken tops, and other evidence of decadence); numerous large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for owls to fly. In the absence of habitat which exhibits all the characteristics listed above, protect the available forested habitat which comes closest to approximating the listed conditions. Stands which do not exhibit at least two of the characteristics listed above are not considered suitable habitat.

*Stream Riparian Management Areas* (OAR 629-635 and OAR 629-642) – OFP Rules addressing stream RMAs are found in the Oregon Water Protection Rules (OWPR) which were recently amended by the Oregon Board of Forestry to include salmon, steelhead, and bull trout (SSBT) stream classifications (ODF 2018a). The SSBT streams are classified as such based on the presence of any of these species or if the streams are otherwise used by these species at any time of the year as determined by the State Forester (ODF 2018a).

The OWPRs specify RMA buffer widths for three stream sizes for each of four different stream types. Stream size designations are based on average annual flow to the upstream drainage area and average annual precipitation (ODF 2018a). Streams are classified, under OAR 629-635-0200 (14) into size categories of small, medium, and large based on average annual flow. Small streams have an average annual flow of  $\leq$  two cu ft per second, medium streams have an average annual flow  $> 2$  and  $< 10$  cu ft per second, and large streams have an average annual flow of  $\geq 10$  cu ft per second. In addition, any stream with a drainage area less than 200 acres shall be assigned to the small stream category regardless of the flow index calculated. Stream types are also based on presence or use by fish. Fish are defined as anadromous fish, gamefish, or fish listed as threatened or endangered under the ESA and includes special consideration for salmon, steelhead, and bull trout.

Stream types are as follows:

Type D (domestic) = stream that has domestic water use, but no fish use;

Type N (nonfish) = stream with neither fish use nor domestic water use;

Type F (fish) = stream with fish use, or both fish use and domestic water use; and

Type SSBT (salmon, steelhead, bull trout) = small or medium stream classified as a Type F stream and that has SSBT use.

According to the OWPRs, RMA widths are designated to provide adequate areas along streams, lakes, and significant wetlands to retain the physical components and maintain the functions necessary to accomplish the purposes and to meet the protection objectives and goals for water quality, fish, and wildlife set forth in OAR 629-635-0100 (ODF 2018a). Thus, the desired future condition for streamside areas along fish use streams is to grow and retain vegetation so that, over time, average conditions across the landscape become similar to those of mature streamside stands (ODF 2018a).

Oregon Department of Forestry RMA widths for the three different stream sizes and by stream type are provided in Table 2-2. Note, Type D streams have been omitted because they comprise only 0.1 mile within the HCP area.

Riparian Management Areas are measured as a slope distance from the high-water level of main channels except where the slope is comprised of steep exposed soil, rock bluff or talus slope. Where these conditions occur, the RMAs are measured as a horizontal distance until the top of the exposed area is reached. RMAs are to be extended to include side channels and stream-associated wetlands extending beyond the RMA plus at least 25 additional feet.

**Table 2-2. Oregon Department of Forestry Riparian Management Area widths by stream size and type\*.**

Stream Size	Type F	Type SSBT	Type N
Large	100 feet	N/A	70 feet
Medium	70 feet	80 feet	50 feet
Small (Perennial)	50 feet	60 feet	No retention required for Western Cascades

\* Modified Table 1 from the Oregon Water Protection Rules – Stream Buffers (ODF 2018a)

The OWRPs (ODF 2018a) include the following requirements for vegetation retention within RMAs of Type F and Type SSBT streams:

- RMA lengths are measured in 1,000-foot segments for Type F and 500-foot segments for Type SSBT;
- All understory vegetation within 10 feet of the high-water level;
- All trees within 20 feet of the high-water level;
- All trees leaning over the channel;
- All downed wood;
- All snags that are safe or do not pose a fire hazard threat; and
- Snags felled for safety or fire hazard reasons retain where felled.

For all Type F and SSBT streams, the no-harvest portion of the RMA is the area within 20 feet of the high-water level. The managed portion of the RMA includes the area from 20 feet out to the edge of the RMA boundary (Table 2-2) (ODF 2018a). The level of management, i.e., basal area and live conifer tree retention, varies depending on whether the stream is a Type F or a SSBT stream (small or medium), the management zone width (SSBT streams have two management zones), and harvest type (ODF 2018a).

For SSBT streams, there are three prescriptions that that can be implemented based on specific conditions. The prescriptions include:

- Prescription 1 - no harvest for the entire RMA width;
- Prescription 2 - variable basal area and tree retention requirements within the two RMA zones (no harvest and managed); and
- Prescription 3 - where applicable, based on stream valley azimuth, a 40-foot no harvest buffer on the north side of a SSBT stream.

The north sided buffer applied under Prescription 3 is to be used in combination with the other prescriptions. Although RMA widths for SSBT streams are wider than for Type F streams, the OFP Rules include “relief” prescriptions that allow for small RMA widths (OAR 629-642-0110). The criteria and prescriptions are described in detail in OWPRs OAR 629-642-0100, OAR 629-642-0105 and OAR 629-642-0110, and summarized in OWPR Table 2 for Type F streams, and OWPR Tables 5 and 6 for SSBT streams (ODF 2018a).

The minimum tree retention in the RMA of Type F large streams is 40 live conifer trees  $\geq$  11 inches DBH per 1,000 feet. For Type F medium streams, the requirement is 30 live conifer trees  $\geq$  8 inches DBH per 1,000 feet. Basal area standard targets for Type F streams in the Western Cascades Geographic Region are: 270 sq. ft. for large, 140 sq. ft. for medium and 40 sq. ft. for small streams. If the basal area standard targets can't be achieved, all live conifers  $\geq$  6 inches DBH are required to be retained in the RMA up to a maximum of 150, 100, and 70 conifers per 1,000 feet for large, medium, and small streams, respectively. Other options for achieving the basal area standard targets are provided in detail in the OWPR including retention of all conifer trees in wider no-harvest zones and counting hardwoods (ODF 2018a).

Vegetation retention requirement for nonfish streams (Type N) varies by stream size. In the Western Cascades Geographic Region, there is no requirement for vegetation retention on small Type N streams. The requirements for large and medium Type N streams include similar requirements as Type F streams, i.e., retain all understory vegetation within 10 feet of the high-water level, and retain all trees within 20 feet of the high-water level (no-harvest zone). RMA widths are 70 feet and 50 feet, respectively, for large and medium Type N streams and are measured in 1,000-foot segments. In the managed zone, 30 live conifer trees and 10 live conifer trees are required to be retained along large and medium Type N streams, respectively. Conifers must be  $\geq$  11 inches DBH for large Type N streams and  $\geq$  8 inches DBH for medium Type N streams. Basal area requirements for the Western Cascades Geographic Region per 1,000 feet of stream on each side of large and medium Type N streams are 110 sq. ft. and 50 sq. ft., respectively. Under certain conditions, described in detail in OFP Rules OAR 629-642-0400, hardwoods may count toward conifer basal area requirements (ODF 2018a). Landowners are encouraged to retain understory vegetation and leave trees along other Type N streams, e.g., small perennial and seasonal streams, but there is no requirement to do so.

Large woody debris delivery to fish streams can occur through natural processes, e.g., windthrow, bank erosion, etc. that cause trees to fall into or across fish streams, or from nonfish stream sources in the upper watershed. Placement of large wood key pieces in a Type F or Type SSBT stream to improve fish habitat is not required but, if conducted, this forest management activity is subject to OFP Rules. Placement of LWD in streams must be conducted in conjunction with another forest management operation, e.g., regeneration harvest or commercial thinning. The OFP Rules require that the placement activity be designed and implemented to:

- Rely on the size of wood for stability and exclude the use of any type of artificial anchoring;
- Emulate large wood delivery configurations that occur from natural riparian processes over time;
- Restore and maintain natural aquatic habitat over time rather than rely on constructed habitat structures; and
- Meet the standards established in State guide for wood placement (ODF and ODFW 2010a).

Placement of LWD in streams is a voluntary measure by landowners conducting forest management activities. The purpose and assumption are that it will enhance or improve fish habitat by providing structural habitat features beneficial to fish.

*Wetland and Lake Riparian Management Areas* (OAR 629-645, OAR 629-650, OAR 629-655) – OFP Rules addressing wetland, lake and bog RMAs are found in the Oregon Water Protection Rules (ODF 2018a). The purpose of these OFP Rules is to protect the functions and values of significant wetlands, i.e., wetlands larger than eight acres, estuaries, and bogs, as well as lakes, on forestlands over time with a focus on the protection of soil, hydrologic functions, and specified levels of vegetation. Vegetation retention (including understory vegetation, snags, downed wood, and live trees) is needed to prevent erosion and sedimentation into the significant wetland, minimize soil disturbance and hydrologic changes, and to maintain components of the vegetation structure to provide for other benefits, particularly fish and wildlife values (OAR 629-645-0000). OFP Rules requirements for wetland, estuary, bog, and lake RMAs in western Oregon pertinent to implementation metrics, such as buffer widths, are summarized below.

Significant wetlands other than estuaries or bogs shall have RMAs extending 100 feet from the wetlands. When an operation is proposed within 300 feet of an estuary or bog, or within 100 feet of a wetland larger than eight acres, the resource site evaluation process shall be followed in coordination with the State Forester (OAR 629-665-0020). The RMA distance is determined according to specific stand conditions and wetland feature characteristics such as size (OAR 629-645-000(6)). Riparian management areas can range from 100 to 200 feet from the estuary, or 50 to 100 feet from the bog. For lakes, operators shall provide an RMA 100 feet from the high water level of large lakes (> 8 acres), 50 feet from the high water level of other lakes that have fish use or other lakes that are equal to or greater than one-half acre in size. No RMA is required for other lakes that do not have fish and that are less than one-half acre. Wetland, estuary, bog, and lake RMAs shall address live tree retention, soil and hydrologic function protection, understory vegetation retention, and snag and down wood retention (OAR 629-645-0010 - OAR 629-645-0050 and OAR 629-650-0010 – 629-650-0040).

Under OFP Rules, RMA requirements for significant wetlands, estuaries, bogs, and lakes include the following:

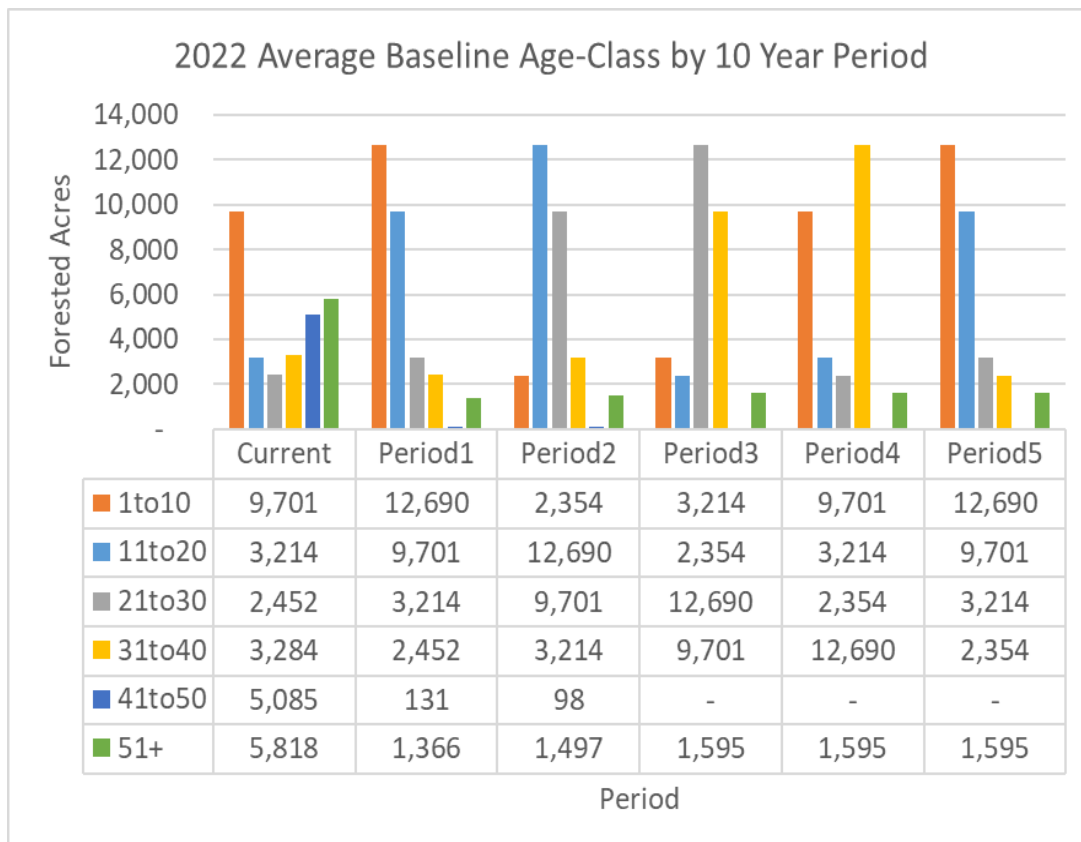
- Live tree retention of approximately 50 percent of the original live trees, by species, in each of four different DBHs ensuring good distribution and representation of trees in the RMA, to include trees at the wetland, bog and lake edge;
- Protection of soil by minimizing disturbances that result in impaired water quality, hydrologic functions, or soil productivity;
- Understory vegetation retention to provide soil and bank in and along significant wetlands and lakes to maintain cover and shade for wildlife habitat and aquatic habitat, and to protect water quality, and to limit disturbance of understory vegetation in RMAs to the minimum necessary to remove timber harvested from the area and achieve successful reforestation; and
- Retention of all snags and downed trees within the wetlands and lakes and their associated RMAs unless they constitute a fire or safety hazard.



There is no RMA requirement for other wetlands or seeps. However, when operating in or along other wetlands greater than one-quarter acre, operators are required to protect soil and understory vegetation from disturbance that results in reduced water quality, hydrologic function, or soil productivity, and to leave snags and downed trees in the wetlands, except where they present a fire or safety hazard. For other wetlands less than one-quarter acre, operators are required to protect soil and vegetation from disturbances which would cause adverse effects on water quality, hydrologic function, and wildlife and aquatic habitat.

*Projected Forest Age-Classes Under the Baseline Forest Management Regime* - Under a baseline forest management regime conducted strictly under OFP Rules, timber does not grow older than 39 years of age, except the required leave trees and trees retained in riparian buffers. That is, Port Blakely would not elect to extend harvest rotation, conduct extensive mid-rotation management, retain wider riparian buffers, or voluntarily implement additional measures to improve roads and provide fish and wildlife habitat. The current condition of Port Blakely’s forest age classes and how they are expected to change by decade over a 50-year period managed under OFP Rules is shown in Figure 2-1. We note that older forest age-classes, e.g., 41 to 50 and 51+ will be harvested in the first decade while younger age-classes will increase and remain steady at higher volumes in the subsequent 40 years. The initial high volume of the 0-10 age-class is a result of salvage harvest of stands burned in the 2020 catastrophic fires. Under OFP Rules, these stands will be regeneration harvested again in the fourth decade.

**Figure 2-1. Acreage of current Port Blakely forest age-classes in the HCP area projected by decade\* to occur under current Oregon Forest Practices Rules.**



The 51+ age-class also will remain relatively constant, ranging from ~1,400 acres in the first decade (Period 1) to ~1,600 acres in the fifth decade, as this age-class will be largely comprised of riparian buffers and leave trees required to be retained by OFP Rules. The 41 to 50 age-class will remain at < 150 acres for the entire projected 50-year period. At the maximum, forest stands that might function as spotted owl habitat, as well as habitat for other terrestrial species, based solely on tree size and stand age, i.e., stands > 40 years of age, will comprise ~ 5% of the forested landscape. Most of this potential habitat would be in dense, unmanaged stands with few of the structural features utilized by terrestrial species distributed throughout the ~29,500-acre HCP area. Thus, habitat for spotted owls and other terrestrial species will be limited under OFP forest management due to 1) the limited number of snags and green trees required to be retained 2) the lack of open stands with some defect that results from mid-rotation management such as commercial thinning, and 3) the short rotation age.

### **2.2.1.2 Commercial Thinning**

Commercial thinning, i.e., a growth enhancement treatment that involves removing trees that have commercial value while retaining trees with sufficient spacing to facilitate growth and survival is not required by OFP Rules. However, under OFP Rules, commercial thinning can be conducted in forest stands, including riparian management areas (OAR 629-642-0100, OAR 629-642-0105, OAR 629-642-0400, OAR 629-642-0800).

Commercial thinning is considered an “unclassified harvest” with no reforestation, wildlife tree or downed log requirements as long as 80 sq. ft of basal area per acre is retained (OAR 529-610-0010). Conifer stands on Site Class I and II soils that have < 35% slopes and are between 20 and 40 years are reviewed for relative density (RD), stocking, wood quality characteristics, and health. Stands on Site Class III and IV soils are not thinned because they typically have the spacing and structure to allow growth without being managed. Port Blakely makes commercial thinning decisions based on these stand conditions, as well as market conditions, targeting an average post-thinning RD of 40, ranging from 35 to 50 for residual stand conditions. Stands of this age-class will typically be 8 to 13 inches DBH. On slopes that allow for ground-based harvesting (< 35% slope), conifer stands with RDs > 50 and with stocking > 270 TPA typically will be considered for commercial thinning, given the proper market conditions.

Typically, commercial thinning operations occurring on an annual basis range from 100 to 200 acres in 2-5 units. This activity typically involves crews of 2-3 people felling and yarding logs for truck loading over a period of approximately 25 days. As a result of the catastrophic fires of 2020, commercial thinning on an annual basis will be conducted at the lower end of this range because nearly a third of the HCP area will be growing as a single age-class. Thus, there will likely be a spike in this activity as the approximately 8,100 acres of burned stands reach an age where commercial thinning would be advantageous. Although not all stands will likely need commercial thinning, when it occurs there will be an increase in this activity for a period of several years in the third decade.

### **2.2.1.3 Pre-commercial Thinning**

Pre-commercial thinning, i.e., cutting of trees that is for growth enhancement treatments, is not required by OFP Rules. However, under current OFP Rules, pre-commercial thinning,

and other release activities to maintain the growth and survival of conifer reforestation can be conducted within riparian management areas (OAR 629-642-0100, OAR 629-642-0105, OAR 629-642-0400).

Candidate stands for enhancement activities via pre-commercial thinning occur across the ownership. Specific stocking levels are considered to trigger pre-commercial thinning. On slopes less than 35%, stands are thinned to a tree density target of  $\leq 330$  trees per acre (TPA). On slopes greater than 35%, stands are thinned to a tree density target of  $\sim 257$  TPA. After a pre-commercial thinning application, stands will have a stocking that allows for increased sun throughout the stand, resulting in radial growth and understory development.

Pre-commercial thinning is generally accomplished by crews of approximately 10 people moving through a stand selectively hand-cutting trees approximately 10 to 20 years of age and does not involve the use of heavy equipment. A typical stand of 60-120 acres can be pre-commercially thinned in approximately 3 to 6 days. The acreage of stands pre-commercially thinned in any given year is variable but, on average, ranges from 300 to 600 acres annually. However, as a result of the catastrophic fires of 2020, pre-commercial thinning on an annual basis will be conducted at the lower end of this range because nearly a third of the HCP area will be growing as a single age-class. Thus, there will likely be a spike in this activity as the approximately 8,100 acres of burned stands reach an age where pre-commercial thinning would be advantageous. Although not all the stands will likely require pre-commercial thinning, when it occurs there will be an increase in this activity for a period of several years in the second decade.

#### **2.2.1.4 Stand Recovery and Natural Disturbances Harvest (Salvage)**

Stand recovery activity refers to the removal of single diseased or damaged stems from a timbered stand without damaging or removing the residual trees to maintain stand health and recover valuable timber. However, when larger areas, greater than two acres, become severely diseased or damaged, such as extensive wildfire damage, it is generally more efficient to harvest the entire area containing the infected or damaged trees as a regeneration harvest. Stands are continually monitored for health and storm damage. The decision to enter a stand for salvage is based on overall stand health, the percent of stems affected, stand age, and market conditions. Stand recovery ranges from 10 to 35% depending on age and stand structure, lower for older stands and higher for younger stands. Stand recovery operations are generally limited to slopes less than 35% for logistic, economic, and efficiency reasons, unless the “greater than two acres” condition is met. It is not the intent of this forest management activity to recover every damaged tree and in those instances where damage is minor, recovery efforts will not be initiated, and the defective trees remain in the stand until it is regeneration harvested.

If a catastrophic environmental event occurs and mortality occurs at the stand level (beyond normal endemic mortality), stand recovery timber harvest is conducted as an “alternate practice” under the OFP Rules (OAR 629-642-0600(3)). The prescription is intended to provide adequate shade, woody debris, and bank stability for the future while creating conditions in the streamside area that will result in quick establishment of a new and healthy stand. With this intent, operators shall:

- Retain trees that have fallen into the stream. Only portions of these trees that are outside the high-water levels and do not contribute to the ability of downed tree to withstand movement during high flows may be harvested.
- Retain all live and dead trees within 20 feet of the highwater level of large and medium streams and 10 feet of the high-water level of small streams.
- For Type F streams, retain live trees, dying or recently dead trees, and downed logs sufficient to satisfy the active management basal area target.
- For Type D and N streams, retain live trees, dying or recently dead trees, or downed logs sufficient to satisfy the standard basal area target.
- Live conifers shall be retained first to meet the basal area targets. If live conifers are too few to satisfy the target, then the target shall be met by as much as possible by including windthrown trees within the channel and dying or recently dead trees.
- For purposes of this prescription the basal area of a windthrown tree in the channel or a retained dying or recently dead tree contributes two times its basal area toward meeting the target.

## **2.2.2 Silviculture**

Commercial silviculture includes a variety of forest management activities conducted to control the establishment, growth, composition, health, and quality of forests to meet diverse needs and values of landowners on a sustainable basis. This is accomplished by applying different types of silviculture treatments such as thinning, harvesting, planting, prescribed burning and site preparation, fertilization, and activities designed to control insect and disease outbreaks, unwanted vegetation, and animal damage. Thinning and harvesting activities are described in the timber harvest section above. Covered silviculture activities are, and will be, implemented as described below regardless of the forest management regime implemented.

### **2.2.2.1 Site Preparation (debris-clearing, piling, and burning)**

Logging slash is comprised of trees and other vegetation residue produced within the harvest operation. Treatment of slash is recognized as a necessary tool for the protection of reproduction and residual stands from the risk of fire, insects, and disease, to prepare the site for future productivity and to minimize the risk of material entering streams (OAR 629-615-0100 through OAR 629-615-0300). Such treatment may employ the use of mechanical processes, fire, chemical or other means to minimize competitive vegetation and residue from harvesting operations.

*Debris-clearing, piling and mechanical site preparation (629-615-0100, 629-615-0200) -* Under the OFP Rules, forest operations shall be conducted in a manner which will provide adequate consideration to treatment of slash to protect residual stands of timber and reproduction to optimize conditions for reforestation of forest tree species, to maintain productivity of forestland, to maintain forest health, and to maintain air and water quality and fish and wildlife habitat. Thus, operators shall dispose of or disperse unstable slash accumulations around landings to prevent their entry into streams.

When mechanical site preparation is necessary in riparian management areas or near waters of the state, operators shall conduct the operations in a way that sediment or debris does not enter waters of the state (629-615-0200). Adequate distance between disturbed

soils and waters of the state to filter sediment from run-off water must be maintained and no debris or soil shall be placed where it may enter waters of the state. No mechanical site preparation in riparian management areas is allowed:

- On slopes over 35 percent, with the exception of excavator-type equipment used during dry periods; or
- On sites with evidence of surface or gully erosion; or
- Where exposure or compaction of the subsoil is likely to occur.

*Prescribed Burning (629-615-0300)* - Prescribed burning is a tool used to achieve reforestation, maintain forest health, improve wildlife habitat, and reduce wildfire hazard. Prescribed burning is to be done consistent with protection of air and water quality, and fish and wildlife habitat. The purpose of this rule is to ensure that necessary prescribed burning is planned and managed to maximize benefits and minimize potential detrimental effects.

When planning and conducting prescribed burning, operators shall:

- Comply with Oregon's "Smoke Management Rules" (629-048-0001 through 629-048-0500) to ensure compliance with the "Oregon Smoke Management Program" (updated 2021);
- Adequately protect reproduction and residual timber, humus, and soil surface;
- Lay out the unit and use harvesting methods that minimize detrimental effects to riparian management areas, streams, lakes, wetlands, and water quality during the prescribed burning operation;
- Fell and yard the unit to minimize accumulations of slash in channels and within or adjacent to riparian management areas; and
- Minimize fire intensity and amount of area burned to that necessary to achieve reforestation, forest health, or hazard reduction needs.

Operators shall describe in a written plan how detrimental effects will be minimized when burning within 100 feet of Type F, Type SSBT and Type D streams, within 100 feet of large lakes, within 100 feet of wetlands larger than eight acres, bogs and within 300 feet of estuaries. Operations shall also protect components such as live trees, snags, downed wood, and understory vegetation required to be retained by OAR 629-635-0310 through 629-650-0040. Operators shall not salvage trees killed by prescribed fire in a riparian management area if the trees were retained for purposes of 629-635-0310 through 629-655-0000.

When the need for prescribed burning outweighs the benefits of protecting components required to be left within the riparian area, aquatic area and wetlands, protection requirements may be modified through a plan for an alternate practice. Approval of such a plan shall consider the environmental impacts and costs of alternative treatments.

#### **2.2.2.2 Reforestation (planting)**

Replanting or "reforestation" following regeneration harvest is required under the OFP Rules (OAR 629-610-000 through 629-610-0090). The purpose of the reforestation rule is to establish standards to ensure the timely replacement and maintenance of free to grow forest tree cover following forest operations at or above stocking levels that will use the tree growth potential of forestlands in Oregon (OAR 629-610-0020). Depending on potential growing

conditions of the soil, reforestation may occur through natural means or, more frequently, by replanting. For replanting activities, tree stocking standards have been established based on soil Site Class, and size of tree being planted. Tree species are also a consideration.

The time period for compliance with the reforestation rules begins at the completion of the operation or 12 months after tree stocking has been reduced, whichever comes first (OAR 629-610-0040). The landowner shall begin reforestation, including any necessary site preparation, within 12 months when reforestation is required. Planting or seeding shall be completed within 24 months unless a plan for an alternate practice for natural reforestation has been approved by the State Forester. By the end of the sixth full calendar year, the landowner shall have established a free to grow stand of trees which meets or exceeds the minimum stocking level required by OAR 629-610-0020.

Reforestation activities involve crews of 12-24 people walking through the harvest unit with shovels and seedling bags. A crew typically plants 15,000 to 30,000 seedlings per day. Seedlings are evenly distributed across the harvested area. Replanting of an average harvest unit typically takes 2-4 days, but the time may vary by a few days depending on conditions such as the amount of slash on the ground, weather conditions and seedling availability.

### **2.2.2.3 Fertilization**

Fertilization of trees to accelerate growth occurs in accordance with product labels and applicable laws for the state of Oregon. Port Blakely fertilizes certain timber stands within the HCP area with the application of nitrogenous pelletized fertilizer, i.e., Urea 46-0-0, at a rate of 330 pounds per acre. Fertilizer is only applied to areas targeted for eventual harvest. All stream and wetland buffers and permanent leave areas around special sites in the uplands are avoided as required by OFP Rules.

Under OFP Rules, fertilizers are grouped with all chemical applications (OAR 629-620-0400, ORS 527.672). Applications of fertilizers are required to follow EPA label restrictions. In addition, except where the label is more stringent, aircraft application of any chemical must not be directly applied within 60 ft of all significant wetlands, aquatic areas of other Type F, Type SSBT and Type D streams, aquatic areas of large lakes and lakes with fish use, and areas of standing open water larger than one-quarter (629-620-0400 (4)). Except where the label is more stringent, ground application of any chemical must not be directly applied within 10 ft from all significant wetlands, aquatic areas of other Type F, Type SSBT and Type D streams, aquatic areas of large lakes and lakes with fish use, and areas of standing open water larger than one-quarter acre (629-620-0400 (5)).

No application of fertilizers is allowed within 100 feet of Type D streams and the domestic use portions of Type F or Type SSBT streams; for other waters of the state, no untreated strips are required to be left when applying fertilizers, except no direct application of fertilizers to significant wetlands, aquatic areas of other Type F or Type SSBT streams or to large and medium Type N streams, aquatic areas of large lakes and lakes with fish use, and areas of standing open water larger than one-quarter acre (629-620-0400 (6)).

All chemical aerial applications must be parallel to the edge of water when applying within 100 ft of all significant wetlands, aquatic areas of other Type F, Type SSBT and Type D

streams, aquatic areas of large lakes and lakes with fish use, and areas of standing open water larger than one-quarter acre (629-620-0400 (8)).

#### **2.2.2.4 Disease, Insect and Animal Damage Control**

##### **2.2.2.4.1 Disease**

The Port Blakely forestlands contain several native pathogens, such as laminated root rot (*Phellinus wierii*), armillaria root disease (*Armillaria spp*), dwarf mistletoe (*Arceuthobium spp.*), and Swiss needle cast that are common factors in forest ecology and may occur anywhere in the HCP area. Laminated root rot is the most common disease affecting Douglas-fir and is estimated to occur on 8% of the commercial forestland in Washington and Oregon (Goheen and Hansen 1993). Pockets of Phellinus kill Douglas-fir and hemlock trees resulting in understory development and/or enhanced growth of red alder and western red cedar. During management activities, depending on stand age, Port Blakely considers planting such Phellinus pockets with more resistant commercial tree species (Port Blakely 2018a).

Armillaria species, which are fungi, have a huge host range, including many conifers and hardwoods and some herbaceous plants. These species cause root disease in all hosts and are difficult to manage. Dwarf mistletoes are host-specific, parasitic flowering plants. Tree damage from dwarf mistletoe includes growth reduction, loss of wood quality, poor tree form, predisposition to insect infestation and diseases, premature death, and reduction in seed crops. In areas that are known to host aggressive Armillaria, commercial tree species may not be viable. In these areas, disease containment becomes a priority, and the disease will be allowed to exhaust the nutrition from the resident host and dissipate before new seedlings are established.

Swiss needle cast is a disease of Douglas-fir foliage caused by a native fungus (*Phaeocryptus gaeumannii*). It causes needles to turn yellow and drop off prematurely, reducing tree growth and survival. This disease has become much more severe only recently (since the late 1980s) in Oregon most likely because of the large reforestation of the Coast Range with Douglas-fir instead of a more diverse mix of species (western hemlock and Sitka spruce) that naturally occurs there. The disease ranges into the west slope of the Cascades but is much more severe near the Coast. Port Blakely forestlands in Oregon are not affected to any significant degree (Port Blakely 2018a). The primary solution for fighting this disease is changing tree species, if possible.

In merchantable timber affected by any of the above, foresters evaluate the existing conditions of the health of the stand to develop treatment plans. Treatments can range from no action to any of the harvest treatments described above, e.g., thinning or regeneration harvest, depending on the severity of any disease or insect and animal damage. These activities are conducted according to basic forest practices rules for timber harvest.

##### **2.2.2.4.2 Insect Outbreaks**

Port Blakely implements an integrated pest management (IPM) approach to insect control. Native insect outbreaks, such as the Douglas-fir bark beetle, in merchantable timber are treated with aforementioned harvest activities designed to remove the pest from the forest to manageable and non-catastrophic levels. Non-native pests, such as Gypsy Moth, are

controlled with a variety of silviculture prescriptions, such as pocket harvests, application of the soil-dwelling bacterium *Bacillus thuringiensis*, and cooperative efforts with Oregon Department of Agriculture. Activities implemented to control insect outbreaks are conducted according to basic forest practices rules for timber harvest.

#### **2.2.2.4.3 Animal Damage Control**

Port Blakely implements an IPM Plan to mitigate the effects of animal browse or destruction of crop species. The response varies depending on species, but in every case, non-lethal trapping or exclusion methods are preferred, and poisons are not used. In areas where cedar is planted to mitigate the effects of disease, fences may be used to exclude deer and elk for the establishment period. Fenced areas do not exceed harvest unit size and are removed before the tenth year of forest growth. These control mechanisms do not involve timber harvest practices.

#### **2.2.2.5 Mechanical Vegetation Control**

Control of competing vegetation, including non-native invasive species, also involves an IPM Plan that employs the use of mechanical methods and prescribed burning described above. Vegetation is controlled, i.e., reduced or eliminated, early in the establishment of the new plantation, thus avoiding excessive competition from competitive brush species, and facilitating early growth of crop trees and trees retained in riparian areas. Crop trees should be free to grow without treatment by age five. Mechanical vegetation control methods include removal of scotch-broom and/or other competitive hardwoods and can occur at any time during the early to mid-stages of the forest lifecycle. It is a highly manual process involving small crews with chainsaws and/or weed whackers. Activities are very localized, e.g., confined to a roadside edge or an individual harvest unit, and may take 2 to 3 days to treat an area approximately 60 acres in size, less time for roadside treatments.

#### **2.2.3 Road Management Under Current Forest Practice Rules**

OAR 629-625-0100 through 629-625-0700. Roads are an integral part of Port Blakely's long-range forest management plan while also providing fire access for each given geographical block. Road construction planning considers logging systems, construction cost alternatives, road density, and removing land base from timber production. Avoidance of sensitive environmental, archeological, and cultural sites is exercised whenever possible. High maintenance permanent road locations are evaluated for long-term economic impacts.

Most road management activities must have the appropriate regulatory permits approved before work commences. The permits and written plans are kept on site during work hours.

The condition of any road during active log hauling or immediately after log hauling must meet the following criteria:

- Ensure that no delivery of road-associated sediment occurs to any stream regulated under OFP Rules or risks damaging natural resources; and
- Ensure that any road that may require additional, but not immediate, work to return the road to normal uses is blocked with a log or have a tank trap installed to prevent vehicle traffic; water bars of sufficient construction to withstand natural and man-caused forces may be used as a temporary measure.



### 2.2.3.1 Road Construction and Maintenance

The OFP Rules include an entire section with requirements for forest road design, construction, and maintenance (OAR 629-625-0100 through OAR 629-625-0800) (ODF 2018a). The stated purpose of the OFP Rules addressing roads is “because a properly located, designed, and constructed road greatly reduces potential impacts to water quality, forest productivity, fish, and wildlife habitat.” In addition to the requirements of the water protection rules, operators must submit a written plan to the State Forester before:

- Constructing a road where there is an apparent risk of road-generated materials entering waters of the state from direct placement, rolling, falling, blasting, landslide, or debris flow;
- Conducting machine activity in Type F or Type D streams, lakes, or significant wetlands; or
- Constructing roads in RMAs.

Oregon Forest Practices Rules require that roads be located where potential impacts to waters of the state are minimized (OAR 629-625-0200) (ODF 2018a). When locating roads, operators are required to designate road locations which minimize the risk of materials entering waters of the state and minimize disturbance to channels, lakes, wetlands, and floodplains. This requirement includes avoidance of locating roads on steep slopes, slide areas, high landslide hazard locations, and in wetlands, RMAs, channels, or floodplains where viable alternatives exist. Additionally, the number of stream crossings are to be minimized, i.e., created only when no other viable, safe, practicable alternative is identified.

Forest road design specifications (OAR 629-625-0300) are required to protect water quality (ODF 2018a). Operators are required to design and construct roads to limit the alteration of natural slopes and drainage patterns to that which will safely accommodate the anticipated use of the road and will also protect waters of the state. Stream crossing structures (culverts, bridges, and fords) are to be constructed such that they minimize excavation of side slopes near the channel and the volume of material in the fill consistent with Forest Practices (ODF 2018a) and Oregon Fish Passage laws (OAR 635-412-0005 through 635-412-0040). Minimizing fill material is accomplished by restricting the width and height of the fill to the amount needed for safe use of the road by vehicles, and by providing adequate cover over the culvert or other drainage structure.

Fills over 15 feet deep contain a large volume of material that can pose a considerable risk to downstream reaches if they fail. As such, any fill expected to be over 15 feet deep requires an approved plan that describes the fill and drainage structure design including how the likelihood of surface erosion, embankment failure, and downstream movement of fill material will be minimized.

Operators shall design and construct stream crossings (culverts, bridges, and fords) consistent with Forest Practices (ODF 2018a) and Oregon Fish Passage laws (OAR 635-412-0005 through 635-412-0040), and approved by NMFS to:

- Pass peak flows that at least correspond to the 50-year return interval; and
- Allow migration of adult and juvenile fish upstream and downstream during conditions when fish movement in that stream normally occurs.

Road drainage systems have the potential to alter stream channels and deliver sediment to streams. The OFP Rules address these risks by prohibiting road drainage water into headwalls, slide areas, high landslide hazard locations or steep erodible fill slopes, as well as diverting water from stream channels into roadside ditches (ODF 2018a). The OFP Rules provide standards for disposal of waste materials, drainage, stream protection, and stabilization to protect water quality during and after road construction (629-625-0400) (ODF 2018a). Thus, operators are required to install structures that divert or filter water before entering streams, minimize road erosion, and provide effective cross drainage.

When constructing stream crossings, operators are required to minimize disturbance to banks, existing channels, and RMAs. For all roads constructed or reconstructed operators shall install water crossing structures where needed to maintain the flow of water and passage of adult and juvenile fish between side channels or wetlands and main channels. Operators are also required to leave or re-establish areas of vegetation between roads and waters of the state to protect water quality.

Oregon Forest Practice Rules addressing road maintenance focus on protecting water quality by implementing timely maintenance of all active and inactive roads (629-625-0600). Required maintenance activities include, but are not limited to, the following measures:

- Maintenance of active and inactive roads in a manner sufficient to provide a stable surface and to keep the drainage system operating as necessary to protect water quality;
- Inspection and maintenance of culvert inlets and outlets, drainage structures and ditches before and during the rainy season as necessary to diminish the likelihood of clogging and the possibility of washouts;
- Provide effective road surface drainage, such as water barring, surface crowning, constructing sediment barriers, or out sloping prior to the rainy and runoff seasons;
- Placement of material removed from ditches in a stable location; and
- Maintenance of fish passage through water crossing structures by:
  - Maintaining conditions at the structures so that passage of adult and juvenile fish is not impaired during periods when fish movement normally occurs; and
  - Keeping structures cleared of woody debris and deposits of sediment that would impair fish passage, as is reasonably practicable.

Road maintenance activities involving rocking of existing roads averages 12 miles, annually. There are nine permanent steel bridges on the HCP lands, four of which are anticipated to need replacement at some point in the next 50 years as part of the long-term road maintenance plan. The need for road construction depends on factors such as the annual harvest plan, the location of the harvest unit in relation to existing roads, and whether the harvest method (cable or ground-logging) requires better access than from existing roads. The total amount of active roads on Port Blakely's ownership is 251 miles resulting in a road density of approximately 5.2 mi/mi<sup>2</sup>. Road construction currently averages 4.2 miles, annually. Road maintenance activities involving rocking of existing roads averages 12 miles, annually.

### 2.2.3.2 Road Deactivation and Abandonment

The practices of vacating, i.e., deactivating, or abandoning forest roads is also addressed in the OFP Rules (629-625-0650), although the provisions are recommendations, rather than requirements, for landowners that choose to conduct this activity. Recommendations focus on leaving roads in a condition where road related damage to waters of the state is unlikely, including:

- Effectively blocking the road to prevent continued use by vehicular traffic (deactivation);
- Removing stream crossing fills and structures (deactivation and abandonment); and
- Pullback of fills on steep slopes, frequent cross ditching, and/or vegetative stabilization (abandonment).

Road deactivation involves blocking access to the road to prevent any use when forest management activities are not anticipated to occur for ten or more years. Drainage structures (cross drains, culverts, and other drainage features) are typically left in place and maintained when needed. Road abandonment activities are implemented if current and acquired lands have stream-adjacent roads or are located near sensitive sites such as wetlands or unstable slopes, and where other options exist for road placement. Abandonment activities include bed and drainage structure removal and restoring to a condition capable of growing trees. Road deactivation and abandonment currently averages 1.1 miles, annually. There are approximately 32 miles of deactivated or abandoned roads on Port Blakely's ownership, i.e., 13% of the existing road system.

### 2.2.3.3 Quarrying (rock pits)

Oregon Forest Practice Rules addressing the development, use, and abandonment of rock pits or quarries located on forestland and used for forest management are required to be conducted using practices which maintain stable slopes and protect water quality (629-625-0500) (ODF 2018a). Operators are not allowed to locate quarry sites in channels and must prevent overburden, solid wastes, or petroleum products from entering streams and wetlands. Operators are also required to stabilize banks, headwalls, and other surfaces of quarries and rock pits to prevent surface erosion or landslides (ODF 2018a). When a quarry or rock pit is inactive or vacated, operators shall leave it in the conditions described above, shall remove from the forest all petroleum-related waste material associated with the operation, and shall dispose of all other debris so that such materials do not enter waters of the state.

*Blasting and crushing* - Blasting & crushing in rock quarries can occur anytime during the year. Contractors in charge of blasting procedures drill holes and place explosives in them to separate the rock formation. After blasting, rock crushing occurs to size the rock for desired uses. This activity is temporary in nature. If blasting rock at quarry sites or when constructing a road there is an apparent risk of road-generated materials entering waters of the state operators must submit a written plan to the State Forester (629-625-0100).

*Hauling* - Hauling is the transportation of road rock materials over forest roads. These activities occur year around. Where needed to protect water quality, as directed by the State Forester, operators shall place additional cross drainage structures on existing active roads within their ownership prior to hauling to meet the requirements of the Road Maintenance

Drainage Rule (OAR 629-625-0330). There is also a Wet Weather Road Use rule (629-625-0700) that is meant to reduce delivery of fine sediment to streams caused by use of forest roads during wet periods that may adversely affect downstream water quality in Type F, Type SSBT or Type D streams. Operators are required to use durable surfacing or other effective measures that resist deep rutting or development of a layer of mud on top of the road surface on road segments that drain directly to streams on active roads that will be used for log hauling during wet periods. Operators must also cease active road use where the surface is deeply rutted or covered by a layer of mud and where runoff from that road segment is causing a visible increase in the turbidity of Type F, Type SSBT or Type D streams as measured above and below the effects of the road.

Quarrying and rock pit activities occur throughout the HCP area. Quarry materials are used primarily for forest roads on the Port Blakely ownership with a strict limitation on the amount of materials (5,000 yards annually) available for sale for off-site use (Dept. Geology and Mining Industries ORS 517.753). Rock material sales can only occur if used for forestry purposes only. Currently, there are 18 rock pits covering approximately 40 acres. These pits are entered, on average, once every three years. When abandoned, they are reclaimed to return the pits to forest production. Port Blakely anticipates the abandonment of eight rock pits over the next 50 years and replacing them with eight new rock pits approximately 1.5 acres in size, on average. New rock pits will be located near existing roads and away from streams.

### **SECTION 3 COVERED SPECIES**

The Covered Species addressed in this HCP include listed aquatic and terrestrial species, and unlisted aquatic and terrestrial species of concern that are likely to occur on Port Blakely forestlands in Clackamas County and lands that may be acquired in the Potential Land Acquisition area, and have the potential to be impacted by Port Blakely's forest management activities (NMFS 2016a, ODFW 2014, USFWS 2016a). Listed and unlisted Covered Species are shown in Table 3-1 and Table 3-2, respectively.

Federal status refers to a species listing status under the ESA. State status refers to a listing under the Oregon ESA as reported by Oregon Biodiversity Information Center (ORBIC 2016). Note: Species identified as State "Sensitive Species" are not "candidate" species to be considered for listing under the Oregon ESA. Rather, the Sensitive Species list indicates species that are facing one or more threats to their populations and/or habitats and is maintained by ODFW in accordance with OAR 635-100-0040.

**Table 3-1. Covered fish and wildlife ESA-listed species with the potential to occur on Port Blakely’s HCP forestlands.**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Federal / State Status</b>	<b>Critical Habitat Status</b>	<b>Notes</b>
<b>AQUATIC SPECIES</b>				
Chinook Salmon Lower Columbia River Fall Run	<i>Oncorhynchus tshawytscha</i>	Threatened / Not listed, sensitive	CH designated, includes Clackamas River	Occurs in Clackamas River drainage and could occur in streams > 10 feet wide in the HCP area.
Chinook Salmon Upper Willamette River Spring Run	<i>Oncorhynchus tshawytscha</i>	Threatened / Not listed, sensitive	CH designated, includes Molalla River	Occurs in Molalla River and Clackamas River drainages and could occur in streams > 10 feet wide in the HCP area.
Coho Salmon Lower Columbia River	<i>Oncorhynchus kisutch</i>	Threatened / Endangered	CH designated, includes Clackamas River	Cascade population of the Lower Columbia River ESU. Both an early and late run per the Recovery Plan. Occurs in Clackamas River drainage including Clear Creek. Known to occur in many small and medium fish streams that flow through the HCP area.
Steelhead Lower Columbia River	<i>Oncorhynchus mykiss</i>	Threatened / Not listed, sensitive	CH designated, includes Clackamas River	Occurs in Clackamas River drainage and is known to occur in many small and medium fish streams that flow through the Port Blakely HCP area.
Steelhead Upper Willamette River	<i>Oncorhynchus mykiss</i>	Threatened / Not listed, sensitive	CH designated, includes Molalla River	Occurs in Molalla River drainage and is known to occur in many small and medium fish streams that flow through the HCP area.
Bull Trout	<i>Salvelinus confluentus</i>	Threatened / Not listed, sensitive	CH designated; none in Clackamas County	The Clackamas population has been designated as an experimental population, non-essential (introduced population). Could occur in the HCP area with expansion from stream where it was introduced.
<b>TERRESTRIAL SPECIES</b>				
Gray Wolf	<i>Canis lupus</i>	Endangered / Not listed, sensitive	None	Currently in northeast, eastern, and the north Cascades, Oregon; does not occur on PB lands but could over time with range expansion; a wolf use area is located 30 miles north of current HCP lands within the Potential Acquisition Lands boundary.
Northern Spotted Owl	<i>Strix occidentalis caurina</i>	Threatened / Threatened	CH designated; Unit WCS 2 on Federal lands adjacent to PB eastern border	Currently does not occur on PB lands based on surveys; i.e., no occupancy. But could occur on PB lands adjacent to Federal lands east and south where owls have occurred in the past.

**Table 3-2. Covered fish and wildlife species of concern with the potential to occur on Port Blakely’s HCP forestlands.**

Common Name	Scientific Name	Federal / State Status	Notes
<b>Fish</b>			
Pacific lamprey	<i>Lampetra tridentata</i>	Concern / Not listed, sensitive	NatureServe (2017) indicates it’s in Clackamas County, and in Molalla-Pudding & Clackamas River watersheds. Observed in in the HCP area within the Molalla River system.
<b>Amphibians and Reptiles</b>			
Cascades frog	<i>Rana cascadae</i>	Concern / Not listed, sensitive	Not observed but could occur; range includes Port Blakely land in central Clackamas County; shown in ODFW Conservation Strategy Western Cascades Ecoregion; NatureServe (2017) indicates it’s in Clackamas County, and in Molalla-Pudding & Clackamas River watersheds. Upcoming review by USFWS.
Coastal tailed frog	<i>Ascaphus truei</i>	Concern / Not listed, sensitive	Not observed but could occur; range includes most of Clackamas County; shown in ODFW Conservation Strategy Western Cascades Ecoregion; NatureServe (2017) indicates it’s in Clackamas County, and in Molalla-Pudding & Clackamas River watersheds.
Cascade torrent salamander	<i>Rhyacotriton cascadae</i>	No status / Not listed, sensitive	Not observed but could occur; shown in ODFW Conservation Strategy Western Cascades Ecoregion; range includes west slope of the Cascade Mountains in northern Oregon south to northeastern Lane County. Upcoming review by USFWS.
Oregon slender salamander	<i>Batrachoseps wrighti</i>	Concern / Not listed, sensitive	Known to occur on Port Blakely land; shown in ODFW Conservation Strategy Western Cascades Ecoregion. Upcoming review by USFWS.
Western/North Pacific pond turtle	<i>Actinemys marmorata marmorata</i>	Concern / Not listed, sensitive	Not observed but could occur; shown in ODFW Conservation Strategy Western Cascades Ecoregion; NatureServe (2017) indicates it’s in Clackamas County, and in Molalla-Pudding & Clackamas River watersheds. Upcoming review by USFWS.
<b>Birds</b>			
Northern goshawk	<i>Accipiter gentilis</i>	Concern / Not listed, sensitive	Not observed but could occur; wide-ranging species likely includes Port Blakely land; shown in ODFW Conservation Strategy Western Cascades Ecoregion; NatureServe (2017) indicates it’s in Clackamas County, and in Clackamas River watershed but not in Molalla-Pudding River watershed.

**Table 3-2. (continued)**

<b>Mammals</b>			
Pacific Fisher	<i>Pekania pennanti</i>	Proposed threatened / Not listed, sensitive	Range in Oregon does not include Port Blakely land but including in anticipation of reintroduction; shown in ODFW Conservation Strategy Western Cascades Ecoregion. Threats: habitat loss, trapping; extirpated; to be reintroduced.
Townsend's big-eared bat	<i>Corynorhinus townsendii</i> spp	Concern / Not listed, sensitive	Not observed but could occur; found throughout much of Oregon; shown in ODFW Conservation Strategy Western Cascades Ecoregion; NatureServe (2017) indicates it's in Clackamas County, and in Molalla-Pudding & Clackamas River watersheds. Threats: habitat loss and/or degradation, potentially WNS.
Hoary bat	<i>Lasiurus cinereus</i>	No status / Not listed, sensitive	Not observed but could occur; found throughout much of North America; shown in ODFW Conservation Strategy Western Cascades Ecoregion; NatureServe (2017) indicates occurrence in Oregon. Threats: habitat loss and/or degradation, wind turbines.
Silver-haired bat	<i>Lasionycteris noctivagans</i>	Concern / Not listed, sensitive	Not observed but could occur; found throughout much of the U.S.; shown in ODFW Conservation Strategy Western Cascades Ecoregion; NatureServe (2017) indicates occurrence in Oregon. Threats: habitat loss and/or degradation, wind turbines, potentially WNS.
Fringed myotis bat	<i>Myotis thysanodes</i>	Concern / Not listed, sensitive	Not observed but could occur; occurs in a variety of habitats including mixed and conifer woodlands; NatureServe (2017) indicates it's in Clackamas County, and in Clackamas watershed; shown in ODFW Conservation Strategy Western Cascades Ecoregion. Threats: habitat loss and/or degradation, WNS.
Long-eared myotis bat	<i>Myotis evotis</i>	Concern / Not listed	Not observed but could occur; found throughout much of Oregon; NatureServe (2017) indicates it's in Clackamas County, and in Clackamas watershed. Threats: habitat loss and/or degradation, WNS.
Long-legged myotis bat	<i>Myotis volans</i>	Concern / Not listed, sensitive	Not observed but could occur; found in Montane coniferous forests; shown in ODFW Conservation Strategy Western Cascades Ecoregion. Threats: habitat loss and/or degradation, WNS.



### 3.1 Listed Species

#### 3.1.1 Chinook Salmon – Lower Columbia River Fall-Run

The lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU) includes naturally spawned Chinook salmon originating from the Columbia River and its tributaries downstream of a transitional point east of the Hood and White Salmon Rivers, and any such fish originating from the Willamette River and its tributaries below Willamette Falls (Figure 3-1). The LCR fall-run Chinook salmon distinct population segment (DPS) also includes Chinook salmon from 15 artificial propagation programs (NMFS 2005a; NMFS 2014).

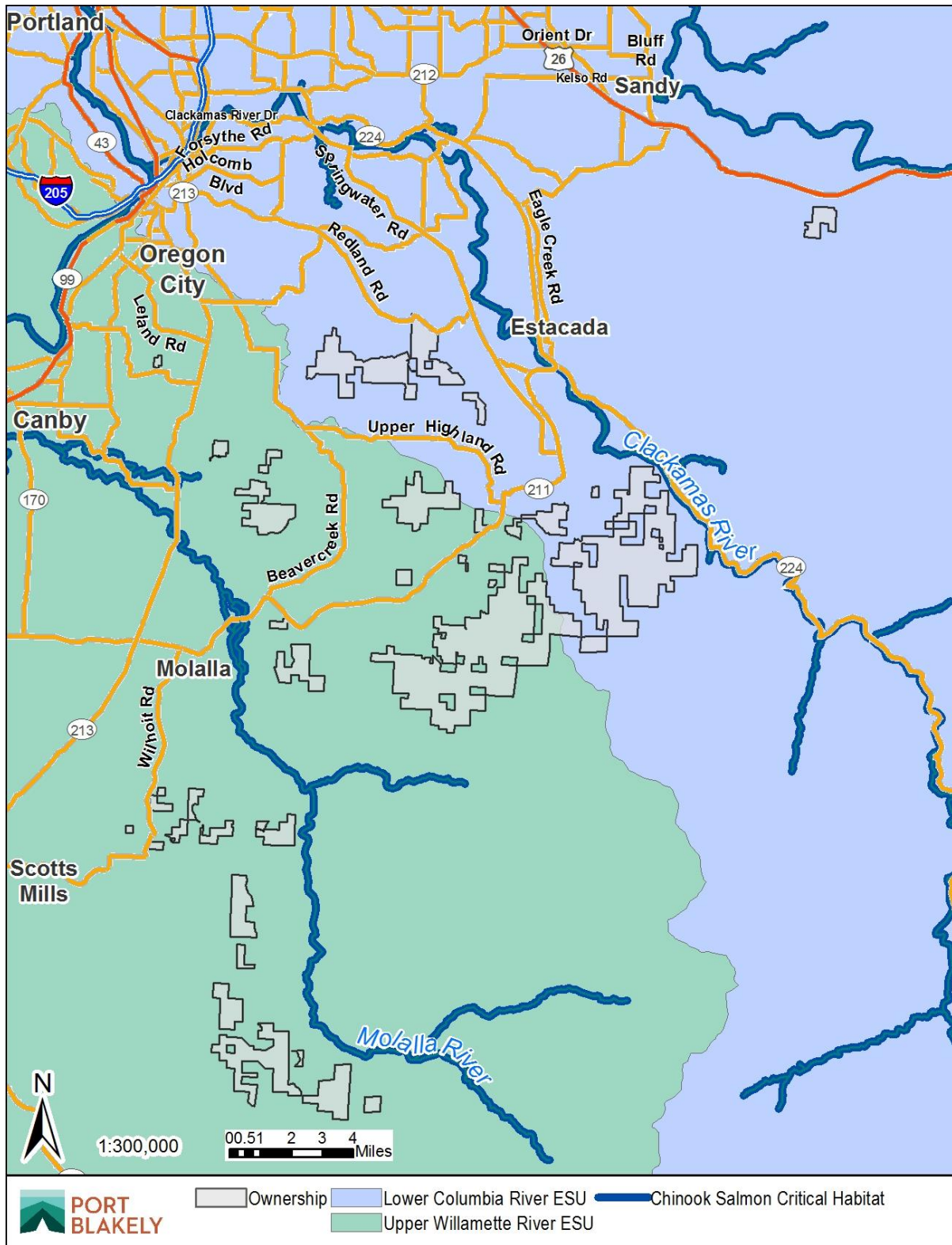
LCR Chinook are classified as fall-run based on when adults return to fresh water. Other life history differences among run types include the timing of spawning, incubation, emergence in freshwater, migration to the ocean, maturation, and return to fresh water. This life history diversity allows different runs of Chinook salmon to use streams as small as 10 feet wide and rivers as large as the mainstem Columbia. Stream characteristics determine the distribution of run types among lower Columbia River streams. Depending on run type, Chinook rear for a few months to a year or more in freshwater streams, rivers, or the estuary before migrating to the ocean. All runs migrate far into the north Pacific on a multi-year journey along the continental shelf to Alaska before circling back to their river of origin. The spawning run typically includes three or more age classes. Adult Chinook are the largest of the salmon species, and Lower Columbia River fish occasionally reach sizes up to 25 kilograms. Chinook salmon require clean gravels for spawning and pool and side-channel habitats for rearing (LCFRB 2010).

##### 3.1.1.1 Status and Distribution

*Status* - The lower LCR fall-run Chinook was listed as Threatened on June 28, 2005 (NMFS 2005a). In April 2014, updates to the descriptions of certain listed West Coast salmonid species to add or remove hatchery stocks consistent with NMFS 5-year reviews under ESA section 4(c)(2) published in 2011 (NMFS 2014). The updates revised the artificial propagation programs to include 15 programs for the LCR Chinook ESU. A recent 5-Year Review confirmed the listing status of four Lower Columbian River salmon species as threatened, including the LCR Chinook (NMFS 2016b). The LCR Chinook ESU was also confirmed as requiring no change.

Critical habitat was designated for the LCR Chinook ESU, and 11 other ESUs of salmon and steelhead, in Washington, Oregon and Idaho in 2005 (NMFS 2005b). Critical habitat is defined as: (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation (NOAA Fisheries 2017a). Relative to the HCP area, including the area of Potential Land Acquisitions, the critical habitat designation for the LCR Chinook ESU includes the Clackamas River watershed of the Clackamas River subbasin from its connection to the Willamette River near Oregon City in Multnomah County into northeastern Clackamas County (Figure 3-1). The Clackamas River and its major tributaries designated as critical habitat do not occur on Port Blakely's HCP lands. However, very small portions of HCP parcels occur

Figure 3-1. Lower Columbia River and Upper Willamette River Chinook Salmon ESUs and Critical Habitat in Relation to Current HCP Lands.



within 0.5 mile west of the Clackamas River (Figure 3-1) and future acquisitions could include critical habitat though it is highly unlikely that Port Blakely would acquire lands that have streams designated as critical habitat. Factors and threats limiting viability of LCR fall-run Chinook salmon are identified and addressed in the 2013 Recovery Plan (Dornbusch and Sihler 2013). Degraded riparian conditions and channel structure issues are also a primary limiting factor for fall-run Chinook salmon in the Clackamas River, as well as other Oregon populations. The lack of large woody debris (LWD) and appropriately sized gravel in the remaining accessible tributary habitat has significantly reduced the amount of suitable spawning and rearing habitat for tule fall Chinook salmon. The baseline status of LCR Chinook salmon populations shows that the Clackamas River population has a very low persistence probability (NMFS 2013).

However, overall, there was little change since the last status review (Ford et al. 2011) in the biological status of Chinook salmon populations in the LCR ESU (NWFSC 2015). Increases in abundance were noted in about 70% of the fall-run populations and decreases in hatchery contribution were noted for several populations. Relative to baseline viable salmon population (VSP) levels identified in the Recovery Plan (NMFS 2013) there has been an overall improvement in the status of a number of fall-run populations, although most are still far from the recovery plan goals (NWFSC 2015).

The majority of the populations in this demographically independent population (DIP) have exhibited stable or slightly positive natural origin abundance trends (NWFSC 2015). Natural origin spawners number in the high hundreds to low thousands of fish, with the majority of the fish on the spawning grounds being natural origin, except for the Toutle, Kalama, and Washougal rivers in Washington where hatchery programs strongly influence the composition of naturally spawning fish. Annual variability in the proportion of hatchery-origin spawners is very high in the Clackamas River, although only a few years of data are available (NWFSC 2015). Overall, this major population group (MPG) exhibits stable population trends, but at low abundance levels, and while the level of hatchery contribution to naturally spawning adults is relatively better than in other MPGs in this ESU, most populations are still far above the hatchery contribution target of 10% identified in the NMFS Lower Columbia River recovery plan (Dornbusch and Sihler 2013).

*Distribution* - A total of 32 historical independent populations have been identified in this ESU: 21 fall, two late-fall, and nine spring-run populations (NMFS 2013). The geographical distribution of LCR fall run Chinook includes five populations in north central Oregon; Hood River, Sandy River, Clackamas River and two identified as lower gorge tributaries. The Clackamas River population is the southernmost and has been identified as a “core population”, i.e., considered historically to be highly productive (NMFS 2013).

### **3.1.1.2 Habitat Characteristics and Use**

Chinook salmon use streams as small as 10 feet wide and rivers as large as the mainstem Columbia. Stream characteristics determine the distribution of run types among lower Columbia River streams. Depending on run type, Chinook rear for a few months to a year or more in freshwater streams, rivers, or the estuary before migrating to the ocean in spring, summer, or fall. All runs migrate far into the north Pacific on a multi-year journey along the continental shelf to Alaska before circling back to their river of origin. The spawning run typically includes three or

more age-classes. Chinook salmon require clean gravels for spawning and pool and side-channel habitats for rearing. All Chinook salmon die after spawning (LCFRB 2010).

Fall Chinook salmon spawn in moderate-sized streams and large river mainstems, including most tributaries of the lower Columbia River. Most LCR fall Chinook salmon enter freshwater from August to September and spawn from late September to November, with peak spawning activity in mid-October (NMFS 2013). Tule fall Chinook salmon populations historically spawned in rivers and streams from the mouth of the Columbia River to the Klickitat River.

Lower Columbia River fall Chinook display an “ocean-type” life history. Juveniles typically begin emigrating downstream as sub yearlings at 1 to 4 months of age and enter saltwater in late summer or autumn. Juvenile trapping indicates that individual populations display different combinations of two basic temporal patterns: an early fry outmigration downstream into intertidal areas in the early spring, followed by a component that rears for a longer period in natal tributary habitat and out-migrates in late spring/early summer (Cooney and Holzer 2011). Ocean-type juveniles make extensive use of the estuary. Rivers with well-developed estuaries, such as the Columbia, are able to sustain large populations of ocean-type salmon. Sub yearling Chinook salmon can be found in the Columbia River estuary during every month of the year. After spending weeks or months rearing in the estuary, LCR fall Chinook migrate northward into ocean waters off of Washington, British Columbia, and Southeast Alaska. Most fall Chinook salmon remain at sea from 1 to 5 years (more commonly 3 to 5 years) and return to spawn at 2 to 6 years of age. They return to fresh water in late summer or fall and usually spawn within a few weeks (LCFRB 2010).

A key habitat concern includes reduced complexity, connectivity, quantity, and quality of habitat used for spawning, rearing, foraging, and migrating. This is true for LCR Chinook and other lower Columbia River listed species. Loss of habitat from conversion to agricultural or urbanized uses continues to be a particular concern throughout the lower Columbia River region, especially the loss of habitat complexity in the lower tributary/mainstem Columbia River interface, and concomitant changes in water temperature (LCFRB 2010, ODFW 2010a, NMFS 2013).

### **3.1.1.3 Occurrence in the HCP Area**

The LCR Chinook salmon ESU includes the Clackamas River drainage (Figure 3-1) (NOAA Fisheries 2017b). The Clackamas River and several major tributaries have also been included as designated Critical Habitat for LCR Chinook salmon (Figure 3-1) (NOAA Fisheries 2017a). The portion of the Clackamas River that has been designated as critical habitat flows adjacent to Port Blakely forestlands. Clear Creek, one of the larger tributaries in the lower basin, flows through Port Blakely, however, Chinook use is unknown. Additionally, many small and medium fish streams flow through Port Blakely forestlands, although they likely are too small for Chinook use, as the majority of streams are ODF-typed as small which are typically < 10 feet wide on the ownership. These stream systems and their associated riparian zones, managed under OFP Rules, exist throughout the forestlands. The Port Blakely HCP area contains a range of forested age-classes from young to mature stands > 50 years old, distributed throughout the Clackamas River tributaries in the upper watersheds. Contributions to riparian and stream function increases as the adjacent forests age, with older stands increasing shade and LWD recruitment at levels that allow fish to utilize the habitat for some or all of their life-stages. These

characteristics likely results in some stream habitat in the proposed HCP area, e.g., medium streams > 10 feet wide, that is suitable for salmonid use in the LCR ESU. Thus, it is likely LCR Chinook occur in Clackamas River and tributaries that flow through and adjacent to Port Blakely's HCP area.

### **3.1.2 Chinook Salmon – Upper Willamette River**

The upper Willamette River (UWR) Chinook salmon ESU includes naturally spawned spring-run Chinook salmon originating from the Clackamas River and from the Willamette River and its tributaries above Willamette Falls (Figure 3-1). This ESU also includes spring-run Chinook salmon from six artificial propagation programs (NMFS 2005a; NMFS 2014, NMFS 2016c). The UWR Chinook salmon hatchery programs have not changed substantially from the previous ESA status review to suggest that their level of divergence relative to the local natural populations has changed (Jones 2015, as cited in NMFS 2016c).

Spring-run Chinook salmon are classified as such based on when adults return to fresh water. Stream characteristics determine the distribution of run types among lower Columbia River streams including the upper Willamette River and its tributaries (NWFSC 2015). Depending on run type, Chinook rear for a few months to a year or more in freshwater streams, rivers, or the estuary before migrating to the ocean in spring, summer, or fall. As with the LCR ESU Chinook salmon, UWR Spring-run Chinook migrate far into the north Pacific on a multi-year journey along the continental shelf to Alaska before circling back to their river of origin to spawn (LCFRB 2010).

#### **3.1.2.1 Status and Distribution**

*Status* - The UWR spring-run Chinook was listed as Threatened on June 28, 2005 (NMFS 2005a). In April 2014, updates to the descriptions of certain listed West Coast salmonid species to add or remove hatchery stocks consistent with NMFS' recently completed 5-year reviews under ESA section 4(c)(2) were published (NMFS 2014). These UWR Chinook salmon hatchery programs were confirmed in a subsequent status review (NMFS 2016c).

Critical habitat was designated for the UWR Chinook salmon ESU, and 11 other ESUs of salmon and steelhead, in Washington, Oregon and Idaho in 2005 (NMFS 2005b). Relative to the HCP area, including the area of Potential Land Acquisitions, the critical habitat designation for the UWR Chinook ESU includes the Clackamas River watersheds in northern Clackamas County, and the Molalla-Pudding River watersheds in northwestern Clackamas County and northern Marion County where they connect with the Willamette River near Canby, Oregon (Figure 3-1). The Clackamas and Molalla Rivers, and their major tributaries designated as critical habitat in this ESU, do not occur on Port Blakely's HCP lands. However, very small portions of HCP parcels occur within 0.5 mile west of the Molalla River and Clackamas River (Figure 3-1) and future acquisitions could include critical habitat though it is highly unlikely that Port Blakely would acquire lands that have streams designated as critical habitat.

Natural origin returns to the Clackamas River have remained flat, despite adults having access to much of their historical spawning habitat. Although returning adults have access to most of the Calapooia and Molalla basin, habitat conditions are such that the productivity of these

systems is very low. Natural origin spawners in the Middle Fork Willamette River in the last 10 years consisted solely of adults returning to Fall Creek.

Although there has likely been an overall decrease in the viable salmonid population (VSP) status of the ESU since the last review, the magnitude of this change is not sufficient to suggest a change in risk category. Given current climatic conditions and the prospect of long-term climatic change, the inability of many populations to access historical headwater spawning and rearing areas may put this ESU at greater risk in the near future (NWFSC 2015).

Relative to abundance and productivity in the HCP area, returning spring-run Chinook salmon in the Clackamas River are enumerated at North Fork Dam and out-migrating juveniles are collected and counted at River Mill Dam (NWFSC 2015). The recent 5-year trend is relatively stable although the abundance is depressed. While the 2014 return of Chinook salmon, 983 fish, was the lowest since the last review, there is some expectation that the benefits of improved juvenile passage will be detected in the next few years (NWFSC 2015).

*Distribution* - The Willamette-Lower Columbia Technical Recovery Team (WLC TRT) identified seven demographically independent populations of spring-run Chinook salmon in the UWR Chinook salmon ESU: Clackamas, Molalla, North Santiam, South Santiam, Calapooia, McKenzie, and the Middle Fork Willamette (Myers et al. 2006). The WLC TRT classified the Clackamas, North Santiam, McKenzie, and Middle Fork Willamette populations as “core populations” and the McKenzie as a “genetic legacy population.” All the populations are part of the Cascades Tributaries Stratum for the ESU. The WLC TRT delineated the populations based on geography, migration rates, genetic attributes, life history patterns, phenotypic characteristics, population dynamics, and environmental and habitat characteristics (Myers et al. 2006).

### **3.1.2.2 Habitat Characteristics and Use**

Habitat characteristics are generally similar to those described above for LCR Chinook salmon. Habitat use is described here based on information from the Recovery Plan (ODFW and NMFS 2011).

Adult UWR spring Chinook begin appearing in the lower Willamette River in January, with fish entering the Clackamas River as early as March. The majority of the run ascends Willamette Falls from late April through May, with the run extending into mid-August (Myers et al. 2006). Historically, passage over the falls may have been marginal in June because of diminishing flows, and only larger fish would have been able to ascend. The disappearance of the June run in the 1920s and 1930s was associated with the dramatic decline in water quality in the lower Willamette River (Mattson 1963). This is also the period of heaviest dredging activity in the lower Willamette River. The main channel of the river was moved from the east side of Swan Island, enough dredge material was removed from the Willamette River to increase the size of Swan Island to three times its original size. Dredge material was also used to fill floodplain areas like Guilds Lake (some came from other sources too). Chinook salmon now ascend the falls via a fish ladder.

After ascending Willamette Falls, adult Chinook migrate quickly to the upper portions of the larger subbasins and “hold” in the deeper pools with cooler water temperatures through the summer. The historic spawning period for UWR Chinook probably extended from July through

October, but at the present spawning generally begins in late August and continues into early October, with peak spawning in September (Mattson 1948, Nicholas 1995, Willis et al. 1995). Adult Chinook salmon must deposit their eggs at a time that will ensure that fry emerge the following spring when productivity is sufficient for survival and growth (Myers et al. 2006). Exact timing varies with water temperature with fish in colder areas, such as the headwaters, spawning earlier than fish lower in the subbasin. Because Chinook spawn in the fall and their offspring emerge from the gravel the following spring, the success of spawning is greatest in areas with relatively stable substrates so that gravel and cobbles shifting during high water events do not damage the eggs.

Chinook fry emerge from gravels from February through March, and sometimes as late as June (Mattson 1962). Unnaturally warm water released in the fall from the large flood control dams on several tributaries hastens the development of eggs and emergence of fry compared to emergence in tributaries with unregulated water flows (Downey et al. 1993). The juveniles rear in areas with a variety of cover types that provide protection. A general trait found in other populations is that older juvenile migrants primarily use mid-channel areas and usually migrate at night, presumably to avoid predators. UWR Chinook typically exhibit a stream-type life history, where adults begin migrating upstream through freshwater zones in the Columbia River in the spring. Unlike some stream-type Chinook populations, the rearing and migratory life history pattern of UWR Chinook is more of a continuum.

A significant proportion, if not the majority of UWR Chinook, emigrate from freshwater as yearlings, similar to other stream-type Chinook salmon. In general, once fish reach this age, there is a directional downstream migration, although there is evidence that fish are growing during this passage, implying they are eating and rearing as they migrate. Distinct phases of juvenile emigration out of tributaries into the Willamette River that are variable with environmental conditions include: 1) Late winter to early spring as fry, 2) fall to early winter as fingerlings, and 3) late winter through spring as yearlings. Once they enter the Pacific Ocean, UWR Chinook migrate north along the coasts of British Columbia and southeastern Alaska (Myers et al. 2006). The majority of both hatchery-origin and natural-origin UWR Chinook adults are four and five years old when they return to freshwater, with small proportions of age-3 and age-6 fish. In general, returning hatchery-origin Chinook adults tend to be younger than natural origin fish, with a higher proportion of age-4 fish. Life history characteristics and genetic background of UWR Chinook populations may have been reduced or traits redirected by artificial propagation, migration barriers, and habitat degradation (Myers et al. 2006; NMFS 2005a).

As stated for the LCR Chinook salmon above, key habitat concerns for lower Columbia River listed species, which includes upper Willamette River salmon, are reduced complexity, connectivity, quantity, and quality of habitat used for spawning, rearing, foraging, and migrating. Loss of habitat from conversion to agricultural or urbanized uses continues to be a particular concern throughout the lower Columbia River region, especially the loss of habitat complexity in the lower tributary/mainstem Columbia River interface, and concomitant changes in water temperature (LCFRB 2010, ODFW 2010a, NMFS 2013).

### 3.1.2.3 Occurrence in the HCP Area

The UWR Chinook salmon ESU includes the Clackamas River drainage and Molalla River drainage which include spawning and rearing areas (Figure 3-1) (NMFS 2016c). The critical habitat designation for the UWR Chinook salmon ESU includes the upper and lower Molalla River watersheds of the Molalla/Pudding Rivers subbasin, and the lower, middle, and upper Clackamas River watersheds of the Clackamas River subbasin (Figure 3-1). Small portions of the Clackamas River and Molalla River that have been designated as critical habitat flows near but not on Port Blakely forestlands. However, it is likely that UWR Chinook salmon occur in the Clackamas River and Molalla River and their major tributaries that flow adjacent to Port Blakely's HCP area. Many fish streams flow through Port Blakely forestlands and into the major tributaries of these river systems, although they likely are too small for Chinook use, as the majority of streams are ODF-typed as small which are typically < 10 feet wide on the ownership. These stream systems and their associated riparian zones, managed under OFP Rules, exist throughout the forestlands. The Port Blakely HCP area contains a range of forested age-classes from young to mature stands > 50 years old, distributed throughout the Clackamas River tributaries in the upper watersheds. Contributions to riparian and stream function increases as the adjacent forests age, with older stands increasing shade and LWD recruitment at levels that allow fish to utilize the habitat for some or all of their life-stages. These characteristics likely results in some stream habitat in the proposed HCP area, e.g., medium streams > 10 feet wide, that is suitable for salmonid use in the UWR ESU. Thus, it is likely UWR Chinook occur in Clackamas River and tributaries that flow through and adjacent to Port Blakely's HCP area.

### 3.1.3 Coho Salmon – Lower Columbia River

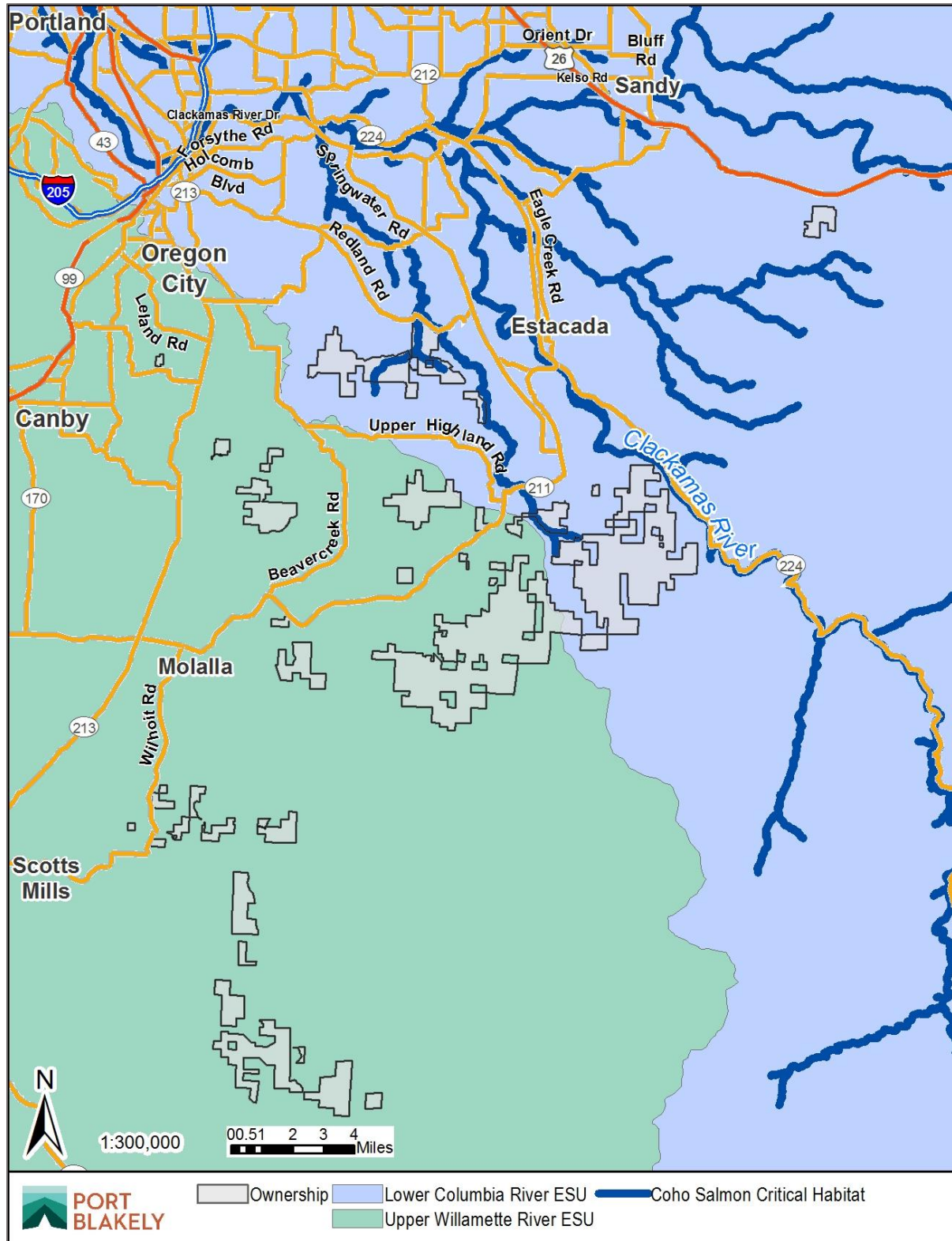
The LCR coho salmon (*Oncorhynchus kisutch*) ESU includes naturally spawned coho salmon originating from the Columbia River and its tributaries downstream from the Big White Salmon and Hood Rivers (inclusive), and any such fish originating in Washington and Oregon, from the mouth of the Columbia River up to and including the Big White Salmon and Hood Rivers, and includes the Willamette River to Willamette Falls (Figure 3-2). This ESU also includes coho salmon from 21 artificial propagation programs (NMFS 2005a; NMFS 2014). Myers et al (Myers et al. 2006) identified three MPGs (Coastal, Cascade, and Gorge), containing a total of 24 DIPs in the LCR coho salmon ESU (NWFSC 2015).

#### 3.1.3.1 Status and Distribution

*Status* - The LCR coho was listed as Threatened on June 28, 2005 (NMFS 2005a). Ford et al. (2011) noted that three status evaluations of LCR coho status, all based on WLC-TRT criteria, had been conducted since the prior biological review team (BRT) status update in 2005. All three evaluations concluded that the ESU was currently at very high risk of extinction. Of the 24 historical populations in the ESU, 21 were considered at very high risk. The remaining three (Sandy, Clackamas, and Scappoose) were considered to be at high to moderate risk (NWFSC 2015). In April 2014, updates to the descriptions of certain listed West Coast salmonid species to add or remove hatchery stocks consistent with NMFS' recently completed 5-year reviews under ESA section 4(c)(2) were published (NMFS 2014). The updates revised the artificial propagation programs to include 21 programs for the LCR coho salmon ESU. According to the NWFSC 2015 report, the status of a number of coho salmon populations have changed since the review by McElhany et al. (2006), Ford et al. (2011), and NMFS (2013a). Changes in



Figure 3-2. Lower Columbia River Coho Salmon ESU and Critical Habitat in Relation to Current HCP Lands.



abundance and productivity, diversity and spatial structure were generally positive; however, this appears to be mostly due to the improved level of monitoring (and therefore understanding of status) in Washington tributaries rather than a true change in status over time.

The 5-Year Review discusses the factors identified in determining whether a species is threatened or endangered (NMFS 2016b). Listing Factor A addresses the destruction, modification or curtailment of a species habitat or range. A pertinent key emergent or ongoing habitat concern for all four LCR listed salmon species is the reduced complexity,

connectivity, quantity, and quality of habitat used for spawning, rearing, foraging, and migrating (NMFS 2016b). Loss of habitat from conversion to agricultural or urbanized uses continues to be a particular concern throughout the lower Columbia River region, especially the loss of habitat complexity in the lower tributary/mainstem Columbia River interface, and concomitant changes in water temperature.

Critical habitat was designated for the LCR coho ESU in 2016 (NMFS 2016d). Relative to the HCP area, including the area of Potential Land Acquisitions, the critical habitat designation for the LCR coho ESU includes the Clackamas River watershed of the Clackamas River subbasin in northern Clackamas County and Multnomah County (NMFS 2016d) (Figure 3-2). The subbasin includes Clear Creek, portions of which flow through the HCP area. Critical habitat in the Clackamas River watershed, as well as the Sandy River watershed, in Clackamas County and Multnomah County occurs within the Potential Acquisition Lands Boundary.

In the absence of specific abundance and diversity data, earlier status reviews had concluded that hatchery origin fish dominated many of the coho salmon populations in the LCR ESU and that there was little natural productivity. Recent recovery efforts may have contributed to the observed natural production, but in the absence of long-term data sets it is not possible to parse out these effects. Populations with longer term data sets exhibit stable or slightly positive abundance trends. Additionally, fish passage programs are allowing for the return of relatively large numbers of naturally produced fish to populations with previously limited numbers of spawning adults. Initiation of or improvement in the downstream juvenile facilities at Cowlitz Falls, Merwin, and North Fork Dam are likely to further improve the status of the associated upstream populations. While these and other recovery efforts have likely improved the status of a number of coho salmon DIPs, abundances are still at low levels and the majority of the DIPs remain at moderate or high risk. For the lower Columbia River region, land development and increasing human population pressures will likely continue to degrade habitat, especially in lowland areas. Although populations in this ESU have generally improved, especially in the 2013/14 and 2014/15 return years, recent poor ocean conditions suggest that population declines might occur in the upcoming return years. Regardless, this ESU is still considered to be at moderate risk (NWFSC 2015).

The coho salmon populations in the Sandy and Clackamas River were the only two populations identified in the original 1996 Status Review that appeared to be self-sustaining natural populations. Abundance trends for these populations also represent the longest complete set of observations for any Lower Columbia River coho salmon populations. With the removal of Marmot Dam in 2008, inventory methods for the Sandy River coho salmon populations have undergone some significant changes. Recent returns of natural-origin (unmarked) fish to the Clackamas River have shown a marked improvement in run size, and the unofficial coho count

for 2014-2015 was 10,670 spawners, the highest recorded. Natural-origin returns to the Sandy River have remained fairly stable since the initial status review in the mid-1990s, although there appears to be a continued hatchery presence. Hatchery fish are collected at the Cedar Creek weir for the Sandy River Hatchery, with only unmarked coho salmon passed above. Estimates for the 2014-15 return year indicate a dramatic improvement in escapement, similar to the Clackamas River, with 5,942 natural origin spawners.

*Distribution* - The LCR coho salmon ESU historically consisted of a total of 24 independent populations (Dornbusch and Sihler 2013). Because NMFS had not yet listed the ESU in 2003 when the WLC TRT designated core and genetic legacy populations for other ESUs, there are no such designations for LCR coho salmon. However, the Clackamas and Sandy subbasins contain the only populations in the ESU that have clear records of continuous natural spawning (McElhany et al. 2007).

### **3.1.3.2 Habitat Characteristics and Use**

Habitat characteristics are generally similar to other anadromous salmonids although use may vary greatly by region and populations. Habitat use is described here based on information from the Federal Recovery Plan (Dornbusch and Sihler 2013) and a state recovery plan (ODFW 2010a).

Lower Columbia River coho salmon are typically categorized into early- and late-returning stocks. Early-returning adult coho salmon enter the Columbia River in mid-August and begin entering tributaries in early September, with peak spawning from mid-October to early November. Late-returning coho salmon pass through the lower Columbia from late September through December and enter tributaries from October through January. Most spawning occurs from November to January, but some occurs as late as March (LCFRB 2010). Migration and spawning timing of specific local populations may be mediated by factors such as latitude, migration distance, flows, water temperature, maturity, or migration obstacles (ODFW 2010a). For example, coho salmon spawning in warmer tributaries spawn later than those spawning in colder tributaries (LCFRB 2010).

Historically, coho salmon spawned in almost every accessible stream system in the lower Columbia River (LCFRB 2010). Coho salmon generally occupy intermediate positions in tributaries, typically further upstream than chum or fall-run Chinook, but often downstream of steelhead or spring-run Chinook (ODFW 2010a). Early-run fish usually spawn farther upstream within a basin than late-run fish. Coho salmon typically spawn in small to medium, low- to moderate elevation streams from valley bottoms to stream headwaters. Coho salmon particularly favor small, rain-driven, lower elevation streams characterized by relatively low flows during late summer and early fall, and increased river flows and decreased water temperatures in winter (LCFRB 2010). On their return, adult fish often mill near the river mouths or in lower river pools until the first fall freshets occur (LCFRB 2010).

Coho salmon construct redds in gravel and small cobble substrate in pool tailouts, riffles, and glides, with sufficient flow depth for spawning activity. Eggs incubate over late fall and winter for about 45 to 140 days, depending on water temperature, with longer incubation in colder water. Fry may thus emerge from early spring to early summer (ODFW 2010a). Hatching success

depends on clean gravel that is not choked with sediment or subject to extensive scouring by floods (LCFRB 2010).

Juveniles typically rear in freshwater for more than a year. After emergence, coho salmon fry move to shallow, low-velocity rearing areas, primarily along the stream edges and inside channels. Juvenile coho salmon favor pool habitat and often congregate in quiet backwaters, side channels, and small creeks with riparian cover and woody debris. Side-channel rearing areas are particularly critical for overwinter survival, which is a key regulator of freshwater productivity (LCFRB 2010). Most juvenile coho salmon migrate seaward as smolts in April to June, typically during their second year. Salmon that have stream-type life histories, such as coho, typically do not linger for extended periods in the Columbia River estuary, but the estuary is a critical habitat used for feeding during the physiological adjustment to saltwater. Juvenile coho salmon are present in the Columbia River estuary from March to August (LCFRB 2010).

Columbia River coho salmon typically range throughout the nearshore ocean over the continental shelf off the Oregon and Washington coasts. Early-returning coho salmon are typically found in ocean waters south of the Columbia River mouth. Late-returning coho salmon are typically found in ocean waters north of the Columbia River mouth (LCFRB). Coho salmon grow relatively quickly in the ocean, reaching up to 6 kilograms after about 16 months of ocean rearing (ODFW 2010a). Most coho salmon sexually mature at age three, except for a small percentage of males (called “jacks”) who return to natal waters at age two, after only 5 to 7 months in the ocean (LCFRB 2010). All coho salmon die after spawning. Weather-related upwelling patterns in the ocean and the short 3-year life cycle of this species cause highly variable population cycles (LCFRB 2010).

### **3.1.3.3 Occurrence in the HCP Area**

The LCR coho salmon ESU includes the Clackamas River drainage and the Sandy River drainage in Clackamas and Multnomah Counties (Figure 3-2) (NOAA Fisheries 2017b). The Clackamas River has also been included as designated Critical Habitat for LCR coho salmon which includes the Clear Creek tributary (Figure 3-2) (NOAA Fisheries 2017a). The portion of the Clackamas River that has been designated as critical habitat flows adjacent to current Port Blakely forestlands and Clear Creek flows through Port Blakely where coho use is known to occur. The Sandy River has also been designated Critical Habitat for LCR coho salmon and this river flows north from Clackamas County through Multnomah County prior to entering the Columbia. Both river systems occur within the Potential Acquisition Lands Boundary, thus, future HCP lands could include tributaries that enter into the Critical Habitat river systems.

Additionally, coho salmon are known to exist in many small and medium fish streams that flow through Port Blakely. These stream systems and their associated riparian zones, managed under OFP Rules, exist throughout the forestlands. The Port Blakely HCP area contains a range of forested age-classes from young to mature stands > 50 years old, distributed throughout the Clackamas River tributaries in the upper watersheds. Contributions to riparian and stream function increases as the adjacent forests age, with older stands increasing shade and LWD recruitment at levels that allow fish to utilize the habitat for some or all of their life stages.

### 3.1.4 Steelhead – Lower Columbia River

The DPS of the LCR steelhead (*Oncorhynchus mykiss*) includes naturally spawned anadromous steelhead originating below natural and manmade impassable barriers from rivers between the Cowlitz and Wind Rivers (inclusive) and the Willamette and Hood Rivers (inclusive) (Figure 3-3). It excludes such fish originating from the upper Willamette River basin above Willamette Falls. This DPS also includes steelhead from seven artificial propagation programs (NMFS 2006a; NMFS 2016b).

#### 3.1.4.1 Status and Distribution

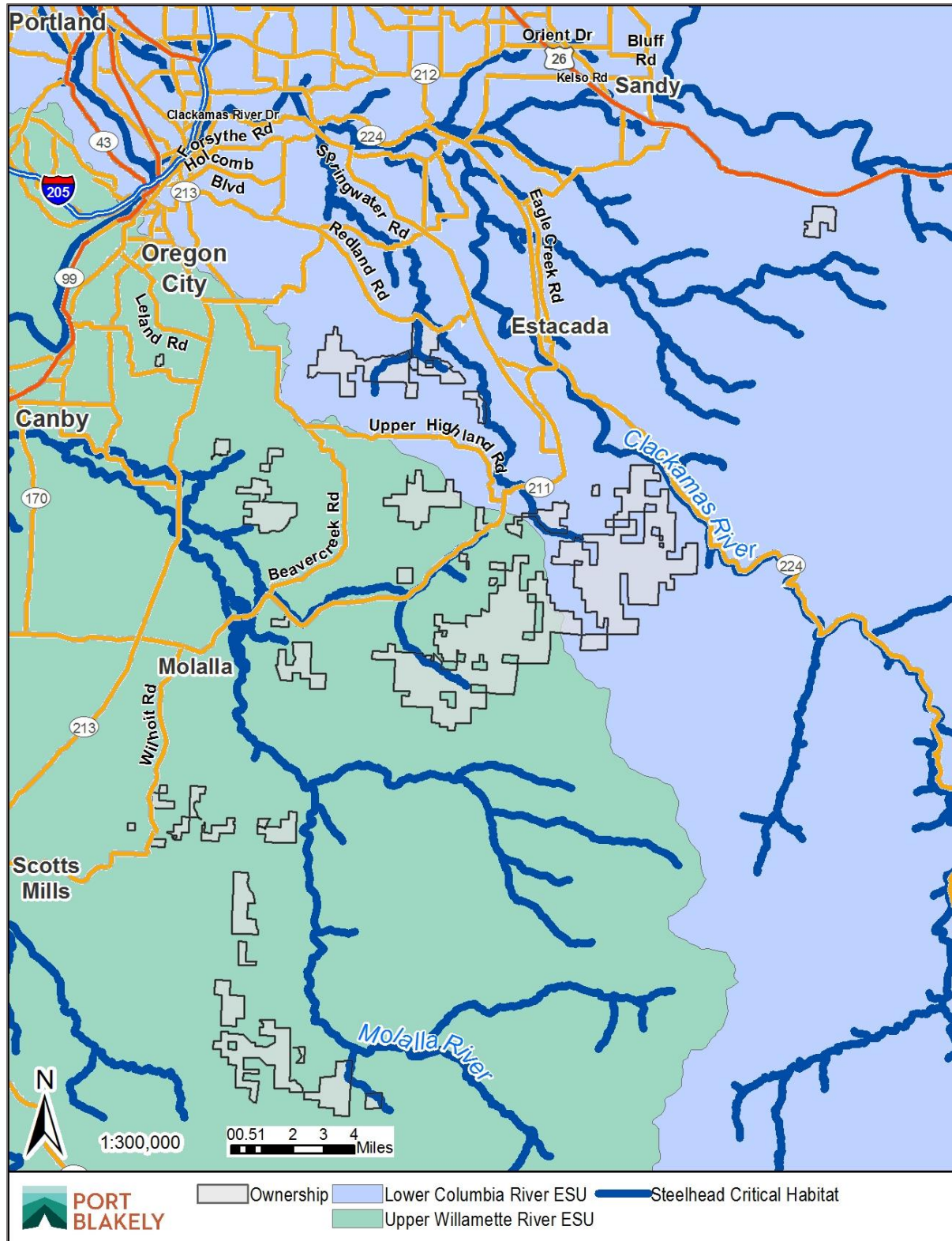
*Status* – Steelhead are the anadromous (migratory) form of the biological species *Oncorhynchus mykiss*. Rainbow trout are the non-anadromous (resident) form of *O. mykiss*. NMFS originally listed LCR steelhead as threatened on March 29, 1998, under the ESU policy (63 Federal Register 13347). NMFS revised the listing on January 5, 2006 (71 Federal Register 8844), this time applying the DPS policy (61 Federal Register 4722). The LCR steelhead DPS includes both summer-run and winter-run populations (ODFW 2010a). On September 2, 2005, NMFS published a final rule (70 Federal Register 52630) to designate critical habitat for 13 ESUs and DPSs of ESA-listed salmon and steelhead which included LCR Chinook, steelhead, and chum (Dornbusch and Sihler 2013). Relative to the HCP area, including the Potential Lands Acquisitions area, the critical habitat designation for the LCR steelhead DPS includes the Clackamas River watershed of the Clackamas River subbasin in northern Clackamas County and Multnomah County, as well as the Sandy River watershed that flows north to the Columbia River through both counties (NMFS 2005b) (Figure 3-3). The Clackamas River subbasin includes Clear Creek, portions of which flow through the current HCP area.

The WLC TRT identified 23 historical independent populations of LCR steelhead: 17 winter-run populations and six summer-run populations, within the Cascade and Gorge ecozones. Out of the 23 populations in this DPS, 16 are considered to have a low or very low probability of persisting over the next 100 years, and six populations have a moderate probability of persistence (LCFRB 2010, ODFW 2010a, Ford 2011). Only the summer-run Wind population is considered viable. Although current LCR steelhead populations are depressed compared to historical levels and long-term trends show declines, many populations are substantially healthier than their salmon counterparts, typically because of better habitat conditions in core steelhead production areas (LCFRB 2010). However, all four strata in the DPS fall short of the WLC TRT criteria for viability.

The low to very low baseline persistence probabilities of most LCR steelhead populations reflects low abundance and productivity. In addition, it is likely that genetic and life history diversity has been reduced as a result of pervasive hatchery effects and population bottlenecks. Spatial structure remains relatively high for most populations, i.e., returning adults can access most areas of significant historical habitat (LCFRB 2010, ODFW 2010a).

*Summer Steelhead* - Baseline persistence probabilities were estimated to be low or very low for three out of the six summer steelhead populations that are part of the Lower Columbia River DPS, moderate for two, and high for one—the Wind, which is considered viable (LCFRB 2010, ODFW 2010a).

Figure 3-3. Lower Columbia River and Upper Willamette River Steelhead DPS' and Critical Habitat in Relation to Current HCP Lands.



Declines in persistence probability are attributable primarily to low abundance and productivity. Except in the North Fork Lewis subbasin, where dams have impeded access to historical spawning habitat, most summer steelhead populations continue to have access to historical production areas in forested, mid- to-high-elevation subbasins that remain largely intact. It is likely that historical hatchery effects have reduced the genetic diversity of many summer steelhead populations and caused declines in productivity (LCFRB 2010). The Hood population has the highest proportion of hatchery spawners, at 53% (ODFW 2010a).

*Winter Steelhead* - Thirteen of the 17 LCR winter steelhead populations have low or very low baseline probabilities of persistence, and the remaining four are at moderate probability of persistence (LCFRB 2010, ODFW 2010a). Declines in persistence probability are related primarily to low abundance and productivity. In addition, it is likely that historical hatchery effects have reduced the genetic diversity of most winter steelhead populations and caused declines in productivity. Most populations have maintained their spatial structure (LCFRB 2010, ODFW 2010a). For the Upper Cowlitz, Cispus, Tilton, North Fork Lewis, and Sandy populations, passage to upper basin habitat is partially or entirely blocked by dams (LCFRB 2010; ODFW 2010a); the Upper Gorge population is constrained by hatchery weirs, and the Hood population is constrained by the presence and operation of an irrigation dam.

The most recent 5-Year Review reports that the majority of winter-run steelhead populations in this DPS continue to persist at low abundances (NWFSC 2015, NMFS 2016b). Hatchery interactions remain a concern in select basins, but the overall situation is somewhat improved compared to prior reviews. Summer-run steelhead DIPs were similarly stable, but at low abundance levels. The decline in the Wind River summer-run DIP is a source of concern, given that this population has been considered one of the healthiest of the summer-runs; however, the most recent abundance estimates suggest that the decline was a single year aberration. Passage programs in the Cowlitz and Lewis basins have the potential to provide considerable improvements in abundance and spatial structure but have not produced self-sustaining populations to date. Habitat degradation continues to be a concern for most populations. Even with modest improvements in the status of several winter-run populations, none of the populations appear to be at fully viable status, and similarly none of the MPGs meet the criteria for viability. The DPS therefore continues to be at moderate risk (NWFSC 2015).

*Distribution* - Steelhead found within the geographical boundaries of the Lower Columbia recovery subdomain fall into three separate DPSs as defined by NMFS: Lower Columbia, Middle Columbia, and Southwest Washington. The LCR steelhead DPS includes the following: 1) all naturally spawned anadromous *O. mykiss* populations below natural and manmade impassable barriers in streams and tributaries to the Columbia River between and including the Cowlitz and Wind rivers in Washington; 2) all naturally spawned anadromous *O. mykiss* populations below natural and manmade impassable barriers in streams and tributaries to the Columbia River between and including the Willamette River up to Willamette Falls, and the Hood River in Oregon; and 3) steelhead from ten artificial propagation programs (Dornbusch and Sihler 2013).

### 3.1.4.2 Habitat Characteristics and Use

Habitat characteristics for the LCR steelhead are generally similar to those described above for other salmonids in the Lower Columbia region. Habitat use is described here based on information from the Recovery Plan (Dornbusch and Sihler 2013).

Lower Columbia River steelhead exhibit perhaps the most complex life history of any Pacific salmonid. Two distinct life history types of steelhead—summer and winter runs—historically were and currently are found in the LCR. The two life history types differ in degree of sexual maturity at freshwater entry, spawning time, and frequency of repeat spawning. Most summer-run steelhead from the LCR steelhead DPS re-enter freshwater between May and October and require several months to mature before spawning, generally between late February and early April. Most winter-run steelhead re-enter freshwater between December and May as sexually mature fish; peak spawning occurs later than for summer steelhead, in late April and early May.

Within the same watershed, winter and summer steelhead generally spawn in geographically distinct areas (Myers et al. 2006). Summer steelhead can often reach headwater areas above waterfalls that are impassable to winter steelhead during the high-velocity flows common during the winter-run migration. In basins where both winter and summer steelhead are present, the summer life history strategy appears to be able to persist only above the barrier falls that exclude winter steelhead. Although the summer steelhead's long duration of pre-spawning holding in freshwater enhances their opportunity to take advantage of periodically favorable passage conditions, it may also result in a higher pre-spawning mortality rate that puts summer steelhead at a competitive disadvantage relative to winter steelhead (Myers et al. 2006).

Steelhead spawn in a wide range of conditions ranging from large streams and rivers to small streams and side channels (Myers et al. 2006). Productive steelhead habitat is characterized by suitable gravel size, depth, and water velocity, and by complexity, primarily in the form of large and small wood (Barnhart 1986). Steelhead may enter streams and arrive at spawning grounds weeks or even months before spawning and therefore are vulnerable to disturbance and predation. They need cover in the form of overhanging vegetation, undercut banks, submerged vegetation, submerged objects such as logs and rocks, floating debris, deep water, turbulence, and turbidity (Geiger 1973). Their spawning timing must optimize avoiding risks from gravel-bed scour during high flow and increasing water temperatures that can become lethal to eggs. Spawning generally occurs earlier in areas of lower elevation, where water temperature is warmer, than in areas of higher elevation, with cooler water temperature.

Depending on water temperature, steelhead eggs may incubate for 35 to 50 days before hatching, after which alevins remain in the gravel 2 to 3 weeks, until the yolk-sac is absorbed. Generally, emergence occurs from March into July, with peak emergence time generally in April and May. Fry emergence is principally determined by the time of egg deposition and the water temperature during the incubation period. In the Lower Columbia subdomain, emergence timing differs slightly between winter and summer life-history types and among subbasins. These differences may be a function of spawning location (and hence water temperature) or of genetic differences between life history types.

Following emergence, fry usually move into shallow and slow-moving margins of the stream. As they grow, they inhabit areas with deeper water, a wider range of velocities, and larger



substrate, and they may move downstream to rear in large tributaries or mainstem rivers. Young steelhead typically rear in streams for some time before migrating to the ocean as smolts. Steelhead smolts generally migrate at ages ranging from 1 to 4 years, but most steelhead smolt after 2 years in freshwater (Busby et al. 1996). In the lower Columbia River, outmigration of steelhead smolts (of both summer and winter life-history types) generally occurs from March to June, with peak migration usually in April or May.

Catch data suggest that juvenile steelhead migrate directly offshore during their first summer, rather than migrating nearer to the coast. Maturing Columbia River steelhead are found off the coast of Northern British Columbia and west into the North Pacific Ocean (Busby et al. 1996). Most steelhead spend 2 years in the ocean (range 1 to 4 years) before migrating back to their natal streams (Shapovalov and Taft 1954, Narver 1969, Ward and Slaney 1988). Once in the river, adult steelhead apparently rarely eat and grow little, if at all.

#### **3.1.4.3 Occurrence in the HCP Area**

The LCR steelhead DPS includes the Clackamas River drainage and the Sandy River drainage (Figure 3-3) (NOAA Fisheries 2017b). These rivers have also been included as designated Critical Habitat for LCR steelhead which includes the Clear Creek tributary (Figure 3-3) (NOAA Fisheries 2017a). The portion of the Clackamas River that has been designated as critical habitat flows adjacent to Port Blakely forestlands. Clear Creek flows through Port Blakely where steelhead are known to occur. Both river systems flow north from Clackamas County through Multnomah County before eventually entering the Columbia River. Thus, they occur within the Potential Acquisition Lands area so future HCP lands could include designated Critical Habitat. Additionally, steelhead are known to exist in many small and medium fish streams that flow through current Port Blakely HCP lands. These stream systems and their associated riparian zones, managed under OFP Rules, exist throughout the forestlands. The Port Blakely HCP area contains a range of forested age-classes from young to mature stands > 50 years old, distributed throughout the Clackamas River tributaries in the upper watersheds. Contributions to riparian and stream function increases as the adjacent forests age, with older stands increasing shade and LWD recruitment at levels that allow fish to utilize the habitat for some of or all their life stages.

#### **3.1.5 Steelhead – Upper Willamette River**

This DPS includes naturally spawned anadromous winter-run steelhead originating below natural and manmade impassable barriers from the Willamette River and its tributaries upstream of Willamette Falls to and including the Calapooia River (NMFS 2006a; NMFS 2014) (Figure 3-3). No artificial propagation programs are included in this DPS (NMFS 2006a). All hatchery winter-run steelhead programs were terminated in the late 1990s, and the current summer-run steelhead hatchery program within the geographic boundaries of the DPS is not part of the DPS because it was originally derived from a non-native, out of DPS Skamania brood stock (Jones 2015).

##### **3.1.5.1 Status and Distribution**

*Status* - The upper Willamette River Steelhead was listed as Threatened on January 5, 2006 (NMFS 2006a). In April 2014, updates to the descriptions of certain listed West Coast salmonid

species to add or remove hatchery stocks consistent with NMFS' recently completed 5-year reviews under ESA section 4(c)(2) were published (NMFS 2014). A subsequent 5-year review confirmed there is no change in the UWR steelhead hatchery programs since the previous ESA status review (NMFS 2016c). Critical habitat was designated for the UWR Steelhead DPS, and 11 other ESUs and DPSs of salmon and steelhead, in Washington, Oregon and Idaho in 2005 (NMFS 2005b). Relative to the current HCP area, the critical habitat designation for the UWR Steelhead DPS includes the Molalla River watershed in northern Clackamas County, of which two tributaries occur in the HCP lands (Figure 3-3). The Potential Land Acquisitions area includes the Pudding, Santiam and Calapooia River systems which also have been designated Critical Habitat. These rivers occur in Linn and Marion Counties prior to entering the Willamette River.

The Willamette-Lower Columbia Technical Recovery Team (WLC TRT) established risk categories for salmon recovery based on population viability. A viable population is one with negligible risk of extinction over 100 years. The WLC TRT criteria are based on a scoring system to describe each population's probability of extinction, as categorized into 'extinction risk' classes. In order to meet the biological criteria for delisting, the UWR steelhead DPS must have three out of four viable populations.

Overall, the declines in abundance noted during the previous review (Ford et al. 2011) continued through the period 2010-2015. There is considerable uncertainty in many of the abundance estimates, except for perhaps the tributary dam counts. Radio-tagging studies suggest that a considerable proportion of winter-run steelhead ascending Willamette Falls do not enter DIPs that constitute this DPS; these fish may be non-native early winter-run steelhead that appear to have colonized the western tributaries, misidentified summer-run steelhead, or late winter-run steelhead that have colonized tributaries not historically part of the DPS. More definitive genetic monitoring of steelhead ascending Willamette Falls in tandem with radio-tagging work needs to be undertaken to estimate the total abundance of the DPS (NWFSC 2015).

Relative to abundance and productivity in the HCP area, estimates of steelhead abundance for this DPS were based on redd counts in the North and South Santiam basins. Adult counts were also available from observations at Willamette Falls, Bennett Dam and the Minto Fish Facility (North Santiam River), and Foster Dam (South Santiam River). In addition, results from tracking studies of radio-tagged winter steelhead were expanded to estimate spawner abundances in specific DIPs. Steelhead arriving at Willamette Falls have also been sampled for genetic analysis to determine the relative proportions of native (late winter steelhead) and out-of- DPS (early winter, summer, or summer/winter hybrid steelhead) genotypes represented in the run (NWFSC 2015).

Population abundance estimates based on spawner (redd) surveys are only available for the Molalla and associated tributaries (Pudding River, Abiqua Creek) through 2006 (NWFSC 2015). These estimates relied on a proportional apportionment of winter-run steelhead counts at Willamette Falls based on index redd counts in the four winter-run steelhead populations. Recent estimates, based on the proportional migration of winter-run steelhead tagged at Willamette Falls (Jepson et al. 2013, Jepson et al. 2014), indicate that a significantly smaller portion of the steelhead arriving at Willamette Falls are destined for the Molalla River. Based on

radio-tag detections and the total winter-run steelhead count at Willamette Falls, the estimated escapement (95% CI) to the Molalla for 2012-2014 was 976 (660-1,406), 903 (651-1,223), and 757 (540-1,042), respectively. Previous escapement estimates (1980 to 2006) had a geometric mean of 1237 ranging from 97 to 4658. The long-term trend shows an annual 3.7% decline, although this decline is likely an overestimate due to the inclusion of hatchery fish in the early years. Estimated declines in the Molalla River are based on correlations with observed trends in the North and South Santiam Rivers. Given that the Molalla River has no major migration barriers, limiting factors in the Molalla River are more likely related to habitat degradation. Abundance is likely relatively stable, but at a depressed level.

*Distribution* - The WLC TRT identified four historical demographically independent populations for UWR winter-run steelhead: Molalla, North Santiam, South Santiam, and Calapooia (Myers et al. 2006). The WLC TRT delineated the populations on geography, migration rates, genetic attributes, life history patterns, phenotypic characteristics, population dynamics, and environmental and habitat characteristics (Myers et al. 2006).

The UWR steelhead DPS includes all naturally spawned winter-run steelhead populations in the Willamette River and its tributaries upstream from Willamette Falls to the Calapooia River (inclusive). The North Santiam and South Santiam rivers are thought to have been major production areas (USFWS 1948) and these populations were designated as “core” and “genetic legacy” (McElhany et al. 2003). The four “east-side” subbasin populations are part of one stratum, the Cascade Tributaries Stratum, for UWR winter steelhead. There are no hatchery programs supporting this DPS (NMFS 2006a). The hatchery summer-run steelhead that are produced and released in the subbasins are from an out-of-basin stock and not considered part of the DPS.

Winter steelhead have been reported spawning in the west-side tributaries to the Willamette River above Willamette falls, and ODFW recognizes the Tualatin, Yamhill, Rickreall, and Luckiamute west-side subbasins as part of the Willamette Winter Steelhead Species Management Unit. In the WLC-TRT assessment these tributaries were not considered to have constituted independent populations historically. Rather, these tributaries may have functioned and continue to function as a population sink with the DPS metapopulation structure (Myers et al. 2006). Conversely, under current or future conditions, steelhead production from West-side subbasins may help buffer or compensate for independent populations that are not meeting recovery goals.

### **3.1.5.2 Habitat Characteristics and Use**

Habitat characteristics for the UWR steelhead are generally similar to those described above for other salmonids in the Lower Columbia region. Habitat use is described here based on information from the Recovery Plan (ODFW and NMFS 2011).

The run timing of UWR steelhead is a legacy of the fact that, before construction of a fish ladder at Willamette Falls in the early 1900s, flow conditions allowed steelhead to ascend Willamette Falls only during the late winter and spring. As a result, the majority of the UWR winter steelhead run return to freshwater in January through April, pass Willamette Falls from mid-February to mid-May, and spawn in March through June, with peak spawning in late April and early May. Compared to spring Chinook, UWR steelhead typically migrate further upstream and

can spawn in smaller, higher gradient streams and side channels. UWR steelhead may spawn more than once, although the frequency of repeat spawning is relatively low. Repeat spawners are predominantly females and usually spend one-year post spawning in the ocean and spawn again the following spring.

Juvenile steelhead rear in headwater tributaries and upper portions of the subbasins for one to four years (most often two years), then as smoltification proceeds in April through May, migrate quickly downstream through the mainstem Willamette River and Columbia River estuary and into the ocean. The downstream migration speed depends to some extent on river flow, with faster migration occurring at higher river flows. UWR steelhead typically forage in the ocean for one to four years (most often two years) and during this time are thought to migrate north to Canada and Alaska and into the North Pacific including the Alaska Gyre (Myers et al. 2006).

### **3.1.5.3 Occurrence in the HCP Area**

The UWR Steelhead DPS includes the Molalla River drainages which include spawning and rearing areas (Figure 3-3) (NMFS 2016c). The critical habitat designation for the UWR Steelhead DPS includes the upper and lower Molalla River watersheds of the Molalla/Pudding Rivers subbasin (Figure 3-3). The Clackamas River critical habitat flows adjacent to current Port Blakely HCP forestlands while portions of the Molalla River critical habitat flows through Port Blakely HCP lands. UWR steelhead occur in both of these systems and their major tributaries that flow through and adjacent to Port Blakely's HCP area. Future acquisitions within the Potential Acquisition Lands area could include Critical Habitat if portions of the Molalla, Pudding, Santiam and Calapooia Rivers in Linn and Marion Counties occur on the acquisitions.

Additionally, steelhead are known to exist in many small and medium sized fish streams that flow through Port Blakely HCP lands. These stream systems and their associated riparian zones, managed under OFP Rules, exist throughout the forestlands. The Port Blakely HCP area contains a range of forested age-classes from young to mature stands > 50 years old, distributed throughout the Clackamas River tributaries in the upper watersheds. Contributions to riparian and stream function increases as the adjacent forests age, with older stands increasing shade and LWD recruitment at levels that allow fish to utilize the habitat for some or all of their life stages.

### **3.1.6 Bull Trout – Columbia River Distinct Population Segment**

The Columbia River bull trout (*Salvelinus confluentus*) DPS occurs throughout the entire Columbia River basin within the United States and its tributaries, excluding bull trout found in the Jarbidge River, Nevada. The Columbia River DPS includes bull trout residing in portions of Oregon, Washington, Idaho, and Montana (USFWS 1998b), and is composed of 141 subpopulations in four geographic areas of the Columbia River basin—(1) lower Columbia River (downstream of the Snake River confluence), (2) mid-Columbia River (Snake River confluence to Chief Joseph Dam), (3) upper Columbia River (upstream from Chief Joseph Dam), and (4) Snake River and its tributaries (including the Lost River drainage) (USFWS 1998b). The lower Columbia River area includes all tributaries in Oregon and Washington downstream of the Snake River confluence near the town of Pasco, Washington. The USFWS identified 20 subpopulations in watersheds of nine major tributaries of the lower Columbia River. However, bull trout are thought to be extirpated from several tributaries in five river systems in Oregon—

the Middle Fork Willamette River, the North and South Forks of the Santiam River, the Clackamas River, the upper Deschutes River (upstream of Bend, Oregon) and the Crooked River (tributary to the Deschutes River) (USFWS 1998b).

### **3.1.6.1 Status and Distribution**

*Status* – In November 1999, the USFWS listed all populations of bull trout within the coterminous United States as a threatened species pursuant to the ESA (USFWS 1999). The 1999 listing applied to one DPS of bull trout within the coterminous United States by including bull trout in the Coastal-Puget Sound populations (Olympic Peninsula and Puget Sound regions) and Saint Mary-Belly River populations (east of the Continental divide in Montana) with previous listings of three separate DPSs of bull trout in the Columbia River, Klamath River, and Jarbidge River basins (USFWS 1999).

A 5-year status review for bull trout was completed on April 8, 2008, which concluded that listing the species as “threatened” remained warranted range-wide in the coterminous United States (USFWS 2008a). Based on this status review, bull trout were reported to be generally “stable” overall range-wide (species status neither improved nor declined during the reporting year), with some core area populations decreasing, some stable, and some increasing (USFWS 2015a). The combination of core habitat (i.e., habitat that could supply all elements for the long-term security of bull trout) and a core population (a group of one or more local bull trout populations that exist within core habitat) constitutes a core area, the basic unit on which to gauge recovery within a recovery unit. Since the listing of bull trout, there has been very little change in the general distribution of bull trout in the coterminous United States, and USFWS was not aware that any known, occupied bull trout core areas have been extirpated (USFWS 2008a, USFWS 2015a).

In a more recent 5-year review the USFWS recommended that bull trout remain listed as threatened in the coterminous United States, based on the best current information regarding the status of the species, threats, and management efforts for the species (USFWS 2015b). Additionally, since the listing of bull trout, numerous conservation measures have been and continue to be implemented across its coterminous range. These measures are being undertaken by a wide variety of local and regional partnerships, including State fish and game agencies, State and Federal land management and water resource agencies, Tribal governments, power companies, watershed working groups, water users, ranchers, and landowners. In many cases these bull trout conservation measures incorporate or are closely interrelated with ongoing work for the recovery of salmon and steelhead, which are limited by many of the same threats.

At the time of their coterminous United States listing in 1999, bull trout were still widely distributed although they had been extirpated from approximately 60% of their historical range (USFWS 2015b). That is, although bull trout still existed in most river basins where they were found historically, they had been likely extirpated in the McCloud River basin, California; the upper Deschutes, North and South Fork Santiam, and Clackamas River basins, Oregon; the White Salmon, lower Nisqually, Satsop, Lake Chelan, Okanagan, Sanpoil, and Kettle River basins, Washington; and locally in numerous tributaries and in salt water, lake, and mainstem river environments in other areas. These declines resulted largely from habitat degradation and

fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, and the introduction and subsequent proliferation of nonnative fish species.

In an effort to re-establish bull trout in the Clackamas River system, the USFWS, jointly with the State of Oregon, and in cooperation with the USFS, Mt. Hood National Forest (USFS), NMFS, and Confederated Tribes of the Warm Springs Reservation of Oregon, announced that they will re-introduce a nonessential experimental population (NEP) of bull trout in the Clackamas River and its tributaries in Clackamas and Multnomah Counties, Oregon (Figure 3-4) (ODFW 2018a, USFWS 2011a). Bull trout were extirpated from the Clackamas River basin in the early 1960s, and it was believed that re-establishing bull trout in the Clackamas River basin would help achieve recovery goals within the Coastal Recovery Unit (USFWS).

The USFWS released adult and juvenile bull trout, translocated from the Metolius River, into areas of suitable spawning and rearing habitat in the mainstem Clackamas River and its tributaries in the upper headwaters of the subbasin, upstream of the Collawash River confluence (USFWS 2011a). The release occurred in 2011 and 2012, and the first spawning activity was observed in the fall of 2011. The success of the reintroduction of bull trout in the Clackamas River basin in Oregon advances the potential for restoring bull trout in other historic core areas along the Lower Columbia River (e.g., North Fork Santiam, Upper Deschutes, and White Salmon River); re-establishing bull trout populations that have been extirpated may help meet recovery criteria in the Coastal Recovery Unit (USFWS).

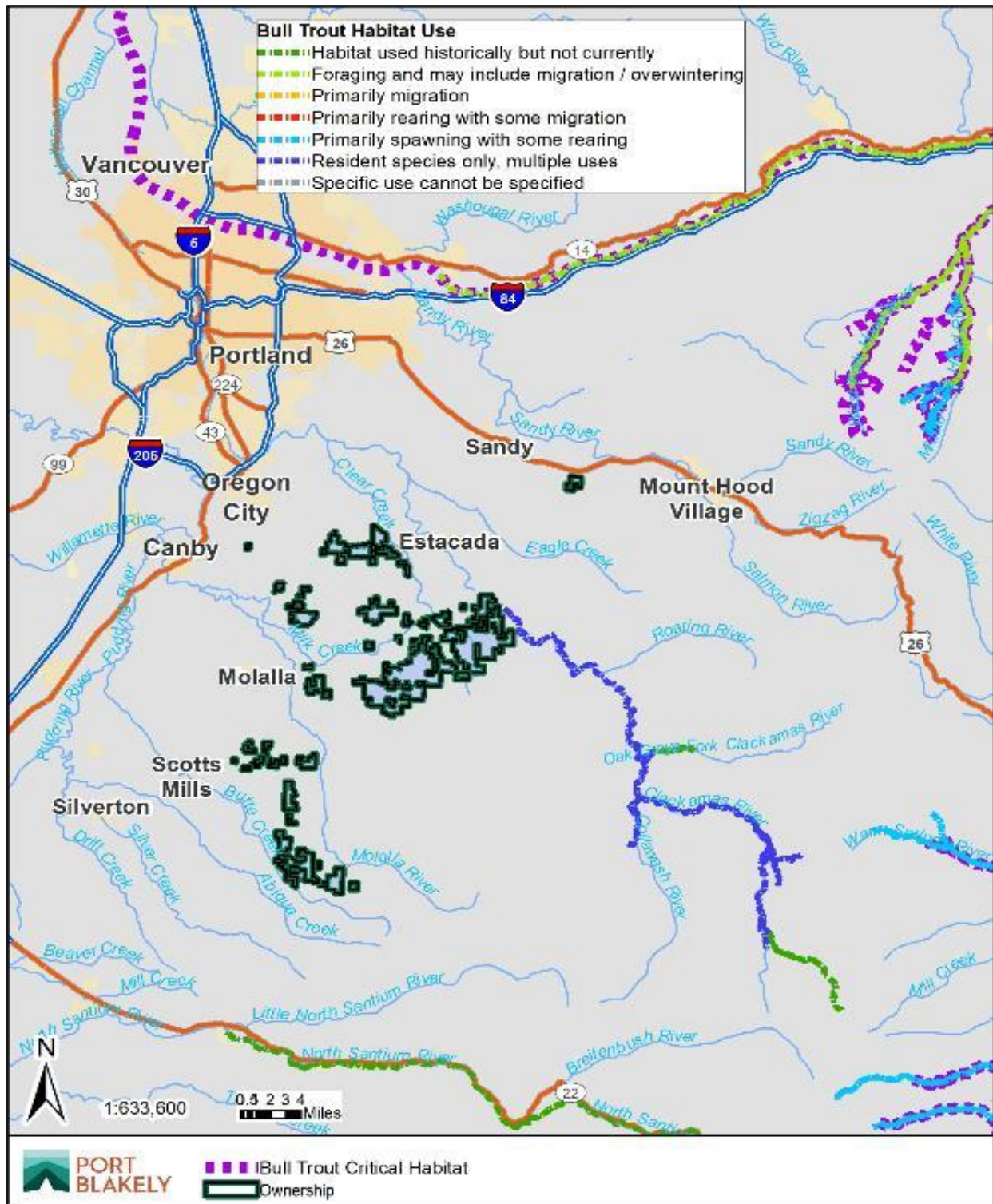
The geographic boundaries of the NEP include the entire Clackamas River subbasin as well as the mainstem Willamette River, from Willamette Falls to its points of confluence with the Columbia River, including Multnomah Channel. The best available data indicated that reintroduction of bull trout to the Clackamas River subbasin was biologically feasible and would promote the conservation of the species (USFWS 2011a).

*Distribution* - Within the coterminous United States, bull trout currently occur in the Columbia River and Snake River basins in Washington, Oregon, Montana, Idaho, and Nevada; Puget Sound and Olympic Peninsula watersheds in Washington; the Saint Mary basin in Montana; and the Klamath River basin of south-central Oregon. At the time of their coterminous United States listing in 1999, bull trout, although still widely distributed, were estimated to have been extirpated from approximately 60% of their historical range (USFWS 2015a).

The current demographic status of bull trout in the Coastal Recovery Unit is variable across the unit. Populations in the Puget Sound region generally tend to have better demographic status, followed by the Olympic Peninsula, and finally the Lower Columbia River region. The Lower Columbia River region contains a very abundant bull trout population and has been used as a donor stock for re-establishing the Clackamas River population.

In the LCR, the majority of core areas are distributed along the Cascade Crest on the Oregon side of the Columbia River. Most core areas in the region historically supported a fluvial life history form, but many are now adfluvial due to reservoir construction. Status is highly variable across this region, with one relative stronghold (Lower Deschutes core area) existing on the Oregon side of the Columbia River. Adult abundances within the majority of core areas in this region are relatively low, generally 300 or fewer individuals. Most core populations in this region are not only isolated from one another due to dams or natural barriers, but they are internally

Figure 3-4. Bull Trout NEP Distribution and Habitat Use in Relation to Current HCP Lands (ODFW 2018a).



fragmented as a result of manmade barriers. Local populations are often disconnected from one another or from potential foraging habitat. In the Coastal Recovery Unit, adult abundance may be lowest in the Hood River and Odell Lake core areas, which each contain fewer than 100 adults. Bull trout were reintroduced in the Middle Fork Willamette River in 1990 above Hills Creek Reservoir. Successful reproduction was first documented in 2006 and has occurred each year since. As stated above, bull trout were reintroduced into the Clackamas River basin in the summer of 2011. Bull trout from the Lower Deschutes core area were utilized for this reintroduction effort.

### **3.1.6.2 Habitat Characteristics and Use**

Of all the native salmonids in the Pacific Northwest of the United States, bull trout generally have the most specific habitat requirements (Rieman and McIntyre 1993), which are often referred to as “the four Cs”: Cold, Clean, Complex, and Connected habitat. This includes cold water temperatures (often less than 12 degrees Celsius [54 degrees Fahrenheit]), complex stream habitat including deep pools, overhanging banks and LWD, and connectivity between spawning and rearing areas and downstream foraging, migration, and overwintering habitats (USFWS 2015a).

The Final Rule for the establishment of a NEP of bull trout in the Clackamas River subbasin provides a brief overview of bull trout characteristics and use which is described below (USFWS 2011a). A more comprehensive discussion of bull habitat and use is provided in the Recovery Plan (USFWS 2015a).

Bull trout exhibit both resident and migratory life-history strategies, although bull trout in the “coastal” lineage are largely migratory. Migratory bull trout spawn in tributary streams where juvenile fish rear for 1 to 4 years before migrating to either a lake (adfluvial form), river (fluvial form), or saltwater (anadromous form) to rear as subadults and to live as adults. Bull trout normally reach sexual maturity between age 4 and 7, and may live longer than 12 years. They are iteroparous (spawning more than once in a lifetime). Both consecutive-year and alternate-year spawning have been reported. Preferred habitat consists of cold water, complex cover, stable channels, loose and clean gravel, and migratory corridors.

### **3.1.6.3 Occurrence in the HCP Area**

The geographic boundaries of the re-introduced NEP include the entire Clackamas River subbasin as well as the mainstem Willamette River, from Willamette Falls to its points of confluence with the Columbia River, including Multnomah Channel. Reintroduction of bull trout in the Clackamas River subbasin above the confluence with the Collawash River has been stated as successful with observations of spawning occurring in 2011 (USFWS). Bull trout could occur in the larger Clackamas River tributaries in the HCP area but are less likely to occur in the smaller streams of the upper watersheds. The upper watersheds that flow through Port Blakely are composed of many small and medium fish streams. These stream systems and their associated riparian zones, managed under OFP Rules, exist throughout the forestlands. The Port Blakely HCP area contains a range of forested age-classes from young to mature stands > 50 years old, distributed throughout the Clackamas River tributaries in the upper watersheds. Contributions to riparian and stream function increases as the adjacent forests age, with older stands increasing shade and LWD recruitment at levels that allow fish to utilize the habitat for



some or all of their life stages. These characteristics likely results in some stream habitat in the lower watersheds in the proposed HCP area that is suitable for the re-introduced NEP of bull trout. Additionally, bull trout typically occupy some of the highest streams in watersheds and eventually could occur in the smaller streams of the upper watersheds in the HCP area.

### **3.1.7 Gray Wolf**

The Gray Wolf (*Canis lupus*) is a keystone predator and an integral component of the ecosystems to which it typically belongs. The wide range of habitats in which wolves can thrive reflects their adaptability as a species, and includes temperate forests, mountains, tundra, taiga, and grasslands.

Historical accounts show that prior to extirpation from Oregon and other western states, gray wolves were widely distributed and efforts by early Euro-American immigrants were largely directed at eliminating the predator (ODFW 2010b). As a result, wolves were extirpated from most of the western United States by the mid- twentieth century. Modern recovery efforts in the Northern Rocky Mountains (NRM) and subsequent conservation actions in the western United States has since led to restored gray wolf populations throughout a portion of its historical range.

#### **3.1.7.1 Status and Distribution**

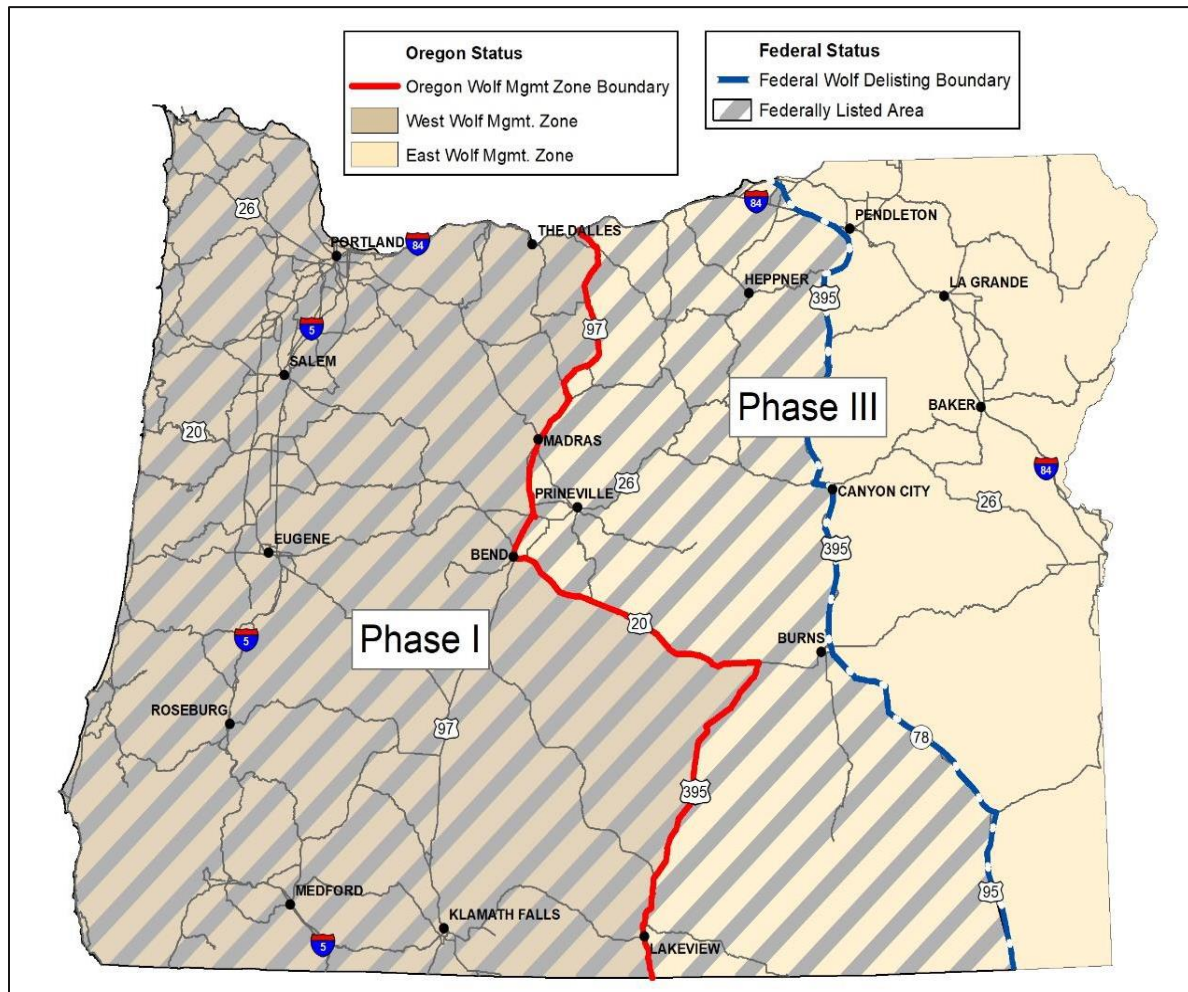
*Status* – Wolves gained endangered status under the ESA in 1974. In 1978, the USFWS published a Final rule designating critical habitat for the gray wolf in Michigan and Minnesota (USFWS 1978). No critical habitat has been designated anywhere else in the nation; thus, no designated critical habitat exists within the state of Oregon. In 1987, the USFWS completed the NRM Wolf Recovery Plan. Four years later Congress initiated an administrative process to reintroduce wolves into Yellowstone National Park and central Idaho (USFWS 1987).

In April 2003, the USFWS established the Western DPS of gray wolves and downlisted their ESA classification from “endangered” to “threatened” because of their recovery progress. As a condition of de-listing the wolf in the Western DPS, the USFWS required state management plans for Idaho, Montana, and Wyoming to ensure the conservation of the species into the future. No such state plan was required of Oregon. After considering the reality and impacts of wolves moving into the State as well as its legal obligations under the Oregon ESA, Oregon crafted and adopted its own management plan in 2005 (ODFW 2010b).

The 2007 Federal/State Coordination Strategy for Implementation of Oregon's Wolf Plan was developed to emphasize close coordination between USFWS and ODFW, and outlined procedures for dealing with wolves while they remained federally listed. In May 2011, wolves in the eastern third of Oregon (east of Oregon Highways 395/78/95) were removed from the ESA (Figure 3-5) (USFWS 2011b). Once federally de-listed, the Oregon ESA will apply until wolves are delisted by the Fish and Wildlife Commission (ODFW 2010b).

Gray wolves were classified as endangered in Oregon in 1987 when the Oregon Endangered Species Act (OESA) was enacted (ODFW 2010b). The OESA requires the conservation of listed species and generally defines conservation as the use of methods and procedures necessary to bring a species to the point at which the measures provided are no longer necessary. To achieve this mandate, the Oregon Fish and Wildlife Commission exercised its authority under

**Figure 3-5. Wolf Management Zones and Current Federal ESA Status in Oregon (ODFW 2019b).**



the OESA by adopting and implementing the Oregon Wolf Conservation and Management Plan (Wolf Plan) in 2005 (ODFW 2010b). The Wolf Plan defined a population objective of four breeding pairs of wolves for three consecutive years in eastern Oregon as the guideline for when wolves may be considered for statewide delisting from OESA.

On November 9, 2015, the Oregon Fish and Wildlife Commission removed wolves from the OESA. During the 2016 Regular Session, the Oregon Legislature ratified the Commission’s decision by passing House Bill 4040. A lawsuit challenging the Commission’s 2015 delisting decision was filed by three environmental groups and the case is pending (ODFW 2016). Wolves are still protected by the Wolf Plan guidelines and its associated rules based on where they are located.

The 2015 evaluation of the Oregon Wolf Conservation and Management Plan resulted in the conclusions that: 1) wolves were once extirpated as a result of historical efforts to eradicate them, and now in absence of those efforts and under current management frameworks, are

increasing in abundance and distribution; 2) there are no known conditions which prevent wolves from inhabiting currently unoccupied portions of range in Oregon or within the eastern Wolf Management Zone; 3) observed movement and dispersal patterns indicate connectivity from source populations and 4) the probability of population failure is very low (ODFW 2016).

*Distribution* – In 1995 and 1996, the USFWS reintroduced 66 gray wolves into the Rocky Mountains of Idaho and Wyoming (ODFW 2015). The reintroductions and associated conservation measures were part of the 1987 NRM Wolf Recovery Plan and were responsible for the successful reestablishment of wolves in Wyoming, Idaho, Montana, and later in parts of Oregon and Washington. In 2014, the NRM wolf population (including Oregon and Washington) was estimated at 1,802 (ODFW 2015).

Though gray wolves were not reintroduced into Oregon, wolf experts predicted that wolves from a successful NRM population – especially Idaho – would eventually travel to and colonize Oregon. This prediction was soon realized and between 1999 and 2007, at least 4 individual wolves were documented to have dispersed into Oregon from Idaho.

Since establishment in 2008, Oregon’s wolves have expanded rapidly and, as of December 2018, the minimum known number of wolves was 137, a 10% increase from 2017 (ODFW 2019b). The actual number of wolves in Oregon is likely higher because not all individuals or groups of wolves present in the state are located during the winter count. At the end of 2018, fifteen packs were documented as successful breeding pairs, a 36% increase from 2017. Reproduction was documented in sixteen groups with a mean pack size of 7.1 wolves and ranging between four and twelve (ODFW 2019b). The sixteen packs were distributed in three geographic areas of Oregon; fourteen packs in northeastern Oregon, one in the southern Oregon Cascades, and one in the northern Oregon Cascades (White River estimated wolf use area near Mount Hood). Eleven percent of known wolves were in the West WMZ. Known resident wolves were located in parts of Baker, Douglas, Grant, Jackson, Klamath, Lake, Lane, Umatilla, Union, Wallowa, and Wasco Counties (Figure 3-6).

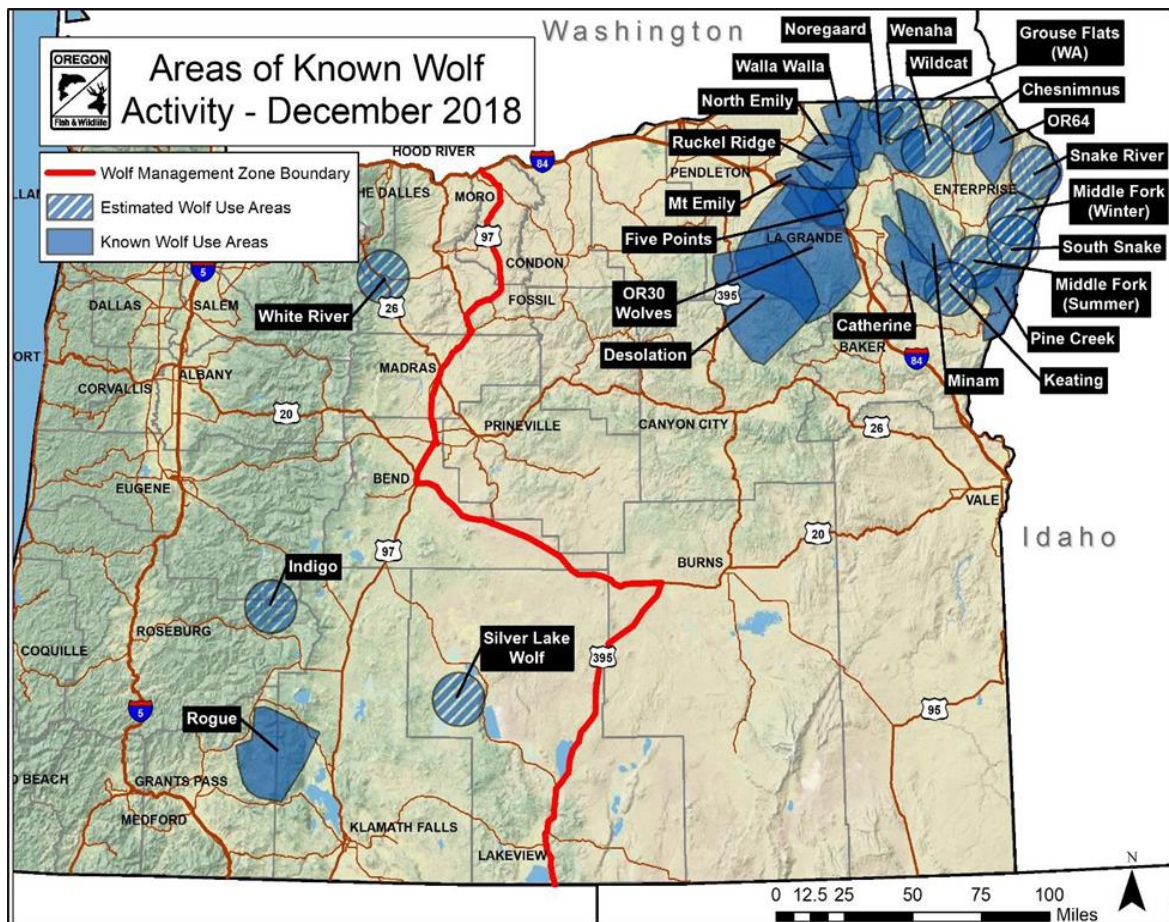
### **3.1.7.2 Habitat Characteristics and Use**

Wolves can occupy a variety of land cover types provided adequate prey exists (Keith 1983, Fuller 1989, Haight et al. 1998) and human activity is minimal (Oakleaf et al. 2006, Belongie 2008). GPS location data indicate wolves in Oregon primarily use forested habitat with seasonal shifts to more open habitats that reflect seasonal distributions of prey (e.g., lower elevation elk wintering areas). Location data from wolves collared in Oregon from 2006 to 2014 showed that 62% of all locations occurred on public and 38% on private lands (ODFW unpublished data). Denning also occurs on both public and private land in Oregon and all known den sites occurred within forested habitat. In 2015, eight (62%) den sites were on National Forest land and five (38%) were on private land.

### **3.1.7.3 Occurrence in the HCP Area**

Wolves do not yet occupy all their estimated potential range in Oregon, however, as stated above, wolves occur throughout much of the state including the White River estimated wolf use area in the north Cascades near Mount Hood. This wolf use area is approximately 30 miles east of the initial HCP lands near Estacada, Oregon. This wolf use area occurs within the Potential

Figure 3-6. Current Distribution of Known Wolves in Oregon (ODFW 2019b).



Acquisition Lands Boundary although most of the area at the eastern edge of the boundary is higher elevation Federal land that does not qualify as lands to be included in the HCP. Wolf collar data shows that wolves move freely between the eastern and western management zones and that they traverse the entirety of the Cascades within the Western Wolf Management Zone. Wolves have proven capable of crossing all types of potential barriers (e.g., rivers, highways) and there are no known conditions which prevent wolves from occupying much of the currently unoccupied areas of range. As habitat generalists that rely on large areas of land without barriers, containing adequate hiding cover and ungulate populations, wolves are likely to continue expanding their range in the western Cascade Mountains of Oregon. The HCP area contains a variety of forest age-classes that provide cover, vegetation for ungulate browsing, and upper watersheds that are miles from human habitation. Thus, the HCP area contains essential habitat elements conducive for wolf occupation and it is likely wolves could occur in the HCP area in the future.

### 3.1.8 Northern Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*) is a subspecies of spotted owl which historically occupied forests from southwestern British Columbia through western Washington and Oregon to northwestern California (USFWS 2018a). In the last 190 years, the loss,

degradation, and fragmentation of spotted owl nesting, roosting and foraging habitat has led to a decline throughout much of the species' historic range. It is estimated that the amount of suitable habitat available to spotted owls has decreased by more than 60% (USFWS 2018a) and spotted owls have been nearly or completely extirpated from southwestern Washington and British Columbia (USFWS 2017a). While conservation efforts have sharply decreased habitat loss, the spotted owl population continues to decline faster than expected (USFWS 2012), likely because of competition from, and predation by, barred owls, a more significant factor than previously believed.

### **3.1.8.1 Status and Distribution**

*Status* - The spotted owl was first listed as a threatened species on June 26, 1990, in response to the widespread habitat loss resulting from timber harvesting, land conversions, and natural disturbances—threats which previous regulatory measures did not adequately address (USFWS 1990). In 2004, USFWS completed a Five-Year Review concluding that the spotted owl should remain listed as a threatened species under the ESA (USFWS 2004a). In October of 2011, the USFWS completed a second status review that concluded, once again, that the spotted owl should remain listed as threatened (USFWS 2011c). However, on August 15, 2012, USFWS received a petition to up-list the spotted owl as endangered and, on April 10, 2015, USFWS found that the petition presented substantial evidence that the up-listing may be warranted (USFWS 2015d). A review of the spotted owl listing status is currently underway (USFWS 2017a).

The initial listing of the spotted owl as a threatened species was followed by publishing a final rule on January 15, 1992, designating 6,887,000 acres of Federal land in Washington, Oregon, and California as critical habitat for the spotted owl (USFWS 1992a). Designated critical habitat for the spotted owl was revised in 2008 to reduce the total critical habitat to 5,312,300 acres of Federal lands in Washington, Oregon, and California (USFWS 2008b). The revised critical habitat acreage was based on the Recovery Plan for the Northern Spotted Owl (Owl Recovery Plan) released to the public in the same year (USFWS 2008a, USFWS 2012).

The 2008 Owl Recovery Plan identified barred owls as competitors with the spotted owl, concluding that they play “some role in spotted owl population decline” but that insufficient evidence existed to characterize that role (USFWS 2008c). The 2008 Owl Recovery Plan was remanded on September 1, 2010, as a result of concerns that agency decision-making processes underlying the Owl Recovery Plan were subject to improper political influence (USFWS 2011d).

On July 1, 2011, the USFWS announced the availability of a Revised Owl Recovery Plan for the Northern Spotted Owl, followed on December 4, 2012, by a revised critical habitat designation (USFWS 2011e, USFWS 2012). This critical habitat designation, which is current for the spotted owl, is comprised of approximately 9,577,969 acres of land in Washington, Oregon, and California (USFWS 2012). Additionally, the Revised Owl Recovery Plan and critical habitat designation put greater emphasis on barred owls as presenting a “significant and complex threat” to the spotted owl population and stated that “habitat conservation alone is not sufficient to achieve recovery objectives” (USFWS 2011d, USFWS 2012). The USFWS is currently conducting an experimental removal of barred owls from spotted owl habitat to assess the effect on spotted owls (USFWS 2018b).

*Distribution* - The current range of the spotted owl extends from southwest British Columbia through the Cascade Mountains, coastal ranges, and intervening forested lands in Washington, Oregon, and California, as far south as Marin County (USFWS 2017a). Spotted owls are particularly rare in British Columbia, the Cascade Mountains of northern Washington, and the Coast Ranges of southwest Washington and northwest Oregon, while a small and virtually isolated population persists on the Olympic peninsula (USFWS 2018a). In Oregon, spotted owls occur in the Coast Range, Klamath Mountains, Willamette Valley, West Cascades, and East Cascade regions, where they are found year-round in forested habitats except for low elevation valleys (OFRI 2017). The amount of suitable habitat within the spotted owl's range has decreased substantially. Owl numbers across the listed range appear to have declined annually by 2.4 to 5.8% per year on average since 1985, when many studies began (USFWS 2018a), and are currently declining at an average rate of 2.9% range wide each year (USFWS 2018b).

### **3.1.8.2 Habitat Characteristics and Use**

Spotted owl habitat is characterized by dense canopy closure typical of mature and old-growth forests that include structure heterogeneity including, abundant logs, snags, and live trees with broken tops. Although they are known to nest, roost, and feed in a wide variety of habitat types, spotted owls prefer older forest stands with variety, i.e., multi-layered canopies of several tree species of varying size and age, both standing and fallen dead trees, and open space among the lower branches to allow flight under the canopy (USFWS 2018a). Spotted owls are territorial raptors that range widely in search of prey but are 'anchored' during the breeding season to a nest site (central-place forager) (USFWS 2017a). Their territories are usually described as a spatial metric (core area around a nesting site enclosed within a wider home range) and a usage metric (nesting, roosting, foraging, and dispersal).

The spatial metric distinguishes between home range and core area. The home range is the "area traversed by the individual in its normal activities of food gathering, mating, and caring for young" (USFWS 2017a). It includes the outward boundary of an owl's territory and, while its limits are somewhat malleable, it can overlap with adjacent pairs (Forsman et al. 1984; Solis and Gutiérrez 1990). Thus, it is suggested that the defended area is smaller than the home range, and some there may be seasonal changes in the total area (Forsman et al. 1984). Nonetheless, spotted owls occupy their home range year-round, so it must provide all the habitat components needed for the survival and successful reproduction of a pair of owls (USFWS 2012). Estimates of median home range size vary by province, from 2,955 acres in the Oregon Cascades (Thomas et al. 1990) to 14,211 acres on the Olympic Peninsula (USDI FWS 1994). These differences are likely a result of habitat quality (USDI FWS 1990a) and may also be affected by the presence of wood rats or flying squirrels as predominant prey species (Zabel et al. 1995).

Core areas are those within the home range that receive concentrated use and include an area surrounding the nest site as well as favored foraging locations (USFWS 2017a). They usually comprise about 20% of the owl's home range (Bingham and Noon 1997). These areas are highly sensitive (Swindle et al. 1997, Miller et al. 1989, Meyer et al. 1998), and are critically important to the breeding season, during which time owls may spend 60-70% of their time (Bingham and Noon 1997). High habitat quality in core areas is thus especially important. The survival and fitness of spotted owls is positively correlated with larger patch sizes and greater

proportion of older forests within the core area (Franklin et al. 2000, Dugger et al. 2005). Bart (1995) found that core areas should contain 30-50% mature and old growth forest (in USFWS 2017a).

Habitat for spotted owls has traditionally been described as consisting of four functional types: nesting, roosting, foraging, and dispersal habitats (USFWS 2012). Spotted owls nest as high as 200 feet off the ground in cavities or the broken tops of trees and may also use nests built by raptors or squirrels (OFRI 2017). As a result, features that support nesting and roosting typically include a moderate to high canopy closure (60 to 80%); a multi-layered, multi-species canopy with large overstory trees (i.e., DBH > 30 inches), a high incidence of large trees with various deformities (large cavities, broken tops, mistletoe infections, and other evidence of decadence), large snags, large accumulations of fallen trees and other woody debris on the ground, and sufficient open space below the canopy for spotted owls to fly (Thomas et al. 1990). Weathers et al. (2001) found the spotted owl association with structurally complex habitats containing high canopy closure was in part due to their intolerance of high temperatures. Complex vertically structured habitat such as mature and old-growth forest habitats contain sufficient cover to provides protection from predators (Franklin et al. 2000). They also prefer nesting sites within close proximity to small streams (OFRI 2017).

Foraging activity is positively associated with tree height diversity (North et al. 1999), canopy closure, woody volume (Irwin et al. 2000, Courtney et al. 2004), snag volume, density of snags greater than 20 inches DBH (North et al. 1999, Irwin et al. 2000, Courtney et al. 2004), density of trees greater than or equal to 31 inches DBH (North et al. 1999), and young forests with some structural characteristics of old forests (Carey et al. 1992, Irwin et al. 2000). Although in general large patches of older forest appear to be necessary to maintain stable populations of spotted owls, home ranges composed predominantly of old forest may not be optimal for spotted owls in the California Klamath Province and Oregon Coast Ranges Province. In these ranges, studies by Franklin et al. (2000) and Olson et al. (2004), respectively, have suggested that spotted owls appear to benefit from a mixture of older forests with younger forest and non-forested areas in their home range as edges between forest types may provide increased prey abundance and availability.

Spotted owl dispersal is essential to maintaining stable populations by filling territorial vacancies when resident spotted owls die or leave their territories, and for providing adequate gene flow across the range of the species (USFWS 2017a). However, the concept of “dispersal” habitat as a specific (lowest quality) type of habitat (which has commonly been considered in previous forest management plans and HCPs) may be inappropriate (USFWS 2017a). Rather, the successful biological function of dispersal requires a variety of habitat conditions and qualities that probably vary depending on the size and condition of the landscapes that owls must disperse across, and the amount of time an owl will spend moving or residing in that landscape before locating a suitable territory. In cases where the distance and time required to disperse to a territory are very short, habitats consisting of tree size and canopy closure that simply allow owls to easily fly through and be protected from avian predators might be sufficient (USFWS 2011d). As distance and time increase, forest structure and stands that provide additional foraging and roosting opportunities become necessary. In some cases, forest stands of adequate structure and quality sufficient to consistently and reliably support roosting and

foraging will need to be well-distributed across the landscape to support long-term dispersing or non-resident owls.

Dispersal habitat, at a minimum, consists of stands with adequate tree size and canopy closure to provide protection from avian predators (USFWS 2011d) and includes younger and less diverse forest stands than foraging habitat. Foraging habitat includes stands that contain some roosting structures and prey species habitat structures to support, over the long-term, dispersing juveniles and/or non-resident spotted owls requiring temporary resting and feeding opportunities (USFWS 2011d).

### **3.1.8.3 Occurrence in the HCP Area**

Spotted owl nest sites or activity centers aren't known to occur in the HCP area, based on protocol surveys in HCP areas closest to known spotted owl sites on adjacent lands that determined no spotted owl occupancy (Coe 2019). Although the majority of the area hasn't been directly surveyed to determine this, forest structure assumed to be minimally suitable for spotted owl nesting does not occur in the HCP area (e.g., older forest stands with large diameter live and dead trees and diverse understory). The highest quality spotted owl habitat that does occur in the HCP area is generally suitable for foraging and perhaps roosting by spotted owl, primarily represented by stands that are >50 years old. This is because these older stands contain woody structural features such as snags, defective trees and downed wood that may be habitat for prey species. Approximately 3,200 to 4,300 acres of this habitat will occur in the HCP area over the term of the plan (11-15% of the HCP forested land) and will generally occur in relatively small blocks distributed within a matrix of younger, less structurally complex stands (age classes 26-40 years old that have been thinned) that allow spotted owls to move and disperse through or are unsuitable for spotted owl use.

No spotted owls or activity centers are currently known to occur on the HCP lands (Coe 2019). Two spotted owl sites have been identified on lands adjacent to the HCP lands; one on Federal land about 0.40 miles to the east of the easternmost parcel, and one on State land (Gawley Creek Site) located about 0.50 miles south of the southeasternmost parcel of the HCP lands. The Federal land owl site to the east is believed to be nonexistent due to the large wildfire, known as the 36 Pit Fire, that occurred in the Clackamas River basin in 2014 that burned through the area where the site center was located. This area sustained additional fire damage as a result of the wildfires that occurred in 2020. Adjacent HCP stands are primarily in the 31-40- and 41-50-year age-classes but younger stands are intermixed. Most of these stands sustained high intensity fire damage. In the near term, as a result of the mixed severity of the 2020 damage, this area is likely to support patchy areas of habitat that support prey species but are unlikely to provide broad connectivity for forage or dispersal spotted owl habitat, as defined in this HCP. The Gawley Creek Site on State lands to the south is considered an existing site center. Annual surveys have been conducted at the Gawley Creek Site since 1988 (Coe 2019). The site center was moved ~3/4 of a mile in 2014 when nesting was confirmed (both owls were banded in 2016 by BLM, so identification was confirmed). However, no nesting has been confirmed since 2014 and there were no detections in 2019 (Coe 2019). This area also sustained intense fire damage as a result of the 2020 wildfires, however the impacts on the actual site center are unknown. Adjacent HCP lands closest to the Gawley Creek Site consist of intermixed stands of various age-classes, including lands in the 51+ age-class. For the most



part, these stands are approximately 60 years old, but trees 62-82 years of age exist in areas retained as riparian buffers. The wildfires caused severe damage to these stands. In the near term, as a result of the mixed severity of the damage, this area is likely to support patchy areas of habitat that support prey species but are unlikely to provide broad connectivity for forage or dispersal spotted owl habitat, as defined in this HCP.

The distance, and geographic, and ecological conditions between these spotted owl sites and the HCP area probably mean demographic and habitat connectivity are limited but not precluded. The State-owned site is close enough and contains nesting habitat such that if the site still exists, some periodic use of the HCP area by those spotted owls and/or their progeny could occur. Even though this site may have burned, it is possible based on past occupancy data that regardless of the extent of fire damage, spotted owls occur sufficiently close that the HCP area could minimally support regional spotted owl conservation as follows: 1) provides a small and localized movement and foraging landscape for spotted owls that periodically and quickly pass through the area while dispersing; 2) provides ongoing supplemental roosting and foraging opportunities for single spotted owls or spotted owl pairs that occasionally occupy territories located primarily on adjacent/nearby Federal or State lands; and 3) provides foraging opportunities and other habitat attributes for occasional non-territorial owls to survive in the HCP area for an unknown amount of time.

## **3.2 Unlisted Species**

### **3.2.1 Pacific Lamprey**

The Pacific lampreys (*Lampetra tridentata*) are the most widely distributed lamprey species on the west coast of the United States. Their distribution includes major river systems such as the Fraser, Columbia, Klamath-Trinity, Eel, and Sacramento-San Joaquin Rivers. Potential distribution of Pacific lampreys in Oregon includes the Columbia River mainstem to McNary Dam, associated Columbia River tributaries in Oregon including the Willamette River, tributaries of the Snake River in Oregon, and Oregon coastal rivers (Kostow 2002). A significant portion of the Pacific lamprey historical range in upper reaches of many rivers has been lost because of construction of dams with no fish passage structures (i.e., upper Deschutes River and tributaries, Hood River, and many tributaries of the Willamette River) (Kostow 2002).

#### **3.2.1.1 Status and Distribution**

*Status* – The Pacific lamprey is not Federally-listed under the ESA. On December 27, 2004, the USFWS announced a 90-day finding on a petition to list three species of lamprey, including the Pacific lamprey, as threatened, or endangered under the ESA (USFWS 2004b). The USFWS found that the petition and additional information in their files did not present substantial scientific or commercial information indicating that listing the species was warranted. Since the 90-Finding decision, efforts have been undertaken to address threats to Pacific lampreys and their habitat (CRITFC 2011, Luzier et al. 2011, USFWS 2015e).

The State of Oregon listed the Pacific lamprey as a sensitive species in 1993, and gave the species protected status in 1996. Commercial harvest was eliminated in 2002 by the Oregon Fish and Wildlife Commission, however, Tribal and personal harvest continues to be allowed with a State permit (USFWS 2004b).

*Distribution* - As stated above, Pacific lamprey distribution includes the Columbia River and its tributaries (Figure 3-7). In Oregon, a significant portion of the Pacific lamprey historical range in upper reaches of many rivers has been lost because of construction of dams with no fish passage structures (i.e., upper Deschutes River and tributaries, Hood River, and many tributaries of the Willamette River) (Kostow 2002).

Observations and records of adult Pacific lamprey passage at mainstem Columbia and Snake River dams indicate the species has declined substantially in these rivers and their tributaries in Oregon (Kostow 2002). Although lamprey numbers have increased in recent years, it is unknown whether these numbers are attributable to favorable ocean conditions resulting in greater host base or other factors, such as the recent inclusion of night counts at many dams, which has increased overall sampling efforts (Kostow 2002).

The petition and other information provide some evidence that the Willamette River was, and may still be, an important area for Pacific lamprey production in the Columbia River basin (Kostow 2002). Although impassable dams and other artificial barriers have likely resulted in reduced distribution and abundance of lampreys in the Willamette River basin, information suggests that thousands of Pacific lampreys still ascend Willamette Falls and are still widely distributed in the Willamette Valley (Kostow 2002).

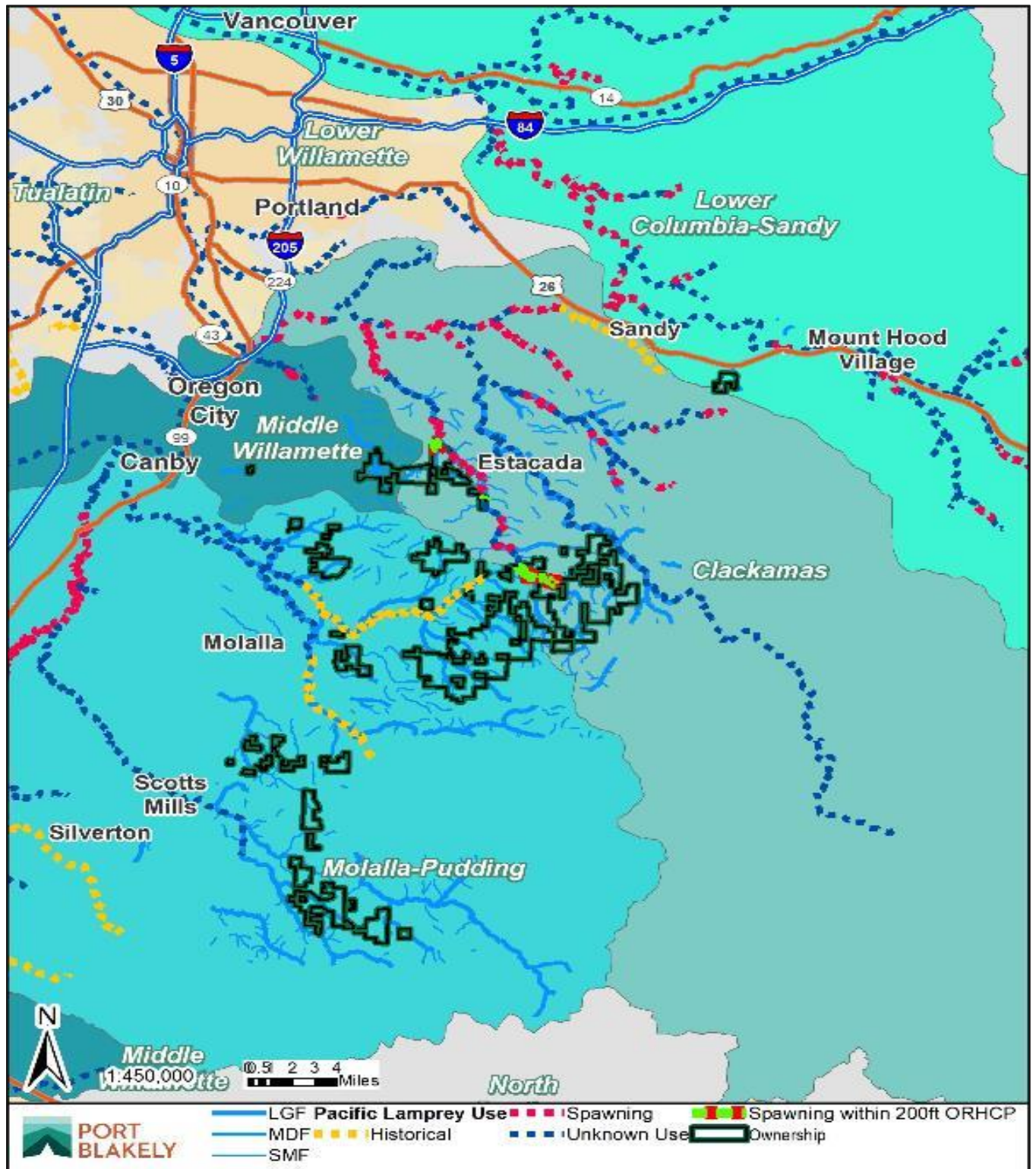
### **3.2.1.2 Habitat Characteristics and Use**

Most lamprey species have a similar life cycle: all begin life in freshwater, but some are anadromous (going from ocean to freshwater tributaries to spawn). In the beginning of their life cycle, the lamprey eggs hatch and the young ammocoetes (larvae) drift downstream to areas of low velocity and silt or sand substrate. They remain burrowed in the stream bottom, living as filter feeders for two to seven years, filter-feeding on algae and detritus (Kostow 2002). After such time, the young larvae transform to macrophthalmia (juveniles) and migrate to the ocean.

After spending one to three years in the marine environment as a feeding adult, Pacific lampreys migrate to freshwater spawning areas between February and June and cease feeding (Kostow 2002); Moyle 2002). Pacific lampreys primarily migrate upstream at night and adult size at the time of migration ranges from about 15 to 24.5 in. Their degree of fidelity to their natal streams is unknown. They are thought to overwinter and remain in freshwater habitat for approximately one year before spawning. Adult lampreys spawn between March and July, depending upon location within their range. Spawning occurs in gravel bottomed streams, at the upstream end of riffle habitat, typically above suitable ammocoete habitat (Moyle 2002). Both sexes construct the nests, often moving stones with their mouths. Fecundity is high but variable, with females producing between 20,000 and 200,000 eggs (Moyle 2002). After the eggs are fertilized and deposited in the nest, embryos hatch in approximately 19 days. Once the ammocoetes reach about 6 in, they begin metamorphosis into macrophthalmia (Moyle 2002). After the eggs are deposited and fertilized, the adults typically die within 3 to 36 days (Kostow 2002).

Pacific lampreys are parasitic as adults and feed on a variety of marine and anadromous fish including Pacific salmon, flatfish, rockfish and pollock. They are preyed upon by sharks, sea lions, and other marine animals. They have been caught in depths ranging from 300 to 2,600 ft., and as far as 62 miles off the coast in ocean haul nets (USFWS 2004b).

Figure 3-7. Current and Historic Pacific Lamprey Distribution in Relation to the HCP Area.



### 3.2.1.3 Occurrence in the HCP Area

The current distribution of Pacific lamprey in the RMU Willamette Subunit includes the Molalla-Pudding and Clackamas River systems (Figure 3-7). These stream systems and their associated riparian zones, managed under OFP Rules, exist throughout the forestlands. The Port Blakely HCP area contains a range of forested age-classes from young to mature stands > 50 years old, distributed throughout the Molalla-Pudding and Clackamas River tributaries in the upper watersheds. Contributions to riparian and stream function increases as the adjacent forests age, with older stands increasing shade and LWD recruitment at levels that allow fish to utilize the habitat for some or all of their life stages. Thus, it is likely that Pacific lamprey occur in the Molalla-Pudding and Clackamas River tributaries that flow through or adjacent to Port Blakely's HCP area.

### 3.2.2 Cascades Frog

The Cascades frog (*Rana cascadae*) is a medium sized amphibian that lives in a moderately small range along the west Cascade Mountains from northern Washington, through Oregon, and down to northern California, with an isolated population in the Olympic Mountains of Washington. They exist in a range of aquatic habitats including lakes, wet meadows, ponds, and adjacent streams (Pope et al. 2014). Populations around the perimeter of the range have been declining, possibly due to airborne agrochemicals, introduced non-native fish, and loss of open meadow habitat due to fire suppression (NatureServe 2018a).

#### 3.2.2.1 Status and Distribution

*Status* – The Cascades frog is not currently listed as a threatened species under the ESA; however, it is a Federal species of concern (USFWS 2017c). The global conservation status is vulnerable (NatureServe 2018a), and the International Union for the Conservation of Nature (IUCN) Red List considers it near threatened (Hammerson and Pearl 2004). The most concern for the status of the Cascades frog is seen in California in the Klamath Mountains and in the southern Cascades. The number of populations are low and population growth trajectories are stable or declining. Without active management, these populations are considered at risk for extirpation within the next ten years (Pope et al. 2014). In Oregon, in mountain meadows, the population numbers are estimated to be in the hundreds within an area of one hectare. Viability appears to be good in areas of occurrence. Despite good local population densities 22% of historical populations have disappeared in Oregon (NatureServe 2018a).

*Distribution* – The Cascades frog is found in the Cascade Mountain Range, from northern Washington to Northern California, and in the Olympic Mountains of Washington, at elevations ranging from 400-2,500 meters (NatureServe 2018a).

#### 3.2.2.2 Habitat Characteristics and Use

The Cascades frog uses a variety of habitats, including large lakes, bogs, ponds, wet meadows, and flowing streams in open coniferous forests (Hammerson and Pearl 2004), and occurrence in these habitats varies depending on life stage and season (Pope et al. 2014). Shallow still-water areas are used for breeding and must maintain water long enough for the frogs to hatch from the eggs and for the tadpoles to develop. It has been documented in the Klamath

Mountains that these frogs prefer lakes, ponds, and wet meadows that are free of fish and have a high percentage of near-shore habitat (Pope et al. 2014).

For adults and juveniles, non-breeding habitat is more varied, and includes ponds, meadows, lakes, and streams. They often employ floating logs or emerged rocks for basking opportunities and foraging sites, while maintaining an aquatic escape from predators. During the summer months, streams are used more often, mostly by adults as they can navigate the currents better than less mature and smaller frogs (Pope et al. 2014).

Overwintering habitat is restricted to spring-fed lakes and ponds, and they are suspected of using aquatic sites that do not freeze solid. Cascades frogs prefer overwintering in deep, loose silt and mud like that found in ponds (Pope et al. 2014).

### **3.2.2.3 Occurrence in the HCP Area**

The Cascades frog could occur in the Port Blakely HCP area wherever the aquatic habitat is suitable to support the entire life cycle and development of the frog. There are natural heritage records that show them occurring in the Clackamas and Molalla-Pudding watersheds (NatureServe 2018a). Port Blakely's HCP contains suitable habitat, i.e., ponds and small fish and nonfish streams, the former of which are protected under current OFP Rules. Even greater protection of these habitat types will be provided under the HCP. Thus, this species likely occurs and could continue to occur in the HCP area.

### **3.2.3 Coastal Tailed Frog**

The coastal tailed frog (*Ascaphus truei*) is one of two species of tailed frogs named after their externally extended cloaca ("tail") which is exhibited only in the males of the species. These frogs are well adapted to life in mountain streams, which can be fast flowing and steep (B.C. Ministry of Environment 2015). They are found in the Pacific Northwest and range from southwest British Columbia to northern California and occur from coastal sea level and into the mountains within the range (NatureServe 2018a).

#### **3.2.3.1 Status and Distribution**

*Status* – The coastal tailed frog is not listed as a threatened species under the ESA (IUCN 2015). However, it is a Federal species of concern (USFWS 2017c). The National Heritage Status is N4 (apparently secure), and the State Rank for Oregon is S3 (vulnerable) (NatureServe 2018a). The coastal tailed frog has a narrow environmental specificity, and the population is probably declining on a short-term trend of 10-30% due to its sensitivity to logging and road building that can increase water temperatures and siltation (NatureServe 2018a).

*Distribution* – This frog is found along the coasts and in the mountains of southwest British Columbia, Washington, Oregon, and in Northern California (NatureServe 2018a). It is absent from most offshore islands, and typically does not exist in lowlands where streams can be slow moving and warm (B.C. Ministry of Environment 2015). Coastal tailed frogs are closely tied to clean, cold streams, necessary for the range of the frog's life, and during cool, wet weather adult frogs will range into upland habitat for foraging but return to the stream for breeding (NatureServe 2018a). They occur at elevations ranging from sea level to 5,900 feet and could occur at elevations above 6,500 in the southerly regions of its range (B.C. Ministry of

Environment 2015). The total population size is unknown but is believed to exceed 10,000 and appear to be common in suitable habitat (NatureServe 2018a). In stream habitat, adult and sub-adult frogs are typically encountered less commonly than larvae. For instance, in a study done in 72 randomly selected streams in California over four years, a total of 693 larvae were found in 54 of the streams, whereas only 32 metamorphosed individuals were found (NatureServe 2018a).

### **3.2.3.2 Habitat Characteristics and Use**

The coastal tailed frog requires both aquatic and terrestrial habitats for its full life cycle and metamorphosis. This frog prefers cascade and step-pool aquatic habitats, with cobbles, boulders, pocket pools, and underlying channel-spanning pools. These channel morphologies are relatively stable compared to pool and riffle sequences and rapids found in large basins and also have low levels of fine sediment and debris (B.C. Ministry of Environment 2015). Eggs and hatchlings cannot resist pulling forces, and cascades and step-pools allow for egg-laying and post-metamorphic recruitment cycles during the lifespan of a breeding adult (B.C. Ministry of Environment 2015). Aquatic habitat is also influenced by stream temperatures and require temperatures above 44°F for embryonic and tadpole development. Eggs tolerate temperatures up to 65°F, whereas tadpoles tolerate temperatures up to 71°F, and temperatures above 75° are lethal to adults (B.C. Ministry of Environment 2015).

Terrestrial habitats are frequented by adults and sub-adults outside of the mating and egg-laying seasons. Riparian forests are most commonly used, though coastal tailed frogs are also found in upland forest areas, which appear to contribute to population density (B.C. Ministry of Environment 2015). That is, a higher abundance of tailed frogs was observed in sites with intact upland and riparian forests (> 140 years) when compared with sites with 100 to 160-foot wide riparian forest (> 140 years) buffers with clear-cut uplands (McEwan 2014). Population densities are also impacted by ground cover, large, downed wood, and availability of moist microhabitat, and a strong association with old-growth and mature forests have been reported in Oregon, Washington, and British Columbia. Some studies suggest that coastal tailed frogs are not adapted to high-ambient light levels such as exposed habitats of clear-cuts. The broader canopy cover of older forests is effective in maintaining humid microclimates and moderately moist, organic soils which facilitate in the movement and dispersal of these frogs (B.C. Ministry of Environment 2015).

### **3.2.3.3 Occurrence in the HCP Area**

The coastal tailed frog is known to occur in Clackamas County in Oregon, specifically in both the Clackamas and Molalla-Pudding Watersheds (NatureServe 2018a), in which the Port Blakely HCP lands are included. Some of the HCP area contains suitable habitat, as described above, especially in the higher elevations with rocky streams and preferred ambient temperatures. Older stands of trees and Port Blakely stands adjacent to mature forests are more suitable to the life cycle of these frogs. The HCP describes measures to maintain or improve the health of riparian environments, such as wider buffers and proactive input of LWD, which is of particular importance to these frogs. Given their occurrence in the HCP area watersheds and the presence of suitable habitat, especially in the future under the HCP conservation measures, it is possible that the coastal tailed frog could occur on Port Blakely forestlands.

### 3.2.4 Cascade Torrent Salamander

Torrent salamanders were previously classified as either members of the families Ambystomatidae or Dicamptodontidae, but are now considered a discrete lineage, Rhyacotritonidae (Howell and Maggiulli 2011). In 1992, the Olympic salamander (*Rhyacotriton olympicus*) was split into four distinct species one of which became the Cascade torrent salamander (*Rhyacotriton cascadae*) (Good and Wake 1992). There is paucity of literature on the present *R. cascadae*, but it is known to have a limited distribution in western Washington and Oregon (Howell and Maggiulli 2011).

#### 3.2.4.1 Status and Distribution

*Status* - The Cascade torrent salamander is not listed as a threatened species under the ESA and, currently, has no special Federal status (USFWS 2019a). The National Heritage Status is N3 (vulnerable), and the State Rank for Oregon is S3 (vulnerable) (NatureServe 2018a). This species is considered “sensitive” in Oregon and is considered an Oregon Conservation Strategy species in the West Cascades and Willamette Valley Ecoregions (OCS 2016). The Cascade torrent salamander has a small range in western Washington and Oregon, but the population is considered to have a relatively stable short-term trend (NatureServe 2018a). The long-term trend is a decline of <50% to relatively stable (NatureServe 2018a). Any decreases in population numbers from historical levels are likely due to anthropogenic influences on both public and private lands (Howell and Maggiulli 2011).

*Distribution* – The Cascade torrent salamander occurs along the west slope of the Cascade Range, from just north of the Cowlitz River and State Route 12, Washington, south to the Middle Fork of the Willamette River, Oregon. In Oregon, the range of this salamander includes Multnomah, Hood River, Clackamas, Marion, Linn, and Lane Counties (Howell and Maggiulli 2011). Within this area, the species is patchily distributed (Howell and Maggiulli 2011). The population size is unknown but is thought to be fairly common in appropriate habitat. McAllister (1995) mapped approximately 53 collection or verified sighting locations in Washington. The number of occurrences in Oregon was estimated to be between 21 and 100 (NatureServe 2018a).

#### 3.2.4.2 Habitat Characteristics and Use

The Cascade torrent salamander is a stream-dwelling amphibian that can be found along the edges of small, high-gradient, permanent, cold-water sources such as seeps, waterfalls, headwaters, and edges of larger streams (Howell and Maggiulli 2011). Because these salamanders prefer rapidly flowing water, they are restricted to high gradient (steep) areas and are absent from flat areas or areas with gentle slopes (Good and Wake 1992). Large roaring streams are avoided. Larvae often occur under stones in shaded streams. Adults also inhabit these streams or stream sides in saturated moss-covered talus, or under rocks in splash zone, and during wet periods they may venture into upland areas (Howell and Maggiulli 2011, NatureServe 2018a). Rhyacotriton species are reported to occur primarily in older forest sites because required microclimatic and microhabitat conditions generally exist only in older forests (Welsh 1990). However, the Cascade torrent salamander survived in many sites that were completely deforested by the 1980 eruption of Mount St. Helens, indicating that “forest cover may not be a critical habitat feature at higher elevations” (Jones et al. 2005).

In managed forests of western Oregon, Russell et al. (2005) found that the occurrence and abundance of Cascade torrent salamander at the stream-reach scale was associated with streams in close proximity to the stream origin (i.e., headwaters). Abiotic factors, such as cobble and gravel substrates with low percentages of fine sediment and sand, were positively associated with salamander presence. The Cascade torrent salamander occupancy and relative abundance at the landscape scale was also greater in streams of consolidated geological composition, in streams with northerly aspects, as compared to southerly aspects, and increased with adjacent riparian forest age. In southern Washington, Pollett et al. (2010) found abundance of Cascade torrent salamander to be lower in unbuffered streams than in streams with buffers or in second-growth forests.

Since torrent salamanders are virtually restricted to cold, high-gradient headwaters and their margins, and only rarely do they venture as far as 50 m from water (Good and Wake 1992). Within-stream movements generally appear to be limited to stream segments of less than 25 m (Petranka 1998). Larvae likely disperse farther than this, but supporting data are lacking. Nussbaum and Tait (1977) found that out of 191 recaptures of different individuals, 70 percent moved less than 2 m, and the greatest known distance moved over one summer was 22 m. Movements as great as 50 m have been observed in wet coastal Douglas-fir habitat but are an exception (Good and Wake 1992). However, these long-distance movements can only occur in very moist habitats as torrent salamander species are desiccation intolerant (Jennings and Hayes 1995).

#### **3.2.4.3 Occurrence in the HCP Area**

HCP lands are within the range of population occurrence which includes Clackamas County (NatureServe 2018a). Some of the HCP area contains suitable habitat, i.e., high-gradient perennial streams, headwaters and seeps, especially in the higher elevations with rocky streams and preferred ambient temperatures. Older stands of trees and younger managed stands in the HCP area, and Port Blakely stands adjacent to mature forests, where high-gradient streams exist are likely to provide habitat suitable to the life cycle of these torrent salamanders. However, many of the higher elevation, head-water streams in the HCP area are low-gradient streams so the abundance of Cascade torrent salamander is likely low across the landscape. The HCP describes measures to maintain or improve the health of riparian environments, such as wider buffers on small fish-bearing streams and perennial nonfish-bearing streams, which are important habitat to these salamanders. Stream-associated seeps and wetlands which are known to be used by Cascade torrent salamanders also receive protection under the HCP. Given their likely occurrence in the HCP area watersheds, albeit potentially limited, and the presence of suitable habitat, especially in the future under the HCP conservation measures, it is possible that the Cascade torrent salamander currently exists in the HCP area and would continue to occur and potentially expand their distribution on Port Blakely forestlands in the future.

#### **3.2.5 Oregon Slender Salamander**

The Oregon slender salamander (*Batrachoseps wrighti*) is an amphibian that is found along both sides of the Cascade Mountains of Oregon (NatureServe 2018a), in late-successional and second growth forests (Clayton and Olson 2009) and is also widely found in managed forests. No focused life history studies have addressed this species (Clayton and Olson 2009). The



Oregon slender salamander's small range, dependence on specific habitat characteristics and a need for downed and decaying logs make it a good candidate for further research.

### **3.2.5.1 Status and Distribution**

*Status* – The Oregon slender salamander is a Federal species of concern under the ESA (USFWS 2017c). In 2001, the USFWS proposed the species for listing (Clayton and Olson 2009). The ODFW considers it a State Strategy Species listed as Sensitive Undetermined Status. The Oregon Natural Heritage Information Center ranks this species as Globally Imperiled (G2G3), Oregon State imperiled (S2S3) and it is a List 1 species (threatened with extinction or presumed to be extinct throughout their entire range). The total population size for this species is unknown but presumed to be at least a few thousand and has declined at a rate of 10-30% based on both long and short-term trends (NatureServe 2018a). The primary potential threat to these salamanders and their habitat is short rotation clear-cut timber harvest, which removes canopy closure, disturbs substrates, and can alter microhabitat refuges and microclimates. In particular, where there is limited large down wood volume and limited down wood recruitment, negative consequences for this terrestrial salamander are likely. However, there is uncertainty about the effect on these salamanders of partial harvest, or regeneration harvest with green tree and down wood retention (Clayton and Olson 2009).

*Distribution* – The Oregon slender salamander exists only in Oregon, mostly on the western flank of the Cascades from the Columbia River Gorge in Multnomah and Hood River Counties and south to Lane County, including Clackamas County. Some population sites have been recorded on the eastern slope in Hood River and Wasco Counties (Nature Serve 2018). The range runs generally north-south and is close to 145 miles long and ranges in elevation from 80 feet at the northern end at the Columbia River gorge up to 5500 feet on the southern end of the range on the west side of the Cascade crest (Clayton and Olson 2009). The distribution of the Oregon slender salamander includes the Molalla-Pudding and Clackamas watersheds (NatureServe 2018a).

### **3.2.5.2 Habitat Characteristics and Use**

This species occurs in forested habitat and requires three primary habitat conditions: moisture, dead wood, and older forests. The Oregon slender salamander is associated with large, downed wood in stands with moist microhabitat conditions (Clayton and Olson 2009). In 2017, as part of a collaborate research project between Oregon State University, ODF, Port Blakely, Weyerhaeuser, BLM and others, Oregon slender salamander occupancy was evaluated and found to be strongly associated with the amount of coarse woody debris (Garcia et al. 2018, Homyack and Kroll 2014, Kroll et al. 2015). This species prefers, and appears more abundantly, in old growth stands compared to 30 to 80-year-old stands. Dense canopy closure, east-west facing slopes, logs in the 20 to 30-inch diameter class, and the presence of snags were found to have a significant positive association with this species of salamander (Clayton and Olson 2009). However, Oregon slender salamanders are reported to be common in second growth forest stands and persisted in units following harvest and/or were able to recolonize units as they regenerated over time (Garcia et al. 2018, Homyack and Kroll 2014). Oregon slender salamanders have been found under rocks, logs, bark, and moss, and in decaying wood, such as stumps and logs, in crevices in the ground, and even in termite burrows. This species is a terrestrial salamander, with no aquatic larval stage, and nests are found under bark and in

rotten logs (NatureServe 2018a). Habitat may differ geographically, as these salamanders have been observed in drier zones, east of the Cascades (Clayton and Olson 2009).

Oregon slender salamanders are invertivores feeding on species commonly associated with decaying woody material, such as spiders, mites, snails, centipedes, and earthworms (NatureServe 2018a). Salamanders in the plethodontid family, which includes the Oregon slender salamander, are thought to play important roles in forest ecosystems and act as indicators of the integrity of forest ecosystems (Clayton and Olson 2009).

### **3.2.5.3 Occurrence in the HCP Area**

HCP lands are within the range of population occurrence, including the Clackamas and Molalla-Pudding watersheds (NatureServe 2018a), and could include habitat characteristic of the Oregon slender salamander. As part of the research project identified above, the occupancy of the Oregon slender salamander was evaluated in 88 randomly selected forest stands (harvest units) that had not been harvested in > 50 years. The forest stands occurred across the properties of four collaborating partners, including Port Blakely property in Clackamas County. Thirteen of 39 units in the Clackamas research block occurred on Port Blakely ownership (Kroll and Jones 2018). All research stands were greater than 10 acres in size above 2,500 feet in elevation and known to be occupied by Oregon slender salamander OSS (Garcia et al. 2018).

Clayton and Olson (2009) report that there is an absence of this species in recent clearcuts, which has been attributed to a combination of canopy removal and a low abundance of woody debris, which is needed for reproduction and nesting. However, more recent studies indicate that the Oregon slender salamander can persist in clearcuts (Garcia et al. 2018, Homyack and Kroll 2014, Kroll and Jones 2018). The HCP outlines the importance of, and a commitment to add, large woody debris to riparian zones and coarse woody debris (CWD) in the uplands, which would improve potential habitat for this species. This species is known to occur on Port Blakely ownership in the western Cascades and is likely to continue occupying the HCP lands given their ability to persist in forest stands post-harvest.

### **3.2.6 Western/Pacific Pond Turtle**

The western pond turtle, or Pacific pond turtle (*Actinemys marmorata*), is a reptile that is widely distributed along the west coast of North America and can be found in both intermittent and permanent freshwater aquatic habitats (Rosenberg et al. 2009). Once abundant, the population has been on a decline in Washington, northern Oregon, southern California, and Baja (Hays et al. 1999). In Oregon, specifically, the western pond turtle occurs widely and in low to very low densities (NatureServe 2018a). Initial declines in population could be attributed to commercial food exploitation and the pet trade (Hays et al. 1999).

#### **3.2.6.1 Status and Distribution**

*Status* – The western pond turtle is not listed as a threatened species under the ESA. However, it is a Federal species of concern (USFWS 2017c). The ODFW considers the western pond turtle a Strategy Species and Oregon Sensitive-Critical Species under their Conservation Strategy. The National Heritage Global Rank is G3G4 (not immediately imperiled). The State Rank for Oregon is S2 (imperiled) (Rosenberg et al. 2009).

*Distribution* – The western pond turtle is found from Northwestern Baja California, Mexico north to the Puget Sound lowlands in Washington (Rosenberg et al. 2009). With few exceptions, it is restricted to areas west of the Cascade Range and Sierra Nevada Range. Small occurrences in British Columbia are likely due to introductions (such as release of pets) and may or may not represent extent populations, as none have been observed in the wild in Canada in over 50 years (NatureServe 2018a). In Oregon it primarily occupies regions with suitable habitat, west of the Cascades, and at elevations below 6,000 feet, with the largest populations found in the Willamette, Umpqua, Rogue, and Klamath River Drainages, and occasionally occur in lowland aquatic habitats throughout western Oregon (Rosenberg et al. 2009). Western pond turtles migrate locally, usually staying within a range of about one kilometer (NatureServe 2018a).

### **3.2.6.2 Habitat Characteristics and Use**

The western pond turtle requires both aquatic and terrestrial habitats. Aquatic habitat can be permanent and intermittent bodies of water such as rivers, creeks, small lakes, and ponds (including stock ponds and sewage treatment ponds), marshes, unlined irrigation canals, and reservoirs (NatureServe 2018a, Rosenberg et al. 2009). Western pond turtles prefer the low-velocity waters and deep pools of streams and rivers. They have been observed at elevations ranging from sea level to 6,000 feet in Oregon (Rosenberg et al. 2009).

The western pond turtle moves from its aquatic habitat onto land for nesting, overwintering, dispersal, and basking. A variety of substrates are used by western pond turtles for these activities, such as solid rock, boulders, cobbles, gravel, sand, mud, decaying vegetation, and combinations of these. Nesting typically occurs within approximately 650 ft of aquatic habitat in areas with compact soil, sparse vegetation, and good solar exposure (Rosenberg et al. 2009). Western pond turtles spend a considerable amount of time basking, thus, they are more abundant in areas with good basking sites, such as logs, partially submerged branches, and large rocks, with plenty of light exposure. Areas along and around waterways with dense growths of woody vegetation may shade potential basking sites and create unsuitable habitat (Hays et al. 1999). In the northern and central part of the range overwintering in upland habitats is common, although some do not leave their aquatic habitat. This variability in behavior is observed throughout the species range (NatureServe 2018a). The turtles that choose a terrestrial habitat for overwintering typically leave the aquatic habitat from September to December. In a study conducted in Washington, most movement to upland sites occurred during September and October (Rosenberg et al. 2009). Terrestrial overwintering sites include a broader vegetation structure, with shrubby, open, and forested environments all being used, although access to basking sites remains important all year. In Oregon, western pond turtles typically enter a state of semi-dormancy during the winter, and opportunistically seem to select either aquatic or terrestrial environments (Rosenberg et al. 2009).

Movements of the western pond turtle is dependent on multiple variables which can include habitat, type and size of aquatic system, availability of upland habitat, season, and environmental stress. In general, the turtle nests and overwintering sites are within 100 meters of an aquatic habitat (Hallock et al. 2017). In California, most exhibit a very small home range, however some have been known to travel up to 5 kilometers overland. Barriers to overland travel include non-traversable topography, highways, and urbanized areas lacking suitable habitat (NatureServe 2018a).

### 3.2.6.3 Occurrence in the HCP Area

The western pond turtle is known to occur in Clackamas and Marion Counties in Oregon, and more specifically in both the Clackamas and Molalla-Pudding Watersheds (NatureServe 2018a), in which the Port Blakely HCP lands are included. Some of the HCP area contains suitable habitat, as described above, especially near streams, ponds, and other aquatic features. The HCP includes measures to maintain or improve the health of riparian habitats, which play an integral role in the life of the western pond turtle. Given their occurrence in the HCP area watersheds and the presence of suitable habitat, it is possible that the western pond turtle could occur on Port Blakely forestlands.

### 3.2.7 Northern Goshawk

Northern goshawks (*Accipiter gentilis*) are highly mobile and have large home ranges, usually ranging from 1,200-10,000 acres depending on sex, habitat characteristics, but has been documented to be variable based on the field procedures used to collect the data. They occupy a wide variety of boreal and montane forest habitats (USDI 1998). Typical territories often contain several alternate nests that are used by pairs over several years. Data regarding population trends are limited. However, a comprehensive review of available peer-reviewed research found no evidence of a decline or increase in goshawks in North America based on its range, demographics (density, fecundity, and survival) and population trends (Kennedy 1997). Timber harvest is the principal threat to breeding populations (Squires and Reynolds 1997). In addition to the relatively long-term impacts of removing nest trees and degrading habitat by reducing stand density and canopy cover, logging activities conducted near nests during the incubation and nestling periods can have an immediate impact, i.e., nest failure due to abandonment (Boal and Mannan 1994, Squires and Reynolds 1997).

#### 3.2.7.1 Status and Distribution

*Status* - Northern goshawks are not listed as a threatened species under the ESA but they are considered a Species of Concern (USFWS 2016a). They were petitioned for listing under the ESA in 1991. In their 12-month finding, issued in June 1998, the USFWS determined that listing this population as threatened or endangered was not warranted, basing the decision on a review of existing population and habitat information (USFWS 1998c). In Oregon, the goshawk is listed as a Sensitive-Vulnerable species and is a State Conservation Strategy Species (ORBIC 2016).

*Distribution* - Goshawks are a widespread species that inhabit the temperate and boreal forests of the Northern hemisphere and also ranges to the southern montane forests of the southwestern U.S. Their year-round range occurs in the majority of the western U.S, including western Oregon, however, they sometimes migrate short-to medium- range distances. Migration patterns often follow areas of abundant prey. Available evidence suggests that distribution of goshawks in the northern and western portions of its range is relatively unchanged since European settlement (USDI 1998).

#### 3.2.7.2 Habitat Characteristics and Use

Goshawks are typically found in large, forested areas with a mosaic of tree stages, forest characteristics, openings, and habitat components (e.g., snags and downed logs). They prefer

an open forest floor for access to ground-dwelling prey. Nest areas range from those with a few mature trees, but with dense understory trees, to those with closed mature canopies and sparse understory trees. However, they can be generalists in terms of the types and ages of forests they can utilize and can also be found nesting in managed younger forests intermingled with mature trees with high canopies. Successful goshawk nest sites on commercial forestland in the west central Cascades Mountains were composed of young (40 to 54-year-old) second-growth conifer-dominated forests with high tree and snag densities (Bosakowski et al. 1999). Sites near forest openings or edges for foraging also can be a preference for goshawks. Goshawks nest in either conifer or deciduous trees, often in one of the largest trees in the stand (Reynolds et al. 1982). The height and diameter of the nest trees are highly variable depending on forest type and geographic location. Typically, goshawk nest habitat is characterized as mature to old-growth forests composed primarily of relatively large trees with relatively high canopy closure (60-80%), near the bottom of moderate slopes, on north exposures and in areas with sparse ground cover but, as noted above, nesting can occur in younger stands if conditions are right (Andersen et al. 2003, Bosakowski et al. 1999). In Oregon, goshawks were reported to nest in dense, mature, or old-growth conifers with a mean tree density of 195 TPA (range 110-304 TPA) (Reynolds et al. 1982).

Changes in habitat have occurred in the distribution, amount, and structural characteristics of mature forests throughout much of its range. In general, the primary change has been a reduction of mature forest cover by logging, catastrophic fire, and development. However, the extent to which the goshawk populations are correlated with amounts of mature forest cover is unknown. Recent survey efforts continue to result in discovery of goshawks, even in areas of historic logging activity, which indicates that the species may not be uncommon but is rather difficult to locate and adequately survey (USFWS 1998c). While the goshawk does typically use mature forest or larger trees for nesting habitat, it appears to be a forest habitat generalist in terms of the types and ages of forests it will use and to meet its life history requirements. Goshawks can use small patches of mature habitat to meet their nesting requirements within a mosaic of habitats of different classes; a key factor appears to be availability of prey (USFWS 1998c). While timber management has been demonstrated to affect goshawk at least at local levels, forest management practices, such as the selective thinning, may also make habitats more suitable to goshawks by opening up dense understory vegetation, creating snags, down logs, and woody debris, and creating other conditions conducive to goshawks and their prey (USFWS 1998c).

### **3.2.7.3 Occurrence in the HCP Area**

Goshawks can occur in all forested regions of Oregon. The exact number of adults or breeding pairs is not known, but they are expected to occur throughout the western Cascades including across the HCP area (USFWS 1998c). The goshawk is identified as occurring in Clackamas County and is known to occur in the Clackamas watershed (NatureServe 2018a; ORBIC 2016). The HCP area currently contains a mosaic of conifer stands with a range of age-classes that includes some mature stands, thinned stands with openings, and legacy snags and older trees scattered throughout the landscape, especially in riparian areas. These stands and structural features have the potential to provide nest sites and prey foraging opportunities. Thus, although nesting and prey habitat features may not be abundant, their presence in the HCP area likely facilitates some use by goshawks.

### 3.2.8 Pacific Fisher

The fisher (*Pekania pennanti*) is a small, carnivorous mammal native to the coniferous and mixed forests of Canada and the northern United States. They are solitary forest-dwelling predators that are rarely seen. They prey on small to medium-sized mammals and birds and are one of the few specialized predators of porcupines. They are hunters but will also scavenge or eat insects, nuts, or berries when prey is not available (USFWS 2016b).

During the 19th and early 20th centuries the fisher declined over much of its range because of excessive fur trapping, predator/pest control and alteration of forested habitats. The high value of the skins, the ease of trapping, and the lack of regulations resulted in over-trapping and is believed to have been the primary initial cause of fisher population losses. Conservation and protection measures to reduce trapping and re-introduce fisher back into their historic range have allowed them to rebound and continued efforts will facilitate recovery success (USFWS 2016b).

In April 2017, a Programmatic/Template Candidate Conservation Agreement with Assurances, (CCAA) for the fisher in western Oregon was made available for landowners to enroll in (USFWS 2017b). A CCAA is a voluntary agreement whereby landowners agree to manage their lands to remove or reduce threats to a species that may become listed under the ESA. The template CCAA is between the USFWS and non-federal landowners and managers who elect to enroll their property under the CCAA through individual site plans. The CCAA contains forest management and disturbance prevention measures that, when implemented, will contribute to the protection and conservation of the fisher. The CCAA provides measures that may potentially be incorporated into conservation strategies designed to benefit the fisher. Port Blakely did not elect to enroll in the CCAA, but instead incorporated the template conservation measures into this HCP.

#### 3.2.8.1 Status and Distribution

*Status* – On December 5, 2000, the USFWS received a petition to list a DPS of the fisher that included portions of California, Oregon, and Washington as an endangered species under the ESA. On April 8, 2004, USFWS published a 12-month status finding that the West Coast DPS of fisher was warranted for listing but was precluded from listing by higher priority actions. On April 8, 2010, the Center for Biological Diversity challenged the USFWS' alleged lack of expeditious progress on pending listing proposals, and in particular regarding the west coast DPS of fisher (Center for Biological Diversity v. Salazar (No. 3:10-cv-01501-JCS) (N.D. California)). This challenge was resolved by stipulated dismissal and approved by the court on October 5, 2011, based on the USFWS' agreement in the context of a larger multidistrict litigation to submit a proposed rule or a not-warranted finding regarding the West Coast DPS of fisher to the Federal Register by the end of Fiscal Year (September 30) 2014.

On October 7, 2014, USFWS published a proposed rule (USFWS 2014) to list the West Coast DPS of fisher as threatened under the ESA. In that proposed rule, the USFWS identified habitat loss from wildfire and vegetation management, toxicants (rodenticides), and the cumulative impact and synergistic effects of these and other stressors in small populations as threats to the continued existence of the West Coast DPS of fisher. Available information on the identified threats, population size, and other factors affecting the West Coast DPS of fisher are available

in the Species Report that was made available at the time of publication of the proposed rule (USFWS 2014). After a 6-month extension for making the final determination, the USFWS published a notice in the Federal Register on April 18, 2016 withdrawing the proposed regulation concluding that, while fishers in the west coast States were clearly exposed to multiple stressors, in some cases over multiple decades, the best available data did not indicate significant impacts to fishers at either the population or range wide scale to the degree that the USFWS considered to be the case at the time of the proposed rule. Along with the withdrawal notice, a more recent and updated Species Report was also published (USFWS 2016b).

A recent Court Order vacated the USFWS withdrawal of the proposed rule to list the Pacific fisher (U.S. District Court-Northern California 2018). The Court ordered USFWS to prepare a new rule by March 22, 2019. Thus, the status of the Pacific fisher at the present time is Candidate for listing as a threatened species (Kim Garner, pers. comm. 11-08-18).

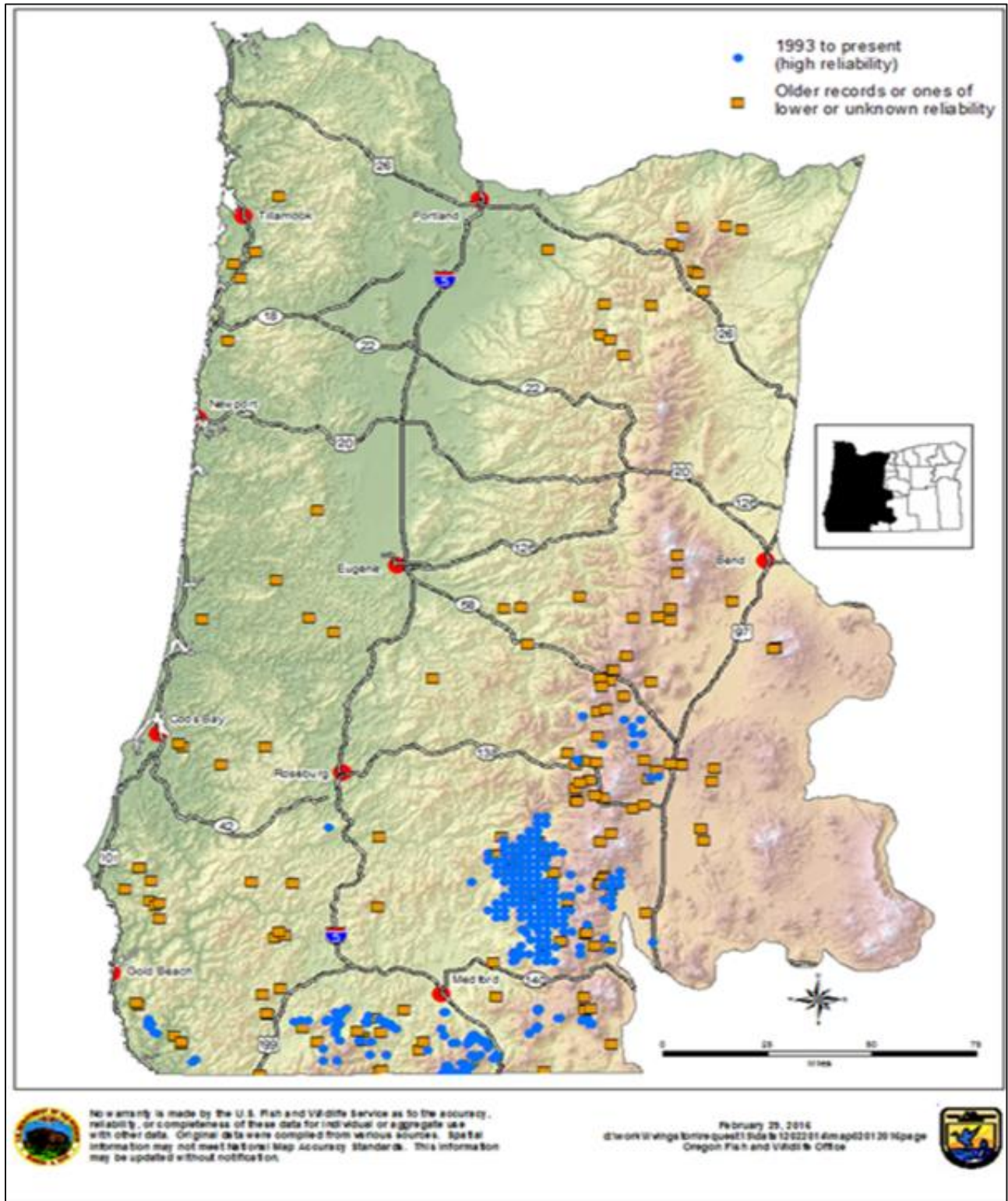
*Distribution* - Historically, the fisher occurred throughout the boreal and temperate forests of North America and its range included southern Canada and most of the northern states as well as peninsular areas that extend south through the eastern states, the northern Rocky Mountains, and the Pacific states (USFWS 2016b). The extirpation of fishers from much of the southern portion of their range that occurred from the late 1800s to the early 1900s resulted in range contraction to ~43% of its historical extent. Efforts to reintroduce fishers in vacant portions of the historical range and improved management of resident fisher populations resulted in fisher recovery and an expansion of the current range to approximately 68% of its historical extent (Figure 3-8) (Lewis et al. 2012).

Although apparently stable, the two fisher populations in western Oregon have seemingly not increased in size or expanded their range over at least the past two decades; however, there has been limited monitoring (USFWS 2016b). The indigenous Siskiyou population occurs primarily in the Klamath Mountains west of Ashland and south of Grants Pass, extending into northern California. However, individuals from this population have recently been detected east of Ashland in the southern Cascades, geographically overlapping with individuals from the southern Oregon Cascades Population (USFWS 2016b). The southern Oregon Cascades population, located near Crater Lake National Park, was established between 1977 to 1981 when ODFW reintroduced individuals from British Columbia and Minnesota. Verifiable detections (i.e., tangible evidence such as photos, scat, tracks, genetic material) of fishers have not occurred in the central and northern Oregon Coast Range nor in the northern Cascades of Oregon, although non-verifiable sightings have been reported (Figure 3-8). Some surveys occurred in the northern Cascades, but recent systematic surveys have not been conducted in these areas, leaving gaps in our understanding of fisher distribution in Oregon.

### **3.2.8.2 Habitat Characteristics and Use**

Fishers use forested habitats across their range, and in western North America, the forested habitats are commonly conifer-dominated (Raley et al. 2012). The fisher is considered a secretive carnivore because they occur at low population densities, they use dense forests where they are difficult to see, and they avoid humans and developed areas. Because individual fishers require large home ranges and occur at low population densities, areas at the scale of 1 or more National Forests are likely to be required to support viable fisher populations. Fisher home ranges are commonly found at low and mid-elevations and are frequently dominated by

Figure 3-8. West Coast Distinct Population Segment of Fishers in Oregon.





forests with 1) a moderate to dense forest canopy, 2) a mosaic of successional stages, 3) few large openings, 4) complex forest structure, and 5) large woody structures (Raley et al. 2012). Fishers are prey generalists and hunt for prey in a variety of stand types including early, mid, and late successional stands in managed or unmanaged forest landscapes. Conversely, fishers select for den site and rest site habitats, and this is related to the availability of large woody structures they commonly use when denning or resting (Raley et al. 2012).

### **3.2.8.3 Occurrence in the HCP Area**

Fisher populations are presumed to not currently exist throughout the northern and central Cascade Range of Oregon (although an individual fisher was detected at the southern edge of Lane County in the Cascades). However, habitat modeling suggests these areas contain habitat sufficient to support fishers in the Cascades (Aubry and Lewis 2003). As described earlier, a large information gap exists concerning the presence and distribution of fisher populations. State level conservation efforts as proposed, focus on surveys to refine the understanding of fisher distribution and increase confidence in determining what areas are devoid of fishers. Priority areas to focus on include the northern and central Cascades, which are recommended by Aubry and Lewis (2003) for potential fisher reintroduction, followed by areas of suitable fisher habitat in the central and northern Oregon Coast Range. The HCP area currently contains a forest habitat mosaic composed of primarily 2<sup>nd</sup> and 3<sup>rd</sup> growth forests with limited structural features, i.e., snags and downed wood that may be used as fisher den sites and as prey species habitat. However, given their historical occurrence, the potential for future introduction efforts on adjacent Federal lands or in the HCP area, and structural features retention efforts implemented under this Plan, it is possible that fishers could occur in the area during the life of the Plan.

### **3.2.9 Townsend's Big-eared Bat**

Townsend's big-eared bats (*Corynorhinus townsendii*) are in the family Vespertilionidae, the largest family in the order Chiroptera, which is also known as the evening bats (Verts and Carraway 1998). Townsend's big-eared bats are widely distributed throughout western North America, including much of Washington and Oregon, ranging from British Columbia south along the coast of North America except for the Baja Peninsula, extending through much of inland Mexico. (Johnson and Cassidy 1997, Verts and Carraway 1998).

Direct threats to Townsend's big-eared bats in Oregon and Washington include human disturbance of any type at roosts, (Thomas 1995, Ellison 2010). Roosts may be destroyed through mining and quarrying activities, collapse, improper closure or filling in of abandoned mines, destruction of abandoned buildings that serve as roosts, and loss of trees with large basal hollows in the Pacific Northwest and northwestern California. Mine and building roosts are being lost more rapidly than they are being created (Woodruff and Ferguson 2005). Indirect threats include degradation of roosting habitat, rendering it less suitable, and degradation of foraging habitat, which can occur from logging, land conversion, invasive species, overgrazing, pesticide spraying for moth larva outbreaks, development, or altered fire regimes and other impacts from climate change. Two additional potential threats include white-nose syndrome (WNS), although it is not yet known to be afflicted by this fungal disease, and mortality caused by wind turbines (NatureServe 2018b, USFWS 2019c). Townsend's big-eared bats may be

particularly vulnerable to all these threats because of their low population sizes and reliance on relatively few roosts in addition to their sensitivity to human disturbance.

### **3.2.9.1 Status and Distribution**

*Status* - Townsend's big-eared bat populations occurring in Oregon are not considered a Federal or State threatened or endangered species. However, USFWS identifies this species as a Federal Species of Concern (SOC) (USFWS 2016a). Townsend's big-eared bats are listed by the State as a Sensitive Species, Critical Category, and a Conservation Strategy Species by the Oregon Department of Fish and Wildlife (Oregon Biodiversity Information Center (ORBIC 2016). The State Natural Heritage rank of Townsend's big-eared bats is S2 (Imperiled) (ORBIC 2016). These bats are also identified as a Sensitive Species in both Oregon and Washington under the Northwest Forest Plan requiring specific standards and guidelines to ensure a reasonable assurance of the species' persistence within the Northwest Forest Plan area by providing protection for certain habitat features, including caves and abandoned mines, wooden bridges, and buildings (USDA and USDI 1994). The global status of Townsend's big-eared bat is G4 (Apparently Secure – uncommon but not rare), causing some concern for long-term decline (NatureServe 2018b).

*Distribution* - In all parts of its range, Townsend's big-eared bats have been described as widespread but rarely abundant (Barbour and Davis 1969). On the West Coast, Townsend's big-eared bats are found regularly in forested regions and buildings, and in areas with a mosaic of woodland, grassland, and/or shrubland (NatureServe 2018b). In Oregon, specimens of Townsend's big-eared bats have been collected throughout the state, with the exception of the western Basin and Range Province and parts of the Blue Mountains Province (Verts and Carraway 1998). Although nearly all of Oregon was considered suitable habitat, recently the availability of estimated suitable habitat has been greatly reduced (Gervais 2017). Townsend's big-eared bats are reported to occur in the Molalla-Pudding and Clackamas River watersheds in Clackamas County (NatureServe 2018b). Within its range, distribution is often linked to the presence of suitable maternity roosts and hibernacula located near foraging habitat (Gruver and Keinath 2006). However, maximum hibernacula and maternity roost counts in Oregon are at most a few hundred (Perkins and Levesque 1987).

### **3.2.9.2 Habitat Characteristics and Use**

Much of the information provided below comes from the recent Conservation Assessment prepared by Gervais (2017) compiled for the USFS and BLM Special Status and Sensitive Species Program for Oregon and Washington. The literature cited is included as shown in the assessment.

Townsend's big-eared bats are classic cave-dwelling bat species, such that some have argued that their distribution may be linked more strongly to underlying geomorphology that supports cave formations than to any particular habitat associations above ground (Pierson et al. 1999). However, Townsend's big-eared bats are also known to use other types of habitat. Mines provide suitable habitat (Pierson et al. 1999) and, along the Pacific coast, Townsend's big-eared bats utilize basal hollows of trees instead of rock features for roosts (Barbour and Davis 1969, Fellers and Pierson 2002, Mazurek 2004). They have also been documented using buildings and bridges for roosts in western California, Oregon, and Washington (Cross and Waldien 1995,

Pierson et al. 1999, Fellers and Pierson 2002). In Oregon and Washington, records indicate that there is significant use of buildings, bridges, tunnels, and mines for roosting by this species, as caves are limited throughout much of these states, particularly west of the Cascades (Culver et al. 1999).

Habitat associations include a variety of forest types such as ponderosa pine (*Pinus ponderosa*), Douglas-fir, western hemlock, pinyon-juniper forest (*Pinus edulis* and *Juniperus occidentalis*), mixed conifer and hardwood, oak woodlands (*Quercus spp.*), spruce-fir mix, and redwoods (*Sequoia sempervirens*). This species has been found at elevations from sea level along the Pacific Coast (Dalquest 1947, Pierson and Rainey 1996), to up to 3,188 m (Szewczak et al. 1998).

Although caves and mines are heavily used day-roost sites and are particularly important hibernacula, Townsend's big-eared bats show some flexibility in their roosting behavior. Buildings are used as day roosts along the coast and at higher elevations, whereas they have been found using buildings as night roosts throughout their range (Barbour and Davis 1969). Mines, buildings, bunkers, bridges, tunnels, and trestles have been documented as day and/or night roosts in Oregon and Washington (GeoBOB 2016, NRIS 2016).

Maternity roosts are day roosts used by pregnant and lactating females and their pups. Maternity roosts occur in many substrates including caves, mines, and buildings, although in most cases these special roosts have similar characteristics. Maternity roosts are typically spacious, often 30 m in length and at least 2 m high (Pierson et al. 1999). Maternity clusters utilize hollows in ceilings of caves or mines just inside the roost entrance, where some daylight still penetrates (Pierson et al. 1999). Bats will move around within their maternity roost and adjust their clustering behavior throughout the day as temperatures within the roost fluctuate (Betts 2010). Buildings used as maternity colonies have included abandoned houses and cabins (Smyth 2000, Fellers and Pierson 2002, Mathias 2005).

Cave or mine systems supporting maternity colonies may also support hibernacula in different locations (Pearson et al. 1952). In Oregon and Washington, hibernacula have been found in caves, mines, buildings, and bridges (Perkins and Levesque 1987, GeoBOB 2016, NRIS 2016). Surveys conducted in western, eastern, and central Oregon in 1982-1986 found that over half of the hibernating Townsend's big-eared bats found were in lava caves of Deschutes County in central Oregon (Perkins and Levesque 1987).

In western Oregon, a number of bat species selected larger concrete bridges that maintained higher night-time temperatures than did smaller ones. Solar radiation exposure was also important, as was the ambient air-bridge surface temperature differential (Keeley 1998 in Keeley and Tuttle 1999, Perlmeter 1996). Bats typically do not use crevices for night roosting but utilize open areas between bridge supports that create protection from weather and wind (Pierson et al. 1996, Keeley and Tuttle 1999). Cast-in-place concrete bridges have a series of sheltered chambers, and these have been found to be heavily used by several bat species in the Oregon Coast Range and elsewhere (Adam and Hayes 2000, Erickson et al. 2003). The end cells of such bridges were particularly heavily utilized, presumably because their position on the bridge helped maintain heat effectively (Perlmeter 1996, Adam and Hayes 2000). Although data for Townsend's big-eared bats' use of bridges is sparse, presumably these general observations hold for this species as well.

Relatively few sites are likely to have conditions suitable for extended torpor; one would therefore expect that more than one species of bat may share a hibernaculum. Townsend's big-eared bats have been found sharing night roosts with many other bat species, including long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), fringed myotis (*Myotis thysanodes*), and Yuma myotis (*Myotis yumanensis*), i.e., other Covered Species (Pearson et al. 1952). Day roosts of Townsend's big-eared bat have also sheltered long-legged myotis, fringed myotis and Yuma myotis (Pearson et al. 1952).

Foraging behavior of the Townsend's big-eared bat is typical of other insectivorous bats. They generally emerge from their roosts after dark (Barbour and Davis 1969, Pearson et al. 1952) although other researchers report bats left maternity roosts soon after sunset (Mathias 2005). They will fly in the roost prior to departing, apparently repeatedly sampling outside light levels, and returning briefly to roost (Twente 1955, Clark et al. 1993). Although non-breeding bats use night roosts, lactating bats with young pups return to the roost throughout the night. Once young bats could fly, the mother bats remained away from the roost all night (Clark et al. 1993, Clark et al. 2002). Presumably at this point they were once again utilizing night roosts.

Townsend's big-eared bats are characterized by slow and highly maneuverable flight, and feed mainly on flying insects caught near and among foliage (Kunz and Martin 1982, Fellers and Pierson 2002, Gruver and Keinath 2006). Gleaning has been observed, but the extent of this technique is unknown (Pierson et al. 1999). In the West, this species forages in closed-canopy forests, canopy gaps, forest edges, riparian corridors, and shrub-steppe (Dobkin et al. 1995, WBWG 2005, Gruver and Keinath 2006). On managed commercial forests in western Washington, Erickson and West (1996) detected minor use of clearcuts (2-3 years old) and pre-commercially thinned stands 12-20 years old, but no use of 30-40-year-old un-thinned stands or 50-70-year-old thinned stands. Bats tracked by Falxa (2008, 2009) fed extensively near large conifers with complex branch systems along the edges of 60-80-year-old forests. Presumably, Townsend's big-eared bats in Oregon exhibit similar foraging behavior.

### **3.2.9.3 Occurrence in the HCP Area**

The Townsend's big-eared bat has been identified as occurring in Clackamas County within the Western Cascades Ecoregion (OCS 2016) (ORBIC 2016). This bat species is also identified as occurring in the Molalla-Pudding and Clackamas watersheds which include parts of the Port Blakely HCP area (NatureServe 2018b), although their actual occurrence in the HCP area is unknown. The HCP area includes potentially suitable night and maternity roosting, and hibernaculum habitat in the form of bridges and culverts, as well as rocky formations that may contain caves and crevices, although these latter features are extremely limited. These features also likely occur on adjacent Federal lands containing a substantial amount of older forest known to be suitable foraging habitat for Townsend's big-eared bat. The HCP area also is comprised of potential foraging areas including an abundance of closed-canopy forests, canopy gaps, forest edges, and riparian corridors, in addition to clearcuts and pre-commercially thinned stands 12-20 years old, as cited above. In the future, Port Blakely could acquire lands with these features as well as old buildings and/or trestles that may be occupied by bats. Thus, given the potential current habitat availability, albeit limited, and the HCP lands proximity to Federal lands with suitable habitat, it is assumed that Townsend's big-eared bats occur or will occur in the HCP area.

### 3.2.10 Migratory Tree-roosting Bats (Hoary and Silver-haired Bats)

The hoary bat (*Lasiurus cinereus*) and the silver-haired bat (*Lasionycteris noctivagans*) are medium-sized migratory tree-roosting bats in the Vespertilionidae family. These bats have large ranges throughout North America, including Oregon, and both species are presumed to have large population sizes though they are thought to be declining due to several threats (NatureServe 2018b). These two bat species are grouped and described together because they have similar distributions, habitat requirements and population threats, and are known to occur in Oregon (NatureServe 2018b; ORBIC 2016). The hoary bat and silver-haired bat are included as Covered Species because of the potential for significant population declines and subsequent listing under the ESA as a result of several threats.

Over the long term, deforestation reducing the availability of habitat is cited as a direct threat to the hoary bat (Morrell et al. 1999, Whitaker et al. 2006). Habitat loss and fragmentation as a result of clearcutting and other causes of deforestation are cited as direct threats to the silver-haired bat (Parker 1996, Parker et al. 1996). Over the long term, deforestation and forest management practices presumably have reduced habitat quality (Campbell et al. 1996) and the number of available bat roost sites (Kunz 1982).

Migratory tree-roosting bat species are also extremely vulnerable to colliding with wind turbines. At least 24 species of bats have been recorded as collision fatalities (AWWI 2017). However, the majority of fatalities reported to date, approximately 80% of all fatalities, are from three migratory tree-roosting bat species: the hoary bat, the eastern red bat, and the silver-haired bat (AWWI 2017). It has been estimated that 247,000-634,000 hoary bats (38% of total bat fatalities) and 149,000-308,000 silver-haired bats (18% of total bat fatalities) were killed at wind energy facilities in the United States and Canada during the period from 2000 to 2011 (Arnett and Baerwald 2013). For hoary bats, fatalities at certain wind energy facilities may exceed 1,000 per year (Arnett et al. 2008, Cryan 2011). It is unknown whether WNS will be a significant source of mortality in migratory tree bats. Cave-dwelling bats are most at risk to WNS, but migratory tree bats rarely occur in caves, and their solitary nature may not facilitate the spread of fungal spores (Foley et al. 2011). However, silver-haired bats have tested positive for WNS although no diagnostic signs have been observed (USFWS 2019c).

#### 3.2.10.1 Status and Distribution

*Status* – Hoary and silver-haired bat populations occurring in Oregon are not listed as a Federal or State threatened or endangered species. However, USFWS identifies the silver-haired bat, though not the hoary bat, as a Federal SOC (USFWS 2016a). Both the hoary bat and silver-haired bat are listed by the State as a Sensitive Species and Conservation Strategy Species by the Oregon Department of Fish and Wildlife ((ORBIC 2016). The State Natural Heritage rank of hoary and silver-haired bats is S3 (Vulnerable) considered to be rare, threatened, or uncommon in Oregon (ORBIC 2016).

*Distribution* – Although the hoary bat ranges throughout North America, it is rare or absent in most of the southeastern US and in deserts of southwestern US (Cryan 2003). The hoary bat's range also includes South America, and a subspecies occurs in the Hawaiian Islands. In North America, populations in the east are dominated by females, whereas males are more common in the mountainous regions of the west (Findley and Jones 1964).

Silver-haired bats are generally absent in the southeastern US during summer (Cryan 2003). They winter in the Pacific Northwest, in scattered areas of the southwestern US, and at middle latitudes of the eastern US approximately south of Michigan and east of the Mississippi River (Izor 1979, Cryan 2003). Males seem to stay farther south in spring and summer than do females, except for populations in British Columbia that do not appear to migrate (Schowalter et al. 1978, Cryan 2003).

Both these bats are reported to occur in Clackamas County, Oregon (ORBIC 2016). However, no definitive literature or surveys were found that identified the occurrence of these two bat species at the level of watersheds in Clackamas County.

### **3.2.10.2 Habitat Characteristics and Use**

*Hoary bat* – Hoary bat habitat includes primarily deciduous and coniferous forests and woodlands, including areas altered by humans. These bats are thought to prefer trees at the edge of clearings but have also been found in trees in heavy forests, open wooded glades, and shade trees along urban streets and in city parks (Anderson 2002). Roost sites are usually in foliage of large deciduous or coniferous trees (Perry and Thill 2007), near the end of branches 3-19 meters above ground, with dense foliage above and open flying room below, often at the edge of a clearing and commonly in hedgerow trees. Sometimes these bats roost in rock crevices but rarely in caves. Occasionally they are found clinging to the overhangs of buildings and in caves in the latter part of the summer. They often have trouble finding their way out of the caves and die there (Anderson 2002).

Foraging habitat includes various open areas, including spaces over water and along riparian corridors. Individuals may forage around lights in nonurban situations (Furlonger et al. 1987). They forage about the treetops, along streams and lake shores, and in urban areas where there are lots of trees. These bats stop to rest between meals at night. Hoary bats are solitary, and feeding is the only time that they appear to associate with other bat species. Hoary bats often form groups when hunting for insects (Anderson 2002).

*Silver-haired bat* - Habitat is primarily forested (frequently coniferous) areas adjacent to lakes, ponds, or streams, including areas that have been altered by humans. Summer roosts and nursery sites are in coniferous or deciduous tree foliage, cavities, or under loose bark, and sometimes in buildings. During the winter months, silver-haired bats that hibernate find shelter in northern areas inside trees, buildings, rock crevices, and similar protected structures (Bentley 2017). In the Pacific Northwest, these bats show an affinity for forests that contain large numbers of snags (Campbell et al. 1996, Mattson et al. 1996, Betts 1998). In Oregon, maternity roosts were in cavities high in tall, declining or newly dead trees (Betts 1998). Silver-haired bats appear to be particularly fond of willow, maple, and ash trees (most likely due to the deeply fissured bark). Hollow snags and bird nests also provide daytime roosting areas for silver-haired bats. Less common daytime roosts include buildings, such as open sheds and garages; however, due to their solitary nature and adaptation to woodland roosts, these bats rarely invade buildings in large enough numbers to cause alarm.

Silver-haired bats are insectivorous. Their diet mainly consists of flies, beetles, and moths. However, these bats feed opportunistically on any concentration of insects they come across. They have a short-range foraging strategy, traveling over woodland ponds and streams. Silver-

haired bats do not always feed in mid-flight; they have been caught in mouse traps, suggesting ground foraging, and they have been reported to consume larvae on trees (Bentley 2017).

### **3.2.10.3 Occurrence in the HCP Area**

The hoary bat and silver-haired bat have both been identified as occurring in Clackamas County within the Western Cascades Ecoregion (ORBIC 2016). They have not been explicitly identified as occurring on the HCP area. However, the HCP area includes potentially suitable night and maternity roosting, and hibernaculum habitat in the form of tree foliage, cavities, and loose bark of coniferous and hardwood forests adjacent to lakes, ponds, and streams. Rocky features occurring in the HCP area, which will be protected, are also available for the occasional roost site. However, these features are not abundant given that the HCP area has significant amounts of second and third growth stands, and stands converted from agriculture uses, managed under current OFP Rules. These features and characteristics are more abundant, in the form of substantially older trees, on nearby Federal lands. Foraging habitat includes various open areas, including spaces over open water, streams and along riparian corridors which is present across the entire HCP ownership and adjacent Federal lands. Thus, given the potential availability of roosting sites and foraging habitat, and the proximity of the HCP lands to Federal lands with suitable habitat, it is assumed that hoary and silver-haired bats occur in the HCP area.

### **3.2.11 Myotis Bats (Fringed, Long-eared, and Long-legged Bats)**

Myotis bats are small, brown, insectivorous bats in the Vespertilionidae family. There are seven myotis bat species known to occur in Oregon although only a subset of these species, fringed myotis (*Myotis thysanodes*), long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), and Yuma myotis (*Myotis yumanensis*), have the potential to occur within the West Cascades EcoRegion based on their known distribution and/or availability of their preferred habitats (NatureServe 2018b). Three of these bat species, fringed myotis, long-eared myotis, and long-legged myotis are grouped and described together because of their similar distributions, habitat requirements and population threats, and their likelihood of occurring in the HCP area. These three bat species are being proposed as Covered Species because they are known to occur in Clackamas County (NatureServe 2018b, ORBIC 2016), the HCP area currently has or will contain habitat features commonly utilized by these bats, and the likelihood that existing or anticipated threats will increase (IUCN 2018), thus, increasing the potential for listing under the ESA.

The fringed myotis and the long-legged myotis are not known to incur significant mortality from turbines at wind energy facilities (Arnett and Baerwald 2013). The long-eared myotis however, is subject to mortality from turbines at wind energy facilities; an estimated 3,730-7,330 individuals were killed by turbines in the United States and Canada during the period 2000-2011 (Arnett and Baerwald 2013). The current impact of turbine-associated mortality on the overall long-eared myotis population is probably relatively small although, given the ongoing increase in turbine installation, this mortality may increase significantly during the foreseeable future (Arnett and Baerwald 2013). All three of these species are confirmed to be affected by WNS in some states within their range, however, no occurrences have been reported for Oregon (USFWS 2019c).

Threats to all three of these bat species pertinent to the HCP area and adjacent lands include human disturbance of maternal colonies in caves and mines, destruction of buildings and bridges used as roosts, livestock grazing and forest management activities. Reduced availability of roost sites in snags and trees with loose bark and reduced foraging habitat quality are threats associated with timber harvest (Keinath 2004, Bogan et al. 2005, Lacki et al 2010).

### **3.2.11.1 Status and Distribution**

*Status* – Fringed, long-eared, and long-legged myotis bat populations occurring in Oregon are not listed as a Federal or State threatened or endangered species. However, USFWS identifies all three species as a Federal SOC (USFWS 2017c). The fringed myotis and long-legged myotis are listed by the State as a Sensitive Species and Conservation Strategy Species by the Oregon Department of Fish and Wildlife ((ORBIC 2016). The long-eared myotis currently has neither designation. The State Natural Heritage rank for fringed, long-eared and long-legged myotis is S2 (Imperiled in Oregon), S4 (Apparently secure - not rare in Oregon) and S3 (Vulnerable - rare, threatened or uncommon in Oregon), respectively (ORBIC 2016).

*Distribution* – Range-wide, the fringed myotis occurs in British Columbia and the western U.S., primarily west of the Rocky Mountains. The long-eared myotis and long-legged myotis populations are distributed in western Canada and the western U.S. south to Mexico. The U.S. population range of these two species also includes the Dakotas and Nebraska.

The fringed myotis and long-eared myotis are reported to occur in the Clackamas watershed in Clackamas County, Oregon (NatureServe 2018b, ORBIC 2016). The long-legged myotis is reported to occur in Marion County immediately south of Clackamas County by NatureServe (2018) but is listed as occurring in Clackamas County by ORBIC (2016). However, no definitive literature or surveys were found that identified the occurrence of these three bat species at the level of watersheds in Clackamas County.

### **3.2.11.2 Habitat Characteristics and Use**

*Fringed myotis* – These bats occur primarily at middle elevations in desert, riparian, grassland, and woodland habitats, but they have been recorded at low elevations along the Pacific Coast (NatureServe 2018b - multiple citations). Roosts are in caves, mines, cliff faces, rock crevices, old buildings, bridges, snags, and other sheltered sites while hibernacula include caves, mines, and buildings (WBGW 2017). Roosting in decadent trees and snags, particularly large ones, is common throughout its range in the western U.S. Fringed bat roosts have been documented in a large variety of tree species and it is likely that structural characteristics (e.g., height, decay stage) rather than tree species play a greater role in selection of a snag or tree as a roost (Arroyo-Cabrales and de Grammont, 2017, WBGW 2017). Roost sites may be in caves, mines, and buildings, where colonies may number several hundreds. They will also use bridges and rock crevices (Miner et al. 1996) as solitary day and night roosts and may hibernate in crevices as well. Fringed bats are known to migrate, but little is known about the magnitude of movements. Females prepare physiologically for hibernation during the post-lactation period of late summer and early autumn, prior to migration. Individuals may awake from hibernation periodically throughout winter. Diet includes beetles and moths. These bats forage close to the vegetative canopy and have relatively slow and highly maneuverable flight (Arroyo-Cabrales and de Grammont, 2017).



*Long-eared myotis* – These bats occupy a diverse array of habitats, including lowland, montane, and subalpine woodlands, mixed conifer forests, shrublands, and meadows, wooded stream courses, and areas over water bodies (Arroyo-Cabrales and Álvarez-Castañeda 2017, NatureServe 2018b - multiple citations). Daytime roosts are in buildings, railroad trestles, snags and hollow trees, spaces behind loose bark of trees or stumps, mines, caves, rock crevices (including those on the ground), erosional cavities and channels in the ground, and similar sites (NatureServe 2018b - multiple citations). In the large uninterrupted forests of the Pacific Northwest, long-ear bats use large snags for day roosts. These bats usually prefer snags that reach high into or above the forest canopy. Diet includes various insects, obtained over water or among trees, or by picking prey from foliage, tree trunks, rocks, or the ground; individuals may fly slowly around shrubs searching for emerging moths or perhaps nonflying prey (NatureServe 2018b).

*Long-legged myotis* – These bats occur primarily in mountainous areas wooded with coniferous trees, but also may be found in riparian and desert habitats. They may change habitats seasonally. Hibernacula are in caves and mines, but winter habits are poorly known. Warm-season daytime roosts are in tree hollows or under loose bark, in crevices among rocks or in cliffs, or in buildings, but apparently not in caves or mines (NatureServe 2018b - multiple citations). In Washington and Oregon, large snags were important roosts, but bats sometimes roosted in rock crevices (Baker and Lacki 2006). In Washington, Oregon, and Idaho, snags used as roosts by long-legged bats usually last only a few years before falling (Lacki et al. 2010). In the Pacific Northwest, long-legged bats selected snags for roosting based on stand- and landscape-scale characteristics, with significant factors varying among different regions (Lacki et al. 2010). These bats feed primarily on moths but also consume a wide variety of other invertebrates, such as beetles, flies, leafhoppers, and others (NatureServe 2018b - multiple citations). They may follow prey for relatively long distances around, through or over the forest canopy, in forest clearings, and over water.

### **3.2.11.3 Occurrence in the HCP Area**

The fringed, long-eared and long-legged myotis bats have all been identified as occurring in Clackamas County within the Western Cascades Ecoregion (ORBIC 2016), although they have not been explicitly identified as occurring the HCP area. The HCP area includes potentially suitable night and maternity roosting, and hibernaculum habitat in the form of tree foliage, cavities, and loose bark of coniferous and hardwood forests adjacent to lakes, ponds, and streams. Rocky features occurring in the HCP area are also available for the occasional roost site. However, all these potential roosting features are limited either as a result of implementation of current OFP Rules (function trees) or as a naturally occurring feature (cliffs and caves). These features and characteristics are likely more abundant in the form of substantially older trees, on nearby Federal lands. Foraging habitat includes various open areas, including spaces over open water, streams and along riparian corridors which is present across the entire HCP ownership and adjacent Federal lands. Thus, given the potential availability of some suitable roost sites and foraging habitat, as well as the proximity of the HCP lands to Federal lands with suitable habitat, it is assumed that the fringed, long-eared and long-legged bats occur in the HCP area.

### 3.3 Plant Species

No Federally listed plant species are likely to occur on Port Blakely current ownership or within the Plan area Potential Land Acquisitions Boundary based on the range of listed plant species and the habitat conditions they require, as briefly described below (USFWS 2016c). Thus, no plant species are requested for coverage, and none are addressed in the HCP.

#### 3.3.1 Listed Plant Species in Clackamas County

The IPac Report (USFWS 2016c) identified five listed plant species that could occur in the HCP area. This is likely because their range currently or in the past includes parts or all of Clackamas County. The five plants and their listing status are shown below:

- |  |            |
|--|------------|
| • Bradshaw's desert-parsley ( <i>Lomatium bradshawii</i> )             | Endangered |
| • Kincaid's lupine ( <i>Lupinus sulphureus</i> ssp. <i>Kincaidii</i> ) | Threatened |
| • Nelson's checker-mallow ( <i>Sidalcea nelsoniana</i> )               | Threatened |
| • Water howellia ( <i>Howellia aquatilis</i> )                         | Threatened |
| • Willamette daisy ( <i>Erigeron decumbens</i> )                       | Endangered |

However, these plant species are extremely unlikely to occur on Port Blakely lands now or in the future because the Plan area forestlands are not within the current range of any of these plants, i.e., they are primarily located in the Willamette Valley. Except for the water howellia, these plants are prairie habitat species. The water howellia is an aquatic plant with very limited patchy distribution in Idaho, Washington, and Oregon. In Oregon, the current range is in the Willamette Valley north and south of Portland which is outside the Plan area.

## **SECTION 4 ENVIRONMENTAL SETTING AND BIOLOGICAL RESOURCES**

### **4.1 Environmental Setting**

As more fully described in Section 2, Port Blakely's HCP ownership encompasses 30,859 acres in Clackamas County, Oregon. The ownership is comprised of discontinuous parcels of commercial forestland (29,553 acres) and some non-forest land (1,306 acres) distributed across the central part of the county at the western edge of the Cascade Mountain Range. This part of the State has been classified as the West Cascades ecoregion. It is almost entirely forested by conifer trees, although the dominant species vary by elevation, site characteristics, and stand history. This ecoregion is considered the healthiest in Oregon in part because it has been determined to have the highest water quality and the fewest problems with water allocation and quantity (OCS 2016).

The HCP forestlands are comprised primarily of Douglas-fir and a mix of white wood (other firs, western hemlock, Sitka spruce, and several pines), hardwoods (alder, cottonwood, maple, oak, and ash), and a small amount of western red cedar. Some of Port Blakely's forestlands were previously managed for agricultural purposes, or have sustained at least two harvest rotations, i.e., is either second or third growth. In addition, approximately 28% (~8,100 acres) of the HCP lands on the easternmost and southernmost parcels were burned at various intensities during the late-summer wildfires of 2020. As such, there are very few legacy structures to provide diversity and complexity across the landscape. This is true for both terrestrial forest habitat in the uplands and riparian habitat along streams and wetlands. Structural features such as standing snags, older trees, forest-floor coarse woody debris, and large wood in streams are uncommon across much of Port Blakely's north central Oregon landscape. What remains are stands that have matured from previous agricultural conditions with few legacy features and stands harvested under current OFP Rules that require only minimum woody features be retained.

Most of the HCP lands are in the upper watersheds of the Clackamas and Molalla River systems. Thus, many of the streams are small and medium (typing according to OFP Rules), some with fish but more than half of small streams (55% of HCP area) are typed as nonfish. Stream typing as fish and nonfish are based on the ODF stream data layer revised by integrating Port Blakely on-the-ground survey data (ODF 2018b, Port Blakely 2018b). Steep slopes are not abundant. Slopes are generally gentle across the HCP area, with steeper slopes occurring adjacent to the larger streams and tributaries that flow through the property. There are approximately 680 acres across the HCP area where slopes > 70% exist which is equivalent to 2.2% of the total land base. Of those acres, approximately 33% (225 acres) occur within 100 feet of fish and nonfish bearing streams. The environmental setting is discussed in more detail by specific topics below. Information and/or data for each of these topics is, for the most part, not available specifically for the HCP area. In the absence of such data, we rely on information related to the West Cascades Ecoregion within which the HCP area is located.

#### **4.1.1 Climate**

The HCP area is located along the western slope of the Cascade Mountain Range in Clackamas County which is characterized by a mild maritime climate (BLM and USFS 1999). In the higher elevations in the western Cascade foothills, temperatures are cool and

receive heavy winter snowfall, compared to the lower elevations which are generally wet with mild winters. Summers are moderately warm to hot, and dry (BLM and USFS 1999). Annual precipitation ranges, on average, from over 100 inches in the mountains to 40 inches on the valley floor (PRISM Climate Group 2018). Most of the rainfall occurs between October and May, when average daily temperatures can range from the low 30's to the low 60's. In May and June, the temperatures begin to increase and reach into the 70's and low 80's, with a decrease in precipitation. July and August are typically the hottest and driest months, with less than one inch of rain each month, and average temperatures into the 80's. The average annual temperature of Clackamas County is 53° F (World Media Group 2018).

#### **4.1.2 Topography/Geology**

Within the Western Cascade Range, multiple watersheds create a complex drainage system throughout the western slope and foothills. Narrow stream valleys at altitudes of 500 to 2000 feet are separated by long acute ridges, with common slopes of 10-20 degrees, the crests of which are at altitudes of 3000 to 5000 feet. In the foothills, east of the Willamette Valley, the ridges become more rounded, and the stream valleys widen (Peck et al. 1964).

The Western Cascades were formed by a series of geologic processes beginning when lava and pyroclastic debris were erupted during the Oligocene consisting of the Little Butte Volcanic Series, in what is now the foothills of the Cascades. On average, this formation is found to be 5,000-10,000 feet thick (Peck et al. 1964). The area was then uplifted and folded. Marine rocks were strongly eroded, producing steep walled westward trending canyons along the face of the foothills (Hampton 1997). In the middle Miocene, basalt flows from the Columbia River Group inundated the canyons and valleys formed by the previous erosion, this formation is 1,500 feet at its thickest and can be seen in the lower valleys of the Clackamas and Molalla Rivers. In the middle to late Miocene an eruption occurred forming a pyroclastic lower unit and an upper unit of basaltic andesite flows, creating the Sardine Formation, which is on average, 3,000 feet thick. Again, there was a period of uplift and folding, probably beginning in the late Miocene, and continuing into the Pliocene. The Cascade Range then experienced accelerated erosion and deposition of sediments, creating the Troutdale Formation, which is 0-400 feet thick, and composed of sandstone, siltstone, and a massive, cross-bedded conglomerate (Peck et al. 1964). This sediment deposition was accompanied by the extrusion of the Boring Lava, which is primarily basaltic andesite (Peck et al. 1964). Most recently, in Holocene time, drainage patterns were reestablished on the valley plain by erosion, and stream channels in the foothills were deeply entrenched. Currently the stream valleys are being deposited with alluvium and colluvium. Numerous landslides have occurred and will continue to occur as erosion removes lateral support of incompetent materials (Hampton 1997).

The soils in these areas are mostly deep, well drained, gravelly loam, with moderate permeability and moderate hazard of water erosion. They formed in colluvium derived from basalt, andesite, and volcanic ash. The surface layer, which is primarily gravelly loam is typically 11 inches thick, and the subsoil is about 29 inches thick and very cobbly loam. The substratum of this soil is also very cobbly loam and reaches a depth of 60 inches. Effective rooting depth is 60 inches or more. This soil is well suited for production of Douglas-fir and other native vegetation, such as western hemlock, and western red cedar (Gerig 1985). Overall, the geology of the HCP area is made up of thick layers of volcanic and sedimentary rock. The lower elevations of the stream channels are primarily alluvium. Mass wasting will

occur along the steepest slopes, and particularly along stream channels, where steady water flow and peak flow events increase the rate of erosion. However, as noted above, only 2.2% (680 acres) of the HCP area has slopes >70%. Of those acres, approximately 33% of them occur within 100 feet of fish and nonfish bearing streams.

#### **4.1.3 Hydrology/Streams, Rivers, and Drainages**

The HCP lands are in the upper watersheds of the Molalla, Pudding, and Clackamas River subbasins and Abernathy Creek basin of the Willamette River Basin. The Molalla-Pudding Subbasin covers an area of approximately 878 square miles. The Pudding River is a large tributary of the Molalla River, and the Molalla River feeds into the Willamette River (Williams and Bloom 2008). The Molalla River and its tributaries are supplied by and closely flow according to seasonal precipitation patterns. Flow rates substantially increase with the onset of the rainy season in October and generally remain high through April. Flows rapidly decrease as summer progresses and reach their lowest in August and September (Cole et al. 2004).

According to Metro Regional Services (1997), the Clackamas River Basin covers more than 940 square miles, with more than half of the streamflow passing through forested areas. The lower reaches flow through agricultural areas and densely populated developed areas. In the Clackamas River Basin, the streamflow mostly comes from the upper basin, from precipitation and groundwater recharge, which supplies the river with continuous flows, even throughout the dry parts of summer. Most of the streamflow in the Clackamas River comes from the Oak Grove Fork, Collawash, and Roaring Rivers, with lesser amounts coming from other tributaries in the lower basin (Carpenter 2003).

Precipitation can run off in streams, be stored in lakes, reservoirs, and wetlands, be evaporated back into the atmosphere, or absorbed by the soil where it becomes groundwater. Groundwater is all water that occurs in a saturated zone below the land surface, and moves by the force of gravity, downslope, to points of discharge, such as springs, seeps along stream channels, or wells. Aquifers are groundwater that saturates permeable rock materials and yields usable quantities of water. The groundwater and aquifers are recharged annually by seasonal precipitation, and as a result of the water table being higher in altitude than some stream surfaces. Ground water is discharged from the aquifers at springs and seeps, by evapotranspiration, and through wells. Groundwater discharged through springs and seeps supports the base flows of the streams that originate in the valley plain and strengthens the flow of streams that originate in adjacent areas (Hampton 1997).

Port Blakely current HCP lands include roughly 190 miles of steam channels within these basins, and approximately 85 miles of those streams are fish bearing. Precipitation originating from Port Blakely's ownership soaks into the soil, and over time filters into ground aquifers or nearby streams via small headwater channels.

#### **4.1.4 Water Quality/Water Quantity**

*Molalla-Pudding Basin* - The headwaters of the Molalla River are located in the rain-snow transition area and is one of the only free-flowing rivers in the Pacific Northwest. As a result, it is susceptible to large rain and rain-on-snow events that produce large peak-flow discharges. Annual peak flows for the Molalla River near Canby were recorded at the Wilhoit

gaging station (14198500) and the Clackamas River gaging station (14210000) at Estacada (Carpenter et al. 2012). Between 1909 and 2009. Based on this data, annual peak flow varied between 92 and 1,240 cubic meters per second (m<sup>3</sup>/s). Peak flows are important in forming and maintaining fish habitat; however, large events can cause landslides in the catchment, deliver sediment to the river, erode banks, scour fish spawning areas, and cause structural damage (Carpenter et al. 2012). On average, the largest monthly discharge occurs in January, due to maximum precipitation, and flows at 69 m<sup>3</sup>/s. The lowest monthly discharge is 2.9 m<sup>3</sup>/s and occurs in August, when the weather is typically warm and dry, as recorded near Canby (Carpenter et al. 2012).

In 2008, the Oregon Department of Environmental Quality (ODEQ) released a Water Quality Management Plan (WQMP) that defines the Total Maximum Daily Loads (TMDLs) for known pollutants, such as temperature, bacteria, nitrate, pesticides, and metals, and which cause impairment of beneficial uses in the Molalla-Pudding subbasin (Williams and Bloom 2008). A reserve capacity for future needs, as well as a margin of safety for uncertainty were taken into consideration when calculating the TDMLs. Implementation of the waste load allocations and load allocations, as outlined in the WQMP, is expected to bring impaired waterbodies, of which there are thirty in the subbasin, into compliance with water quality standards (Williams and Bloom 2008).

Several small sections of three creeks (Beaver Creek, Butte Creek and Teasel Creek) in the subbasin identified as impaired waterbodies, totaling 0.90 miles, flow through the HCP area (ODEQ 2019, Port Blakely 2018b). Year-round temperatures are the impairment for all three creeks. In addition, Butte Creek had impairments for iron (year-round) and E. coli (summer), while Teasel Creek had an impairment related to biological criteria (year-round), i.e., requiring sufficient quality to support aquatic species without detrimental changes in the resident biological communities. Streams in the HCP area in this subbasin flow through agricultural and urban lands before draining into the Willamette River.

*Middle Willamette Basin* – Although almost 100% of the Middle Willamette Basin does not include HCP lands, the water quality data was reviewed because one section of one creek within the basin, Abernethy Creek, flows through the current HCP area. The overall condition of stream habitat in the Middle Fork Willamette subbasin was good for all indicators (ODEQ 2009). The most extensive stressor was riparian human disturbance for approximately 30% of the stream extent. The Middle Fork Willamette subbasin had the 5th greatest extent of streams impaired by low levels of large woody debris (28%) and low levels of fish cover of all types (16%). The overall water quality condition in the Middle Fork Willamette subbasin was good with 86% of the stream length having excellent Oregon Water Quality Index scores (ODEQ 2009). The leading water quality stressor in the subbasin was warm water temperature (50%) (ODEQ 2009). A section of one creek (Abernethy Creek) in the subbasin identified as an impaired waterbody, totaling 2.72 miles, flows through the HCP area (ODEQ 2019, Port Blakely 2018b). In addition to a temperature impairment (summer), Abernethy Creek has an impairment related to biological criteria (year-round).

*Clackamas Basin* - The quantity of water in the Clackamas River Basin is slightly more complex than that of the unregulated Molalla, and is influenced by three primary factors:

- Direct Withdrawals (e.g., dams, diversions, etc.): the exercise of water rights which reduce the amount of available instream water and have the greatest impacts on aquatic species and water quality during the summer and early fall.
- Indirect Land Use Effects: including increased runoff efficiency and decreased water retention associated with vegetation removal and the consequent reduction in evapotranspiration, roads and road drainage systems, and urbanization resulting in increased amounts of impervious surface area.
- Changes in Flow Timing: associated with the operation of hydroelectric facilities, and to a lesser degree, maintaining and operating irrigation storage facilities (WPN 2005).

In 2005, the Clackamas River Basin Council prepared a summary of the water quality and quantity in the Clackamas River Basin which included the TMDLs defined for known pollutants (WPN 2005). Within the parameters of the TMDLs it was concluded that all the pollutants are interrelated and cumulatively impact the overall water quality in the basin. In the upper basin the water quality is very good compared to the lower basin and mainstream. Land management practices including forestry practices and hydroelectric facilities contribute to increased nutrients, sedimentation, and variance in water temperatures, and an overall poorer water quality in the lower reaches of the basin (WPN 2005). No impaired waterbodies in this basin flow through the HCP area (ODEQ 2019, Port Blakely 2018b). Streams in the HCP area in this subbasin, for the most part, flow through agricultural and urban lands before draining into the Lower Columbia River.

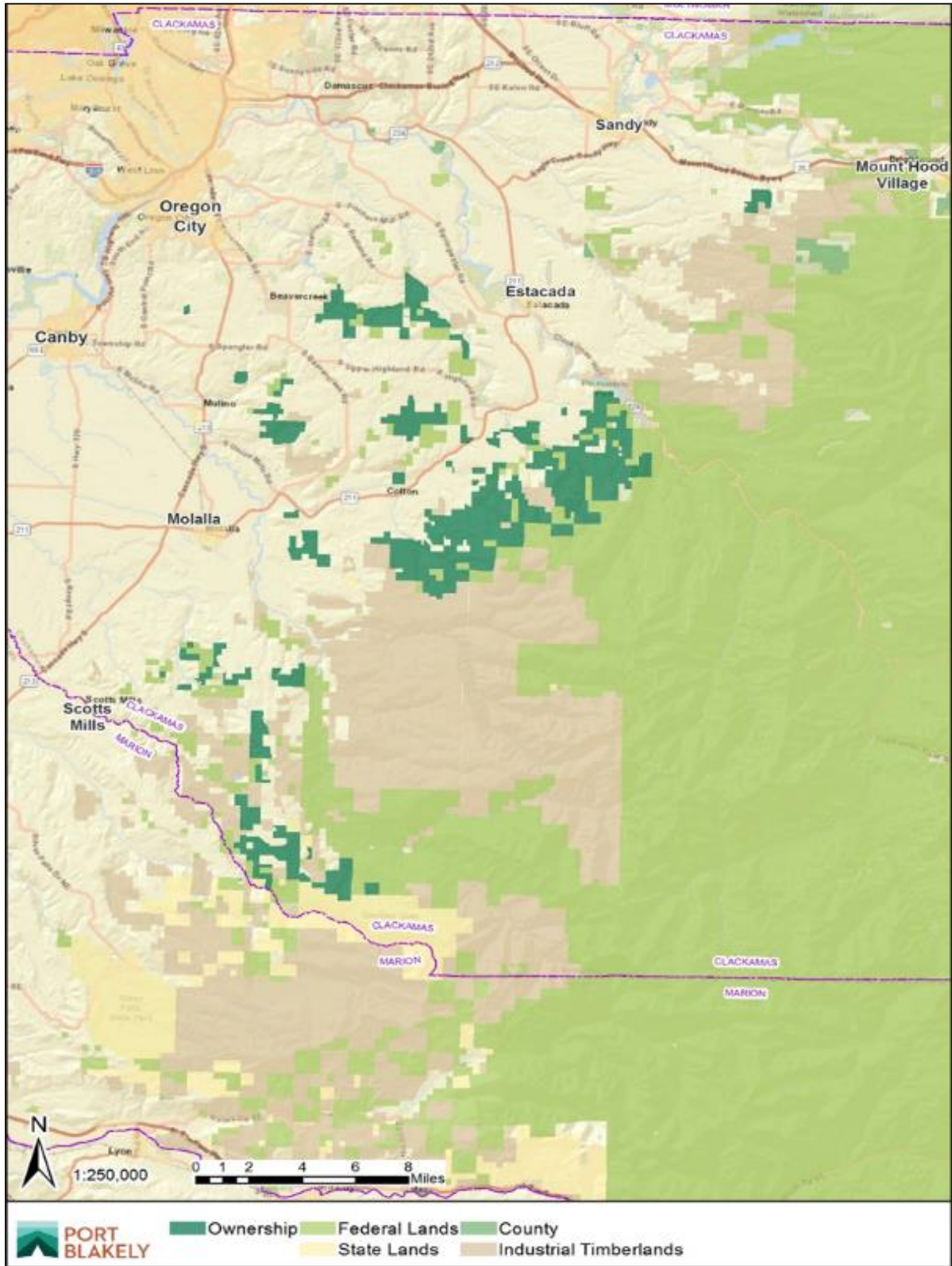
*Sandy River Basin* – Water quality monitoring data reviewed by ODEQ indicated that portions of the Sandy River and tributaries failed to meet temperature, bacteria and dissolved oxygen water quality standards and several stream segments were included on the 2002 303d list (ODEQ 2005). A section of one creek (Cedar Creek) in the Sandy River watershed, identified as an impaired waterbody, totaling 0.38 miles, flows through the HCP area (ODEQ 2019, Port Blakely 2018b). A previous 303(d) listing was for summer bacteria that failed to meet water quality standards (ODEQ 2005). Temperature (year-round) was identified more recently as an impairment (ODEQ 2019).

#### **4.1.5 Existing Land Use**

Port Blakely's HCP lands are surrounded and/or intermixed with urban residences, rural private lands managed for forestry or agriculture, other commercial forestlands, and state and federal lands composed primarily of forestlands (Figure 4-1). The HCP lands are bordered on the north primarily by small private landowners managing their lands in forestry and agriculture, on the east by Federal lands (BLM and USFS), to the southeast by Weyerhaeuser, to the south by Federal and State lands, and to the southwest and west by private forests, agriculture lands, and urban areas (cities and towns) (see Figure 1-2).

Adjacent commercial forestlands are intensely managed for timber harvest on relatively short rotations (< 45 years). Federal forestlands are managed according to the Northwest Forest Plan that includes 1) stands harvested at much longer rotations (150-year rotation in Federal Matrix lands) than the industrial average (approximately 35-40-year rotation in commercial forests), 2) stands used to apply adaptive management approaches to achieve older forest conditions at different rates and conditions, and 3) stands allowed to develop into old growth. Rural land uses include a mixture of grazing, dairy farming, nurseries,

Figure 4-1. Clackamas County Forest Land Ownerships.





Christmas tree farms, viticulture, orchards, horse farms, and small woodlots (Clackamas County 2011). Urbanization encroachment is increasingly apparent near and adjacent to Port Blakely's ownership along its western boundary as evidenced by new residential developments and communities, increasing numbers of five to ten-acre farms, and the associated commercial businesses developed to service the increasing population. All the streams on Port Blakely ownership flow through these agricultural and urban lands before flowing northward into the Lower Columbia River or westward into the Willamette River.

## **4.2 Biological Resources**

### **4.2.1 Vegetation**

The vegetation comprising the montane western forest of the HCP area is dominated by conifers, typically Douglas-fir. Canopy structure varies from single to multi-storied. Tree size also varies from small to large. Large snags and downed trees vary from uncommon to abundant based on past land practices and naturally occurring weather events. Mid to lower canopies vary in structure and are comprised of a variety of native species depending on sunlight penetration, elevation, and precipitation. Deciduous broadleaf shrubs are the most common understory dominants (Chappell 2001).

In lower elevations, western hemlock, western red cedar, white fir, and grand fir are common, while Pacific silver fir, mountain hemlock, lodge pole pine and subalpine fir exist in higher elevations (Campbell et al. 2002). Primary understory coverage includes vine maple, red huckleberry, dwarf Oregon grape, ocean spray, and sword fern, which prefer stands 35 to 65 years old. In younger stands, aged 5 to 15 years, trailing blackberry, snowberry, and bracken fern are more common in the understory (McIntosh et al. 2009). Other species of understory includes hazelnut, salal, dwarf rose, thimbleberry, salmon berry, buckthorn, poison oak, Himalayan blackberry, elderberry, honeysuckle, willow, whitebark raspberry, redwood sorrel, bedstraw, and thistle. Occurrence and density of these shrubs and forbs depends on their shade tolerance and moisture requirements (McIntosh et al. 2009).

Prior to Port Blakely's acquisition of its forestlands in Clackamas County, approximately 8% of the HCP area was managed for agricultural land uses, e.g., pastures, Christmas tree farms or orchards. These areas, totally approximately 2,496 acres, in eight parcels that are widely scattered across the HCP area and have been converted to Douglas-fir stands managed for timber production. The remainder of the ownership is comprised of forest stands that have sustained one or two harvest rotations, i.e., it is either second or third growth, and roads, rock pits, and natural features. The wildfires of 2020 affected approximately 8,100 acres at various intensities, however, most stands sustained intense burning and have been harvested and reforested. Burned stands that are expected to survive will be allowed to grow to full maturity. As such, there are limited, and in some areas, no, legacy structures that contribute to diversity and complexity across the landscape. This is true for both terrestrial forest habitat in the uplands and riparian habitat along streams and wetlands. Additionally, all of Port Blakely's forestlands have been managed under state Forest Practice Rules where minimal woody debris retention is required and, as such, standing snags, older trees, forest-floor coarse woody debris, and large wood in streams is nominal.

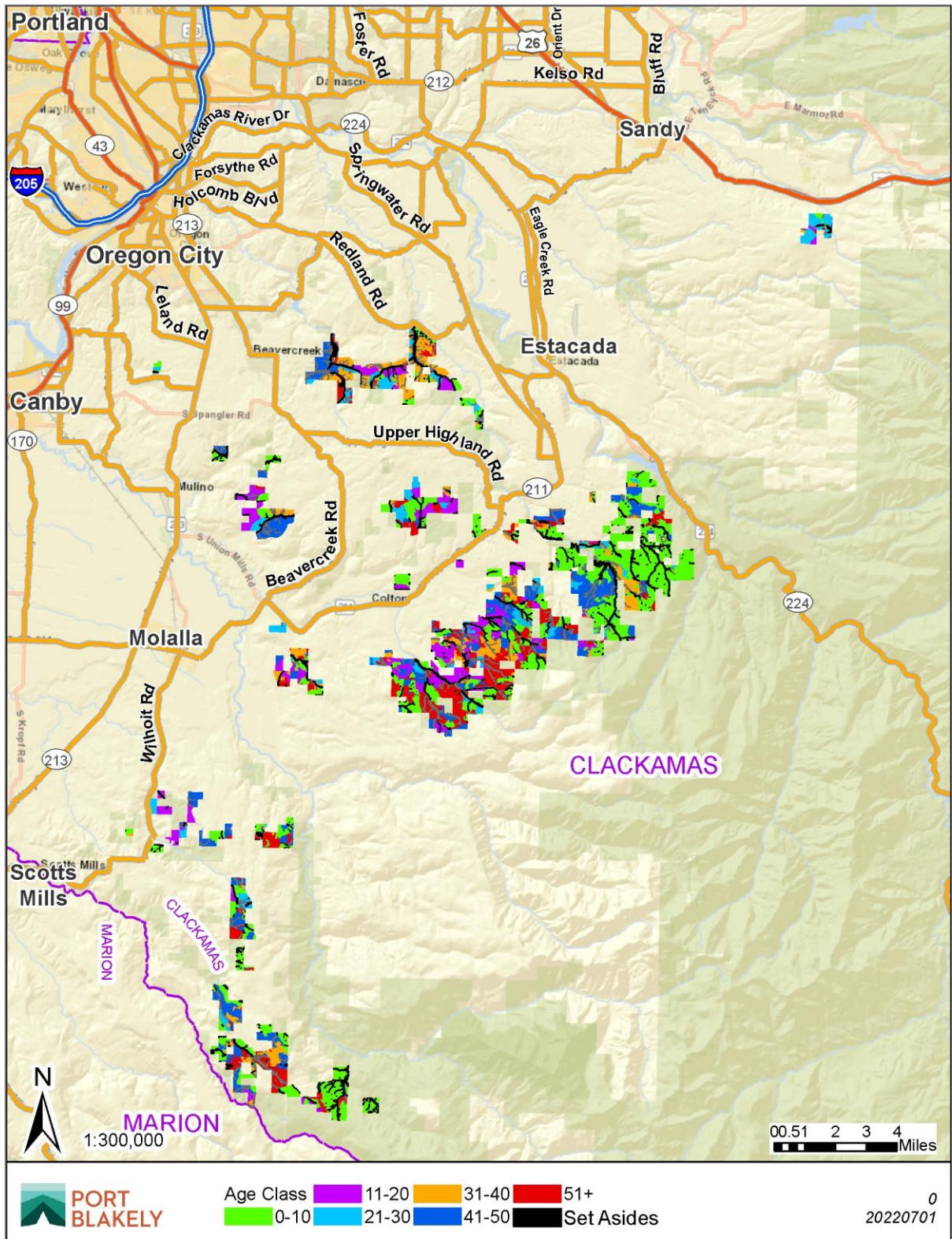
Nonetheless, there are areas of higher quality habitat, i.e., areas with older trees and some structural features that are more beneficial to wildlife than typical second and third growth forest stands. These areas are primarily located in stream buffers that have been applied under OFP Rules over the past several decades and are comprised of stands that are 51 to 70+ years of age that survived the catastrophic fires of 2020. The existing leave areas within buffers combined with the older age class of the managed landscape compose 20% of the forested stands in the HCP area, nearly all of which are < 70 years of age (see Table 2-1). These riparian and older stands contain some snags and older conifer and hardwood trees that have attained the size and/or defect that provides habitat characteristics, such as broken tops, cavities, etc., that can be utilized by spotted owls, its prey species, bats, and a variety of forest-dwelling species. The current age-class distribution based on Port Blakely's forest management plan in ten-year increments is shown below (Figure 4-2). These age-classes and stand distribution across the landscape are a result of implementation of basic OFP Rules, voluntary activities by Port Blakely to extend the harvest rotation age, and the wildfires of 2020 (see Table 2-1 for acreage figures). Younger age-classes, i.e., the 1 through 10-year-old age-class, closely resembles the early seral stages of a natural forest that has undergone natural disturbance. During this stage, a variety of forbes and grasses are dominant, while in the 11-20-year-old age-class, young trees experience rapid growth evolving into a stand representative of a young sapling/shrub dominated forest. The 1-10-year-old young forests are very diverse and are comprised of a large variety of native hardwoods, shrubs, and understory vegetation.

As the Douglas-fir plantation ages, in the 11-20-year-old age-class, the canopy begins to close, and understory vegetation begins to be outcompeted. This 'stem exclusion' period triggers a pre-commercial thin management entry where greater than 25% of trees are cut. All the cut trees are retained on site, contributing to an abundance of short-term woody debris. Sunlight is again able to penetrate to the forest floor and the understory responds. The cycle continues and as the Douglas-fir in the 21-30-year-old age-class again begins to close, a commercial-thin management entry is triggered. The trees are removed from the stand during this management entry which increases sunlight penetration to the forest floor causing understory vegetation to develop. These older age-classes, with some wildlife habitat structural elements as a result of weather events, are left to mature to maximum timber value in the 41-50 and 50+ year-old age-classes. Stands in these age-classes are candidates for regeneration harvest, and the cycle begins anew. These forest-age classes are distributed across the HCP landscape in proportions ranging from 8% (21-30 age-class) to 33% (0-10 age-class) (see Table 2-1).

#### **4.2.2 Fish and Aquatic Habitat**

In addition to the listed and unlisted, covered, aquatic species described in detail in Section 3, there are numerous other species of native fish known to occur in the Willamette Zone, according to Oregon Department of Fish and Wildlife (ODFW 2018b). This area covers the entire Willamette River watershed and its tributaries, which include the Molalla-Pudding and Clackamas River basins. These species include, but are not limited to, black crappie, bluegill sunfish, largemouth bass, brown bullhead, white crappie, white sturgeon, hatchery rainbow trout, green sunfish, smallmouth bass, channel catfish, pumpkinseed sunfish, yellow bullhead, redear sunfish, warmouth sunfish, American shad, mountain whitefish, walleye, and yellow perch (ODFW 2018b).

Figure 4-2. Current Forest Age-class Distribution on HCP Lands.



As described in Section 3, numerous salmonid species occur throughout western Oregon including the HCP area. The Clackamas River Basin is home to one of the two remaining runs of spring Chinook in the Willamette Basin, and also supports populations of fall Chinook, bull trout, summer and winter steelhead, and coho salmon (NFS 2018a). In the Molalla River, the flows and habitat support native winter steelhead, spring Chinook, and resident cutthroat trout, as well as coastal cutthroat trout, resident rainbow trout, and Pacific lamprey (NFS 2018b).

Approximately 190 miles of streams flow on Port Blakely's Clackamas County ownership (Table 4-1). Approximately 22% of streams located across the ownership are small fish-bearing streams (including small SSBT), while more than half the streams (55%) are small perennial and seasonal nonfish streams.

**Table 4-1. Miles of known fish and nonfish-bearing streams by stream type, including SSBT streams, and percent of total stream miles on the HCP ownership.**

<b>Stream Type</b>	<b>Miles</b>	<b>Percent</b>
Large Fish	17.7	9.3
Medium Fish – Non SSBT	18.0	9.5
Medium Fish - SSBT	6.9	3.6
Small Fish – Non SSBT	42.3	22.3
Small Fish - SSBT	0.3	0.2
Large NF	0.0	0.0
Medium NF	0.2	0.1
Small NF	104.5	55.0
Domestic	0.1	0.0
<b>Total Miles</b>	<b>190.0</b>	<b>100</b>

1 ODF Hydro Layer (ODF 2018b).

2 Port Blakely Hydro Layer (Port Blakely 2018b).

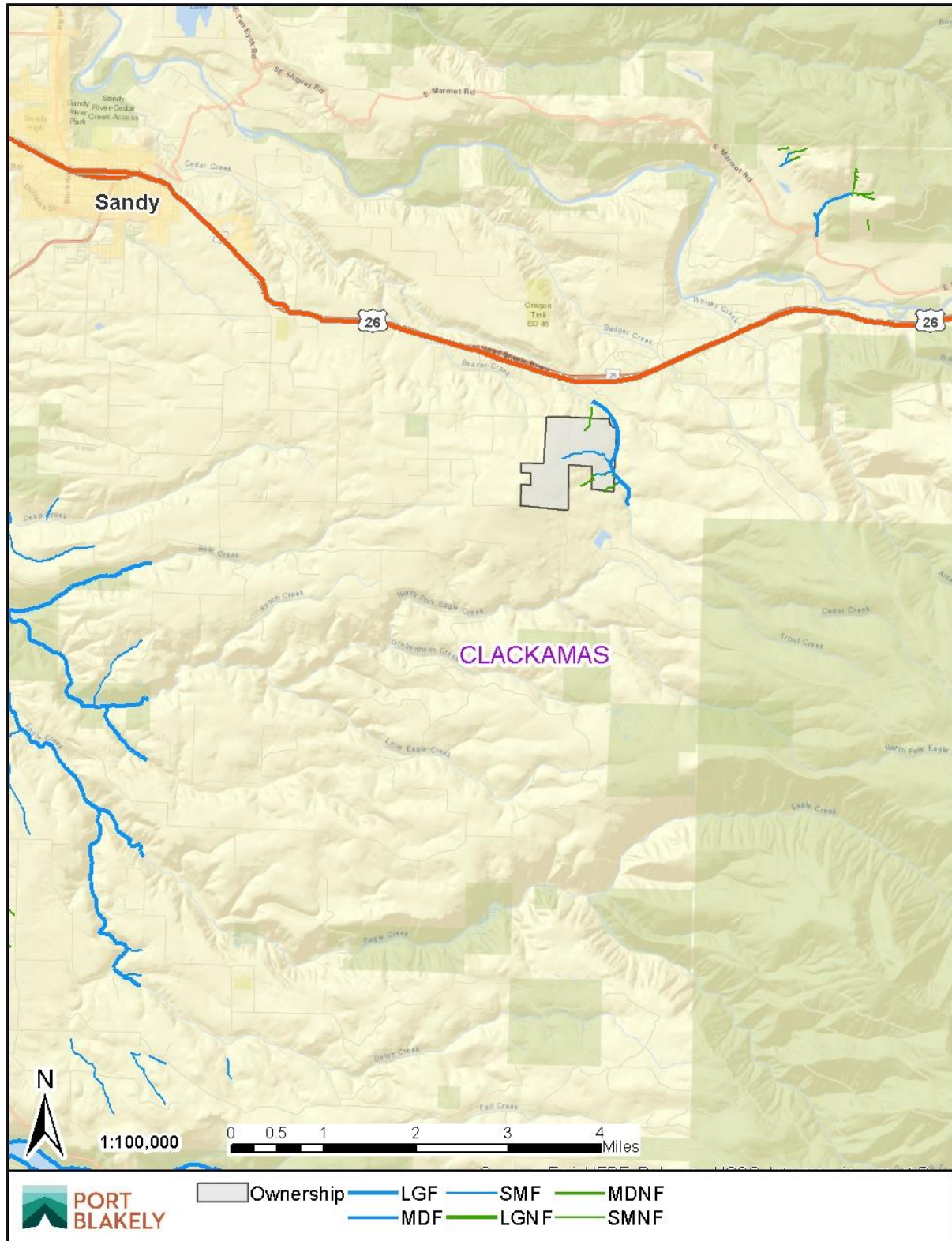
For larger fish-bearing streams and rivers that flow through or adjacent to the Plan area, it is assumed that a variety of fish species, representing all fresh-water life-stages are present. The fish utilizing the headwater streams that flow through the HCP area include resident cutthroat trout, steelhead, and sculpin species. Occasionally coho and lamprey are detected. Salmonids that are detected within these headwater streams are typically rearing juveniles, while sculpin and lamprey have been detected at all life-stages. Under OFP Rules, fish-bearing streams are defined by fish use. "Fish use" means inhabited at any time of the year by anadromous or game fish species or fish that are listed as threatened or endangered species under the federal or state endangered species acts (ODF 2018a). Fish streams are not typed as such if anadromous, game or listed species are not present, even

if other native fish are present. However, Port Blakely considers all native fish as “fish” for purposes of stream typing and HCP protections.

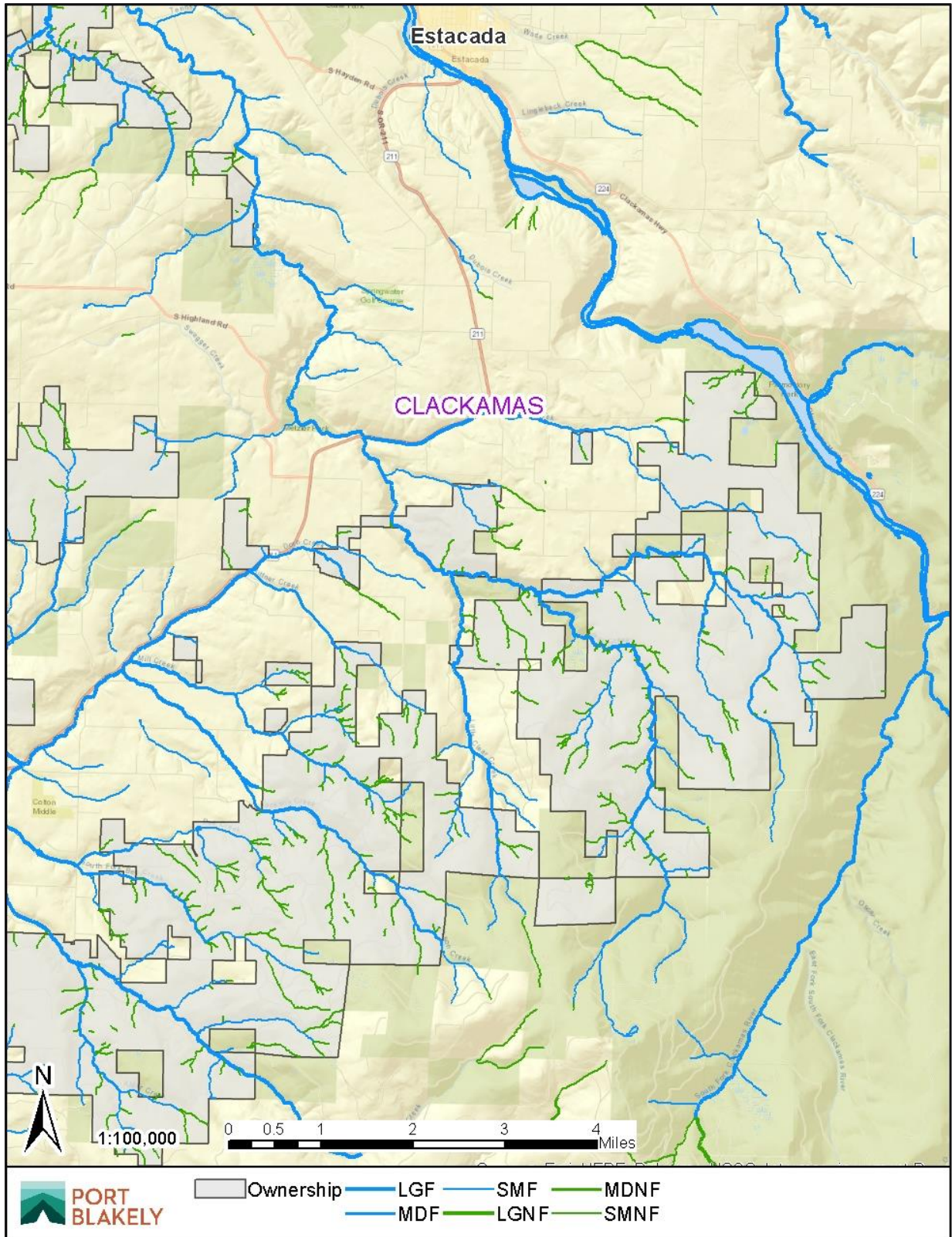
Spatial data reflecting the extent of the known distribution of all fish combined are shown in Figure 4-3 through 4-6, the known fish and nonfish streams on Port Blakely lands in each of four HCP areas. The fish and nonfish stream designations were obtained from the ODF stream data layer and revised by incorporating Port Blakely on-the-ground survey data (ODF 2018b, Port Blakely 2018b). Port Blakely biologists or their contractors, conduct fish distribution surveys typically 3-5 years in advance of land management activities. Surveys are conducted in the spring (March-May), during the time that fish are most likely to be fully distributed throughout the stream network. When water conditions are suitable, streams are evaluated by observing the physical characteristics of the stream channel and by looking for the presence of fish. Where necessary, to determine the upper-most point of fish distribution, streams are surveyed for fish using electroshocking guidelines established by NMFS (NMFS 2000) and protocols established by ODF and ODFW (1995). The stream size categories are determined by assessing the average annual flow of the stream measured in cubic feet per second. Average annual flow is calculated using a relationship that is based on upstream drainage area and annual precipitation (ODF, 1994). Streams that are determined to be nonfish bearing are resurveyed in late summer (August-September) to determine if they have year round perennial flow or if they go seasonally dry. Each nonfish stream can have the additional designation of domestic. This means that there is a freshwater intake located along the stream reach that has an associated water use permit issued by the Oregon Water Resources Department. A combination of all these factors determines the final stream classification that is used to update the GIS hydro layer and inform resource protection. Stream type designations are as follows: large, medium and small fish-bearing streams are designated as LGF, MDF and SMF, respectively; large, medium and small nonfish-bearing streams are designated as LGNF, MDNF and SMNF, respectively.

Spatial data reflecting the extent of known aquatic habitats such as wetlands, lakes and bogs are obtained from the USFWS National Wetlands Inventory and revised by incorporating Port Blakely on-the-ground survey data (USFWS 2019b, Port Blakely 2018b). Aquatic habitats are surveyed and mapped by Port Blakely biologists or their contractors on a unit by unit basis, typically 3-5 years prior to conducting forest management activities. Delineations are conducted year-round through evaluation of local hydrology, vegetation, and soil profiles, as outlined in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (V2) (2010). Mapping of these sensitive habitats is a recent effort. Features that have been identified to date are mapped in our internal GIS system (Figure 4-7 through 4-10).

**Figure 4-3. Known Fish and Nonfish Streams on the Current HCP Lands – Northeast Ownership.**



**Figure 4-4. Known Fish and Nonfish Streams on the Current HCP Lands – East Ownership.**



**Figure 4-5. Known Fish and Nonfish Streams on the Current HCP Lands – South Ownership.**

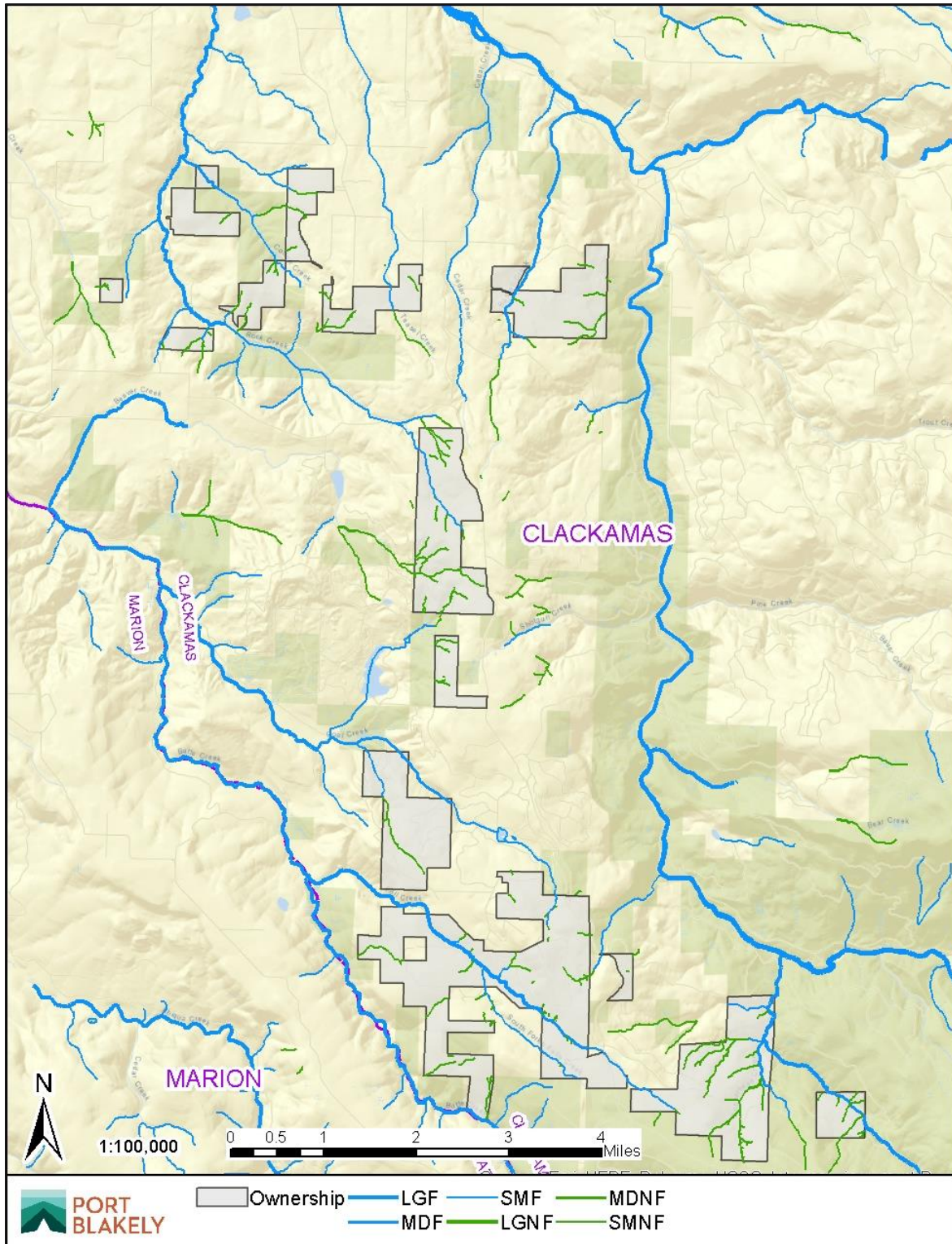
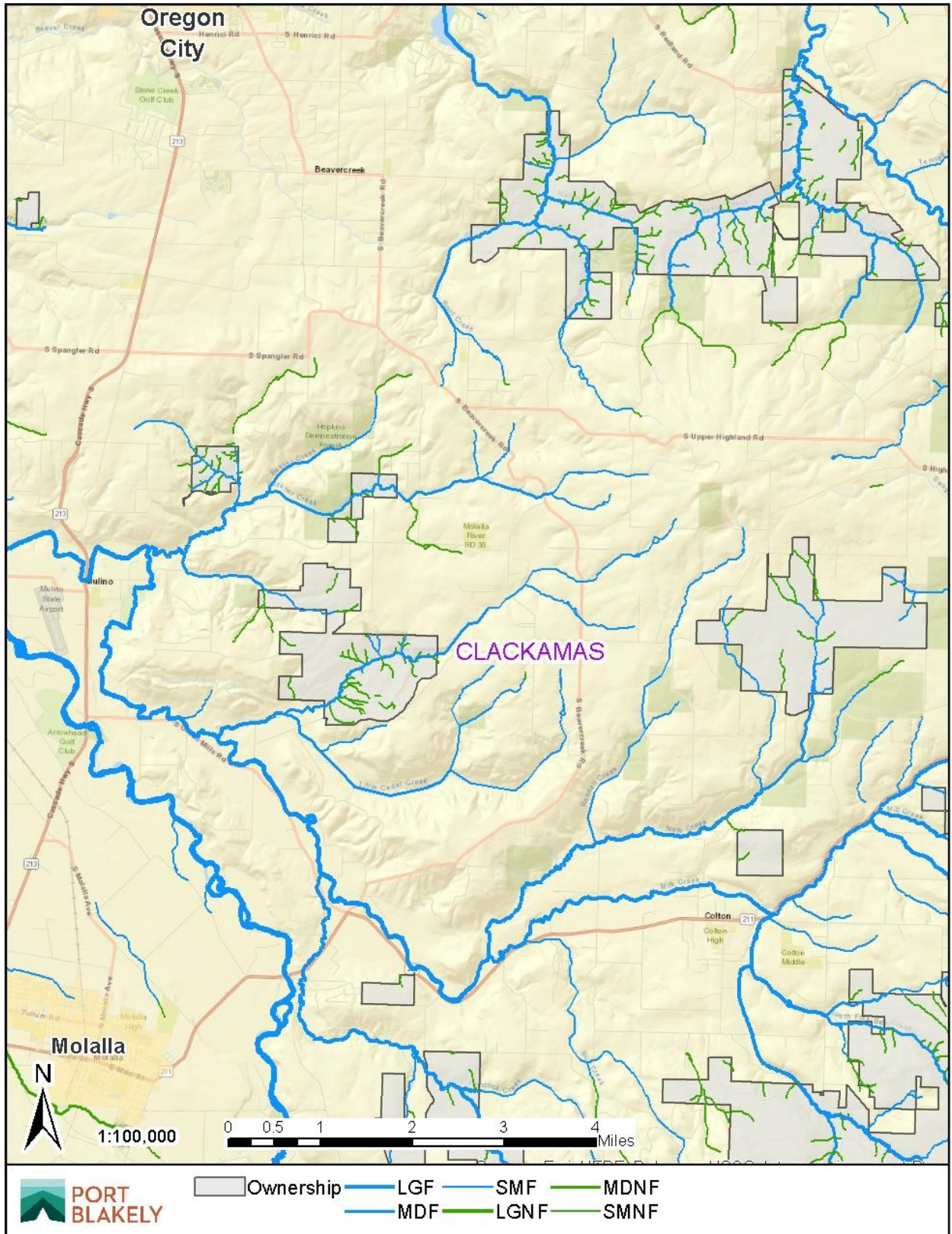




Figure 4-6. Known Fish and Nonfish Streams on the Current HCP Lands – West Ownership.



**Figure 4-7. Known Sensitive and Unique Habitats on the Current HCP Lands – Northeast Ownership**

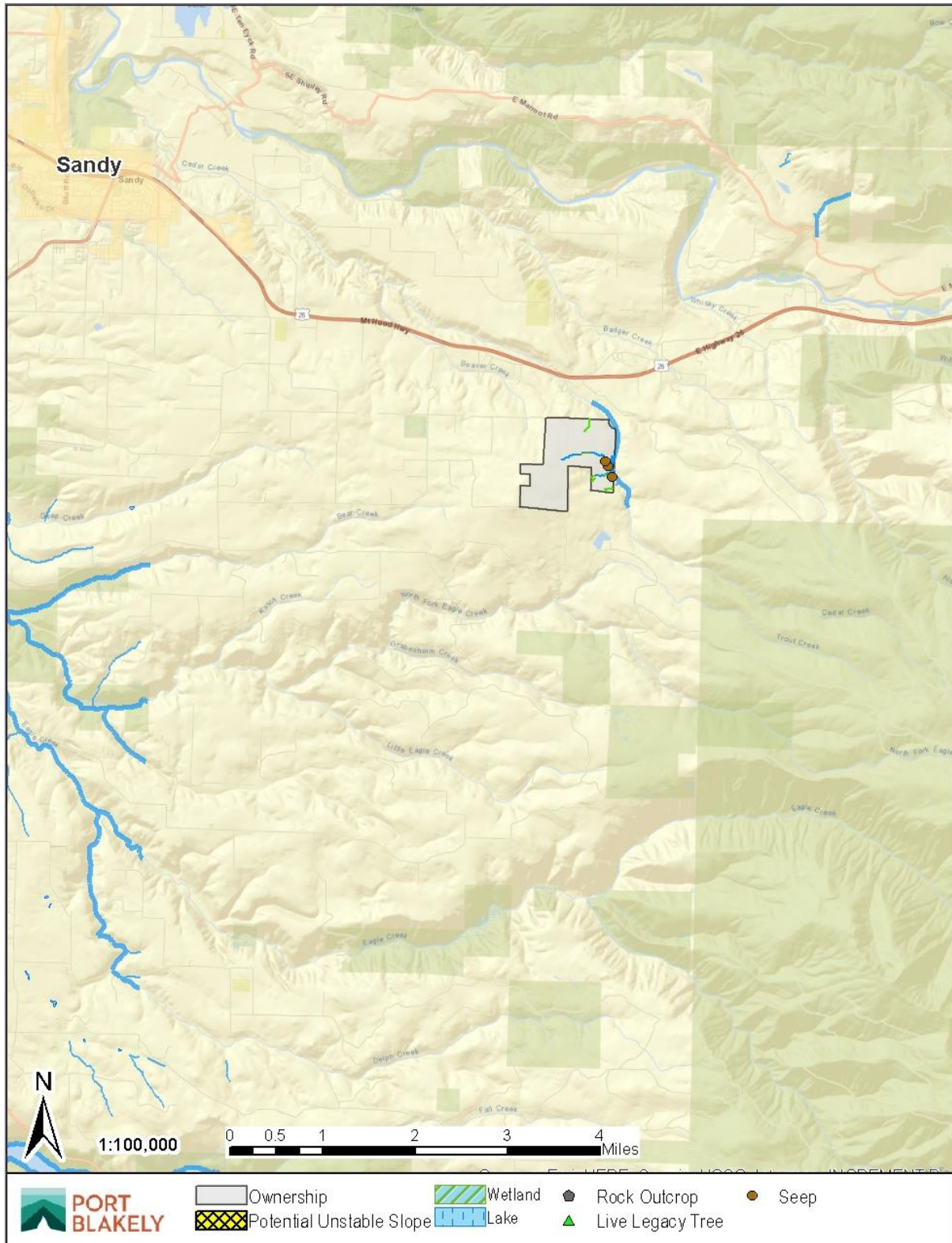
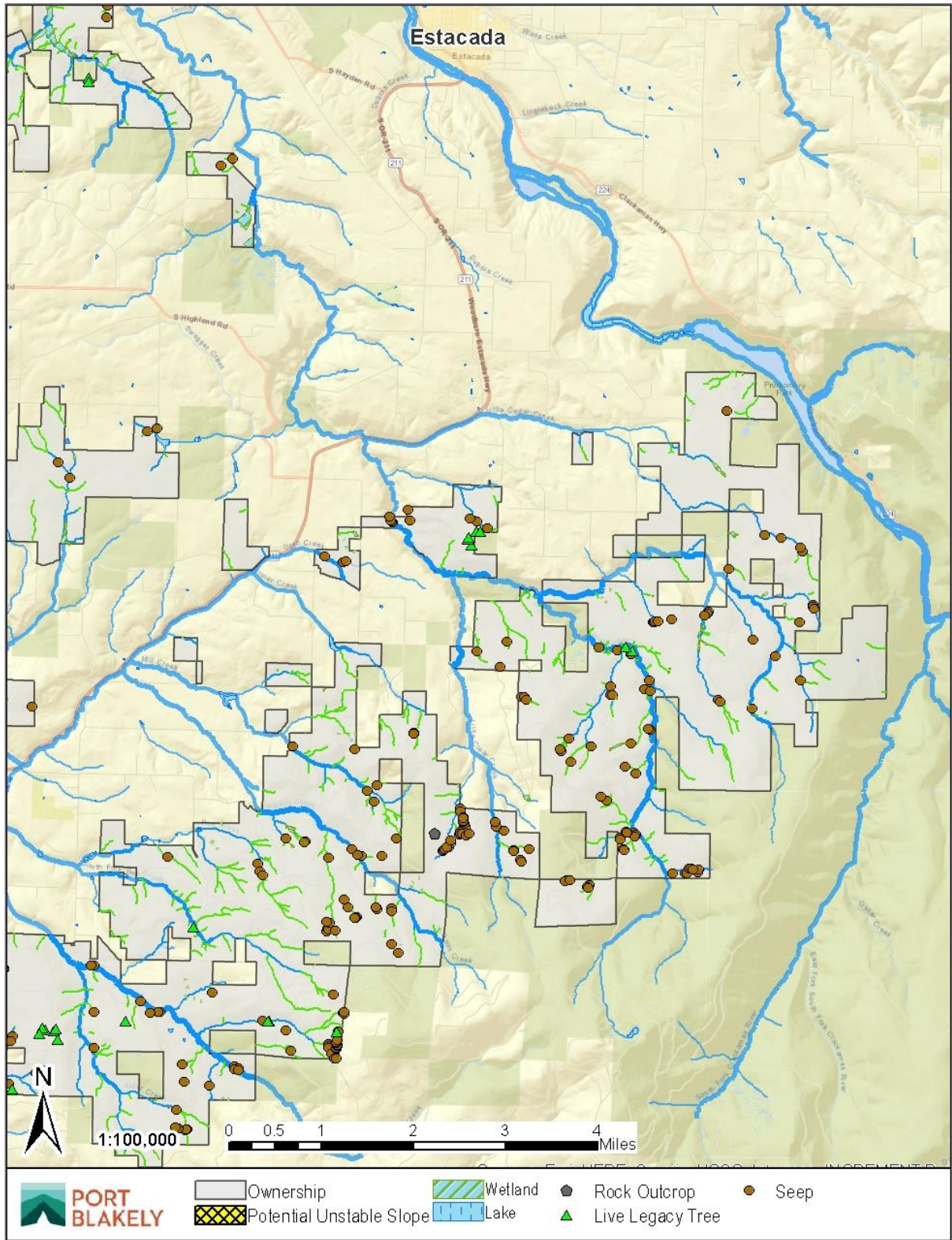


Figure 4-8. Known Sensitive and Unique Habitats on the Current HCP Lands – East Ownership.







### 4.2.3 Wildlife and Terrestrial Habitat

In addition to the listed and unlisted, covered terrestrial wildlife species described in detail in Section 3, there are nearly 300 additional vertebrate species known to be associated with the streams and forests of western Oregon (Olson 2001). A broad landscape mosaic comprised of early to mature seral habitats provide the complexity of structures necessary for nesting or denning, and foraging habitats throughout the trophic chain. Wildlife that is generally associated with middle-age forest stands in the western Cascades, similar to Port Blakely's forested stands in the HCP area, include, but are not limited to, the Roosevelt elk, black-tailed deer, black bear, cougar, bobcat, coyote, marten, long-tailed weasel, raccoon, bushy-tailed woodrat, snowshoe hare, Douglas squirrel, band-tailed pigeon, black-throated gray warbler, Swainson's thrush, Townsend's warbler, Wilson's's warbler, hermit warbler, winter wren, chestnut-backed chickadee, red-breasted nuthatch, Cooper's hawk, sharp-skinned hawk, ruffed grouse, gray jay, Pacific-slope flycatcher, common garter snake, northern alligator lizard, rubber boa, *Ensatina* salamander, long-toed salamander and Pacific tree frog (Woodward et al. 2011). Most of these species, if not all, could occur in the HCP area.

In younger stands, like those typically found on managed forestlands, closely associated species include, but are not limited to, the mountain beaver, northern pocket gopher, creeping vole, deer mouse, western jumping mouse, striped skunk, American goldfinch, chipping sparrow, common nighthawk, dusky flycatcher, fox sparrow, Lazuli bunting, MacGillivray's warbler, spotted towhee, and western bluebird (Woodward et al. 2011). Many of the species cited above as occurring in middle-age stands are also generally associated with younger stands. In addition, these younger stands may be occupied by red fox, long-eared bat, American robin, dark-eyed junco, song sparrow and common garter snake (Woodward et al. 2011).

Federal forestlands occur adjacent to some of Port Blakely's HCP lands and tend to have older forest stands. The species generally associated with mature forests are the red tree vole, northern flying squirrel, hoary bat, Cooper's hawk, northern spotted owl, pileated woodpecker, pine siskin, pygmy nuthatch, varied thrush, and Vaux's swift. These species utilize the habitat afforded in mature forest stands for part or all of their life (Woodward et al. 2011). Many of the species that typically occur in the younger and middle-aged stands may also occur in older forest stands because they exhibit a high degree of adaptability and may be supported by numerous habitats and conditions. Some of these species, not previously mentioned, include the fisher, myotis bats, black-backed woodpecker, and brown creeper (Woodward et al. 2011). Likewise, species that utilize mature forest for nesting, may forage in younger, more open forest types.

The HCP area is known to be inhabited by many of the species associated with younger and middle-aged stands. In addition, because of the close proximity of the HCP lands to older forest stands on adjacent Federal lands, some of the species associated with older stands are likely to occur in the area at some point during their life cycle. This is because 1) there are still a few older stands remaining on the HCP landscape, 2) riparian corridors contain old trees with structural features that are key habitat components for these species, and 3) retention of snags and green trees generally results in the availability of structural features important to many of these species. Spatial data reflecting the extent of known sensitive wildlife species are obtained from the ORBICs database (ORBIC 2016). Follow-up surveys

for sensitive wildlife species are conducted as necessary. Prior to conducting forest management activities, typically 3-5 years in advance, harvest units are surveyed for sensitive and unique aquatic and terrestrial habitats such as upland aquatic habitats, rock outcrops, legacy features, and caves. Identification and mapping of these features is a recent effort conducted by Port Blakely biologists and foresters or their contractors. Features that have been identified to date are mapped in our internal GIS system (see Figure 4-7 through 4-10) (Port Blakely 2018b).

## **SECTION 5 POTENTIAL BIOLOGICAL IMPACTS**

### **5.1 Direct and Indirect Impacts**

The following discussion provides a description of the direct and indirect effects (impacts) that generally result to Covered Species from the types of forest management activities covered in this HCP, and that might be expected to result from Port Blakely's management actions in the absence of conservation measures specifically designed to avoid, minimize, and offset those effects, i.e., under baseline OFP Rules. Under the HCP, Port Blakely will implement such conservation measures. These measures, the actual effects most likely to occur, and how those effects will specifically impact Covered Species, e.g., amount and extent of incidental take, are described in Section 7.

#### **5.1.1 Aquatic Species**

##### **5.1.1.1 Threats**

The ESA Recovery Plan for Lower Columbia River Salmonids (LCR Recovery Plan) and the Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead (UWR Recovery Plan) provide comprehensive discussions of the limiting factors and threats responsible for salmon species declines in Oregon (ODFW and NMFS 2011, NMFS 2013). Limiting factors are the physical, biological, or chemical conditions (e.g., inadequate spawning habitat, habitat connectivity, high water temperature) and associated ecological processes and interactions experienced by the fish that result in reductions in viable salmonid population parameters (abundance, productivity, spatial structure, and genetic diversity). Threats are the human activities or natural events (e.g., road building, floodplain development, fish harvest, hatchery influences) that cause or contribute to limiting factors (ODFW and NMFS 2011).

Development and land use practices are among the threats identified for UWR Chinook and steelhead (ODFW and NMFS 2011), as well as LCR salmonids (NMFS 2013). Many of the threats contribute to limiting factors affecting other fish species, e.g., bull trout and Pacific lamprey, inhabiting the stream ecosystems in the HCP area. The assessment of the potential impacts to aquatic Covered Species will focus on the threats posed by land use management activities, specifically forest management activities described in the Covered Activities section above, as they are the activities that are under Port Blakely's control and for which the incidental take permit is being requested.

#### **Lower Columbia River Salmon ESU and Steelhead DPS**

The LCR Recovery Plan for salmon (coho and Chinook) and steelhead addresses multiple ESUs and DPSs in a single recovery plan which presents an opportunity to evaluate limiting factors and threats at the regional scale, discern large-scale patterns in ecological conditions, and identify regional approaches to recovery (NMFS 2013). The LCR Recovery Plan describes limiting factors at the regional scale that have affected LCR salmon and steelhead, and regional strategies to address the specific limiting factors identified. The regional strategies also highlight the need for domain-scale coordination to implement effective recovery strategies in tributary habitat, estuary habitat, hydropower, hatcheries, harvest, and ecological interactions. Relative to LCR salmon and steelhead, this impacts analysis focuses on land management threats to tributary habitat because this is the type of



activity and habitat type where the recovery is affected most by the land management activities cited above, and for which the Port Blakely HCP can make a contribution to LCR salmon and steelhead recovery. Most, if not all, of Port Blakely's HCP lands include tributary habitat of the upper watersheds of the two main river systems, Molalla, and Clackamas Rivers, which are likely to be occupied by listed salmonids.

Tributary habitat degradation from past and/or current land and water use is a limiting factor for all LCR salmon and steelhead populations. Widespread development and other land use activities have disrupted watershed processes, reduced water quality, and diminished habitat quantity, quality, and complexity in most of the LCR subbasins. Past and/or current land use or water management activities have adversely affected stream and side channel structure, riparian conditions, floodplain function, sediment conditions, and water quality and quantity, as well as the watershed processes that create and maintain properly functioning conditions for salmon and steelhead (LCFRB 2010, ODFW 2010a). Specific activities that have adversely affected salmon and steelhead habitat include logging and other forest management practices in addition to the following:

- Agricultural activities;
- Construction of fish passage barriers;
- Urban and rural development; and
- Sand and gravel mining.

Logging on unstable slopes and in riparian areas has led to the degradation of watershed processes. Improperly located, constructed, or maintained forest roads have disrupted stream flow patterns and sediment supply processes, disconnected streams from floodplains, and, in riparian areas, reduced wood recruitment to streams. The historical use of splash dams to transport logs reduced instream structure and available spawning gravel in several stream systems. Impacts continue in many areas, and the legacy of historical practices will continue for some time (NMFS 2013).

Together these factors have reduced the amount and quality of spawning and rearing habitats available to LCR salmon and steelhead, severed access to other historically productive habitats, and degraded watershed processes and functions that once created healthy ecosystems for salmon and steelhead production (NMFS 2013). Today, many streams have lower pool complexity and frequency compared to historical conditions. Channels also lack the complex structure needed to retain gravels for spawning and invertebrate production. Also missing from many channels is the connectivity with shallow, off-channel habitat and floodplain areas that once provided productive early-rearing habitat, flood refugia and overwintering habitat, and cover from predators. In many areas, contemporary watershed conditions are so different from those under which native fish species evolved that they now pose a significant impediment to achieving recovery (LCFRB, ODFW 2010a).

To address the limiting factors and threats described above, the regional tributary habitat strategy is directed toward protecting and restoring high quality, well-functioning salmon and steelhead habitat through a combination of (1) site specific projects that will protect habitat or provide benefits relatively quickly, (2) watershed-based actions that will repair habitat-forming processes and provide benefits over the long term, and (3) landscape-scale programmatic actions that affect a class of activities (such as stormwater management or

forest practices) over multiple watersheds (NMFS 2013). Federal lands will play a significant role in providing and protecting anchor habitats, but substantial improvements also are needed in marginal areas of potentially productive habitat (LCFRB 2010a). Especially at low elevations, much of the land is in private ownership, where restoration activities are likely to be challenging and expensive (NMFS 2013).

The Oregon Plan (for recovery) includes actions to (1) develop land management scenarios that address hydrograph changes resulting from altered runoff and climate change, (2) protect and restore riparian areas to provide long-term supplies of large wood to streams, (3) develop stormwater management plans, (4) conduct sediment source analyses and implement needed actions, (5) ensure that future development impacts in the 100-year floodplain are either low-impact or are mitigated, and (6) prohibit development of new dikes, levees, and floodwalls in the 100-year floodplain unless they will not increase flood volume, size, and/or intensity (ODFW 2010a).

The 5-Year Review discusses the factors identified in determining whether a species is threatened or endangered (NMFS 2016b). Listing Factor A addresses the destruction, modification or curtailment of a species habitat or range. A pertinent key emergent or ongoing habitat concern for all four LCR listed salmon species is the reduced complexity, connectivity, quantity, and quality of habitat used for spawning, rearing, foraging, and migrating (NMFS 2016b). Loss of habitat from conversion to agricultural or urbanized uses continues to be of particular concern throughout the lower Columbia River region, especially the loss of habitat complexity in the lower tributary/mainstem Columbia River interface due to dams, and concomitant changes in water temperature.

One of the key protective measures identified is the implementation of HCPs that have carried forward improvements to fish passage and road management via Road Maintenance and Abandonment Plans to properly abandon or stabilize existing forest roads and improve standards on how new roads are to be built and existing roads maintained or abandoned to ensure fish passage and minimize sediment delivery to streams and rivers. Overall, timber harvest practices that increased stream buffers, together with improved road management, have reduced the amount of sediment load to streams and rivers, and allowed better riparian conditions, all of which serve to benefit LCR salmon and steelhead (NMFS 2016b). For further information on additional areas of concerns, as well as a discussion of the other four factors considered in determining the listing status of the LCR salmon populations see the 2016 5-Year Review (NMFS 2016b).

### **Upper Willamette River Chinook ESU and Steelhead DPS**

Of the regional limiting factors identified in the UWR Recovery Plan for the UWR Chinook and steelhead populations, habitat access, habitat quality and quantity, and water quality are the factors that are the most pertinent to this assessment (ODFW and NMFS 2011). Threats that cause or contribute to these limiting factors include land management practices associated with agriculture, timber harvest, mining and grazing activities, diking, damming, development of transportation corridors, and urbanization which can degrade or destroy ecosystem function by altering habitat characteristics, including sediment, connectivity of side channels and water quality (ODFW and NMFS 2011). Although all these threats exist, UWR Chinook and steelhead occur in Clackamas County. Threats to these species in the

Port Blakely HCP ownership are caused by timber harvest and associated land management activities such as road construction.

Land management activities have degraded stream habitat conditions in the Willamette River mainstem above Willamette Falls and associated subbasins (ODFW and NMFS 2011). In the Willamette River mainstem and lower subbasin mainstem reaches, high density urban development and widespread agricultural effects have impacted aquatic and riparian habitat quality and complexity, sediment and water quality and quantity, and watershed processes. In upper subbasin mainstem reaches and subordinate tributary streams, the major drivers of current habitat conditions are past and present forest practices, roads, and barriers. Aquatic habitat degradation is primarily the result of past and/or current land use practices that have affected functional attributes of stream channel formation, riparian connectivity, and magnitude and frequency of contact with floodplains, as well as watershed processes. Timber harvest is one of six land use activities, including agricultural development which is prevalent in Clackamas County, that have led to current aquatic habitat conditions (ODFW and NMFS 2011). Timber harvest on unstable slopes and riparian areas has led to the decoupling of watershed processes. Improperly located, constructed, or maintained roads have degraded stream flow and sediment supply processes. The legacy effects of splash dams to transport logs continues to inhibit instream structural complexity and available spawning gravel in several stream systems.

Together these land management activities continue to inhibit the amount and quality of spawning and rearing habitats available to UWR salmon and steelhead populations, principally by severing access to historically productive habitats, and by weakening the important watershed processes and functions that once created and maintained healthy freshwater ecosystems for UWR Chinook and steelhead production (ODFW and NMFS 2011). Today, many streams have lower frequency and complexity of pools compared to historical conditions. And many of those that remain lack the complex structure needed to retain gravels for spawning and invertebrate production, and the connectivity with shallow, off-channel habitat areas that once provided refugia from floods, over-wintering and hiding cover, and productive early-rearing habitat.

These activities have also reduced water quality in the principle subbasins and mainstem Willamette River (ODFW and NMFS 2011). Land uses that involve water withdrawals have contributed to elevated water temperatures in many population areas at critical periods. Elevated stream temperatures are often the result of multiple factors including water withdrawals and/or altered hydrology and a lack of intact, functional, and contiguous riparian management zones and sufficient streamside buffers. In some areas, water quality has also been reduced because of contaminants for agricultural use, and contaminants generated from urban storm water runoff and industrial sources.

### **Bull Trout**

The 2008 Bull Trout Status Review identified historical habitat loss and fragmentation, interaction with nonnative species, and fish passage issues as the most significant primary threat factors affecting bull trout (USFWS 2008a). In addition, the decline of bull trout has also been attributed to poor water quality, angler harvest, and entrainment into diversion channels and dams (USFWS 2011a). Specific land and water management activities that may negatively impact bull trout populations and habitat, if not implemented in accordance

with best management practices, include the operation of dams and other diversion structures, forest management practices, livestock grazing, agriculture, agricultural diversions, road construction and maintenance, mining, and urban and rural development (USFWS 2011a).

In the Clackamas River subbasin, extirpation was likely caused by many of the factors cited above, including migration barriers from hydroelectric and diversion dams, direct and incidental harvest in sport and commercial fisheries, targeted eradication through bounty fisheries (currently known as “sport reward” programs), and habitat and water quality degradation from forest management and agricultural activities not in accordance with best management practices (USFWS 2011a).

Currently, most of the threats affecting bull trout generally fall into three broad categories: (1) habitat threats, (2) demographic threats, and (3) nonnative species threats. Habitat threats are those threats that impact bull trout habitats, demographic threats are those threats that impact individuals or local populations, and nonnative species threats result from introduced fish species or their management that impact bull trout individuals or populations (USFWS 2015a). However, primary threats, i.e., factors known or likely to negatively impact bull trout population at the core area level, relative to habitat, demographics, and nonnative fishes are not listed for the Clackamas River core area because of its status as a nonessential experimental population (USFWS 2011a, USFWS 2015c).

### **Pacific Lamprey**

According to the Pacific lamprey assessment, Pacific lamprey face a variety of threats to its various life history states, and no single threat can be pinpointed as the primary reason for their apparent decline (Luzier et al. 2011). Threats include artificial barriers to migration, poor water quality, predation by native and nonnative species, stream and floodplain degradation, loss of estuarine habitat, a decline in prey, ocean conditions, dredging, and dewatering (Luzier et al. 2011). The Lower Columbia/Willamette RMU is at relatively lower risk than other Columbia River Basin RMUs, however, restricted tributary passage and degraded water quality are cited as ongoing threats (Luzier et al. 2011).

The Willamette River Sub-Unit, which is within the Lower Columbia River/Willamette Regional Management Unit, includes the Middle and Coast Forks, McKenzie, North and South Santiam, Yamhill, Molalla-Pudding, Tualatin, Clackamas and Upper, Middle, and Lower Willamette River watersheds. Threats that may apply to the HCP area, i.e., lands near the Molalla-Pudding and Clackamas Rivers, include artificial barriers, such as culverts, channelization and loss of side channel habitat, increased water temperature and sedimentation (Luzier et al. 2011). The RMU Willamette Subunit Implementation Plan cites passage, and stream and floodplain degradation, as the highest priority threats in the Willamette River, followed by dewatering, flow management and water quality (Kavanagh 2015). In the Molalla-Pudding River system, passage, dewatering and flow management, and stream and floodplain degradation threats were rated as low/medium, high, and high, respectively. In the Clackamas River system, these threats were rated as medium/high, medium, and high, respectively.

Specifically, culverts may impact distribution and abundance of Pacific lamprey by impeding upstream migrations by adults and downstream movement of ammocoetes and

macrophthalmia. Culverts designed to pass salmonids can block lamprey passage, if they have sharp angles that lamprey cannot attach to. Also, culverts and other low-head structures that have a drop at the outlet are impassable for a variety of reasons including high velocities or distance, insufficient resting areas, and lack of suitable attachment substrate (Luzier et al. 2011).

### **Cascades Frog**

Causes of declines are not fully known but introduced trout, UV-B radiation, fungal pathogens, and loss of open meadow habitat due to fire suppression have been suggested (Fellers and Drost 1993, Blaustein et al. 1994, Kiesecker and Blaustein 1997, Fite et al. 1998, Adams et al. 2001). Forest management activities could pose a threat to Cascades frogs when these activities change moisture-temperature conditions of open meadows and associated aquatic habitats or creates habitat fragmentation. Dispersal is limited by moisture-temperature conditions (Blaustein et al. 1995). However, adults regularly range onto mountain slopes far from aquatic or wetland habitats when conditions are suitably moist. At these times, timber harvest could negatively affect suitable upland habitat conditions.

### **Coastal Tailed Frog**

The coastal tailed frog is sensitive to logging and road building (Leonard et al. 1993). Logging practices that increase water temperatures and siltation may have an adverse effect on tailed frog populations (Nussbaum et al. 1983, Welsh and Ollivier 1998). McEwan (2014) found that undisturbed sites with intact upland and riparian forest have more frogs than sites with a logged upland, even if the riparian forest is retained (varying buffer widths up to 50 m); however, frogs were not absent from logged habitats, and were found associated with structural complexity and moist microsites, such as ephemeral drainages and wet draws.

In addition to terrestrial habitat loss and increased stream temperatures, large-scale forest removal and associated road construction can change a watershed's hydrological regime (Jones and Grant 1996). Roads can intercept shallow groundwater and convert it to surface flows in ditchlines, with surface flow much more rapid than groundwater flow. Thus, road networks can increase the drainage efficacy in the landscape, causing a greater amount of scour and sediment transport and decreasing channel stability during peak flow events, with reduced base flows during the summer when the species is most active, thus, reducing habitat for aquatic life stages.

However, Diller and Wallace (1999) emphasized that current timber harvest practices are not as detrimental as those used in the past. Despite negative effects of logging, this species frequently occurs in many young forests that have been harvested one or more times in the past. Sensitivity to timber harvest may depend on surface geology and harvest practices (Adams and Bury 2002, Welsh and Lind 2002).

### **Cascade Torrent Salamander**

The main suspected threats to Cascade torrent salamanders include factors that degrade habitat quality, particularly those that result in increased water temperatures and sedimentation (Lannoo 2005). Also, any event that influences the inner-channel gorge of an

occupied stream with the potential for destabilizing the geomorphology and hydrology of a stream (e.g., gully-washer, debris flow that scours to bedrock, altered peak flow from rain-on-snow event, or loss of upland canopy cover) may be problematic for the Cascade torrent salamander (Crisafulli et al. 2005). The primary anthropogenic threats to headwater stream and seep habitats include forest management activities such as timber harvest, impassable culverts, and road construction/maintenance. These activities increase water temperature, turbidity, peak flow or debris flow events, and habitat degradation and fragmentation. Additional potential threats include chemical applications, mining, recreation, fire, volcanism, disease, and climate change (Howell and Maggiulli 2011).

### **Western Pond Turtle**

Initial declines in populations could be attributed to commercial food exploitation and the pet trade (Hays et al. 1999). However, major threats to western pond turtles are habitat destruction and fragmentation caused by a variety of land management activities including, but not limited to, agricultural development, flood control, groundwater depletion, timber harvest and urbanization (Rathbun et al. 1992, USFWS 1992b, Todd 1999, Lovich and Meyer 2002). The loss of wetlands, and especially small channels and oxbow lakes, has reduced the extent of aquatic habitat for western pond turtles considerably (Taft and Haig 2003). Because of these large-scale changes to the western pond turtles' habitat, habitat loss is considered one of the greatest threats to the conservation of western pond turtles in Oregon. Loss of deep pools from streams due to sedimentation and loss of large structure such as woody debris may have reduced aquatic habitat following timber harvest (Todd 1999).

#### **5.1.1.2 Potential Impacts to Aquatic Species from Baseline Forest Management Activities**

Under current OFP Rules, landowners conducting forest management activities must implement specific rules pertaining to timber harvest, silviculture, and road management (ODF 2018a). Implementation of these activities can result in impacts to fish and other aquatic species that may occur on Port Blakely's ownership in Clackamas County, especially with respect to upland timber harvest, forest management in riparian zones, wildlife tree retention, and road management. Forest management activities regulated by OFP Rules (and covered in the HCP) that have the potential to impact aquatic species are described in Section 2.2. The potential impacts to aquatic species from baseline forest management activities are described below.

Forest management activities, such as timber harvest, are cited as one of numerous land management practices that have contributed to current degraded covered fish species habitat conditions in the LCR and UWR (ODFW and NMFS 2011, NMFS 2013, USFWS 2015a). Other land management practices associated with degraded salmon, bull trout and lamprey habitat conditions include agriculture, mining and grazing activities, diking, damming, development of transportation corridors, and urbanization. All these practices can degrade or destroy ecosystem function by altering habitat characteristics, including sediment, connectivity of side channels and water quality (ODFW and NMFS 2011). Degraded stream and riparian conditions, i.e., ecosystem functions, also affect other stream-associated species, such as the coastal tailed frog, and species that occur in or near streams at some stage of their lifecycle, e.g., Cascades frog and the western pond turtle.

Although a broad range of land use practices contribute to the degradation of, and resultant negative impacts to, aquatic species habitat, this assessment examines only the effects of forest management (Covered Activities) on the aquatic Covered Species.

The effects of forest management activities on salmon, bull trout, other aquatic species and their habitats have been discussed in recovery plans (ODFW 2010a, ODFW and NMFS 2011, NMFS 2013, USFWS 2015a), Federal agency biological opinions (NMFS 2006b, NMFS 2016e, USFWS 2006, USFWS 2016d), completed HCPs in the Pacific Northwest that address these species (WDNR 1997, WDNR 2005), and the associated NEPA analysis documents (WDNR 1998, NMFS and USFWS 2006). The recovery plans provide the most comprehensive information about impacts of land use activities on listed salmon, steelhead, and bull trout, cite specific watersheds where there are primary and secondary concerns, and describe approaches to address the impacts and restore fish habitat (ODFW 2010a, ODFW and NMFS 2011, NMFS 2013). This information, as it relates to forest management activities in the HCP area, is discussed below with a focus on impacts to small fish and nonfish streams in the upper watersheds of the Molalla and Clackamas Rivers, which comprise 77% of the streams in the HCP area. These two rivers and their associated tributaries compose the primary stream systems flowing through Port Blakely HCP lands that are included in the UWR and LCR ESUs, respectively.

Fish habitat is the product of many components within the freshwater and estuarine/nearshore environments, depending on the particular species and life history strategy. These components include water quality, hydrology/flows, complex channel structure, appropriate sediment supplies, access, or connectivity throughout the watershed, functioning floodplains, healthy riparian zones, and healthy estuarine/nearshore environments. When properly functioning, these components are closely intertwined to form habitat conditions favorable to healthy populations of fish. The potential for these components to be affected by forest management activities such as timber harvest, silviculture, and road management, to the extent they exist in and near small tributaries of the upper watersheds in the HCP area, are addressed below for salmonids by river system ESUs and DPSs, i.e., LCR and UWR, respectively, and for bull trout and Pacific lamprey, as well as stream-associated amphibians.

### **Lower Columbia River Salmon ESU and Steelhead DPS**

***Timber Harvest Impacts:*** Past timber harvest on unstable slopes and in riparian areas led to the degradation of watershed processes (ODFW 2010a, NMFS 2013). Timber harvest activities on upland slopes have contributed to reduced soil stability, increased the extent of impermeable surfaces, reduced vegetative cover, and altered drainage systems. As a result, many stream systems now exhibit higher peak flows and lower base flows than they did historically (ODFW 2010a). Altered stream flows and/or reduced water quantity due to land use practices, including timber harvest, on upland slopes is considered a secondary concern for LCR coho populations from the egg through winter parr life stages, LCR fall Chinook populations from the egg through summer parr life stages, and LCR winter and summer steelhead population areas from the egg through winter parr life stage (ODFW 2010a, NMFS 2013).

In the Clackamas River and tributaries, the straightening and restricting of the stream channels has decreased channel complexity and connectivity to side channels and other off-

channel areas that historically provided important overwintering habitat for juvenile salmonids. These conditions are a key factor limiting juvenile coho and fall-run Chinook viability in all population areas except the Lower Gorge population of coho and the Lower and Upper Gorge areas for Chinook (ODFW 2010a, NMFS 2013).

Coho productivity has also been impacted by timber harvest practices that degrade riparian conditions by decreasing large wood recruitment and increasing delivery of fine sediments to downstream areas (ODFW 2010a). In the Clackamas basin, loss of habitat diversity and suitable coho spawning and rearing habitat is primarily caused by a reduction in large wood in the streams due to degraded riparian condition and lack of large wood recruitment (NMFS 2013, Primozich and Bastasch 2004). The lack of LWD and appropriately sized gravel in the remaining accessible tributary habitat has also significantly reduced the amount of suitable spawning and rearing habitat for tule fall Chinook salmon and winter steelhead (NMFS 2013). Sediment conditions are identified as a secondary limiting factor for the Oregon portion of the LCR Chinook ESU (NMFS 2013).

In conjunction with water withdrawals, elevated stream temperatures often exist because of a lack of intact, functional, and contiguous riparian management zones and sufficient streamside buffers. High water temperatures affect coho population abundance, productivity, and spatial structure. They can be lethal, contribute to disease, and/or act as temporary adult migration barriers (ODFW 2010a). High summer water temperatures are a concern for juvenile Chinook in the Clackamas population and are considered a secondary threat to winter steelhead in the Clackamas and other watersheds. High summer water temperatures affect juvenile steelhead productivity in the Clackamas and Sandy winter steelhead populations (NMFS 2013). Results of an Ecosystem Diagnosis and Treatment (EDT) assessment, a modeling approach to identify primary and secondary habitat limiting factors, identified summer water temperature as limiting juvenile spring Chinook summer rearing (NMFS 2013, Primozich and Bastasch 2004). Adult fall Chinook are also affected by high summer and fall water temperatures in the lower river, which occur during their spawning period and reduce egg survival. These high-water temperatures are primarily the result of ponding behind the dams, decreased riparian forest in the tributaries and mainstem, and other upriver factors, while conditions in the lower Clackamas area have only a minor impact on the conditions (NMFS 2013, Primozich and Bastasch 2004).

Many of the impacts described above likely occurred prior to the existence of recently revised OFP Rules (ODF 2018a) that require more upland tree retention and wider buffers on fish streams, especially those that are, or have the potential to be, occupied by salmon, steelhead, and bull trout (ODF 2018a). However, these impacts, for the most part, are likely still ongoing, albeit to a lesser extent as the current OFP Rules focus on preventing sediment delivery to streams and protecting stream functions, i.e., increasing levels of LWD input and reducing the potential for temperature increases.

As described in Section 2, current OFP Rules under OAR 629-630-0100 and OAR 629-630-0150 are designed to address unstable slopes and potential impacts to riparian areas. For example, logging methods and equipment are required to be selected with consideration for slope, landscape, and soil properties to minimize soil deterioration and to protect water quality. Ground-based yarding is prohibited on unstable, wet, or easily compacted soils unless operations can be conducted without damaging soil productivity through soil disturbance, compaction, or erosion. Slopes over 60 percent, and slopes over 40 percent



where soils consist of decomposed granite-type materials or other highly erodible materials, are considered erosion-prone and subject to specific requirements to avoid compaction and operations near stream channels. For example, skid trails located on steep or erosion-prone slopes shall be located at least 100 feet from any stream channels. OFP Rules regarding yarding (OAR 629-630-0700 and OAR 629-630-0800) are designed to minimize impacts to wetlands and fish-bearing streams requiring placement of sediment barriers, ensuring stream crossings minimize sediment input and prevent fish passage blockages, and location of specific activities such as skidding  $\geq$  35 feet from fish streams.

Restrictions on the amount and location of regeneration harvest within a watershed are based on green-up requirements, and harvest unit size limitations (up to 120 acres before written approval by the State Forester is required). Regeneration harvest units can contribute sediment to streams especially when conducted near small fish-bearing streams, and perennial nonfish-bearing streams that receive little or no riparian vegetation protection. Thus, although some sediment from baseline timber harvest practices will occur, and have a subsequent impact on coho, Chinook and steelhead, from egg to juvenile life stages, it is likely less than under forest management activities of the past.

Degraded channel structure and form, i.e., channel complexity and connectivity to side channels and other off-channel areas, is a primary limiting factor for fall-run Chinook salmon in the Clackamas River and important overwintering habitat for juvenile salmonids, generally. Reduced physical habitat quality/habitat access is a key threat to winter steelhead in the Clackamas and other drainages. Reduced habitat quality and complexity, and connectivity with off-channel habitats significantly limit juveniles of all summer steelhead populations and most winter populations including the Clackamas watershed (ODFW 2010a). These conditions are less likely to occur under OFP Rules because of prohibitions on changes to stream channel integrity. So, although required buffers may not be totally adequate in providing fully functional riparian and stream habitat, the structural integrity of fish streams is retained intact.

Stream and wetland buffer requirements are described in the Water Protection Rules (OAR 629-635 through OAR 629-660) described in Section 2 (see Table 2-2). Required buffers for Type F streams range from 50 feet (small fish streams) to 100 feet (large fish streams). Small and medium buffers on salmon streams are required to be 60 feet and 80 feet, respectively. For all Type F and SSBT streams, the no-harvest portion of the RMA is the area within 20 feet of the high-water level. The managed portion of the RMA includes the area from 20 feet out to the edge of the RMA boundary which varies by stream type (ODF 2018a). The level of management, i.e., basal area and live conifer tree retention, varies depending on whether the stream is a Type F or a SSBT stream, the management zone width and harvest type (ODF 2018a).

Vegetation retention requirements for perennial nonfish streams (Type N) varies by stream size. The requirements for large and medium Type N streams include similar requirements as Type F streams, i.e., retain all understory vegetation within 10 feet of the high-water level, and retain all trees within 20 feet of the high-water level (no-harvest zone). In the Western Cascades Geographic Region, there is no requirement for vegetation retention on small Type N streams. Thus, there is no contiguous RMA that includes merchantable trees from the point of perennial stream flow to ameliorate temperature increases or as a source of LWD upstream from small fish-bearing streams. However, after regeneration harvest,

understory vegetation typically is present consisting of small diameter trees, shrubs and woody debris in various amounts retained in the small Type N streams channels that helps to shade them, albeit to a limited extent.

Large woody debris delivery to fish streams can occur through natural processes, e.g., windthrow, bank erosion, etc. that cause trees to fall into or across fish streams, or from nonfish stream sources in the upper watershed. Placement of large wood key pieces in a Type F or Type SSBT stream to improve fish habitat is not required but, if conducted, this forest management activity is subject to OFP Rules. Placement of LWD in streams must be conducted in conjunction with another forest management operation, e.g., regeneration harvest or commercial thinning, and meet standards established in the State guide for wood placement (ODF and ODFW 2010a).

Forest Practices Rule OAR 629-642-0300 provides operators with incentives to conduct stream enhancement projects to create immediate improvements in fish habitat. Operators placing large wood key pieces in streams, as described in OAR 629-642-0200, may qualify for the live tree retention credit for Type F or Type SSBT streams if such placement meets the additional requirements of the rule (ODF 2018a). For each conifer log or downed tree, the operator places in a small Type F stream, or small or medium Type SSBT stream, the (live tree) basal area credit is equal to the basal area of the placed log or tree (ODF 2018a). Placement of LWD in streams is a voluntary measure by landowners conducting forest management activities and Port Blakley does this on a limited basis when partnering with other entities on restoration projects. The purpose and assumption are that it will enhance or improve fish habitat by providing structural habitat features beneficial to fish. For purposes of analyzing impacts of basic forest practices rules, it should be assumed that voluntary efforts to place LWD will not occur frequently and, if so, there will be a basal area trade-off in the RMA. That is, increases in LWD placement will likely result in less trees contributing to stream shading.

Riparian buffers can ameliorate the potential for stream temperature increases from timber harvest, depending on the RMA width and level of harvest allowed within the RMA. These conditions, along with other factors such as slope, also aid in LWD input to streams. In the Clackamas basin, loss of habitat diversity from applying less than fully functional RMAs can result in a reduction in LWD in the streams and lack of LWD recruitment (Primozich and Bastasch 2004). The limited supply of wood in the Clackamas River and tributaries has reduced formation of complex habitats that create deep pools and retain spawning gravels (ODFW 2010a). These conditions are ameliorated to some extent by OFP Rules that require RMAs with a 20-foot no-harvest zone and a managed zone requiring BA and tree retention minimums, but they are not considered to provide fully functional riparian zones (USDA & USDI 1993).

The basal area and conifer tree retention requirements are prescribed to occur within 60 or 80 feet of the stream edge for small and medium SSBT streams, respectively. All small and medium Type F and SSBT streams comprise 31.8% and 3.8% by stream Type, respectively, in the HCP area (see Table 4-1). Although some LWD input and stream temperature amelioration are expected to occur under OFP Rules, these buffers are substantially narrower than buffers expected to provide for fully functional riparian zones (USDA & USDI 1993). A lack of intact, functional, and contiguous RMAs with adequate streamside buffers with a corresponding lack of LWD in accessible tributary habitat can reduce the amount of

suitable coho and Chinook spawning and rearing habitat (NMFS 2013). High water temperatures affect coho population abundance, productivity and spatial structure, juvenile and adult Chinook in the Clackamas population, as well as juvenile steelhead productivity in the Clackamas and Sandy winter steelhead populations (NMFS 2013).

Thus, the buffers for SSBT streams required to be provided when conducting regeneration harvests under OFP Rules that allow some management in the outer RMA zone of small and medium fish-bearing streams, and the lack of a requirement to provide a riparian buffer on perennial nonfish-bearing streams, likely do not provide sufficient trees to completely prevent stream temperature increases or sufficient amounts of LWD input to the stream system. That said, other factors play a role in the ability of riparian buffers to provide these functions specific to the HCP area including subbasin slopes and stream size. The predominantly low-gradient, narrow-width (< 10 ft) small fish-bearing and nonfish-bearing streams that comprise 77% of the HCP area (see Table 4-1) may be, in many subbasins, sufficient for ameliorating potential temperature increases and providing LWD suitable to the stream size and flow volumes.

*Silviculture Impacts:* Commercial silviculture includes a variety of forest management activities conducted to control the establishment, growth, composition, health, and quality of forests to meet diverse needs and values of landowners on a sustainable basis. This is accomplished by applying different types of silviculture treatments such as planting, site preparation, fertilization, and activities designed to control insect and disease outbreaks, unwanted vegetation, and animal damage. Silvicultural activities occur outside of RMAs and typically involve small crews of 2-15 people operating in forested stands or harvested units for 2-4 days, although planting crews may number 25-30 workers.

Of these activities, only site preparation (debris-clearing and piling) may involve the use of heavy equipment, usually in harvest units that have been previously tractor-logged. Minimizing the risk of slash material from entering streams is required under OFP Rules (OAR 629-615-0100 through OAR 629-615-0300). Mechanical site preparation in RMAs is allowed but only if the activity is conducted in a manner such that sediment or debris does not enter waters of the state (OAR 629-615-0200). Specific conditions apply for slopes > 35% as described in Section 2.2.2.1. Adequate distance between disturbed soils and waters of the state to filter sediment from run-off water must be maintained and no debris or soil shall be placed where it may enter waters of the state. Nonetheless, site preparation has the potential to deliver sediment to fish-bearing streams, although the impacts to LCR salmonids is likely not significantly more than what occurs while conducting regeneration timber harvest with heavy equipment, and this amount is related to the level of filtering allowed by various buffer widths. For impacts assessment purposes, we use an average annual regeneration harvest of 500 acres occurring across the HCP area. Approximately 80% of the HCP area is tractor-logging ground with the associated site preparation. Extrapolating, the annual acreage of harvest units receiving site preparation is approximately 400 acres, or 1.3% of the HCP area.

Treatment of diseased or insect-damaged trees, if warranted, includes thinning or regeneration harvest although typically on a much smaller scale than the average size of regeneration harvest. Potential impacts to LCR salmonid habitat from this activity conducted under OFP Rules would be similar to impacts from regeneration harvest, albeit substantially less because diseased and/or insect-damaged trees typically occur in small pockets of a few

acres. In the past 15 years, no diseased or insect-damaged trees have warranted special entry to forested stands within the HCP area. Rather they have been removed/harvested at the time of regeneration harvest.

The remaining silviculture activities, i.e., reforestation, fertilization, and mechanical vegetation control, are unlikely to have an impact on salmonid habitat because they involve small crews walking through the harvest unit over a span of several days, and do not result in significant ground/soil disturbance or operations in RMAs. Fertilization activities are restricted from occurring in stream and wetland buffers and are required to be applied within minimum distances from these features to prevent entry into aquatic habitat (OAR 629-620-0400, ORS 52.672).

*Road Management Impacts:* Generally, improperly located, constructed, or maintained roads have degraded stream flow and increased movement of fine sediment to stream channels (ODFW 2010a). Road development that restricted stream channels and impinged on channel dynamics has also had a major impact on salmon habitat quality. In the upper Clackamas basin, several roads along streams restrict channel movement and access to off-channel areas that historically provided important overwintering habitat for juvenile coho salmonids (ODFW 2010a). Impaired physical habitat quality due to fine sediment from forest and rural roads has affected abundance and productivity of several coho population areas including the Clackamas River. The roads have altered sediment routing and led to an overabundance of fine-grained sediments, excess of coarse-grained sediments, inadequate coarse-grained sediments, and/or contaminated sediment. Excessive fine sediment reduces egg development and survival during the coho incubation life stage (ODFW 2010a). Degraded physical habitat quality and excessive fine sediment due to roads is a secondary threat for Clackamas River fall Chinook and to juvenile winter and summer steelhead abundance in several watersheds including the Clackamas (ODFW 2010a). The high density of forest and rural roads throughout the area, as well as timber harvest practices on over-steepened slopes adjacent to riparian habitat, contributes to an abundance of fine sediment in tributary streams which covers spawning gravel, limiting egg development and incubation, and increases turbidity (NMFS 2013).

As described in Section 2.2.3.1, the OFP Rules include requirements for forest road design, construction, and maintenance (OAR 629-625-0100 through OAR 629-625-0800) (ODF 2018a). The purpose of the OFP Rules addressing roads is “because a properly located, designed, and constructed road greatly reduces potential impacts to water quality, forest productivity, fish, and wildlife habitat.” Forest managers are also required to design and construct stream crossings (culverts, bridges, and fords) consistent with Forest Practices (ODF 2018a) and Oregon Fish Passage laws (OAR 635-412-0005 through 635-412-0040) that pass peak flows that at least correspond to the 50-year return interval and allow migration of adult and juvenile fish upstream and downstream during conditions when fish movement in that stream normally occurs (OAR 629-625-0600). The requirement to meet the return interval may not be sufficient, as climate changes occur and upslope forest management activities, such as regeneration harvests, result in lower water retention capabilities. These conditions could contribute to a higher frequency of high flow events that exceed the 50-year return interval. Maintenance of fish passage through water crossing structures also includes a requirement to keep structures cleared of woody debris and deposits of sediment that would impair fish passage, as is reasonably practicable. However,

there is no requirement to create a plan to replace or repair fish passage blockages or to prioritize blockage fixes on a worst-first basis, so blockages aren't fixed until forest management activities are scheduled to occur in the vicinity.

The OFP Rules related to roads are designed to prevent degradation of stream flow and increased movement of fine sediment to stream channels from forest management activities that have the potential to reduce fish habitat quality such as egg development and survival during the coho and steelhead incubation life stage, and Chinook spawning and rearing habitat. The OFP Rules address these risks by prohibiting road drainage water into headwalls, slide areas, high landslide hazard locations or steep erodible fill slopes, as well as diverting water from stream channels into roadside ditches (ODF 2018a).

The need for road construction in the HCP area depends on factors such as the annual harvest plan, the location of the harvest unit in relation to existing roads, and whether the harvest method (cable or ground-logging) requires better access than from existing roads. There is a total of 251 miles of active road on Port Blakely's ownership resulting in a road density of approximately 5.2 mi/mi<sup>2</sup>. Road construction currently averages 4.2 miles, annually. Road maintenance activities involving rocking of existing roads averages 12 miles, annually. Road construction in the HCP area will continue but it is unknown whether it will be conducted at annual average levels of the recent past, as it's difficult to predict exactly when and where road construction will be needed in response to changing 5-year harvest plans. Road rocking activities should result in minimal impacts to salmonids as rock roads have substantially less potential to deliver sediment as would the use of finer gravels.

The practices of vacating, i.e., deactivating, or abandoning forest roads is implemented in the HCP area according to OFP Rules (629-625-0650), which are recommendations rather than requirements, for landowners that choose to conduct this activity. Recommendations focus on leaving roads in a condition where road related damage to waters of the state is unlikely (described in Section 2.2.3.2). Road deactivation involves blocking access to the road to prevent any use when forest management activities are not anticipated to occur for ten or more years. Drainage structures (cross drains, culverts, and other drainage features) are typically left in place and maintained when needed. Road abandonment activities in the HCP area are implemented when current and acquired lands have stream-adjacent roads or are located near sensitive habitats such as wetlands or unstable slopes, and where other options exist for road placement. Abandonment activities include bed and drainage structure removal and restoring to a condition capable of growing trees. Road deactivation and abandonment currently averages 1.1 miles, annually. There are approximately 32 miles of deactivated or abandoned roads on Port Blakely's ownership, i.e., 13% of the existing road system. Deactivation and abandonment activities reduce the potential impacts to salmonids by eliminating sources of sediment input.

Stream-adjacent roads can restrict stream channels and impinge on channel dynamics that create off channel areas important as overwintering habitat for juvenile coho salmonids. High road densities, coupled with other forest management activities on over-steepened slopes adjacent to riparian habitat, contributes to an abundance of fine sediment in tributary streams which covers spawning gravel, limiting egg development and incubation, and increases turbidity. In addition to the requirements of the water protection rules, operators must submit a written plan to the State Forester before constructing roads in RMAs. This doesn't prevent roads in RMAs from occurring but suggests that if options for road

placement outside RMAs are available, they may be required. Port Blakely will relocate a road in an RMA when it is fortuitous, i.e., in association with local forest management activities and there is a practical and efficient alternative. There are no OFP Rules addressing road density. Thus, existing, or newly constructed roads close to streams and road densities are likely to have negative impacts to salmonid habitat quality under OFP Rules.

The development, use, and abandonment of rock pits or quarries located on forestland and used for road management activities are addressed in the OFP Rules (ODF 2018a). Quarrying is required to be conducted using practices which maintain stable slopes and protect water quality (OAR 629-625-0500). Required protections are described in Section 2.2.3.3. Quarrying and rock pit activities occur throughout the HCP area. Currently, there are 18 rock pits covering approximately 40 acres. Two of these rock pits, totaling approximately four acres, are approximately 150 feet from a stream. These rock pits existed at the time of HCP land acquisition over 30 years ago. One is near a medium stream with a buffer of material maintained to prevent sediment input to the stream from rock extraction activities. The second rock pit is near a seasonal stream and not currently in use. Future quarries will be sited away from streams to be compliant with OFP Rules requiring landowners to protect water quality, i.e., prevent sediment delivery to streams, which are expected to result in minimal impacts to salmonid habitat. Active rock pits are entered, on average, once every three years. When no more material can be safely extracted, i.e., without risk of material input to streams, it is abandoned. When abandoned, rock pits are reclaimed to return the pits to forest production. Port Blakely anticipates abandoning eight rock pits over the next 50 years and replacing them with eight new rock pits approximately 1.5 acres in size, on average. New rock pits will be located near existing roads and away from streams. Quarrying activities conducted under OFP Rules are not expected to significantly impact aquatic species because of their site location relative to streams, and the small acreage affected within the HCP area.

### **Upper Willamette River Chinook ESU and Steelhead DPS**

*Timber Harvest Impacts:* Habitat degradation is considered the primary factor limiting future production and recovery of the Chinook population in the Molalla River (ODFW and NMFS 2011). Land use management activities in the Clackamas River subbasins, including timber harvest, are cited as impairing physical habitat quality from stream cleaning, straightening and channelization, diking, wetland filling, and lack of large wood recruitment and are a key concern for Clackamas spring Chinook winter parr and fry (ODFW and NMFS 2011). Historical and, in some places continued, wood removal from streams and riparian harvest has reduced large wood in the channels, though riparian areas in the forested upper subbasin have more conifer trees than in the lower subbasin. Reduced wood in stream channels limits pool formation, thus reducing hiding areas for adult steelhead fish and restricting the quality and quantity of juvenile steelhead rearing habitat (ODFW and NMFS 2011).

High summer water temperatures caused by land management activities are considered a secondary concern for Clackamas spring Chinook. Elevated water temperatures decrease survival and/or growth of juvenile Chinook (NPCC 2004). Elevated water temperatures from land use practices decrease survival and/or growth of juvenile steelhead. High water temperatures are common in the lower Molalla subbasin and are aggravated by loss of

riparian cover, reduced wetland areas, channel simplification and increased impervious surfaces (WRI 2004). The high-water temperatures are primarily the result of ponding in reservoirs behind the hydroelectric dams, decreased riparian forest in the tributaries and the mainstem Clackamas River, and other upriver factors. However, riparian and upslope conditions in the lower Clackamas subbasin have only a minor impact on the elevated temperatures conditions (NPCC 2004).

Impacts to UWR salmon and steelhead from timber harvest activities conducted under current OFP Rules are the same as described for LCR salmon and steelhead. Refer to the Timber Harvest Impacts section above to review impacts likely to occur to UWR salmon and steelhead.

*Silviculture Impacts:* Impacts to salmon and steelhead in the UWR ESU/DPS from silvicultural activities conducted under current OFP Rules are the same as described for LCR salmon and steelhead. Refer to the Silviculture Impacts section above to review impacts likely to occur to UWR salmon and steelhead.

*Road Management Impacts:* Generally, improperly located, constructed, or maintained roads have degraded stream flow and increased movement of fine sediment to stream channels (ODFW 2010a). Road development that restricted stream channels and impinged on channel dynamics has also had a major impact on salmon habitat quality. Several roads along streams in the upper Clackamas subbasin restrict and impinge on channel dynamics and also impact habitat quality for UWR Chinook (NPCC 2004).

Forest and rural roads have altered sediment routing and led to an overabundance of fine-grained sediments, excess of coarse-grained sediments, inadequate coarse-grained sediments, and/or contaminated sediment in stream channels. Excessive fine sediment reduces egg development and survival during the incubation life stage (ODFW 2010a). The high density of forest and rural roads throughout the area, as well as timber harvest practices on unstable slopes adjacent to riparian habitat, contributes to an abundance of fine sediment in tributary streams which covers spawning gravel, limiting egg development and incubation, and increases turbidity (NMFS 2013). During the road building process, destabilized stream banks can release excess sediment, causing turbid water and silt deposits that harm aquatic life and violate water quality standards. These conditions are considered secondary threats to UWR Spring Chinook in the Molalla River basin (ODFW and NMFS 2011).

Small dams, irrigation diversions, road crossings and other passage impediments related to land use restrict juvenile and adult steelhead access to habitat on wadable-sized tributaries of the Molalla River basin (ODFW and NMFS 2011). Subbasin channels in the lower Molalla River, particularly near the city of Molalla (RM 20), and in some tributaries have been simplified through revetments, roads, riprap, and other actions that restrict channel movement. During the road building process, destabilized stream banks can release excess sediment, causing turbid water and silt deposits that harm aquatic life and violate water quality standards. These conditions are considered secondary threats to UWR steelhead in the Molalla River basin (ODFW and NMFS 2011).

Impacts to UWR salmon and steelhead from road management activities conducted under current OFP Rules are the same as described for LCR salmon and steelhead. Refer to the

Road Management Impacts section above to review impacts likely to occur to UWR salmon and steelhead.

## **Bull Trout**

The effects of forest management activities, i.e., timber harvest, silviculture, and road management, on bull trout habitat are similar to those described above for anadromous salmonids. However, of native salmonids in the Pacific Northwest, bull trout have the most specific habitat requirements (Rieman and McIntyre 1993). These requirements include cold water temperatures compared to other salmonids; the cleanest stream substrates; complex stream habitat including deep pools, overhanging banks and large woody debris; and connectivity between spawning and rearing areas and downstream foraging, migration, and overwintering habitats (USFWS 2015a). Thus, forest management activities that affect these habitat requirements are of greatest concern. Information related to impacts of timber harvest on bull trout habitat was obtained from a USFWS Biological Opinion on a BLM Forest Management Program and is summarized below (USFWS 2018c).

*Timber Harvest Impacts:* The Bull Trout Critical Habitat Final Rule states that timber harvest and road building in or close to riparian areas can immediately reduce stream shading and cover, channel stability, and large woody debris recruitment and increase sedimentation and peak stream flows (USFWS 2010a). These activities can, in turn, lead to increased stream temperatures, bank erosion, and decreased stream productivity.

Removing trees in riparian areas reduces the amount of shade which leads to increases in thermal loading to the stream (Moore and Wondzell 2005). However, although stream shade correlates with the width of no-cut buffers, the relationship is quite variable, depending on site-specific factors such as stream size, substrate type, stream discharge, topography (Caissie 2006), channel aspect, and forest structure and species composition. Inputs of cold water from the streambed, seepage areas on the stream bank, and tributaries can help cool the stream on hot summer days if they are sufficiently large relative to the stream discharge (Wondzell 2012).

The density of vegetation in riparian areas affects shade and thermal loading to a stream due to the penetration of solar radiation through gaps in the canopy and among the branches and stems (Brazier and Brown 1973; DeWalle 2010). In some instances (such as narrow streams with dense, overhanging streamside vegetation, or stands on the north sides of streams with an east-west orientation), no-cut buffers as narrow as 30 feet adjacent to clearcuts can maintain stream shade (Brazier and Brown 1973).

Timber felling and yarding can disturb soils and increase their potential for sediment transport to local stream channels. Timber felling kills the roots, which can increase the probability of slope failure, particularly on steep slopes. This also increases the potential of sediment delivery to the stream network.

The HCP lands in close proximity to the Clackamas River are located near the southern-most extent of the area where bull trout were introduced, i.e., the mainstem Clackamas River and its tributaries in the upper headwaters of the subbasin, upstream of the Collawash River confluence (see Figure 3-4). Should bull trout expand their range into the tributaries flowing from the HCP lands, impacts from timber harvest activities conducted under current OFP Rules to potential bull trout habitat would be the same as described above for other



LCR salmonid species. However, existing conditions of streams with increased sediment input, reduced LWD and increased temperatures would likely preclude bull trout from expanding into these areas. Known impacts to fish streams from timber harvest notwithstanding, impacts to bull trout life stages in the HCP area are not expected to be significant because of the small number of tributaries originating in the HCP area that deliver to the Clackamas River and the likelihood that bull trout would only become established (expand their range in the Clackamas River system) where habitat conditions are suitable for growth and production.

*Silviculture Impacts:* Impacts to reintroduced bull trout in the Clackamas River system from silvicultural activities conducted under current OFP Rules are the same as described for LCR salmon and steelhead. Refer to the Silviculture Impacts section for LCR salmon and steelhead above to review impacts likely to occur to bull trout.

*Road Management Impacts:* The effects of forest road management activities on bull trout habitat are similar to those described above for anadromous salmonids. Additional information related to impacts of road management activities on bull trout habitat are added here which was, for the most part, obtained from a USFWS Biological Opinion on a BLM Forest Management Program (USFWS 2018c).

There is a likelihood that road management activities may introduce sediment into ditchlines and, potentially, into streams. At greatest risk of contributing sediment to fish habitat are road construction of, and maintenance on, road segments draining to fish streams, and stream culvert installation, replacement, and removal in close proximity to fish streams.

The effects of road construction and associated maintenance account for a majority of sediment loads to streams in forested areas (USFWS 2010a). Sedimentation affects streams by reducing pool depth, altering substrate composition, reducing interstitial space, and causing braiding of channels (Rieman and McIntyre 1993), which reduce carrying capacity. Sedimentation negatively affects bull trout embryo survival and juvenile bull trout rearing densities (USFWS 2010a). An assessment of the interior Columbia Basin ecosystem revealed that bull trout were less likely to use highly roaded basins (road densities not provided) for spawning and rearing and, if present in such areas, were likely to be at lower population levels (Quigley and Arbelbide 1997). These activities can directly and immediately threaten the integrity of essential physical or biological features required by bull trout.

Should bull trout expand their range into the tributaries flowing from the HCP lands, impacts to potential bull trout habitat from road management activities conducted under current OFP Rules would be the same as described above for other LCR salmonid species. However, the sensitivity of bull trout to highly roaded basins may preclude bull trout from expanding into the Clackamas River tributaries in the HCP area if the existing road density of 5.2 mi/mi<sup>2</sup> is considered a high road density with respect to suitable bull trout habitat. Thus, impacts from road management activities conducted under current OFP Rules are not expected to be significant because of the low likelihood of bull trout expanding into a small number of tributaries originating in the HCP area that deliver to the Clackamas River and the likelihood that bull trout would only become established (expand their range in the Clackamas River system) where habitat conditions are suitable for growth and production.

## **Pacific Lamprey**

*Timber Harvest Impacts:* The impacts from timber harvest activities described above for other fish species are relevant to Pacific lamprey in that degradation of riparian and stream habitat will likely have a negative effect on some or all its life stages. Lamprey, spawn, and rear in low gradient stream reaches with complex channel structure, pools, and riffles, and adjacent stream margins and side channels with finer sediment and detritus. These features are frequently found in lower gradient areas with wider floodplains. Loss of this habitat from forest management activities reduces areas for spawning and rearing (Luzier 2011, USFWS 2010b). Riparian vegetation is an important component of ammocoetes rearing areas and loss of vegetation and shading, e.g., from timber harvest, would likely negatively impact lamprey (Luzier 2011). Although threats to water quality including elevated temperature were generally ranked low as a limiting factor in the Lower Columbia/Willamette Region, which includes the HCP area, logging is cited as one of the activities that contributes to poorer water quality (Luzier 2011).

Pacific lamprey habitat, i.e., lower gradient streams with wider floodplains and associated side channels with finer sediment and detritus, suggests a preference for larger stream systems. Large and medium streams are not abundant in the HCP area comprising 17.7 and 24.9 miles, respectively, or approximately 22% of the total length of streams (see Table 4-1 Under OFP Rules, these streams receive buffers with 20-foot no-harvest zones and 50-80 feet of managed zone. While these buffers serve to ameliorate potential temperature increases as a result of timber harvest, they are not as effective as buffers that provide 100% of riparian habitat functions (USDA & USDI 1993). The buffers for SSBT streams, i.e., small and medium streams expected to have salmonid use, required to be provided when conducting regeneration harvests under OFP Rules that allow some management in the outer RMA zone, and the lack of a requirement to provide a riparian buffer on perennial nonfish-bearing streams, likely do not provide sufficient trees to completely prevent stream temperature increases. Thus, although elevated stream temperature is ranked as a low limiting factor, there is likely some negative impact to Pacific lamprey as a result of implementing OFP Rules should they occur in these streams in the HCP area.

*Silviculture Impacts:* Impacts to Pacific lamprey from silvicultural activities conducted under current OFP Rules are similar to those described for LCR and UWR salmon and steelhead, i.e., small amounts of human activity resulting in minimal soil disturbance are not likely to affect Pacific lamprey habitat in low gradient streams. Refer to the Silviculture Impacts section for LCR salmon and steelhead above to review impacts likely to occur to Pacific lamprey.

*Road Management Impacts:* The impacts from road management activities described above for other fish species are relevant to Pacific lamprey in that the potential for sediment delivery to streams will likely have a negative effect on some or all its life stages. However, sediment as a direct impact is not discussed in Pacific lamprey assessment and management documents (Luzier 2011, USFWS 2010b). Passage issues appear to be more important than issues related to sediment input. Artificial barriers impact distribution and abundance of Pacific lamprey by impeding upstream migrations by adult lamprey and downstream movement of ammocoetes and macrophthalmia. Thus, blockages related to road construction and design could result in impacts to Pacific lamprey. Furthermore, culverts designed to pass salmonids can block lamprey passage. Culverts that have a drop at the

outlet are impassable for a variety of reasons including high velocities or distance, insufficient resting areas, and a lack of suitable attachment substrate (Luzier 2011).

Under OFP Rules, stream crossings (culverts, bridges, and fords) are required to be designed and constructed consistent with Oregon Fish Passage laws (OAR 635-412-0005 through 635-412-0040) and approved by NMFS to pass the peak flow 50-year return interval and allow migration of adult and juvenile fish upstream and downstream during conditions when fish movement in that stream normally occurs. This includes installation of water crossing structures where needed to maintain the flow of water and passage of adult and juvenile fish between side channels or wetlands and main channels. These criteria should facilitate Pacific lamprey movement up and down stream, as well.

Some of the OFP Rules addressing road maintenance activities designed to decrease the potential for impacts to salmonids will have a similar effect on Pacific lamprey, such as the requirements to 1) inspect and maintain culvert inlets and outlets, drainage structures and ditches before and during the rainy season as necessary to diminish the likelihood of clogging and the possibility of washouts; and 2) maintain water crossing so that passage of adult and juvenile fish is not impaired during periods when fish movement normally occurs. However, there are no OFP Rule requirements to create a plan to replace or repair fish passage blockages or to prioritize blockage fixes on a worst-first basis. Thus, the 11 known man-made fish passage barriers in the HCP area won't be repaired or removed until other forest management, e.g., timber harvest, are conducted in the vicinity of the blockage. That said, the OFP Rule requirements addressing road maintenance should still result in a moderate likelihood that Pacific lamprey will not be impeded from moving from suitable habitat up and down stream where they occur in the HCP area.

## **Cascades Frog**

*Timber Harvest Impacts:* Cascades frogs use a variety of habitats, including large lakes, bogs, ponds, wet meadows, and flowing streams in open coniferous forests (Hammerson and Pearl 2004). Adults are known to regularly range onto mountain slopes far from aquatic or wetland habitats when conditions are suitably moist. In the HCP area, Cascades frog habitat consists of slow-moving, small fish and nonfish streams, and associated wetlands and riparian habitat, and possibly some uplands with older forest, e.g., 51+ age-class, that maintain moist conditions. Timber harvest near small perennial nonfish streams and associated wetlands could reduce the amount of near-shore habitat this species prefers by changing moisture-temperature conditions or creating habitat fragmentation (Pope et al. 2014). Timber harvest activities could also result in direct impacts to adults if conducted during the time when they are occupying terrestrial habitat upslope from streams.

Under OFP Rules, RMAs for all streams consist of a 20-foot no-harvest zone. Small Type F and Type SSBT stream buffers have a 30 or 40-foot managed zone, respectively, with specific basal area requirements established to provide shade and LWD and prevent sediment input. There is no requirement to provide a riparian buffer on perennial Type N streams where Cascades frogs are likely to occur, i.e., all merchantable trees may be harvested leaving only understory vegetation. Wetlands, other than estuaries or bogs, and large lakes (> 8 acres) are required to have 100-foot managed buffers. Operations near estuaries or bogs are protected with RMAs that range from 100 to 200 feet from an estuary, or 50 to 100 feet from a bog depending on stand conditions and feature characteristics such

as size. For other lakes that have fish use or are equal to or greater than one-half acre in size, the RMA is 50 feet. Stream, wetland, and lake buffers are managed to retain 50% of the original trees by species and diameter class, and to sustain little or no management-associated soil disturbance.

Although some riparian habitat is retained along small streams and stream-associated wetlands as a result of OFP Rule requirements, the RMAs reduce the amount of habitat available for Cascades frogs and likely do not provide enough trees to completely prevent temperature increases. Reductions in wetland, lake, and stream-adjacent riparian habitat on small fish streams, as a result of low basal area retention requirements of OFP Rules, and the lack of a requirement to provide a riparian buffer on perennial nonfish-bearing streams, may change riparian habitat moisture conditions, increase water temperatures, and/or contribute to shorter hydroperiods in breeding pools that result in poor annual survival of eggs and tadpoles (Pope et al. 2014).

Regeneration timber harvest of the 51+ age-class in the next decade anticipated to occur under current OFP Rules will reduce potential Cascades frog adult habitat from approximately 5,000 acres to < 2,000 over the next 50 years. This assumes some or all this age-class has moisture-temperature conditions suitable for adult Cascades frogs.

*Silviculture Impacts:* The Cascades frog is an aquatic amphibian species that also uses adjacent upland forests for part of its life cycle. Impacts to Cascades frogs aquatic habitat from silvicultural activities conducted under current OFP Rules are similar to those described for other aquatic species that rely on streams, stream-associated wetlands, and riparian habitat, i.e., LCR and UWR salmonids and Pacific lamprey. See the Silviculture Impacts section for LCR salmon and steelhead above to review impacts likely to occur to Cascades frog aquatic habitat. Small amounts of human activity resulting in minimal soil disturbance outside the RMAs are not likely to affect Cascades frog habitat in slow-moving nonfish streams and wetlands or add to the impact of previously harvested forest stands adjacent to these aquatic features. That is, activities conducted in a harvest unit post-harvest such as debris-clearing and piling, planting, and fertilizing are less likely to have an impact on this species because timber harvest activities will likely already have had the greatest impact on Cascades frogs that were in the harvest unit at the time of harvest.

*Road Management Impacts:* Road maintenance activities are unlikely to affect Cascades frogs, but road construction activities have the potential to remove Cascades frog habitat if located in or near wetlands and/or small slow-moving streams, or occurs in uplands that adults may frequent given suitable moisture conditions. However, OFP Rules focus on avoiding or minimizing the potential for delivery of sediment to streams and stream-associated wetlands. Thus, roads are required to be constructed as far away from these features as economically and practically possible. Relative to road construction near suitable aquatic habitat, this activity is unlikely to have a negative effect on Cascades frog habitat. However, roads constructed upslope from suitable aquatic habitat may result in the removal of adult habitat and directly impact adult frogs should they occur in these areas although this is expected to be minimal given the OFP Rules requirements to locate roads away from streams to avoid sediment input to streams, and the low amount of annual average road construction (4.2 miles) that is anticipated to continue.

## Coastal Tailed Frog

*Timber Harvest Impacts:* Logging practices that increase water temperatures and siltation may have an adverse effect on tailed frog populations (Nussbaum et al. 1983, Welsh and Ollivier 1998). Logging results in upslope and riparian habitat modification (conversion from old to young seral stages) that is harmful to juvenile and adult coastal tailed frogs and, at the landscape level, disrupts their movement and dispersal through habitat fragmentation (B.C. Ministry of Environment 2015). In British Columbia, Dupuis et al. (2010) suggested that large reductions in coastal tailed frog populations are the predicted result of a more than 50% loss of their riparian forest habitat. Even at lower harvest levels, logging has the potential to cause substantial declines, given the tendency for frogs to seasonally concentrate at specific locations along streams and nearby wet features. Thus, timber harvest activities could result in direct impacts to coastal tailed frogs if conducted during the time when they are occupying terrestrial habitat upslope from streams. However, despite negative effects of logging, the coastal tailed frog has been reported to frequently occur in many young forests that have been harvested one or more times in the past (Adams and Bury 2002, Welsh and Lind 2002).

Coastal tailed frogs prefer cascade (cobbles, boulders, and pocket pools) and step-pool (cobble/boulder steps and underlying channel-spanning pools) habitats, characteristic of small, fast-flowing streams in the upper basins or watersheds. In the western Oregon, these streams are typically small fish and nonfish streams. Under OFP Rules, RMAs for all small Type F and Type SSBT stream buffers have a 30 or 40-foot managed zone, respectively, with specific basal area requirements established to provide shade and LWD and prevent sediment input. There is no requirement to provide a riparian buffer on perennial Type N streams where coastal tailed frogs are likely to occur, i.e., all merchantable trees may be harvested leaving only understory vegetation. Although coastal tailed frogs prefer colder fast-flowing waters of the upper watersheds, they can tolerate warm water temperatures. Eggs tolerate temperatures up to 65°F, whereas tadpoles tolerate temperatures up to 71°F, while temperatures >75° are lethal to adults (B.C. Ministry of Environment 2015).

Although some riparian habitat is retained along small streams and stream-associated wetlands as a result of OFP Rule requirements, the RMAs reduce the amount of habitat available for coastal tailed frogs and likely do not provide enough trees to completely prevent temperature increases. Reductions in stream-adjacent riparian habitat on small fish streams, as a result of low basal area retention requirements of OFP Rules, and the lack of a requirement to provide a riparian buffer on perennial nonfish-bearing headwater streams, may increase water temperatures. Collectively these streams comprise 77% (~147 miles) of streams in the HCP area. Although understory vegetation retention along Type N streams and the managed buffers along small Type F and Type SSBT streams may reduce the potential for stream temperature increases and, thus, be tolerable to coastal tailed frogs, it is likely they negatively affect annual survival of eggs and tadpoles.

*Silviculture Impacts:* The coastal tailed frog is a highly aquatic amphibian species that also uses adjacent upland forests for part of its life cycle. Impacts to coastal tailed frogs from silvicultural activities conducted under current OFP Rules are similar to those described for other aquatic species that occur in small streams and adjacent riparian habitat in the upper headwater portions of stream basins, i.e., LCR and UWR salmonids. Refer to the Silviculture Impacts section for LCR salmon and steelhead above to review impacts likely to occur to

aquatic coastal tailed frog habitat. Small amounts of human activity resulting in minimal soil disturbance outside the RMAs are not likely to affect coastal tailed frog habitat in small fish streams and perennial nonfish streams, or add to the impact of previously harvested forest stands adjacent to these aquatic features. That is, activities conducted in a harvest unit post-harvest such as debris-clearing and piling, planting, and fertilizing are less likely to have an impact on this species because timber harvest activities will likely already have had the greatest impact on coastal tailed frogs that were in the harvest unit at the time of harvest.

Road Management Impacts: Road maintenance activities are unlikely to affect coastal tailed frogs, but road construction activities have the potential to remove coastal tailed frog habitat if located in or near small fish and perennial nonfish headwater streams, or occurs in uplands frequented by adults and sub-adults outside of the mating and egg-laying seasons. Road construction involves vegetation clearing and soil disturbance (terrestrial habitat loss), and instream works for culvert and bridge replacements/installations (aquatic habitat loss). Roads can fragment forest habitats and interfere with movement and dispersal of metamorphs, juveniles, and adults. Culverts can potentially hinder tadpole movements by disrupting channel beds and local flow patterns, particularly if these culverts are suspended above the channel bed. These impacts are expected to be slight for several reasons: the majority of roads occur in upslope habitats less occupied by coastal tailed frogs (i.e., not near and parallel to watercourses); some downstream drift by tadpoles does occur through culverts; and the coastal tailed frog does not migrate in mass during the spring or fall as do some other amphibian species (B.C. Ministry of Environment 2015).

OFP Rules relative to road management focus on avoiding or minimizing the potential for delivery of sediment to streams. Roads are required to be constructed as far away from streams as economically and practically possible. Relative to road construction near suitable aquatic habitat, this activity is unlikely to have a significant negative effect on coastal tailed frog habitat. Roads constructed upslope from suitable aquatic habitat may result in the removal of adult habitat and directly impact adult frogs should they occur in these areas although this is expected to be minimal given the OFP Rules requirements to locate roads away from streams to avoid sediment input, and the low amount of annual average road construction (4.2 miles) anticipated to continue which is unlikely to occur in forested stands adjacent to riparian habitat of headwater streams.

### **Cascade Torrent Salamander**

Timber Harvest Impacts: The Cascade torrent salamander shares habitat with coastal tailed frogs and several other stream-associated salamanders (Howell and Maggiulli 2011), thus, the impacts from forest management activities are similar to those described above for the coastal tailed frog. Timber harvest can impact torrent salamander habitat by increasing sedimentation and water temperatures in headwater streams. **However, studies suggest that** if there is canopy cover, that Cascade torrent salamanders can persist. Olson and Ruggger (2007) found no negative effects of thinning with four different stream buffer widths on torrent salamanders (*R. cascadae* and *R. variegatus*) on federally managed lands in western Oregon in the first two years post-harvest. In a study of 1<sup>st</sup> order streams on industrial timberlands in the Washington Cascade Range, Steele et al. (2003) found that captures of Cascade torrent salamanders were highest in 25-60-year-old forests, lowest in 0-24-year-old forests, and intermediate in stands > 60 years. Kroll et al. (2008) found similar

results for *Rhyacotriton* spp. on managed lands in Oregon and Washington with occupancy being lowest in the youngest and oldest sampled stands.

Good and Wake (1992) found that Cascade torrent salamanders are typically absent from areas logged up to fifteen years previously, and there is no current evidence of these salamanders breeding in areas denuded of forest. However, as forest age increases, so do the chances of finding torrent salamanders. Studies suggest that once a forest reaches the age of at least 30 years, slope, aspect, and the type of underlying rock in the area are more likely to predict the presence of torrent salamanders than is the age of the trees (Nordstrom 1997). However, streams with shallow gradients (<9%), which are prevalent in the HCP area, are less resistant to sedimentation (Steele 1996). In these streams, forest age may be a significant indicator of torrent salamander habitat for a much longer period of time (Corn and Bury 1989).

In uncut forests, Bury and Corn (1988) and Corn and Bury (1989) found that densities of torrent salamanders were unrelated to stream gradient (steepness), whereas in logged areas, the salamanders were absent from all streams with shallow gradients of less than 11%. Sediment is eventually flushed from high gradient streams but not from those with low gradients such as exists in the HCP area. This suggests that the disruptive effects of increased sedimentation are greatest in low-gradient streams, which receive silt delivered to them from higher-gradient reaches upstream (Welsh and Lind 1996). If sedimentation is a major negative impact on torrent salamander populations, those inhabiting low-gradient streams can be put at risk by sediment generating activities on higher gradient reaches upstream. Additionally, logging reduces large woody debris (LWD) in the streambed over the long term, which helps trap and filter sediments from streams (Bury and Corn 1988).

Torrent salamanders are specialized for life in cold water and cannot survive where water temperatures are too high. Thermal tolerances for *Rhyacotriton* spp. are among the lowest for amphibians (Bury 2008). Pollett et al. (2010) found that Cascade torrent salamanders were almost absent from streams where water temperatures were  $\geq 14^{\circ}\text{C}$  for  $\geq 35$  consecutive hours. In the western Oregon, streams preferred by Cascade torrent salamander are typically small fish and nonfish streams. Under OFP Rules, RMAs for all small Type F and Type SSBT stream buffers have a 30 or 40-foot managed zone, respectively, with specific basal area requirements established to provide shade and LWD and prevent sediment input. There is no OFP Rule requirement to provide a riparian buffer on perennial Type N streams where Cascade torrent salamanders are likely to occur, i.e., all merchantable trees may be harvested leaving only understory vegetation.

Although some riparian habitat is retained along small streams and stream-associated wetlands as a result of OFP Rule requirements, the RMAs reduce the amount of habitat available for Cascade torrent salamanders and likely do not provide enough trees to completely prevent temperature increases. Reductions in stream-adjacent riparian habitat on small fish streams, as a result of low basal area retention requirements of OFP Rules, and the lack of a requirement to provide a riparian buffer on perennial nonfish-bearing streams, may increase water temperatures. However, in the absence of studies documenting the specific needs of the Cascade torrent salamander, in terms of canopy cover or amount of disturbance tolerated, it is assumed that riparian areas with minimal activity will protect the species in habitats where it is already found. However, there is a general lack of information on the most effective buffer widths to protect *Rhyacotriton* spp.

(Bury 2008). Studies suggest that some canopy cover will enable the Cascade torrent salamander to persist (Howell and Magguilli 2011). Thus, given the absence of Cascade torrent salamanders for up to fifteen years post-harvest, it is likely they will not be present in the nonfish streams receiving no RMA unless the understory retention ameliorates the potential for temperature increases. These streams comprise 55% of the streams in the HCP area. Although understory vegetation retention along Type N streams and the managed buffers along small Type F and Type SSBT streams may reduce the potential for stream temperature increases and, thus, may be tolerable to these salamanders, it is likely they negatively affect annual survival.

*Silviculture Impacts:* The Cascade torrent salamander is a highly aquatic amphibian species that typically does not range far into adjacent upland forests. Good and Wake (1992) report that only rarely do they venture as far as 50 m (~ 165 feet) from water, and this was observed in wet coastal Douglas-fir habitat and was considered an exception to normal behavior. Nussbaum and Tait (1977) found that out of 191 recaptures of different Cascade torrent salamander individuals, 70 percent moved less than 2 m, and the greatest known distance moved over one summer was 22 m (~ 70 feet).

Pile burning post-harvest may have a negative effect on Cascade torrent salamanders if they are in the uplands at the time of burning, which typically occurs in the fall. However, they would likely only be present under very moist conditions, thus, burn piles in spots would not likely have a significant effect on the Cascade torrent salamander. Given these salamanders reside largely in, or adjacent to, streams where fuel moistures are higher, fire that does creep into these riparian areas will likely not completely consume the vegetation.

Impacts to Cascade torrent salamander from silvicultural activities conducted under current OFP Rules are similar to those described for coastal tailed frog and other aquatic species that occur in small streams and adjacent riparian habitat in the upper portions of stream basins. That is, small amounts of human activity resulting in minimal soil disturbance outside the RMAs are not likely to affect Cascade torrent salamander habitat in small fish streams and perennial nonfish streams, or add to the impact of previously harvested forest stands adjacent to these aquatic features.

*Road Management Impacts:* Road maintenance activities are unlikely to affect Cascade torrent salamanders but road construction activities, road placement and culverts have the potential to introduce sediment to streams, fragment habitat, and disrupt amphibian movement, respectively. Road construction involves vegetation clearing and soil disturbance (terrestrial habitat loss), and instream works for culvert and bridge replacements/installations (aquatic habitat loss).

Stream gradient, and the presence and amount of sedimentary rock in a watershed influences the degree of sedimentation in an area (Bury and Corn 1988). The primary causes of siltation in managed forests are road-grade failures, surface erosion from both roads and logging, and mass wasting (the movement of soil, rock, and vegetation downslope), all of which are more likely to occur on steep terrain. In the HCP area, the low mileage of roads constructed each year (averaging 4.2 miles), common road management practices required under OFP Rules, and low gradient slopes combines to reduce potential sediment delivery to small streams in the upper watersheds where Cascade torrent salamanders are likely to occur.



Culverts can potentially hinder salamander movements by disrupting channel beds and local flow patterns, particularly if these culverts are suspended above the channel bed. An inability to disperse puts populations at risk because it limits gene flow and the ability to recolonize after disturbance (Jackson 2003). Specifically, perched culverts are problematic due to loss of substrate continuity and increased velocity of water above a surface that does not present any natural characteristics, such as instream structures, substrate, or quiet pools, which would facilitate animal movement. Given its close association to the stream channel and adjacent, saturated ground, this torrent salamander may not likely move any significant distance upland to navigate around such barriers. It is not known to what degree culverts and roads fragment habitat for Cascade torrent salamander as there have not been any studies on distribution specifically related to road locations (Howell and Magguilli 2011). Nonetheless, Hayes et al. (2006) found that coastal tailed frogs (*Ascaphus truei*) engaged in upstream seasonal movements seeking invertebrate-rich intermittent headwater areas and Olson and Weaver (2007) speculated that similar environmental situations may exist for post-metamorphic torrent salamanders to do the same.

These impacts are expected to be slight because the majority of roads occur in upslope habitats infrequently occupied by Cascade torrent salamanders (i.e., not near and parallel to watercourses) and most culverts with flow issues are repaired when forest management activities occur in the vicinity. OFP Rules relative to road management focus on avoiding or minimizing the potential for delivery of sediment to streams. Roads are required to be constructed as far away from streams as economically and practically possible. Relative to road construction near suitable aquatic habitat, this activity is unlikely to have a significant negative effect on Cascade torrent salamander habitat. Roads constructed upslope from suitable aquatic habitat may result in the removal of adult habitat although this is expected to be minimal given the OFP Rules requirements to avoid sediment input to streams, and the low amount of annual average road construction (4.2 miles) anticipated to continue which is unlikely to occur in forested stands adjacent to riparian habitat.

### **Western Pond Turtle**

*Timber Harvest Impacts:* Western pond turtle aquatic habitat can be permanent and intermittent bodies of water such as naturally occurring rivers, creeks, small lakes and ponds, and marshes (NatureServe 2018a, Rosenberg et al. 2009). Western pond turtles prefer the low-velocity waters and deep pools of streams and rivers. Terrestrial overwintering sites include a broader vegetation structure, with shrubby, open, and forested environments all being used, although access to basking sites remains important all year. Western pond turtles that choose a terrestrial habitat for overwintering typically leave the aquatic habitat from September to December. However, in Oregon, western pond turtles typically enter a state of semi-dormancy during the winter, and opportunistically seem to select either aquatic or terrestrial environments (Rosenberg et al. 2009).

Most regeneration timber harvest likely doesn't have a big impact on western pond turtles because much of it occurs in uplands. However, timber harvest and other forest management activities occurring in RMAs, and vegetation and soils adjacent to preferred wetlands (ponds) and nearby terrestrial habitat where they may overwinter, may be disturbed, removed, or degraded. Logs used for basking and foraging, and refuge areas may be destroyed. However, OFP Rules require 100-foot managed buffers (retention of 50% of trees) around wetlands and 70-foot or 100-foot buffers along medium and large

streams, respectively. These buffers will protect the aquatic habitat and adjacent vegetation to some extent but may not be wide enough to include all the available suitable overwintering upland habitat for western pond turtles. Opening adjacent uplands by removing all trees may result in increases in dense growths of woody vegetation in areas along and around waterways which may shade potential basking sites and create an unsuitable habitat (Hays et al. 1999). Harvest of stands close to streams and wetlands occupied by western pond turtles could damage overwintering habitat in the uplands and directly impact overwintering western pond turtles. The most significant potential to negatively affect western pond turtles from timber harvest is related to the level of forest management entry, e.g., regeneration harvest or thinning of adjacent stands, width of buffer retention, and removal or damage of vegetation in and adjacent to wetlands and slow-moving streams that is their preferred habitat, i.e., where they spend much of their life cycle, notwithstanding a short overwintering period in the uplands.

*Silviculture Impacts:* Impacts to western pond turtles from silvicultural activities on aquatic habitat conducted under current OFP Rules are similar to impacts to other aquatic species that rely on streams, stream-associated wetlands, and riparian habitat, described above. However, there are additional potential impacts from silviculture activities that occur in the managed zone of RMAs and harvest units adjacent to RMAs where western pond turtles may overwinter. Silviculture activities that disturb the substrate may negatively impact western pond turtles, especially site preparation activities such as debris-clearing, piling, and burning. Although there are OFP Rules that address avoidance of sediment delivery to streams by minimizing soil disturbance, they are not likely adequate to protect overwintering western pond turtles. That is, small amounts of human activity resulting in minimal soil disturbance outside the RMAs are not likely to affect western pond turtle habitat in streams and ponds, but they may impact previously harvested forest stands adjacent to these aquatic features that turtle may still utilize as overwintering habitat.

*Road Management Impacts:* Road maintenance activities are unlikely to affect western pond turtles, but road construction activities have the potential to remove or degrade their habitat if located adjacent to occupied wetlands and streams, or occurs in uplands frequented by overwintering turtles. Road construction involves vegetation clearing and soil disturbance (terrestrial habitat loss), and instream works for culvert and bridge replacements/installations (aquatic habitat loss). However, OFP Rules focus on avoiding or minimizing the potential for delivery of sediment to streams and stream-associated wetlands. Thus, roads are required to be constructed as far away from these features as economically and practically possible. Thus, relative to road construction near suitable aquatic habitat, this activity is unlikely to have a negative effect on western pond turtle habitat. Roads constructed upslope from suitable aquatic habitat may result in the removal of overwintering habitat although this is expected to be minimal given the OFP Rules requirements to locate roads away from streams to avoid sediment input, and the low amount of annual average road construction (4.2 miles) anticipated to continue. Western pond turtle habitat may be affected where a road crosses a stream, though the effects are likely temporary until such time as the culvert or bridge has been put in place and adjacent vegetation has been replaced and/or restored.

## **5.1.2 Terrestrial Species**

### **5.1.2.1 Threats**

Although numerous land management and land-use activities may cause direct and indirect threats to the terrestrial Covered Species, we specifically identify threats posed by forest management activities described in the Covered Activities section (Section 2.2), where applicable, as they are the activities that are under Port Blakely's control and for which the incidental take permit is being requested.

For most of the terrestrial Covered Species, e.g., spotted owls, goshawk, amphibians and bats, the biggest threat to their continued survival is the elimination or degradation of suitable habitat over time as a result of a variety of land management activities including forest management. However, some bats, fisher and wolves were or are also threatened by direct human-caused mortality. The hoary bat and silver-haired bat are extremely vulnerable to colliding with wind turbines (AWWI 2017). Fishers were largely extirpated from Washington and Oregon by trapping (Aubry and Lewis 2003). Humans are the largest cause of wolf mortality and the only cause that can significantly affect populations. Human-caused mortality of wolves includes control actions to resolve conflicts such as livestock depredations, legal and illegal killings, and car/train collisions (ODFW 2010b).

#### **Gray Wolf**

The wide range of habitats in which wolves can thrive reflects their adaptability as a species, and includes temperate forests, mountains, tundra, taiga, and grasslands. Wolves can occupy any of these habitat types provided adequate prey exists (Keith 1983, Fuller 1989, Haight et al. 1998) and human activity is minimal (Oakleaf et al. 2006, Belongie 2008). There are no known conditions which prevent wolves from inhabiting currently unoccupied portions of their range in Oregon (ODFW 2016). The primary threats to gray wolves are direct human actions that result in death or injury from livestock depredation protection, illegal killing, and vehicle collisions (ODFW 2010b). Forest management activities present little threat to wolves except temporarily when and where timber management operations are occurring. Forest management activities create forest openings and substantial amounts of early seral vegetation stages that provide forage for deer and elk. Thus, forest management activities likely result in a benefit, not a threat, to wolves by retaining a range of forest stand age-classes that provide resting and hiding cover and providing prey species habitat across the commercial forest landscape.

#### **Pacific Fisher**

In the proposed rule to list the West Coast DPS of fisher as threatened under the ESA, USFWS identified habitat loss from wildfire and vegetation management, toxicants (rodenticides), and the cumulative impact and synergistic effects of these and other stressors as threats to the continued existence of the West Coast DPS of fisher (USFWS 2014). Although timber harvest actions are widespread across ownerships throughout occupied and unoccupied regions within the fisher's range, there are also large areas of suitable habitat throughout the area that are not yet occupied, suggesting that habitat may not currently be the limiting factor for populations on the west coast (USFWS 2016B).

Based on the analysis in a recent USFWS report, vegetation management is considered a low- to medium-level impact on fishers. In the sense that the amount of vegetation management occurring across the landscape is a relatively small portion of available older forest habitat, it is a low-level impact. But, given the large home range of fishers and the extent of forest management throughout the analysis area, a moderate portion of fisher individuals are likely affected, creating a moderate level impact (USFWS 2016b). However, this is tempered by the fact that fishers appear to tolerate some levels of vegetation management, although population responses are not known, and where fisher habitat trends were modeled, fisher habitat was found to increase despite vegetation management and other disturbances (USFWS 2016b).

### **Townsend's Big-eared Bat**

Direct threats to Townsend's big-eared bats specifically in Oregon and Washington include human disturbance of any type at roosts (Thomas 1995, Ellison 2010). Both roosting and foraging areas may be negatively impacted by timber harvest practices and loss of riparian habitat (WBWG 2005, Piaggio et al. 2009), although forest management activities are only one of many types of activities that may directly affect Townsend's big-eared bats. The primary threat appears to be disturbance and/or destruction of roost sites resulting from a variety of mining-associated activities (WBWG 2005, Hayes and Wiles 2013). Indirect threats include degradation of roosting habitat, rendering it less suitable, and degradation of foraging habitat, which can occur from logging, land conversion, invasive species, overgrazing, pesticide spraying for moth larva outbreaks, development, or altered fire regimes and other impacts from climate change. Mortality associated with wind turbines is a potential threat. Currently, turbines are not known to be a significant source of mortality, but they could become so as more turbines are installed throughout the range of the species (Miller et al. 2011). The WNS fungus has been detected in this species although no diagnostic signs have been observed, and WNS has not been detected in bats in Oregon (USFWS 2019c).

### **Migratory Tree-roosting Bats**

Over the long term, deforestation reducing the availability of habitat is cited as a direct threat to the hoary bat (Morrell et al. 1999, Whitaker et al. 2006). Habitat loss and fragmentation as a result of clearcutting and other causes of deforestation are cited as direct threats to the silver-haired bat (Parker 1996, Parker et al. 1996). Over the long term, deforestation and forest management practices presumably have reduced habitat quality (Campbell et al. 1996) and reduced the number of available bat roost sites (Kunz 1982).

Migratory tree-roosting bat species are also extremely vulnerable to colliding with wind turbines (AWWI 2017), especially the hoary bat and silver-haired bat (AWWI 2017). For hoary bats, fatalities at certain wind energy facilities may exceed 1,000 per year (Arnett et al. 2008, Cryan 2011). It is unknown whether WNS will be a significant source of mortality in migratory tree bats because they rarely occur in caves, and their solitary nature may not facilitate the spread of fungal spores (Foley et al. 2011). However, the fungus has been detected in silver-haired bats although no diagnostic signs have been observed (USFWS 2019c).

## **Myotis Bats**

Threats to the three myotis bat species include human disturbance of maternal colonies in caves and mines, destruction of buildings and bridges used as roosts, livestock grazing and forest management activities. Reduced availability of roost sites in snags and trees with loose bark, reduced foraging habitat quality or increased habitat fragmentation are threats associated with timber harvest (Keinath 2004, Bogan et al. 2005, Lacki et al 2010). Disturbance or destruction of water sources and riparian habitat may also negatively affect some populations.

Although the fringed myotis and the long-legged myotis are not known to incur significant mortality from turbines at wind energy facilities, the long-eared myotis is subject to mortality from these structures and operations (Arnett and Baerwald 2013). The current impact of turbine-associated mortality on the overall long-eared myotis population is probably relatively small although, given the ongoing increase in turbine installation, this mortality may increase significantly during the foreseeable future (Arnett and Baerwald 2013). All three of these species are confirmed to be affected by WNS in some states within their range, however, no occurrences have been reported for Oregon (USFWS 2019c).

## **Northern Spotted Owl**

A comprehensive list of threats is addressed and described in Appendix B of the Revised Owl Recovery Plan (USFWS 2011d). Although five categories of threats are discussed, the primary threats are loss of habitat and competition from barred owls. The report on loss of habitat as a result of timber harvest and natural disturbances on Federal lands shows that range-wide, 0.6 percent (53,800 acres) of the spotted owl nesting and roosting habitat on Federal lands were lost to timber harvest and 2.8 percent (244,800 acres) to natural disturbances, primarily wildfire, resulting in a total range-wide loss of 3.4 percent (298,600 acres). The greatest percentage of Federal land habitat loss was in Oregon, specifically in the Oregon Klamath Province (10.9 percent of the habitat) due primarily to wildfire. The amount of spotted owl habitat lost to timber harvest on non-Federal lands in Oregon was 301,200 acres (21.8% of the habitat on Oregon Non-Federal lands (USFWS 2011d).

Barred owls are considered a serious threat to spotted owls because they are known to physically attack spotted owls, utilize habitat with similar characteristics preferred by spotted owls, have similar diet preferences, and appropriate spotted owl sites (USFWS 2011d). The preponderance of evidence suggests barred owls are contributing to the population decline of spotted owls, especially in Washington, portions of Oregon, and the northern coast of California which may explain the sharper decline in the spotted owl population trend in the northern portion of the spotted owl's range compared to those in the southern portion of the range (USFWS 2011d).

A Five-Year Status Review of the spotted owl reaffirmed that habitat loss and competition from barred owls are the primary threats to the spotted owl (USFWS 2011c). Disease and the effect of climate change on vegetation were considered potential but more uncertain future threats. Experts ranking threats by physiographic provinces, identified the negative effects of habitat fragmentation and ongoing habitat loss as a result of timber harvest as high threats in the Western Oregon Cascades Province. However, the Western Oregon Cascades Province was also the province with the fewest number of threats (USFWS 2011c).

## **Northern Goshawk**

Although threats to northern goshawks include use of pesticides, predation, grazing, diseases (insect and tree) and the deterioration or loss of nesting habitat from fire suppression, timber harvest has been identified as the principal threat to breeding populations of goshawks (Graham et al. 1999, Squires and Reynolds 1997). In addition to the relatively long-term impacts of removing nest trees and degrading habitat by reducing stand density and canopy cover, logging activities conducted near nests during the incubation and nestling periods can have an immediate impact, i.e., nest failure due to abandonment (Boal and Mannan 1994, Squires and Reynolds 1997). While timber management has been demonstrated to affect goshawks at least at local levels, forest management practices, such as the selective thinning, may also make habitats more suitable to goshawks by opening up dense understory vegetation, creating snags, down logs, and woody debris, and creating other conditions conducive to goshawks and their prey (USFWS 1998c).

## **Oregon Slender Salamander**

Oregon slender salamanders have been observed to either persist in units following harvest and/or was able to recolonize units as they regenerated over time (Garcia et al. 2018, Homyack and Kroll 2014). Studies have shown that occupancy is associated strongly with the amount of coarse woody debris suggesting that the absence of these structures are more of a threat to the Oregon slender salamander than removal of the overstory. Very little is known about this salamander and no focused life history studies have addressed this species (Clayton and Olson 2009). However, it is believed that the primary potential threat to the Oregon slender salamander and its habitat is short rotation clearcut timber harvest, which removes canopy closure, disturbs substrates, and can alter microhabitat refuges and microclimates (Clayton and Olson 2009). In particular, where there is limited large down wood volume and limited down wood recruitment, negative consequences for this terrestrial salamander are likely. However, there is uncertainty about the effect on these salamanders from partial harvest, or regeneration harvest with green tree and down wood retention (Clayton and Olson 2009).

### **5.1.2.2 Potential Impacts to Terrestrial Species from Baseline Forest Management Activities**

Forest management activities are known to impact terrestrial habitat conditions in the Pacific Northwest. Timber harvest practices can degrade upland and stream ecosystem functions by altering habitat characteristics including decreases in structural features such as large trees, snags, and coarse woody debris on the forest floor, decreases in older age-class forest stands, as well as riparian habitat and LWD associated with stream habitats. Road construction and maintenance activities also contribute to forest landscape conditions that degrade suitable forest habitat necessary for terrestrial species. Degraded terrestrial habitat conditions can have resultant negative impacts to terrestrial Covered Species that may occur in the HCP area.

Under current OFP Rules, landowners conducting forest management activities must implement specific rules pertaining to timber harvest, silviculture, and road management (ODF 2018a). Implementation of these activities are considered a threat to most of the terrestrial Covered Species resulting in impacts that may occur on Port Blakely's HCP

ownership, especially with respect to upland timber harvest, forest management in riparian zones, wildlife tree retention, and road management. Forest management activities regulated by OFP Rules (and covered in the HCP) that have the potential to impact terrestrial species are the same as described in Section 2.2. The potential impacts to terrestrial species from baseline forest management activities are described below.

## **Gray Wolf**

*Timber Harvest Impacts:* Wolves in Oregon primarily use forested habitat with seasonal shifts to more open habitats that reflect seasonal distributions of prey (ODFW 2015). All known den sites in Oregon have occurred within forested habitat. As habitat generalists that rely on large areas of land without barriers and that contain adequate hiding cover and ungulate populations, gray wolves are likely to utilize forested landscapes with a variety of forest age-classes that provide cover, vegetation for ungulate browsing, and upper watersheds that are miles from human habitation.

There are no specific OFP Rules that address resource site protection for wolves like those that address some birds including the spotted owl (629-665-0000). Conducting timber harvest activities under OFP Rules could result in destruction of wolf den sites, although this would likely be uncommon given their propensity to locate den sites away from human activity. The resultant changing industrial forest landscape mosaic is not likely to negatively affect wolves in the long term provided landscape conditions also result in suitable prey species habitat conditions. Regeneration harvest and subsequent silvicultural activities such as planting will result in a variety of forest age-classes across the landscape with numerous openings (up to 120 acres) of young forest stands that provide foraging habitat for ungulates (see Figure 2-1). Forested landscapes with a variety of forest age-class stands can provide hiding and denning habitat for wolves, as well, although forest age classes greater than 41 years of age that are more likely to allow wolf movements through the forest and include habitat conditions for denning will be greatly reduced over the next decade, i.e., over 10,000 acres will be reduced by approximately 8,500 acres. Riparian zones along medium and large low-gradient streams comprised of 70 to 100-foot buffers, respectively, can likely provide sufficient hiding cover to function as travel corridors. In upper watersheds containing small streams, the OFP Rule requirements for small (50-foot wide) buffers on fish streams and no forested buffers on nonfish streams may not be capable of being used by wolves for travel or hiding because of the narrow width and/or dense understory vegetation typical of forested stands in the HCP area. In the short term, human activity associated with timber harvest could disturb wolves to the extent they are temporarily displaced from areas used for denning or hunting prey. There are no OFP Rules addressing disturbance distances with respect to wolf occupancy. However, once human activity is absent, wolves could occupy commercial forest landscapes where denning habitat is located and/or adequate numbers of prey species are present. This is especially true in remote upper watersheds where frequent human activity may not occur.

*Silviculture Impacts:* Wolves may be disturbed by the human presence associated with conducting silviculture activities. These activities typically involve small crews of people for periods of 2-4 days. If these activities are isolated, i.e., not in proximity to numerous other forest management activities, wolves can readily move back into previously occupied areas if habitat conditions are suitable. Conducting silvicultural activities is not likely to result in a long-term disturbance to wolves.

Road Management Impacts: Low road densities are one of the five main predictors of wolf habitat (ODFW 2015). In an updated biological status review and evaluation of criteria to remove the gray wolf from the Oregon ESA list, ODFW used areas of known wolf activity in Oregon to estimate a threshold value of road density which wolves did not currently occur. The analysis suggested wolves did not currently occur in areas where road densities exceeded 3.5 km of road/km<sup>2</sup> (5.6 mi/mi<sup>2</sup>) (ODFW 2015). An approximate estimate of active road density throughout the HCP area is 5.2 mi/ mi<sup>2</sup> which is near this threshold. There are no OFP Rules that limit road densities on an industrial forest landscape. Currently, Port Blakely constructs an average of approximately 4.2 miles of road annually while road abandonment and deactivation averages 1.1 mile, annually. These rates are expected to occur over the next several decades. Thus, the road density may remain at or near the level in which wolves would still inhabit the forested landscape mosaic that currently exists given that road density is only one of several predictors of viable wolf habitat.

Roads alone should not have an impact on wolves; only the human activity associated with roads, such as haul trucks and staff vehicles used to conduct road management and other forest management activities. Fritts and Mech (1981) observed that some wolves use secondary roads in winter (if plowed) even though the probability of harmful contact with humans is increased considerably. Disturbances from roads are expected to be brief and temporary in nature, lasting only as long as the specific road use, construction and maintenance activity occurs. Thus, there will likely be short term impacts from human activity associated with roads which could temporarily displace wolves. However, once human activity is absent, the roads and adjacent habitat are likely to be used by wolves should they expand their range to include the HCP area because wolves will occupy a variety of land cover types provided adequate prey exists (Keith 1983, Fuller 1989, Haight et al. 1998) and human activity is minimal (Oakleaf et al. 2006, Belongie 2008).

## **Pacific Fisher**

Timber Harvest Impacts: Fishers in Oregon were found to use live trees, snags, logs, slash piles and stumps for resting, and as den and maternal structures (OFRI 2018). Regeneration timber harvest creates openings in canopy cover and removal of available fisher rest sites and dens, such as live and/or hollow trees and snags. Logs and stumps are sometimes disturbed, especially in stands harvested with ground-based equipment.

There are no specific OFP Rules that address resource site protection for fisher. However, some fisher habitat may be retained during regeneration harvest, e.g., snags, logs, stumps, and large down trees, on steep ground where cable yarding is the preferred method, on level ground where it is safe to retain snags, and as a result of OFP Rule requirements. Under ORS 527.676, operators are required to leave two snags or two green trees at least 30 feet in height and 11 inches DBH, and one or more downed logs or trees that total at least 20 cu ft in volume. These structures could function as potential resting or den sites given suitable habitat conditions surrounding the structures. Defect that occurs in stands > 30 years of age, as a result of wind and ice storms, could also contribute to the overall stand functioning as fisher habitat. Under baseline forest management, these stands will range from approximately 4,000 acres to 14,300 acres (13 - 48% of the forested HCP area). Resting and den structures retained in stream buffers, may also result in use by fishers in the future as the stand regenerates but this may take decades to occur if not located near mature stands. Regeneration timber harvest, therefore, will generally result in long-term



effects to fishers because of the removal of trees and snags that function as den and resting structures, as well as prey habitat, even though these structures are required to be retained in small amounts on a per acre basis (ORS 527.676).

*Silviculture Impacts:* Fishers may be disturbed by the human presence associated with conducting silviculture activities. These activities typically involve small crews of people for periods of 2-4 days. If these activities are isolated, i.e., not in proximity to numerous other forest management activities, fishers may continue to use occupied areas if habitat conditions are suitable. Alternatively, they may be disturbed to an extent where they move to areas of suitable habitat in the HCP area or other ownerships. Conducting site preparation, i.e., debris-clearing, piling and mechanical site preparation (629-615-0100, 629-615-0200) can result in elimination of potential fisher resting and denning sites or habitat for prey species, especially if the debris piles are subsequently burned. Over the long term, a lack of these structures in stands that would normally provide suitable habitat conditions, i.e., older stands with closed canopies, would likely preclude fishers from occupying the HCP area.

*Road Management Impacts:* Road construction removes habitat and creates openings in continuous canopy forest. In addition to their disruption of habitat continuity, roads are sources of vehicle-collision mortality of fishers (USFWS 2016b). The type of road and its use level likely affects a fisher's susceptibility to collision mortality, i.e., low use secondary roads seem to pose a reduced probability of vehicular collision compared to paved major roads (USFWS 2016b). The adverse impacts of roads on movement patterns are more severe on low-density carnivores like fishers compared to many wildlife species due to the fisher's large home range, relatively low fecundity, and low natural population density (Ruediger *et al.* 1999). In addition, the adverse effects of roads (and other linear features) may also include displacement due to noise and human activity (Naney *et al.* 2012). Thus, the existence of roads has a long-term effect of removing habitat and temporary short-term effects in the form of disturbance from vehicular road use. There is likely a continuous negative effect associated with roads due to the potential for vehicle collision mortality, a function of road type and use. Secondary forest roads, used for ongoing timber harvest operations but for little or no other activities, likely don't pose a serious risk to fishers. Port Blakely currently restricts motorized public access to its forestlands in Clackamas County but there is no requirement to do so. This policy could change in the future, allowing more frequent road activity that could impact fishers occupying the HCP area.

## **Spotted Owl**

*Timber Harvest Impacts:* Timber harvest on intensively managed commercial forestlands under OFP Rules results in depletion of older forested stands that, in the past, may have functioned as nesting, roosting, and foraging (NRF) habitat that spotted owls rely on (USFWS 2011d). Typically, when managed private forestlands are commercially thinned, nearly all defective trees and snags are removed to enhance growth of remaining trees or for safety reasons, although thinning can open a stand resulting in tree spacing and canopy lift that allows spotted owls to move through the stand. There are no OFP Rules that explicitly apply to commercial thinning, and under baseline forest management projections, Port Blakely will not conduct commercial thinning. Regeneration harvest of Douglas-fir stands in the western Oregon Cascades results in clearcuts that remove all the trees. Managing stands on a short rotation basis results in clearcuts distributed across the landscape resulting in habitat fragmentation that also contributes to degradation of suitable

spotted owl habitat at the landscape scale, i.e., a mix of young stands < 40 years old distributed across the ownership.

Under current OFP Rules, Port Blakely is not required to conduct commercial thinning and is not committed to doing so. Rather, regeneration harvest is the primary forest management activity being conducted. Forest stands will be harvested by the time they reach 40 years of age which is typical for private commercial forestlands. Unless a forested stand is occupied by spotted owls (known nest tree or activity center of an adult pair), removal of suitable habitat, and woody structures that serve as habitat for prey species, is permitted under OFP Rules (OAR 629-665-0210) and could result in degradation or elimination of potentially suitable spotted owl habitat on a large scale. However, Federal law prohibits a person from taking spotted owls which, as cited in OFP Rules, may include significant alteration of owl habitat on any class of land ownership.

Existing stands in the HCP area with characteristics likely to provide suitable spotted owl habitat, i.e., foraging/dispersal and perhaps some roosting and/or nesting, are those > 50 years of age. Currently, these stands total approximately 5,800 acres of which approximately 3,370, 1,740 and 710 acres are in the 51-60, 61-70 and 71+ year old age-classes, respectively (Port Blakely 2020). Under baseline forest management, these stands are anticipated to be reduced in the next decade to approximately 1,400 acres in the first decade and remain at < 1,600 acres for the following 40 years (see Figure 2-1) subject to existing spotted owl nest site protection of the OFP Rules (OAR 629-665-0210). The forest management plan has the potential of precluding spotted owls from nesting in the HCP area. Currently, there are no spotted owl nest sites in the HCP area. If a spotted owl nest site is identified in the HCP area, it will be protected under OFP Rules, which requires protection of all spotted owl nest sites, by retention of a 70-acre area of suitable spotted owl habitat encompassing the nest site maintained as suitable spotted owl habitat. The nesting site includes the tree, when known, containing a spotted owl nest or, when not specifically known, includes an activity center of a pair of adult spotted owls.

The anticipated result of the projected baseline forest management activities will be that approximately 95% of the HCP area will be in age-classes less than 40 years of age. Remaining older age-class trees will be primarily located in riparian areas and scattered small upland leave tree patches or single trees. Since there will be no commercial thinning and no focus on retention of trees with defect and/or legacy structures, except for basic OFP Rules for retention of wildlife tree (two per acre) and downed woody debris (at least 20 cu ft gross volume), spotted owl foraging/dispersal and prey habitat will be minimal across the landscape (ORS 527.676). It is unlikely, under these circumstances, that spotted owl nest sites will be established in the HCP area, or that foraging/dispersal habitat will be available in adequate amounts that facilitate spotted owl use.

Some suitable spotted owl habitat may remain in riparian areas; however, these corridors of standing timber provide very little interior forest conditions conducive for spotted owl use until such time as the adjacent stands reach a height that buffers the riparian trees (approximately 35-40 years of age). Replanted stands allowed to mature naturally, as well as commercially thinned stands, have the potential to become functional roosting, foraging and dispersal habitat given the right conditions. Naturally maturing stands achieve this condition later than commercially thinned stands which, with proper spacing and retention of some defective trees, could provide habitat for use by spotted owls for these activities.

However, under baseline OFP Rules, Port Blakely is not required nor are they committed to conducting commercial thinning. Thus, implementation of forest management activities on Port Blakely's industrial forest landscape will likely preclude these functions from occurring because of the focus on growth of vigorous, "clean", defect-free trees planned for harvest as early as 35-40 years of age.

The effects of noise on spotted owls are largely unknown, and whether noise is a concern has been a controversial issue (USFWS 2017a). The effect of noise on birds is extremely difficult to determine due to the inability of most studies to quantify one or more variables such as 1) timing of the disturbance in relation to nesting chronology; 2) type, frequency, and proximity of human disturbance; 3) clutch size; 4) health of individual birds; 5) food supply; and 6) outcome of previous interactions between birds and humans (Knight and Skagan 1988). Additional factors that confound the issue of disturbance include the individual bird's tolerance level, ambient sound levels, physical parameters of sound, and how it reacts with topographic characteristics and vegetation, and differences in how species perceive noise (USFWS 2017a). It is assumed that human activities associated with timber harvest, including use of heavy equipment and helicopters, cause some disturbance to owls as evidenced by the disturbance and disruption distances established by USFWS (USFWS 2003, USFWS 2013). Disturbance of spotted owls is also addressed in the OFP Rules (629-665-0210). Prevention of disturbances resulting from forest management activities "which cause owls to flush from the nesting site" during the critical period of nest use each year, i.e., between March 1 and September 30, is not authorized without a written plan approved by the State Forester. Should a spotted owl nesting site be discovered, this disturbance restriction would be applicable, minimizing the potential for disturbance to spotted owls.

*Silviculture Impacts:* Spotted owls may be disturbed by the human presence associated with conducting silviculture activities. These activities typically involve small crews of people for periods of 2-4 days. If these activities are conducted according to the OFP Rule, i.e., do not cause spotted owls to flush from the nesting site, they should result in no disturbance to spotted owls. Silviculture activities are typically conducted in harvest unit's post-regeneration harvest so unless these units are adjacent to an older occupied stand, they are unlikely to result in disturbance to spotted owl nest sites. There is some flexibility associated with the timing of conducting silvicultural activities, so adherence to the OFP Rule relative to spotted owl disturbance can, for the most part, be implemented without impacts to spotted owls.

*Road Management Impacts:* New road construction results in removal of trees and creates openings in forested stands adding to the habitat depletion and fragmentation that occurs from regeneration timber harvest. Potential impacts to spotted owls from new road construction will have similar impacts as timber harvest when this activity involves the removal of trees.

Road management activities also can cause disturbance of spotted owls that may be occupying an older forest stand functioning as dispersal habitat with roosting and foraging opportunities, or younger stands that qualify simply as dispersal habitat. Disturbance of spotted owls may cause them to move out of an area to less suitable areas and/or disrupt their behavior such that they are exposed to predation. If the road management activities have the potential to cause disturbance to nesting spotted owls, they are subject to the same OFP Rule as silviculture activities described above, i.e., no disturbance that causes

spotted owls to flush from the nesting site during the critical period of March 1 through September 30, each year.

Once roads are in place, impacts on spotted owls will be limited to the disturbance associated with haul trucks and staff vehicles used to conduct road management and other forest management activities. This disturbance is expected to be temporary in nature, lasting only as long as the specific road use, construction and maintenance activity occurs. Thus, there will likely be short term impacts from human activity associated with roads which could temporarily displace spotted owls that may be using nearby habitat.

### **Northern Goshawk**

Timber Harvest Impacts: There are no specific OFP Rules that address resource site protection for northern goshawks like those that address some birds including the spotted owl (629-665-0000). Goshawks are not known to occur in the HCP area but even though forested stands are predominately second and third growth, it is possible that goshawks could nest where remnant older trees or snags exist in younger stands. However, this potential is reduced by regeneration timber harvest that occurs by the time stands reach age 40, which is likely to eliminate any potentially suitable nesting structures, notwithstanding OFP Rule requirements to retain some snags and wildlife trees (ORS 527.676). Riparian Management Areas may also provide potential nesting structures provided other breeding area characteristics such as older trees, continuous canopy forest, and reduced stand initiation cover are available (Finn et al. 2002).

Forested stands > 40 years of age currently total approximately 11,000 acres. Under baseline forest management, these stands are projected to be reduced over the next decade to approximately 1,400 acres and increase by approximately 100 acres per decade over the subsequent 20 years before flattening out. This level of harvest, conducted under current OFP Rules, will likely eliminate most goshawk nesting structures that occur in the HCP area, notwithstanding that some forest structures will be retained by the OFP Rule requirement to retain two wildlife or green trees per acre that could function as nest trees as the surrounding stand matures. Riparian buffers could also be a source of potential nest trees as adjacent stands become old enough to provide continuous canopy forest. However, should a goshawk nest be established, there are no OFP Rule requirements to protect nest sites or prevent disturbance to nesting goshawks. The overall impact of managing the industrial forest landscape on short rotations with age classes < 40 years of age will likely preclude use of the HCP area by goshawks.

Silviculture Impacts: Goshawks may be disturbed by the human presence associated with conducting silviculture activities. These activities typically involve small crews of people for periods of 2-4 days. There are no OFP Rules restricting disturbance to goshawks from forest management activities. Silviculture activities are typically conducted in harvest units post-regeneration harvest so unless these units are adjacent to an older occupied stand which, for the most part, will be harvested in the next decade, they are unlikely to result in disturbance to goshawk nest sites.

Road Management Impacts: Potential impacts to goshawks from new road construction will have similar impacts as timber harvest when this activity involves the removal of trees. Disturbances associated with timber harvest such as road construction, maintenance and use may negatively affect goshawks. McLaughlin (2002) observed a coastal goshawk nest

that was immediately adjacent to a newly constructed road (i.e., construction began after nest initiation) and exposed to forestry activities (blasting, hauling, falling) throughout one breeding season. Although the female goshawk never habituated to the disturbance, three young successfully fledged from this nest. Goshawks may habituate to some types of noise disturbance, such as weaker noises farther from nests and those of a constant, predictable nature, compared to unpredictable and erratic louder noises closer to nests (McLaughlin 2002). There are no OFP Rules that address protection of goshawks nest sites or provide disturbance restrictions. Thus, direct disturbance from commercial forest management activities conducted under OFP Rules is likely to occur which can disrupt goshawk breeding including nest abandonment.

### **Townsend's Big-eared Bat**

*Timber Harvest Impacts:* Riparian zones and forests can be degraded from activities such as timber harvest with resulting impacts on moth communities important as forage for Townsend's big-eared bat. Regeneration timber harvest can result in removal of existing forest canopy near occupied mines and caves, and day roosts in very large (legacy) trees with basal hollows. Mines and caves are not known to occur in the HCP area. If habitat removal doesn't occur, forest management activities in the vicinity have the potential to disturb bats at maternal and day roosts which, if chronic, may cause abandonment. Removal of older trees during regeneration harvest or during mid-rotation management will likely remove opportunities for foraging by Townsend's big-eared bat. Current OFP Rules do not have provisions that protect Townsend's big-eared bat roost sites or prevent disturbance to day roosts or maternal roosting sites. Under current OFP Rules, mid-rotation will not occur, and regeneration harvest will focus on older age-class stands, e.g., > 40 years of age, resulting in the removal of potential roosting habitat. Habitat features important to Townsend's big-eared bat likely to occur would be existing older forest retained as legacy structures or in leave tree patches, as a result of OFP Rules for wildlife tree and snag retention, and in RMAs, all of which could provide suitable roosting habitat. OFP Rules require 100-foot managed buffers (retention of 50% of trees) around wetlands and 50-foot, 70-foot or 100-foot buffers along small, medium, and large streams, respectively. Although large portions of these buffers are managed (60-80%, depending on stream size), they still provide some protection of this aquatic habitat and adjacent vegetation resulting in retention of potential foraging habitat for Townsend's big-eared bat.

*Silviculture Impacts:* Silviculture activities are conducted by small crews for short durations during daylight hours. These activities will not have an impact on night-foraging Townsend's big-eared bats. Silviculture activities do not result in the removal of potential roosting structures as any removal or degradation of roosting structures will have already occurred during regeneration harvest activities. If debris-piling occurs and piles are retained, i.e., not burned, it is possible the debris piles could function as day roosts for individual bats after adjacent vegetation develops.

*Road Management Impacts:* Road construction has the potential to remove older trees with basal hollows that serve as Townsend's big-eared bat roosts. Road management activities that occur near or cross streams have the potential to disturb or displace roosting bats, if present. Individual males and non-reproductive females of this species may roost under bridges in summer. Maternity colonies have been found occasionally using the underside of cast-in-place bridges that provide warm but exposed cavernous habitat. There are nine

permanent steel bridges in the HCP area, four of which are anticipated to need replacement at some point in the next 50 years as part of the long-term road maintenance plan. Steel bridges are not cited as the type of bridge frequently used by bats including Townsend's big-eared bat, but bridge replacements could result in removal of Townsend's big-eared bat roosts, depending on when the replacement occurs. Under this HCP, bridges that are replaced will be equipped with structures suitable for roosting bats, based on best available science.

### **Migratory Tree-roosting Bats**

*Timber Harvest Impacts:* Regeneration timber harvest removes deciduous and conifer trees forests that are preferred habitat of these bats both for roosting and foraging. Roost sites in the form of snags are typically removed for safety reasons. However, some of these structures will be available post-harvest under the wildlife tree and snag retention requirements of OFP Rules but their use may depend on where they are located relative to other standing trees. If there is a source of suitable roosting and resting structures in nearby forests, the forest edge created by rotation harvesting over time may provide foraging opportunities for these tree-roosting bats.

Forest management in and adjacent to streams and wetlands results in removal of trees that may function as roost sites but also may affect the integrity of foraging habitat. This is ameliorated to some extent by OFP Rules that require protection of streams and wetlands with buffers. However, a large portion (60-80% depending on stream size) of the stream buffers and the entirety of wetland buffers is comprised of a managed zone that likely reduces the effectiveness of the buffers in maintaining the integrity of the aquatic features and, thus, reduces the foraging quality of wetlands and streams.

*Silviculture Impacts:* Silviculture activities are conducted by small crews for short durations during daylight hours. These activities will not have an impact on night-foraging migratory tree-roosting bats. Most silviculture activities do not result in the removal of potential roosting structures as any removal or degradation of roosting structures will have already occurred during regeneration harvest activities. However, insect control activities may result in removal of small pockets of insect-infested trees. Insect control activities are uncommon but when conducted they will be part of a regeneration timber harvest or function as a small-scale timber harvest with similar effects to bats as described above, i.e., potential removal of roost sites and, possibly, removal of an insect foraging source. If debris-piling occurs and piles are retained, i.e., not burned, it is possible the debris piles could function as day roosts for individual bats after adjacent vegetation develops. Fertilization activities are typically a one-time application that enhances tree growth and has little or no impact on bat forage species.

*Road Management Impacts:* Road construction activities that involve the removal of trees will have similar effects to these bats as timber harvest activities though to a lesser extent because entire forest stands would not be removed. Maintenance activities are unlikely to have much of an effect on these bats relative to potential for disturbance because most bat activity occurs during non-daylight hours when road activity is minimal or non-existent. The exception would be if there is a suitable older tree or snag functioning as a roost located adjacent to a forest road where activity is occurring. This would likely present a temporary

negative effect to roosting bats depending on the proximity of the roost structure to the active road.

### **Myotis Bats**

*Timber Harvest Impacts:* These three myotis bats utilize snags and hollow trees, spaces behind loose bark of trees or stumps, and crevices among rocks or in cliffs as solitary day and night roosts (NatureServe 2018b). These bats feed primarily on moths and may follow prey for relatively long distances around, through or over the forest canopy, in forest clearings, and over water.

Regeneration timber harvest often results in removal of snags in various stages of deterioration, hollow trees and the green and dying trees that can provide future snags (Taylor 2006). Forest management in and adjacent to streams and wetlands results in removal of some trees that may function as roost sites but also may affect the integrity of foraging habitat. This is ameliorated to some extent by OFP Rules that require protection of streams and wetlands with buffers. However, a large portion (60-80%) of the stream buffers and the entirety of wetland buffers is comprised of a managed zone that likely reduces the effectiveness of the buffers in maintaining the integrity of the aquatic features and, thus, reduces the foraging quality of wetlands and streams.

*Silviculture Impacts:* Silviculture activities are conducted by small crews for short durations during daylight hours. These activities will not have an impact on night-foraging myotis bats. Most silviculture activities do not result in the removal of potential roosting structures as any removal or degradation of roosting structures will have already occurred during regeneration harvest activities. However, insect control activities may result in removal of small pockets of insect-infested trees. Insect control activities are uncommon but when conducted they will be part of a regeneration timber harvest or function as a small-scale timber harvest with similar effects to bats as described above, i.e., potential removal of roost sites and, possibly, removal of an insect foraging source. If debris-piling occurs and piles are retained, i.e., not burned, it is possible the debris piles could function as day roosts for individual bats after adjacent vegetation develops because they are known to use stumps as day roosts. Fertilization activities are typically a one-time application that enhances tree growth and has little or no impact on bat forage species.

*Road Management Impacts:* Myotis bats are likely to be affected by road management similar to tree-roosting bats described above. Road construction activities that involve the removal of trees will have similar effects to these bats as timber harvest activities though to a lesser extent because entire forest stands would not be removed. Maintenance activities are unlikely to have much of an effect on these bats relative to potential for disturbance because most bat activity occurs during non-daylight hours when road activity is minimal or non-existent. The exception would be if there is a suitable older tree or snag functioning as a roost located adjacent to a forest road where activity is occurring. This would likely present a temporary negative effect to roosting bats depending on the proximity of the roost structure to the active road.

### **Oregon Slender Salamander**

*Timber Harvest Impacts:* Oregon slender salamanders occur in second growth forest stands and exhibit a preference for woody debris as a habitat substrate. The primary potential effect

of forest management activities to the Oregon slender salamander and its habitat is short rotation clearcut timber harvest, which removes canopy closure, disturbs substrates, and can alter microhabitat refuges and microclimates by degrading down wood and limiting down wood recruitment. Tree-felling and ground-based logging systems mechanically disturb the substrate and ground cover which can result in both substrate compaction and loss of the integrity of existing down wood. However, Kroll and Jones (2018) report that three years post-harvest, there was no strong evidence of a harvest effect on either occupancy or abundance of Oregon slender salamanders in second-growth harvest units located in the western Cascade Mountains of Oregon.

For impacts assessment purposes, the average acreage of regeneration harvest occurring annually across the HCP area will be approximately 500 acres. Forested stands > 40 years of age currently total approximately 11,000 acres. Under baseline forest management, these stands are projected to be reduced over the next decade to approximately 1,400 acres and increase by approximately 100 acres over the following two decades before flattening out. However, habitat features, i.e., large down trees, preferred by Oregon slender salamander will be retained on steep ground where cable yarding is the preferred method, and, to a limited extent, on all harvest units as a result of OFP Rule requirements. Under ORS 527.676, operators are required to leave one or more downed logs or trees that total at least 20 cu ft in volume. Small amounts of down wood and the volume required by OFP Rules may be sufficient to provide a minimal amount of habitat structures preferred by Oregon slender salamanders and, thus, support continued occupancy in harvested stands. Also, as harvested stands grow and develop suitable microclimates in proximity to occupied stands, they may function as suitable habitat that Oregon slender salamanders can move to when regeneration harvest of adjacent occupied stands occurs. This is more likely to occur on steep ground that precludes the use of heavy equipment which comprises (20%) of the 500 acres harvested annually, on average.

*Silviculture Impacts:* Some silviculture activities are unlikely to have a significant impact to Oregon slender salamander because they involve small crews working in a harvest unit for a short duration, e.g., replanting, and mechanical vegetation control. However, potential impacts could occur from debris clearing, piling, and burning.

Approximately 80% of the HCP area is tractor-logging ground with the associated site preparation. Given an average annual acreage of regeneration harvest of 500 acres occurring across the HCP area, and extrapolating, the annual acreage of harvest units receiving site preparation is approximately 400 acres, or 1.3% of the HCP area. These silviculture activities disturb the substrate, and degrade and collect down wood, thus, negatively impacting Oregon slender salamanders that may have remained in the harvest unit post-harvest. Although there are OFP Rules that address avoidance of sediment delivery to streams by minimizing soil disturbance, they are not likely adequate to prevent soil disturbance that alter microclimates important to the Oregon slender salamander. If debris piles remain unburned, they may ultimately function as a refuge and retain microclimate functions suitable for this species. Current OFP Rules require a minimum volume of 20 cu ft be retained per acre in regeneration harvest units. Although this will benefit the Oregon slender salamander as the harvest unit matures, the immediate effect is likely not very beneficial because of the soil compaction and down wood degradation that



will have occurred throughout the harvest unit, notwithstanding their ability to continue to occupy harvested stands to some extent.

*Road Management Impacts:* Road maintenance and road use activities are unlikely to have an impact on Oregon slender salamanders because the ground disturbance activities from road construction would have already occurred. Road construction in suitable habitat directly removes overstory, affects down woody material, and compacts the substrate. The intensity of impacts is more intense and longer lasting than timber harvest, although it occurs to a much lesser extent. Road construction likely causes direct mortality to individuals and some amount of habitat loss, however, due to the scale of impact, the linear nature of the action, and the low amount of annual average road construction (4.2 miles), the impacts from road management activities to the species is likely very low.

### **5.1.3 Plant Species**

As stated in Section 3.3, there are no listed plant species known to occur within the HCP area, nor are any listings anticipated. As such, no plant species are included in the Covered Species addressed in the HCP, thus, a discussion of impacts to covered plant species is not warranted.

## SECTION 6 CONSERVATION PROGRAM

The following conservation program will be implemented based, in part, on habitat development and enhancement, and protection measures that have been developed, proposed or implemented in various conservation plans and strategies for the Covered Species, including forestland HCPs previously approved by NMFS and USFWS, Federal land management plans, conservation assessments (Pope et al. 2014, Clayton and Olson 2009, Rosenberg et al. 2009), and recommendations of the OCS for Oregon's priority species and habitats (OCS 2016). Development of the conservation measures were also informed by the recovery plans for LCR and UWR salmon ESUs and DPSs (ODFW 2010a, ODFW and NMFS 2011, NMFS 2013) and for other covered listed species (USFWS 1987, USFWS 2011e, USFWS 2015a). These prior measures and recommendations were then adopted and tailored, where applicable, in consideration of the unique landscape conditions, conservation role and potential impacts of the Covered Activities specific to Port Blakely's Covered Lands. Where needed, additional conservation measures were developed. Thus, these measures reflect the latest thinking for implementing conservation measures that provide a net conservation benefit to listed salmonid species and their habitats, as well as terrestrial Covered Species, in managed forest landscapes of the Pacific Northwest and, especially, for the Port Blakely HCP area landscape conditions on the western lowland slopes of the Cascade Mountains in north central Oregon. The conservation measures are described below and summarized in Appendix B Summary of Conservation Program Measures. A comparison of baseline measures under OFP Rules and HCP conservation measures is provided in Appendix C Comparison of HCP Conservation Measures and Oregon Forest Practice Statutes/Rules.

To understand what Port Blakely is able to provide, in terms of habitat conservation measures, it is important that the baseline conditions are described both in terms of the current landscape conditions and the regulatory context. As described in Section 4, approximately 8% of the HCP area was previously converted from native forest to agricultural land uses but has now been returned to young native forest. The remainder of the ownership is comprised of forest stands that have sustained one or two harvest rotations, i.e., it is either second or third growth. The wildfires of 2020 created a condition that necessitated increased harvest in specific areas of older stands that sustained intense burns such that young stands, i.e., 0–10-year-old age-class, are more abundant than previously planned in the early decades of the HCP term. As such, there are limited, and in some areas, no legacy structures that contribute to diversity and complexity across the landscape. This is true for both terrestrial forest habitat in the uplands and riparian habitat along streams and wetlands. Additionally, all of Port Blakely's forestlands have been managed under state Forest Practice Rules where minimal woody debris retention is required and, as such, standing snags, older trees, forest-floor coarse woody debris, and large wood in streams is nominal. Thus, these features will need to be protected where they exist, to the extent possible, or developed over the period of the HCP.

The conservation program Port Blakely envisions, described in detail in Sections 6.2 and 6.3, will result in a noticeable increase in structural features, and habitat diversity and complexity than what currently exists on the landscape managed under OFP Rules. The habitat mosaic will be developed over time and is intended to protect ecosystem functions and natural process regimes. Development of the strategy took into consideration the

specific species, habitats and functions that are encountered on Port Blakely's ownership, making this Plan site specific. Maintaining or mimicking natural forest habitat features is a primary goal. This will occur both along streams and in the uplands important to covered fish and wildlife species. The habitat that is protected, grown, and enhanced will result in a net conservation benefit over existing baseline conditions established under implementation of OFP Rules, as described in Appendix C Comparison of HCP Conservation Measures and Oregon Forest Practice Statutes/Rules, by:

- Ensuring that Port Blakely's forestlands stay in forestry;
- Increasing the habitat quantity and quality beyond what is required by current OFP Rules;
- Contributing more to fish and wildlife habitat than what would occur under regeneration harvests at the economic rotation age conducted under OFP Rules;
- Complementing habitat and resource management goals for adjacent Federal lands; and
- Serving as a complementary buffer between higher quality habitat on adjacent Federal lands and habitat degradation activities associated with ever-increasing and expanding urbanization and agriculture.

#### **6.1 Salmonid Recovery Plan Actions Recommended for LCR and UWR ESUs and DPSs Pertinent to the HCP Area**

Summaries of restoration activities and recommendations included in the LCR and UWR recovery plans as they pertain to the HCP area are provided below (ODFW 2010a, ODFW and NMFS 2011, NMFS 2013). The focus actions and areas included here are for land management/uses, specifically forest management, for tributaries in ESUs and DPSs where salmon may occur on streams effected by Port Blakely. Because of where the HCP lands occur in the upper watersheds of the Molalla and Clackamas River systems, the tributaries of these rivers are the salmon habitat elements where Port Blakely may potentially have an impact, and for which they have some control and can adjust activities to contribute to salmon recovery.

*Lower Columbia River Coho Recovery Plan Summary* - The ESU recovery strategy for LCR coho salmon involves improvements in all threat categories to increase abundance, productivity, diversity, and spatial structure to the point that the Coast, Cascade, and Gorge strata are restored to a high probability of persistence (NMFS 2013). The ESU recovery strategy has seven main elements, the most pertinent to the HCP area and forest management activities are:

- Protect and improve populations with a clear record of continuous natural spawning and are likely to retain local adaptation (the Clackamas River); and
- Restore tributary habitat (particularly overwintering habitat) to the point that each subbasin can support coho salmon at the target status for that population.

In implementing the LCR coho salmon tributary habitat strategy in the Cascade stratum, considerations include, but are not limited to, the following:

- In the lower reaches of most Cascade subbasins, floodplains of southwest Washington rivers, as well as the Clackamas River in Oregon, have been drastically altered or disconnected as a result of channel modification to facilitate and protect

urban and industrial development, agricultural land, and, in some cases, gravel mining. Restoration in these areas will need to be balanced with the need to protect existing infrastructure and control flood risk.

- This stratum includes the most heavily urbanized areas in the Columbia Basin. Managing the impacts of growth and development on watershed processes and habitat conditions will be key to the protection and improvement of habitat conditions for coho salmon in these areas.

In addition to the actions described as part of the regional strategy for tributary habitat, addressing passage barriers such as culverts will benefit coho salmon by restoring access to habitat. Assuming that the impacts of other threats are reduced to specified levels, the scale of habitat improvements needed for Cascade-stratum coho salmon populations ranges from minimal for the Tilton and Salmon Creek to a 35% to 50% increase in the productive capacity of tributary habitat in the Sandy, Washougal, and East Fork Lewis subbasins. Oregon estimated that, for the Clackamas population, existing habitat is adequate to achieve a very high probability of persistence (NMFS 2013).

*Lower Columbia River Chinook Recovery Summary* - For fall Chinook salmon recovery strategy, management unit plans set a high priority on reducing the impacts of sediment on survival to emergence and on improving juvenile rearing habitats, including reconnecting or restoring side channels and marsh habitats that are particularly critical to juvenile rearing of tule Chinook salmon (NMFS 2013). Priority of site-specific actions will focus on protecting, restoring, or creating lowland floodplain function, riparian function, and stream habitat complexity. Priority restoration projects will include those to create or improve access to off-channel and side-channel habitat (alcoves, wetlands, floodplains, etc.) and restore riparian areas and instream habitat complexity; this includes improving recruitment of large wood to streams (NMFS 2013).

The LCR coho and fall Chinook salmon tributary habitat strategies in the Cascade stratum, include considerations of, but are not limited to, the following:

- The lower reaches of most Cascade subbasins, as well as the Clackamas River in Oregon, have been drastically altered or disconnected as a result of channel modification to facilitate and protect development, agricultural land, and, in some cases, gravel mining. Restoration of these areas will need to be balanced with the need to protect existing infrastructure and control flood risk.
- The stratum includes the most heavily urbanized areas in the Columbia Basin. Managing the impacts of growth and development on watershed processes and habitat conditions will be key to the protection and improvement of habitat conditions for fall Chinook salmon in these areas.

In addition to the actions described as part of the regional strategy for tributary habitat, addressing passage barriers such as culverts will benefit Chinook salmon by restoring access to habitat (NMFS 2013). The recovery plan cites the Oregon management unit plan as identifying a need to address flow issues in the Clackamas subbasin and incorporates a number of flow-related actions. ODFW estimated that, for the Clackamas population, existing habitat is adequate to achieve the targeted medium persistence probability, assuming that all other targeted threat reductions for that population are achieved (ODFW

2010a). However, the Oregon plan notes that, because of multiple uncertainties, efforts should still be made to protect and restore habitat in the Clackamas subbasin.

*Lower Columbia River Steelhead Recovery Summary* - The recovery strategy for the LCR steelhead DPS is aimed at restoring the Cascade and Gorge winter and summer strata to a high probability of persistence. The most crucial element of the LCR steelhead DPS recovery strategy, pertinent to the HCP area, includes protection and improvement of specific winter steelhead populations, including the Clackamas, which currently are the best-performing winter populations. This is accomplished through population-specific combinations of threat reductions to include protection and restoration of tributary habitat (crucial) and reductions in proportion of hatchery-origin spawners (NMFS 2013). Actions of particular benefit to steelhead focus on protecting and restoring habitat complexity and diversity, access to side channels and off-channel habitats, and improving riparian cover and recruitment of large wood to streams (NMFS 2013). Tributary habitat recovery strategies for summer and winter steelhead do not specifically mention the Clackamas subbasin, however, a regional strategy recommends addressing passage barriers such as culverts which will benefit winter steelhead by restoring access to habitat (NMFS 2013).

*Upper Willamette River Chinook and Steelhead Recovery Plan Summary* - Subbasin habitat actions are focused on protecting existing functional physical habitat, restoring degraded habitat reaches (adequate pools/glides/riffles, side channels, cover structures, spawning gravels) and improving water quality/quantity. One key component of this is the continued protection of spawning and rearing habitat in public (Federal) lands above the dams in the North Santiam, South Santiam, McKenzie, and Middle Fork subbasins. In addition, there are short-term and long-term strategies and actions that can be located and scaled sufficiently to create complex stream habitat features that can restore hydrologic connectivity with the adjacent riparian area and floodplain. In the short-term, subbasin habitat actions are proposed to help encourage the placement of large wood in streams to create reach complexity, and to protect key stream reaches that contain summer holding pools for Chinook adults. This latter action is augmented by steps taken to reduce harassment and poaching of adults in summer holding pools. Taken together, these actions are intended to bridge the gap until long-term habitat actions begin restoring natural habitat forming processes. In the long-term, this Plan proposes creating, improving, and/or maintaining riparian areas to provide a continual source of large wood and other functions (example: shade and filtering functions) that benefit water quality/quantity and complexity. Water quality improvement actions are proposed, many of which are to be implemented through TMDL implementation plans and other supporting programs. Actions are also proposed to identify sources of sediment entering streams and approaches to reduce or eliminate those sources. Other actions have been identified to encourage water conservation and coordination of water withdrawals for permitted users. Subbasin habitat actions within smaller tributaries are more focused on steelhead, as Chinook do not often spawn in smaller tributaries. However, Chinook that spawn and rear in larger order streams downstream of steelhead will benefit indirectly from the actions identified and implemented in upstream steelhead habitat, as water quality improvements and habitat forming processes are transmitted downstream.

## 6.2 Biological Goals and Objectives

The biological goals of the Port Blakely HCP stated below are followed by the biological objectives necessary to accomplish them.

The HCP's biological goals are largely habitat and ecosystem function based. Port Blakely's efforts will be focused on maintaining or creating, enhancing, and restoring aquatic and terrestrial habitat that will contribute to the long-term conservation of Covered Species that rely on these habitats and/or ecosystems. Specifically, stream and riparian habitat conservation measures will address potential impacts to listed salmonids consistent with the LCR and UWR salmonid recovery plans (ODFW 2010a, ODFW and NMFS 2011, NMFS 2013), as well as other fish and stream-associated amphibians. The HCP will provide functional riparian area protection which will affect in-stream function in the following ways: reduce the potential for temperature increases, increase delivery of LWD, and reduce the potential for sediment delivery. Terrestrial habitat measures focus on providing spotted owl foraging habitat and increasing woody features common to natural forest conditions, e.g., snags, coarse woody debris, and green leaf trees patches, throughout the HCP area that are expected to result in improved habitat conditions and ameliorate potential impacts to spotted owls, forest birds, and a variety of mammals known to occur in the central Oregon Cascade Mountains.

The biological objectives below describe the actions necessary to achieve the biological goals and provide the foundation for determining the conservation measures and evaluating the effectiveness of the overall conservation strategy. The biological objectives will follow a SMART approach, i.e., they will be specific, measurable, achievable, results-oriented, and time-fixed.

*Goal 1: Provide forest habitat with functional structural and age-class complexity and diversity in the context of commercial forest management* – Create and maintain an increased amount and distribution of structural features (such as coarse wood debris, legacy snags and large trees) within managed stands and a forest age-class range which will include some older stands, i.e., 50+ years across the HCP area. These structural features and older stands are currently not widely present on the HCP lands due to previous management, requirements of current forest practices, and typically not produced in commercial forests being managed on a short-rotation basis, i.e., less than or equal to a 40-year economic rotation-age. These landscape conditions will be enhanced from current conditions and those that would exist in the future under current OFP Rules. This will be accomplished through provisions of the HCP related to structural retention during regeneration harvests, mid-rotation thinning activities, stream buffers, special habitat protections, upland leave tree patches, and Port Blakely's regeneration harvest rotation longer than the economic rotation-age, and averaging ~ 500 acres, annually. They will provide functional habitat for covered amphibian, avian, and mammalian species within the context of Port Blakely's commercial forest management BMPs.

*Objective 1: Variable width stream buffers.* At regeneration harvest throughout the Permit term, establish variable width stream buffers on all fish-bearing streams within the HCP area specific to each stream type that provides buffer zones based on stream type, to include a 50-foot no-harvest zone around stream-associated special habitat types and/or features (including wetlands, seeps, and unstable slopes).

*Objective 2: Buffers on lakes, wetlands, and bogs.* At regeneration harvest throughout the Permit term, establish a 100-foot buffer on stream-associated lakes and wetlands >8 acres or bogs of any size: Buffers will contain a 50-foot no harvest zone measured from the edge of the lake, wetland or bog and will include a 50-foot managed buffer composed of 50% relative retention of original live trees by DBH class well distributed, with retention of snags, downed wood and understory trees/shrubs  $\leq 10''$  DBH, measured from the wetland edge.

*Objective 3: Slope protection.* At regeneration harvest and partial harvest, inner gorges, bedrock hollows and convergent head walls with slopes greater than 70% and adjacent to streams will be protected with retention of all trees within the feature and those trees where the crowns drip line extends over the feature if adjacent to nonfish streams, and will be protected with a 50-foot no harvest buffer if adjacent to fish streams.

*Objective 4: Large Wood.* At regeneration harvest throughout the Permit term, proactively contribute LW to all Small and Medium fish-bearing streams, at locations to be determined in coordination with an ODFW habitat biologist, to the extent possible, and according to ODFW LW Placement Guidelines. Placement will occur at the rate of one tree, on average, per 300 feet on each side of the stream, rounding up to 4 trees per 1,000' (or 8 trees if both sides of the stream are included in the harvest unit). Trees selected for input to the stream will primarily be conifer, located from within the buffer, and be felled mechanically on slopes < 35%, or hand-felled on slopes > 35%. Root wads with trees attached may be transported from other locations within the riparian buffer and placed within the stream channel in areas where conditions merit. However, equipment will not be entering the 30-foot ELZ or pushing over/cutting trees that are within 20 feet of the stream. Areas disturbed by machine tracks will be covered with slash to prevent erosion following machine entry.

*Objective 5: Owl habitat.* Throughout the Permit term, create owl dispersal and foraging habitat conditions with woody structural features for potential utilization by a variety of terrestrial species through commercial thinning of 25 to 40-year age-classes resulting in a minimum of approximately 11% of the HCP forested area (~ 3,100 acres) in foraging habitat, i.e., forest age-classes greater than 35 years of age on slopes less than 35% that have been commercially thinned, distributed across the HCP area. The amount of foraging habitat will be maximized in 4<sup>th</sup> and 5<sup>th</sup> decades of the Permit term to approximately 16% and 20% of the HCP area, respectively (~ 4,900 and 5,800 acres). Dispersal habitat acreages will add a minimum of an additional 8% (~ 2,400 acres) in the second decade to the foraging/dispersal habitat mosaic increasing to 23% in the 4<sup>th</sup> decade (~6,700) and a maximum of approximately 31% (~ 9,100 acres) in the fifth decade resulting in approximately 51% (~ 15,000 acres) of the forested HCP landscape in a foraging/dispersal habitat condition.

*Objective 6: Wildlife trees per acre.* At regeneration harvest throughout the Permit term, retain four wildlife TPA which are expected to function as important habitat features for spotted owl prey and other covered wildlife species as the stands develop.

*Objective 7: Snags per acre.* At regeneration harvest throughout the Permit term, provide additional habitat structures by retaining all safe snags and creating additional snags at the rate of one snag for every 10 acres of regeneration harvest. At commercial thin harvest, retain two defective trees or create two snags from the largest size class, or a combination of both, per acre.

*Objective 8: Coarse Wood.* At regeneration harvest throughout the Permit term, contribute to terrestrial species habitat potential by retaining or creating CWD on the forest floor that is at least 30 cu ft per acre, on average, with no pieces to be < 10 cu ft in volume, and/or create wood piles 5-10 ft in diameter, comprised of piece sizes that average 10" diameter and are 1-3 ft long from residual logging debris. At commercial thin harvest, retain or create two TPA on the forest floor, defective or of the largest size class.

*Objective 9: Retain understory trees.* At regeneration harvest, retain understory trees < 10" DBH where they exist along stream buffers, in upland patches, or along the edge of the unit. Retain understory western red cedar where they exist throughout the harvest unit to facilitate structural diversity and perching, and nesting habitat for songbirds.

*Objective 10: Leverage benefits of logging slash.* At regeneration harvest, retain logging slash distributed throughout the unit to contribute to soil structure, maintain moisture and contribute to small mammal and amphibian habitat.

*Objective 11: Leave trees.* At regeneration harvest, retain a minimum of 25% of the leave trees in the uplands as reserves around special management areas (SMAs) where they exist or, if SMAs not present, in 1/4 acre to 1-acre sized patches distributed across the harvest unit to minimize habitat fragmentation and to provide terrestrial species nesting, denning and foraging habitat and to protect sensitive or unique upland habitats.

*Objective 12: Control invasive species.* After regeneration harvest throughout the Permit period, control non-native invasive species with the use of mechanical methods and prescribed burning to facilitate early growth in retained trees in riparian and other leave tree areas.

*Objective 13: Forest age-class range.* Through a combination of RMAs, special habitat protections, upland leave-tree patches, and Port Blakely's regeneration harvest longer than the economic rotation-age, create a forest age-class range that retains a minimum decadal average of approximately 14% (4,300 acres) of the HCP area in older forest stands (i.e., 50+ years) during the first decade, and remaining relatively stable from 16% to 19% through the remainder of the Permit term. This habitat is comprised primarily of riparian and upland leave tree reserves that are guaranteed to remain on the landscape for as long as an Incidental Take Permit is in force.

*Objective 14: Legacy woody features.* At regeneration and partial harvest, retain biological legacy woody features such as live trees, snags, and downed trees, where operationally feasible and safety requirements are met.

*Objective 15: Clearcut (patch) size.* At regeneration harvest, minimize habitat fragmentation by maintaining an average clearcut size of 60 acres.

*Objective 16: Distance between leave trees.* At regeneration harvest, maintain minimal distances between leave trees such that no place in the harvest unit will be more than 500 feet from a leave tree (wildlife trees will be no farther than 1,000' apart).

*Goal 2: Riparian and Stream Ecosystem Functions* – Improve riparian and stream ecosystem functions from current baseline conditions. This will be accomplished by designating wider RMAs and by implementing an overall management regime that: a) increases retention and creation of shade, trees, other woody vegetation, and standing and



down debris directly adjacent to the RMAs, and b) maintains a diversity of forest age-classes and stand structures (including some stands older and more structurally complex than typical commercial forest practices) across the landscape. As a result, the ecological function of most stream reaches will, for substantial portions of the HCP term, be supported both by designated RMAs that substantially maintain stream integrity and contribute to stream habitat quality and by adjacent/proximal forest conditions. These measures are expected to moderate temperature, reduce sediment input, and provide LWD, as well as re-connect habitat, resulting in improved suitable aquatic habitat for all salmonid life stages, thus, contributing to viable salmonid population maintenance and increases as detailed in LCR and UWR salmonid recovery plans.

*Objective 1: Variable width buffers on all fish-bearing streams.* At regeneration harvest throughout the Permit term, establish variable width no-harvest stream buffers on all fish-bearing streams within the HCP area specific to each stream type that provides a minimum 100, 90 and 75-foot no-harvest zone reserves for Large, Medium, and Small fish streams, respectively, to include a minimum 50-foot no-harvest zone around stream-associated special habitat types and/or features (including wetlands, seeps and unstable slopes).

*Objective 2: Variable width buffers on Large and Medium nonfish-bearing streams.* At regeneration harvest throughout the Permit term, establish 80-foot stream buffer reserves on all Large and Medium nonfish-bearing streams. Buffers will contain a 55-foot no-harvest zone next to the stream and have a 25-foot managed zone respectively, to include a 50-foot no-harvest zone around stream-associated special habitat types and/or features.

*Objective 3: Buffers on Small nonfish-bearing streams.* At regeneration harvest throughout the Permit term, establish a 50-foot buffer on Small nonfish-bearing streams with a 25-foot no-harvest zone and a 25-foot managed zone, to include protection (no-harvest) of stream-associated special habitat types and/or features to maintain the integrity of the special habitat/feature. Buffers are to be retained as reserves for the Permit term.

*Objective 4: Buffers on lakes, wetlands, and bogs.* At regeneration harvest throughout the Permit term, establish a 100-foot buffer on stream-associated lakes and wetlands >8 acres or bogs of any size. Buffers will contain a 50-foot no harvest zone measured from the edge of the lake, wetland or bog and will include a 50-foot managed buffer composed of 50% relative retention of original live trees by DBH class well distributed, with retention of snags and downed wood, measured from edge, and understory trees/shrubs  $\leq 10''$  DBH will be retained where feasible.

*Objective 5: Slope protection.* At regeneration harvest and partial harvest, inner gorges, bedrock hollows and convergent head walls with slopes greater than 70% and adjacent to streams will be protected with retention of all trees within the feature and those trees where the crowns drip line extends over the feature if adjacent to nonfish streams, and will be protected with a 50-foot no-harvest buffer if adjacent to fish streams.

*Objective 6: Large Wood.* At regeneration harvest throughout the Permit term, proactively contribute LW to all Small and Medium fish-bearing streams, at locations to be determined in coordination with an ODFW habitat biologist, to the extent possible, and according to ODFW LWD Placement Guidelines. Placement will occur at the rate of one tree, on average, per 300 feet on each side of the stream rounding up to 4 trees per 1,000' (or 8 trees if both sides of the stream are included in the harvest unit). Trees selected for input to the stream will

primarily be conifer, located from within the buffer, and be felled mechanically on slopes < 35%, or hand-felled on slopes > 35%. Root wads with trees attached may be transported from other locations within the riparian buffer and placed within the stream channel in areas where conditions merit. However, equipment will not be entering the 30-foot ELZ or pushing over/cutting trees that are within 20 feet of the stream. Areas disturbed by machine tracks will be covered with slash to prevent erosion following machine entry.

*Objective 7: Minimize sediment.* Throughout the Permit term, implement road management measures designed to avoid and/or minimize the potential for sediment delivery to streams, accommodate 100-year flood events without damage, and allow passage of all life-stages of all native fish species.

*Objective 8: Address existing fish passage blockages.* Beginning the first year of the Permit term, repair or replace all fish passage blockages within five years, currently known to occur at 11 locations, re-establishing access, for all fish including Pacific lamprey and resident species, to 3.5 miles of upstream fish habitat.

*Objective 9: Address new fish passage blockages.* Throughout the Permit term, all newly acquired or developed fish passage blockages will be repaired or replaced beginning the first year of Permit issuance and be completed within three years of discovery to allow passage by all fish including Pacific lamprey and resident species.

*Objective 10: Road removal.* Beginning the first year of the Permit term, remove approximately two miles of stream-adjacent roads within five years, and remove stream-adjacent roads when topographically feasible in subsequent 5-year planning horizons; no construction of new roads in RMAs unless there are no other topographical options.

*Objective 11: Landscape conditions.* Create and maintain landscape conditions across the Covered Lands so that for most stream reaches for substantial portions of the HCP term, the contributions to stream integrity and function provided by designated RMAs will be supplemented by forest conditions (beyond those designated zones) that provide additional shade, slope and soil stability, and sources of large woody debris. These landscape conditions will be enhanced through provisions of the HCP that increase structural retention, mid-rotation thinning, and special habitat protections, and that result in some forest stands older and more structurally complex than typical commercial forest practices. (See *Goal 1* for additional detail regarding this objective).

*Objective 12: Watershed restoration.* Contribute to watershed restoration projects through in-kind, product or monetary support at a minimum rate of \$10,000 per year and a maximum rate of \$25,000 per year.

*Goal 3: Spotted Owl Foraging and Movement/Dispersal*— Improve the amount and quality of habitats that allow the Covered Lands to act as an effective movement and foraging landscape for dispersing owls, and that have the potential to provide roosting opportunities for territorial owls residing on nearby Federal/state lands or for non-territorial owls that might utilize the Covered Lands for extended periods of time. These improvements will enhance the function of the Covered Lands compared to current conditions.

*Objective 1: Foraging habitat.* Throughout the Permit term, create habitats with potential foraging characteristics (contains prey species habitat features) through commercial thinning

of 25 to 40-year age-classes resulting in a minimum of approximately 11% (~ 3,100-3,700 acres) of the HCP area (in the first three decades of the Permit period) in foraging habitat in forest age-classes from 35 to 50+ years of age distributed across the forested HCP area.

*Objective 2: Snags per acre: commercial thinning.* Throughout the Permit term, facilitate development of owl foraging habitat potential by retaining and/or creating two defective trees or snags and two downed logs per acre during commercial thinning operations in the 25 to 40-year-old age-classes; foraging habitat expected to be available for 10-25 years.

*Objective 3: Wildlife Trees Per Acre.* At regeneration harvest throughout the Permit term, facilitate development of owl foraging habitat potential by retaining four wildlife TPA which are expected to function as important habitat features for spotted owl prey and other covered wildlife species as the stands develop.

*Objective 4: Leave trees.* At regeneration harvest through the Permit term, retain 25% of the leave tree commitment in the uplands, as reserves around SMAs or in upland leave tree patches from ¼ acre to 1 acre in size.

*Objective 5: Snags per acre: regeneration harvest.* At regeneration harvest throughout the Permit term, facilitate development of owl foraging habitat potential by retaining all safe snags and creating additional snags at the rate of one snag for every 10 acres of regeneration harvest.

*Objective 6: Coarse Wood.* At regeneration harvest throughout the Permit term, contribute to owl prey species and other terrestrial species habitat potential by retaining or creating CWD on the forest floor that is at least 30 cu ft per acre, on average, with no pieces to be < 10 cu ft in volume, and/or create woody debris piles 5-10 ft in diameter, comprised of piece sizes that average 10" diameter and are 1-3 ft long from residual logging debris.

*Objective 7: Legacy woody features.* At regeneration and partial harvest, retain biological legacy woody features such as live trees, snags, and downed trees, where operationally feasible and safety requirements are met.

*Objective 8: Forest age-class range.* Through a combination of RMAs, special habitat protections and Port Blakely's regeneration harvest longer than the economic rotation age, provide for a forest age-class range which will include some older stands on the Covered lands. (See *Goal 1* for additional detail regarding this objective.)

*Goal 4: Contribute to Spotted Owl Population Recovery* – Provide protection to suitable habitat and nest sites when site centers are in or adjacent to the HCP area.

*Objective 1: Higher quality habitat features.* Throughout the Permit term, complement existing site center(s) protections on adjacent land with retention and/or creation of higher quality habitat features characteristic of suitable owl habitat, e.g., older stands, legacy structures, where they occur on the HCP lands within the nest-tree 70-acre core.

*Objective 2: Nest tree protection.* Throughout the Permit term, where owl nest trees (site centers) are known to occur on the HCP lands, protect a 70-acre core of the highest quality suitable owl habitat around the existing nest tree for up to three nests based on guidance and recommendations from USFWS; protect these nest trees for as long as occupied and for five consecutive years of unoccupancy.

*Objective 3: Additional nest tree protection.* If more than three active nest sites, coordinate with USFWS to provide protection where advised.

*Objective 4: Noise restrictions.* Throughout the Permit term, implement noise disturbance restrictions recommended by USFWS for nest site protection from March 1 through September 30.

*Goal 5: Contribute to Population Viability of Specific Covered Species* – Provide habitat features and/or disturbance restrictions specific to Covered Species, currently not required, that facilitate sustainable populations of specific Covered Species.

*Objective 1: Wolf den sites* - Protect up to two active den sites for a minimum of three years but as long as occupied; implement disturbance timing restrictions from March 15 to July 30; den site protection and disturbance restrictions will be applied to an area comprising 0.50 miles around den sites; restrict public access to HCP area roads. Create landscape level habitat mosaic.

*Objective 2: Fisher* - Protect confirmed denning females and their young by limiting or preventing access and disturbance within 0.25 mile of occupied sites, including the destruction of the denning structure itself; provide protection of denning females by restricting trapping and nuisance animal control activities within 2.50 miles of known occupied dens; create CWD piles for potential use as dens by fishers and/or prey species. Retain biological legacy woody features such as live trees, snags, and downed trees, where operationally feasible and when safety requirements are met.

*Objective 3: Northern goshawk* – Protect 30 acres of forest habitat around up to two active nest sites for a minimum of three years but as long as occupied; provide forest landscape-wide habitat mosaic; implement operational disturbance restriction for a distance of 0.50 mile from active nests March 1- August 31.

*Goal 6: Protect Ecosystems Associated with Over-steepened and Potentially Unstable Slopes* – Naturally occurring steep-slope movement is a part of the natural environment and contributes valuable coarse sediment and large woody debris to riparian areas. Throughout the term of the Permit period, implement measures that prevent existing over-steepened and potentially unstable slopes on the landscape from disturbance, i.e., conduct forest management activities so that they do not contribute to measurable slope failure.

*Objective 1: Landslide hazard areas.* At regeneration harvest and partial harvest, any road construction or quarry development on or immediately adjacent to landslide hazard areas determined to be a risk to public safety by a regulatory authority will have a written management plan prepared in consultation with a licensed geotechnical specialist.

*Objective 2: Slope protection: fish-bearing streams.* At regeneration harvest and partial harvest, inner gorges, bedrock hollows and convergent head walls with slopes > 70% and adjacent to fish bearing streams will be protected with the retention of all trees within the feature and retention of all trees within 50 feet of the slope break boundary of the feature.

*Objective 3: Slope protection: nonfish-bearing streams.* At regeneration harvest and partial harvest, inner gorges, bedrock hollows and convergent head walls with slopes > 70% and adjacent to nonfish bearing streams will be protected with retention of all trees within the feature and those trees where the crowns drip line extends over the feature.

*Objective 4: Slope protection: non-connected streams.* At regeneration harvest and partial harvest, inner gorges, bedrock hollows and convergent head walls with slopes > 70% adjacent to non-connected streams will be a priority leave area for upland leave trees.

*Objective 5: Deep-seated landslides.* At regeneration harvest and partial harvest, deep-seated landslides with greater than 65% slopes and convex or planar slopes greater than 80% will be evaluated in coordination with a licensed geotechnical specialist to develop management options. These options may include ground-based equipment exclusion, vegetation retention during plantation establishment, full-suspension of harvested logs in and over the feature, and mitigation of disturbed soils > 10% of the feature area.

*Objective 6: Quarry locations.* Quarry's will not be developed within one hundred feet of inner gorges, bedrock hollows and convergent headwalls with slopes > 70% and will be far enough from the feature to assure surface runoff does not influence the feature. Quarry development at the toe of deep-seated landslides and on convex or planar slopes > 80% will be approved by a licensed geotechnical professional.

*Objective 7: Road locations.* Road construction across inner gorges, bedrock hollows, and convergent headwalls > 70%, and the toes of deep-seated landslides will be avoided unless no alternative routes are available that are cost-effective and/or environmentally sound. Road construction inclusive of the preceding and including convex or planar slopes > 80% will be reviewed by a licensed geotechnical professional.

### **6.3 Measures to Avoid, Minimize, and Mitigate Take**

The conservation measures that are derived from the biological objectives are designed to:

- Create a landscape level habitat mosaic that conserves ecosystem functions;
- Exceed baseline OFP Rules;
- Be implemented to the maximum extent practicable; and
- Be commensurate with the impacts of the take that occurs incidentally from conducting the Covered Activities in ESUs where numerous other human activities and land management uses are already having impacts on the Covered Species.

#### **6.3.1 Streams and Riparian Ecosystem Functions**

Under the HCP, the stream and riparian conservation measures are designed to reduce the risk of sediment input to streams, increase LWD delivery to streams and reduce any potential for temperature increases of streams that result from conducting commercial forest management activities under current OFP Rules. As described below, the HCP stream and riparian conservation measures are consistent with recommended conservation actions cited in recovery plans, conservation assessments and the OCS for Oregon priority habitats and species will improve stream and riparian habitat conditions increasing the biological function across the HCP commercial forest landscape, such that they make a contribution to the conservation and/or recovery of the Covered Species. Port Blakely's program to identify and repair or replace fish passage blockages will result in re-connecting the stream to currently unavailable fish habitat upstream. Stream-associated wetlands along fish streams will also be protected which have the potential to function as off-channel habitat for rearing and foraging fish.

### *Biological Function and Role of HCP/SA Stream and Riparian Conservation Measures*

*Sediment Reduction* - Port Blakely will implement road management measures that are additions to, or enhancements of, current OFP Rules that focus on reducing the potential for sediment input to streams. Reducing sediment input will improve water quality and, thus, habitat for fish and wildlife that rely on clean water, e.g., anadromous salmonids and amphibians. Sediment input will be reduced or eliminated by:

- Locating roads away from streams outside RMAs and removing stream-adjacent roads, depending on their location within the harvest unit and if there are no safety issues;
- Creating additional water bars and cross-drains designed to divert road run-off and sediment onto forest floor well above streams;
- Disconnecting ditchlines from streams;
- Replacing poorly functioning culverts beginning the first year of Permit issuance and completing within five years of Permit issuance;
- Installing larger than required culverts and bridges able to accommodate 100-year flood events; and
- Applying no-harvest stream riparian buffers which will block and/or filter sediment delivery.

These activities will reduce sediment from the stream, improving water quality and stream function for fish and wildlife that rely on stream ecosystem habitats in the HCP area. Additionally, Port Blakely's implementation of unstable slopes protections on fish and nonfish streams will reduce the potential for mass-wasting events to contribute significant sediment input to downstream reaches.

Roads are an integral component of the long-range management of timber harvest operations and provide access for fire suppression activities across the HCP forestlands. Road planning and construction occur in consideration of operational efficiencies such as logging systems that will be utilized at the time of harvest, construction cost alternatives, minimized road density and loss of land from timber production. Avoidance of sensitive environmental, archeological, and cultural sites will be exercised whenever possible. A road maintenance plan, explained in detail below, will be implemented that addresses stream and water quality resulting in measures that will reduce the potential for impacts to listed fish and fish habitat.

Under the HCP, the additional road management measures described in Section 6.3.4, have been designed to improve the forest road systems on Port Blakely lands in order to avoid and minimize negative effects to aquatic resources from road related issues such as sediment delivery and loss of shade. These additional measures, though previously voluntary, will now be commitments under the HCP. These activities will exceed current OFP Rule road management standards as follows:

- 1) Perennial nonfish-bearing stream crossing culverts will be a minimum of 24" in diameter instead of 18" in diameter (under OFP Rules) and will be designed to pass 100-year flood events instead of 50-year events;
- 2) Cross-drain culverts will be 18" in diameter instead of 15" in diameter (under OFP Rules), and an inventory of new installations that meet this measure will be

- completed within five years of Permit issuance (existing structures will be upgraded with the larger culvert size at the time the pipe needs to be replaced);
- 3) Road crossings on fish-bearing streams will be designed to pass all life-stages of all native fish species instead of just anadromous, game and ESA listed species, required under OFP Rules, and will be designed to allow 100-year flood events to pass rather than 50-year flood events;
  - 4) All known existing man-made fish passage barriers will be fixed beginning the first year of Permit issuance and be completed within five years of Permit issuance (under OFP Rule 629-625-0600, fish passage impairment fixes are only required for roads constructed or reconstructed after September 1994 and there is no time requirement to identify and repair); and
  - 5) Newly discovered or acquired man-made barriers will be fixed within the first year of Permit issuance, if operationally possible, but no later than within three years of discovery or acquisition.

Construction of new forest roads will result in removal of trees on a small scale in association with regeneration harvest and thinning activities. High maintenance permanent road locations will be evaluated for long term economic impacts. Road decommissioning (deactivating) will be implemented where the road is not expected to be needed for 20-25 years. Detailed descriptions of Port Blakely's road construction and maintenance activities are provided in Section 2.2.3 while additional road management commitments are described in Section 6.3.4. Port Blakely will adopt new road management methodologies as they are developed over the term of the HCP that are not only more efficient and economical but improve effectiveness. Road construction and management activities designed to avoid and/or minimize sediment inputs to streams are summarized below:

1. Reduce the potential for sediment delivery to streams and sensitive aquatic features through implementation of road maintenance measures that address water/sediment run-off:
  - a. Design structures to accommodate 100-year flood events;
    - i. Bridges
    - ii. Culverts
  - b. Prevent delivery of road associated sediment to any regulated stream or sensitive aquatic resource;
    - i. Hauling or road related forestry activities will be restricted when those activities risk delivery of sediment to streams. Restriction may include limitations or cessation of the activity until conditions improve. In extreme cases, roads may be blocked with tank traps or logs. Mitigation measures may include installation of adequate surface water bars to divert water to the forest floor.
    - ii. Cross-drains will be installed when operationally opportunistic at 308 locations identified for ditch line relief to reduce the potential for sediment delivery to streams.
    - iii. Potential delivery from ditchlines will be reduced/eliminated by disconnecting ditchlines from streams.
    - iv. Abandon (remove and/or relocate) an estimated 1.9 miles of stream-adjacent parallel roads beginning the first year of Permit issuance and be completed within five years of Permit issuance, i.e., roads within small,

medium and large fish stream RMAs that are aligned parallel to the general direction of a stream for more than 300 feet, where another road alternative exists that is cost-effective and environmentally sound. Streams important to listed salmonids that will benefit from this activity include Mosier Creek and Clear Creek in the Clackamas drainage.

2. Implement road management strategies that reduce impacts to terrestrial and aquatic habitat. Port Blakely has been voluntarily implementing a program for fixing fish passage barriers on the HCP ownership for the past 18 years, during which 78 fish passage barriers have been repaired or removed, re-connecting 60.2 miles of fish habitat upstream of the barriers (Table 6-1). Port Blakely will commit to continuing its fish passage barrier program which includes implementation of the following measures to address existing and future fish passage barriers in the HCP area:
  - a. Facilitate fish passage for all life stages of all native fish species by continuing a program of systematically removing or repairing man-made fish passage barriers, primarily poorly functioning culverts, expected to reconnect an additional 3.5 miles of fish-stream habitat (Table 6-2), as follows;
    - i. Verify number of barriers and their location in addition to those already known (currently 11);
    - ii. Apply a priority scheme that addresses worst first for repair/replacement in coordination with ODFW (not required by OFP Rules);
    - iii. Implement fish passage barrier fixes on an accelerated schedule that completes the fixes within five years of Permit issuance;
    - iv. As new barriers are acquired or develop, repair, or remove as soon as operationally possible but no later than within three years of discovery; and
    - v. As new fish bearing streams are identified, assess passage at road crossings and add to road management plan if barriers are identified.
  - b. Decommission (de-activate) roads that won't be necessary for forest management activities, and abandon non-essential roads, especially the 1.9 miles of stream-adjacent parallel roads (SAPRs) beginning in the first year and be completed within the first five years of the HCP period;
  - c. Design structures to facilitate fish passage for all life stages of native fish species, i.e., culverts that accommodate 100-year flood events or bridges (Note: any stream > ten feet in width will require a bottomless structure such as bridges and bottomless arch culverts).
    - i. All fish will be treated as fish requiring protection regardless of whether they are ODF regulated anadromous, game, or ESA-listed species, and streams occupied by fish will be protected accordingly.
    - ii. Structures will receive periodic inspection i.e., as forest management activities occur or in response to high precipitation events, to assure fish passage has not been compromised. A fish-distribution survey and designed structure will be required for permanent fish crossing installations.
    - iii. In addition to the measures described above, Port Blakely will commit to managing our roads as follows to avoid and minimize road disturbance



and potential sediment input to streams, none of which are required under OFP Rules:

1. All roads will be closed to the public via locked gates;
2. No non-permitted uses of the HCP area will be allowed;
3. Authorized road use will be relegated to primary access roads only;
4. Secondary roads will be used only for access to current Port Blakely forest management activities; and
5. An active program will be implemented to remove an estimated 1.9 miles of stream-adjacent parallel roads over the next 5 years.

**Table 6-1. Number of fish passage barriers previously removed and number of miles of fish habitat re-connected on the current HCP ownership by ESU.**

ESU	Number of Barriers	Miles of Habitat Re-connected
LCR ESU	42	37.8
UWR ESU	36	22.4

**Table 6-2. Number of fish passage barriers to be removed by barrier type and number of miles of fish habitat to be re-connected on the current HCP ownership by ESU.**

ESU	Number of Barriers	Barrier Types		Miles of Habitat Re-connected
		Blocked/ Perched	Damaged/ Rotten	
LCR ESU	5	2	3	0.6
UWR ESU	6	3	3	2.9

*Large Wood* – The presence of LW in streams diverts water flow, changes water velocity to trap sediment or create pools, provides a source for fish prey production, and provides cover for juvenile fish. Riparian habitat contributes LW to streams through naturally occurring processes. The distance of near-stream inputs to streams varies with forest conditions and geomorphology. Empirical studies indicate that 95% of total instream wood (from near-stream sources) comes from distances of 82 to 148 feet; shorter distances occur in young, shorter stands and longer distances occur in older and taller stands (Spies et al. 2013). In McDade et al. (1990), studies have shown that the amount of instream LWD for 80-foot buffers in unmanaged stands of mature hardwood and mature conifer stands (80 – 200 years old) was 100% and 90%, respectively, and for 65-foot buffers it was 90% and 80%, respectively. Beechie (2015), citing McDade et al. (1990), states that models for western Oregon forests indicate that 90% of wood recruited to streams from conifer forests originates from within 90-131 feet of the stream. The difference between the study and modeled results stem from using uniform tree height (most managed stands have shorter tree heights than naturally occurring older forests), random direction of tree fall, and uniform stocking

density. The modeling results suggest that most wood recruitment could be protected by leaving forested buffers 90 feet or greater in width.

Thus, under the HCP, the 100-foot and 90-foot no-harvest buffers on Large and Medium fish-bearing streams, respectively, as well as the 75-foot no-harvest buffer on Small fish-bearing streams, as described below, should be sufficient to provide most of the LW necessary for this element of functional fish habitat.

Pro-active management actions can be implemented to supplement the delivery of LW to streams. There are no OFP Rules requiring forest landowners to implement proactive steps to add LW to streams, although there are incentives that involve compensatory live tree retention credits. However, to ensure a higher potential for LW to enter streams in the HCP area, Port Blakely will implement a LW input strategy that contains mitigation measures explicitly designed to retain LWD and/or ensure placement of additional LW in the riparian area and the stream. This approach will supplement LW delivery expected to occur from within the HCP riparian buffers. Natural and pro-active actions will result in stream habitat complexity and features important to all salmon life stages. This will be especially important in streams such as Mosier Creek where past land use activities such as mill operations led to a noticeable deficit of LW. The HCP The LW conservation measures accomplish an important role in providing LW structures to fish streams, including small fish streams prevalent in the HCP area, that will be substantially more than what would occur under standard OFP Rules and have the potential to contribute to stream and fish habitat functions.

The additional LW (on average, one tree per 300 feet on each side of small and medium fish streams, rounding up) will provide more structures to the stream creating habitat features important to spawning and rearing habitat for a variety of fish species. LW in the stream creates pools and riffles as well as causing re-shaping the course of the stream with the potential to create side channels used for rearing and foraging opportunities. Fully intact buffers will have a density of trees suitable to function as a source of recruitment into adjacent streams. Proactively adding LW supplements naturally occurring LW input to streams from HCP riparian buffers and not only improves fish habitat but also provides woody debris structures for amphibians.

Naturally occurring LW input to streams from adjacent stream buffers results from:

- Windstorms;
- Ice storms;
- Bank erosion; and
- Steep side-slopes.

Management actions will be conducted that facilitates tree recruitment into streams following a stepwise decision-making process based on the following criteria:

- Slopes less than 35% (determines mechanical vs hand-falling);
- Stream type – medium and small fish;
- Determination of occurrence of gaps in in-stream LW; and
- Operationally feasible with minimal damage to existing riparian stand.

Mitigation measures to recruit LW will be implemented throughout the HCP and Permit period during regeneration harvest operations using mechanical and/or hand-felling. When the slopes next to the streams are gentle enough to deploy ground-based equipment during harvest (generally <35% slope), it is anticipated that the equipment will be able to push the trees over and maintain the root wad attached. Root wads with trees attached may be transported from other locations within the riparian buffer and placed within the stream channel in areas where conditions merit. However, equipment will not be entering the 30-foot ELZ or pushing over/cutting trees that are within 20-feet of the stream. Areas disturbed by machine tracks will be covered with slash to prevent erosion following machine entry.

On slopes where hand-cutting is required, the trees will be placed into the stream via hand-cutting and therefore the root wads will not be attached. It is anticipated that proactive LWD recruitment measures will supplement overall LW input into streams when combined with the no-harvest stream buffers being retained across the HCP area. The LW recruitment will include placement of one tree, on average, per 300 feet of stream length, i.e., approximately three trees per 1,000 feet. Proportions of trees will be rounded up to the next whole tree, e.g., stream lengths > 900 feet but < 1,200 feet would receive four trees. Trees selected for LW placement will be representative of existing riparian tree species, but conifer trees will be selected over hardwood trees, where appropriate. We note that a combination of conifers and hardwoods increases the complexity of in-stream structures, and that hardwoods serve important functions. For example, since hardwoods break down more rapidly, they serve as feeding platforms for a variety of insects increasing biological diversity. Hardwoods also are structurally weaker so during flood events the hardwood pieces will break allowing water pressure to be reduced through the new open area. The smaller pieces move down stream and can be accumulated on the next structure. Hardwoods would only be used where it is determined that these types of benefits outweigh the use of conifer.

The size and length of trees, as well as the placement location, will be applied according to specific criteria recommended by State agency guidance (ODF and ODFW 2010a, OPSW 1999), e.g.,  $\geq 10$ " DBH for bank-full width 0-10 ft. However, LW recruitment activities will not be implemented in large fish streams, nonfish streams or in areas on or adjacent to unstable landforms and/or deep-seated land slide features.

Pushing or placing LW into large fish streams in the HCP area was deemed unsuitable due to the potential risk of downstream tree mobility and associated damage risk to public resources, property, or structures. Nonfish streams were not considered appropriate targets for wood placement because it is not believed to be beneficial on the HCP landscape. The small nonfish streams are typically comprised of low gradient, very narrow channels, and small basin size. It is anticipated that, as a result of harvest debris, and wood contributions (via wind) from the no-harvest and partial harvest buffers along nonfish perennial streams, functional piece sizes from slash and downed trees in and adjacent to nonfish streams is likely to be appropriately sized and not likely to be limited. It is also anticipated that the associated shrub and intact woody debris components from within the buffer will be suited to protect riparian function.

All trees selected for LWD placement in streams will be counted as wildlife trees. A Port Blakely wildlife biologist, in consultation with ODFW to the extent possible, will make the determination of the number of pieces and location of where LWD placement will occur based on State agency guidance and existing in-stream LWD conditions. Prior to

implementing a wood placement project, it is important to evaluate the existing reach conditions as it is quite possible a given stream already has enough functional wood in it.

Port Blakely will place/fall trees according to the following criteria that address habitat values as well as ownership risk, and are consistent with guidelines:

- Tree DBH to be appropriate to stream bank full width as described in existing guidance;
- If root wad retained, tree length is to be 1.5 times bank full width;
- If root wad not retained, tree length is to be 2.0 times bank full width;
- Trees may be placed singly or in groups depending on existing LW conditions, i.e., where in-stream LW is missing;
- May include hardwoods; and
- The term “on average” recognizes that some streams may not need LW and others may need more than one piece of LW per 300 ft. of stream length.

Finally, as part of Port Blakely’s ongoing commitment to watershed health, we will make LW available for purchase or gratis for other landowners provided the LW placement is in HCP area watersheds (see fish and habitat restoration commitment below).

*Shade and Stream Temperature Maintenance* – Applying no-harvest buffers on fish-bearing streams will reduce the potential for stream temperature increases. Managed buffers with a no-harvest zone on perennial nonfish-bearing streams will function in ameliorating the potential for stream temperature increases prior to entering a fish stream. Improving the quality of fish habitat will enable fish to utilize streams in the HCP area for spawning, rearing, and feeding.

Approximately 190 miles of streams currently occur on the Port Blakely Clackamas County ownership (see Table 4-1). More than half the streams (55%) are small nonfish streams. Together, small fish streams, including small SSBT streams, and small nonfish streams comprise 77.5% of the streams in the HCP area. Buffers will be completely no-harvest (for fish-bearing streams) or have a no-harvest zone adjacent to the stream (for nonfish-bearing streams), and a variable width depending on stream type and site-specific conditions, such as gradient and the presence of ecologically sensitive sites or potentially unstable slopes, etc. Ecologically sensitive sites and unique habitat types will be identified prior to the management of each harvest unit to ensure protection occurs in conjunction with stream buffers.

Several factors were considered when determining the width of no-harvest and managed stream buffers to be applied. In a recent Biological Opinion on a BLM Resource Management Plan, NMFS stated that stream shade correlates with the width of no-cut buffers, but the relationship is quite variable, depending on site-specific factors such as stream size, substrate type, stream discharge, topography, channel aspect, and forest structure and species composition (NMFS 2016e). Czarnomski et al. (2013) show in a review of studies on the effectiveness of stream buffers that stream aspect, as well as other conditions such as substrate characteristics, gradient, length of buffers, canopy/shrub cover, elevation, in combination with near-stream forest management, have the potential to effect stream temperatures or riparian shade. Although riparian vegetation is one of the most important factors affecting stream temperatures, Cristea and Janisch (2007) also cite numerous other factors including air temperature, solar radiation, flow, stream width and

depth, bed morphology and channel orientation, groundwater and hyporheic exchange, and microclimate.

However, applying riparian buffers that retain riparian vegetation is one of the few actions industrial forest managers can take to moderate potential stream temperature changes. The HCP buffer widths to be applied, described below, were informed by and are based on a various scientific studies and reports that address the relationship between buffer widths, stream size (to some extent), and ability to ameliorate potential stream temperature increases as a result of regeneration harvesting of stream-adjacent forest stands.

Broderson (1973) found that 15.2-m (50-ft) buffers provided adequate shade for small streams; further, buffer widths along slopes could decrease with increasing tree height with no significant loss of shading (as cited in Castelle et al. (1994)). Lynch et al. (1985) determined that a 30-m (98-ft) buffer from logging operations was able to maintain water temperatures within 1 °C of their former average temperature. In their study, Brazier and Brown (1973) sought to define the characteristics of buffer strips that were important in shading small streams adjacent to logging. They found that 24 m (73 ft) forested buffer was often sufficient to shade these streams, maintaining pre-logging temperature ranges. Buffers that are at least 30 m (98 feet) wide have generally been found to provide the same level of shading as that of an old-growth forest (Beschta et al. 1987). The results of these studies and several others assessing the shading effectiveness of buffer widths are provided in Cristea and Janisch (2007). Additional studies found that most of the potential shade came from the riparian area within about 75 feet (23 m) of the channel (CH2M Hill 2000, Castelle and Johnson 2000, Christensen 2000). Beechie (2015) reports that a recent modeling effort showed that, on average, a 90-foot forested buffer in Oregon forests was likely to keep the temperature increase less than 0.3°C (Groom et al. 2011). This suggests that stream temperatures may still not be protected [completely] in many reaches even with a 90-foot buffer (Beechie 2015).

These studies and reports vary somewhat with respect to the width of buffers necessary to maintain stream temperatures. What's notable is, even though stream width is considered a contributing factor, it generally is not discussed in much of the literature recommending buffer widths. Given the existing scientific information, the Port Blakely HCP will establish 100-foot and 90-foot no-harvest riparian buffers on Large and Medium fish-bearing streams, respectively, that are expected to provide nearly all the necessary shade to protect stream temperatures (Lynch et al 1985, Beschta et al. 1987, Groom et al. 2011, Beechie 2015). The 75-foot no-harvest buffer on Small fish-bearing streams is within distances reported to provide sufficient shade to streams (Broderson 1973, Brazier and Brown 1973, Cristea and Janisch 2007).

Nonfish-bearing stream buffer widths to be applied, i.e., 80 feet on Large and Medium streams and 50 feet on Small streams, take into account the important of a no-harvest zone to provide sufficient shade to reduce the potential increase in stream temperatures and provide LWD. All three stream types will have a no-harvest zone and a 25-foot managed zone. In a study on perennial small nonfish-bearing (headwater) streams in the western Cascades of southern Oregon, where stream buffers consisting of mature timber were maintained, investigators did not observe significant changes to stream temperature when preserving some percentage of preharvest canopy closure (Macdonald et al., 2003; Gomi et al., 2006). In the absence of shading provided by mature timber, there was some evidence

that logging slash (coarse and fine woody and vegetative debris left after forest harvesting) may function as an agent of post-harvest shade, with potentially mitigating effects to temperatures of streams partially or fully covered by slash (Kibler et al. 2013). After harvesting, streams were partially covered by a layer of organic material left when the merchantable timber was removed. The logging slash attenuated solar radiation and likely moderated increases in stream temperature. This is consistent with Jackson et al. (2001) findings that attributed a damped post-harvest temperature response of clearcut streams to exclusion of solar radiation due to a layer of logging slash that deposited over streams during harvesting. However, it should be noted that logging slash only excludes solar radiation temporarily, and there are potential ecosystem-level problems that may arise from the input of such large quantities of organic matter into the stream system (Kibler et al. 2013). Logging slash retention, and its effect on ameliorating potential stream temperature increases, is likely to occur in the 25-foot managed zone of all nonfish-bearing stream sizes. The HCP strategy includes retention of all trees and understory < 10 feet in the 25-foot managed zones. Thus, some slash may contribute to reducing the potential for stream temperature increases but this is likely to occur only in the Small stream buffer due to the distance from the stream that the management zone occurs. The amount is not expected to result in inputs of large quantities of organic matter to the stream system.

Stream buffers applied under the HCP will vary depending on the stream size using OFP Rules definitions which incorporate flow levels and drainage sizes (OAR 629-635-0200). Streams are classified into size categories of small, medium, and large based on average annual flow. Small streams have an average annual flow of  $\leq$  two cu ft per second, medium streams have an average annual flow  $> 2$  and  $< 10$  cu ft per second, and large streams have an average annual flow of  $\geq 10$  cu ft per second. In addition, any stream with a drainage area less than 200 acres shall be assigned to the small stream category regardless of the flow index calculated. All prescriptions for fish-bearing and nonfish-bearing streams by stream size are provided in detail below.

In addition to protective riparian stream buffers to be applied that reduce or minimize the potential for stream temperature increase, the HCP also includes a mitigation measure designed to improve stream conditions. On an annual basis, Port Blakely will contribute funds to support stream restoration projects on streams that occur within the HCP or on other ownerships downstream from streams flowing through the HCP area. See the *Fish and Wildlife Habitat Restoration* subsection below.

Port Blakely wildlife biologists conduct surveys on all stream and wetland features within or associated with harvest units typically 3-5 years prior to harvest operations. As part of this ongoing process, the streams and wetlands are classified, and the upper distribution of fish is identified and then marked in the field and mapped into our internal GIS system as described in Section 4.2.2. This data is then communicated to our forestry team to inform harvest layout. Potentially unstable slopes are also mapped on a unit-by-unit basis, typically 1-3 years prior to harvest. These features are assessed by Port Blakely's forest engineers, under consultation with licensed geotechnical professionals, when necessary. Under the HCP, Port Blakely commits to continuing these practices of conducting surveys to determine stream and wetland classifications, fish distribution, and occurrence and location of unstable slopes to determine appropriate protective measures.

Port Blakely conducts pre-commercial and commercial thin management although it is not an OFP Rule requirement. Under the HCP, Port Blakely commits to conducting pre-commercial and commercial thin management that reduces stand homogeneity and promotes diverse and complex habitat, including in the riparian areas (Section 6.3.2). When the stand is not overstocked and uniform, buffers are implemented as described in regeneration harvest below. The occurrence of riparian stand conditions that are overstocked (>240 TPA) and uniform (homogenous Douglas-fir plantation) is uncommon as the condition is a function of past management activities, e.g., buffers were not retained during the last harvest and were reforested in tandem with the adjacent stand.

During pre-commercial and commercial thin management, stream and riparian protection (buffers) will be established on each side of the stream when overstocked and uniform conditions exist as follows:

1. All sizes of fish streams will receive:
  - a. 20-foot minimum no-harvest buffer;
  - b. Additional retention of all trees that exist outside the 20-foot buffer that lean over the stream channel; and
  - c. 30-foot equipment limitation zone (ELZ).
2. All nonfish streams will receive:
  - a. Retention of all trees that lean over the stream channel;
  - b. Retention of all trees whose roots exist within the bank full channel or are contributing to bank stabilization; and
  - c. 30-foot ELZ.

At regeneration harvest management, stream, and riparian protection in the form on no-harvest reserves will be established on each side of the stream, based on stream type, as follows:

1. Large Fish
  - a. Retain a minimum 100-foot, horizontal distance, no-harvest buffer on both sides of stream;
  - b. Variable width will include minimum 50-foot no-harvest buffer around stream-associated sensitive sites, such as wetlands, seeps, and potentially unstable slopes; and
  - c. For stream-associated lakes and wetlands > 8 acres or bogs of any size: 50-foot no-harvest buffer measured from edge, plus 50-foot managed buffer with 50% relative retention of original live trees by DBH class (size classes; 11-20 inches, 21-30 inches and > 30 inches), well distributed; retention of snags and downed wood; retention of understory trees/shrubs  $\leq$  10" DBH where feasible; and disturbance to soils will be minimized.
2. Medium Fish
  - a. Treat non-SSBT Medium Fish streams as SSBT Medium Fish streams;
  - b. Retain a minimum 90-foot, horizontal distance, no-harvest buffer along both sides of the stream;
  - c. Variable width will include minimum 50-foot no-harvest area around stream-associated sensitive sites, such as wetlands, seeps, and potentially unstable slopes;

- d. For stream-associated lakes and wetlands > 8 acres or bogs of any size: 50-foot no-harvest buffer measured from edge, plus 50-foot managed buffer with 50% relative retention of original live trees by DBH class (size classes; 11-20 inches, 21-30 inches and > 30 inches), well distributed; retention of snags and downed wood; retention of understory trees/shrubs ≤ 10" DBH where feasible; and disturbance to soils will be minimized; and
  - e. At regeneration harvest, where LWD is minimal or does not exist in the stream, placement of up to 1 tree per 300 feet, on average, rounding up to 4 per 1,000 feet each side of stream, from within the riparian buffer.
3. Small Fish
- a. Treat non-SSBT Small Fish streams as SSBT Small Fish streams;
  - b. Retain a minimum 75-foot, horizontal distance, no-harvest buffer along both sides of the stream;
  - c. Variable width will include minimum 50-foot no-harvest buffer around stream-associated sensitive sites, such as wetlands, seeps, and potentially unstable slopes;
  - d. For stream-associated lakes and wetlands > 8 acres or bogs of any size: 50-foot no-harvest buffer measured from the lake or bog edge, plus 50-foot managed buffer with 50% relative retention of original live trees by DBH class (size classes; 11-20 inches, 21-30 inches and > 30 inches), well distributed; retention of snags and downed wood; retention of understory trees/shrubs ≤ 10" DBH where feasible; and disturbance to soils will be minimized; and
  - e. At regeneration harvest, where LWD is minimal or does not exist in the stream, placement of up to 1 tree per 300 feet, on average, rounding up to 4 per 1,000 feet each side of stream, from within the riparian buffer.
4. Large Nonfish
- a. Retain a minimum 80-foot, horizontal distance buffer along both sides of the stream;
  - b. Buffer will include a 55-foot no-harvest zone; remainder of buffer, i.e., 25 feet, will be a managed, partial-harvest zone;
  - c. Managed buffer will consist of 50% relative retention of original live trees in the buffer by DBH class (size classes; 11-20 inches, 21-30 inches and > 30 inches), well distributed; retention of snags and downed wood; retention of understory trees/shrubs ≤ 10" DBH where feasible; and disturbance to soils will be minimized;
  - d. Variable width will include 50-foot no-harvest buffer around stream-associated sensitive sites, such as wetlands, seeps, and potentially unstable slopes; and
  - e. For stream-associated lakes and wetlands > 8 acres or bogs of any size: 50-foot no-harvest buffer measured from the edge, plus 50-foot managed buffer with 50% relative retention of original live trees by DBH class (size classes; 11-20 inches, 21-30 inches and > 30 inches), well distributed; retention of snags and downed wood; retention of understory trees/shrubs ≤ 10" DBH where feasible; and disturbance to soils will be minimized.
5. Medium Nonfish



- a. Retain a minimum 80-foot, horizontal distance buffer along both sides of the stream;
  - b. Buffer width will include a 55-foot no-harvest zone; remainder of buffer, i.e., 25 feet, will be a managed, partial-harvest zone;
  - c. Managed buffer will consist of 50% relative retention of original live trees in the buffer by DBH class (size classes; 11-20 inches, 21-30 inches and > 30 inches), well distributed; retention of snags and downed wood; retention of understory trees/shrubs  $\leq 10$ " DBH where feasible; and disturbance to soils will be minimized;
  - d. Variable width will include 50-foot no-harvest buffer around stream-associated sensitive sites, such as wetlands, seeps, and potentially unstable slopes; and
  - e. For stream-associated lakes and wetlands > 8 acres or bogs of any size: 50-foot no-harvest buffer, measured from the edge, plus 50-foot managed buffer with 50% relative retention of original live trees by DBH class (size classes; 11-20 inches, 21-30 inches and > 30 inches), well distributed; retention of snags and downed wood; retention of understory trees/shrubs  $\leq 10$ " DBH where feasible; and disturbance to soils will be minimized.
6. Small Nonfish (Perennial)
- a. Retain a minimum 50-foot buffer along entire stream length;
  - b. Buffer will include a 25-foot no-harvest zone and 25-foot managed zone;
  - c. Managed buffer will consist of 50% relative retention of original live trees in the buffer by DBH class (size classes; 11-20 inches, 21-30 inches and > 30 inches), well distributed; retention of snags and downed wood; retention of trees  $\leq 10$ " DBH and understory vegetation in managed zone, where feasible; and disturbance to soils will be minimized;
  - d. Variable width will include protection of stream-associated sensitive sites such as wetlands, seeps, and potentially unstable slopes; these sites are not required to be buffered, but they will be managed as no-harvest areas to maintain the integrity of the site; and
  - e. Maintain a 30-foot ELZ along the entire stream length to protect soils and understory vegetation.
7. Small Nonfish (Seasonal)
- a. Maintain a 30-foot ELZ along the entire stream length to protect soils and understory vegetation;
  - b. Retain understory trees/shrubs  $\leq 10$ " DBH where feasible; and
  - c. Consider these streams as preferred leave tree areas especially if associated with forested wetlands or other sensitive sites.
8. Wetlands Protection (Buffers) will be implemented as described below:
- a. Lakes and significant wetlands > 8 acres, or bogs of any size:
    - i. Retain a 100-foot buffer consisting of a 50-foot no-harvest zone, measured from the lake, wetland or bog edge, and a 50-foot managed zone with 50% relative retention of original live trees by DBH class (size classes; 11-20 inches, 21-30 inches and > 30 inches), well distributed; retention of snags and downed wood; retention of understory trees/shrubs  $\leq 10$ " DBH, where feasible; and disturbance to soils will be minimized;

- b. Lakes < 8 acres with fish:
    - i. All stream-associated or isolated lakes; retain a 50-foot no-harvest buffer measured from the lake edge.
  - c. Lakes 1/4-8 acres without fish:
    - i. Retain a 50-foot buffer with 25-foot no-harvest zone, measured from the lake edge, and 25-foot managed zone;
    - ii. Managed zone will consist of 50% relative retention of original live trees by DBH class (size classes; 11-20 inches, 21-30 inches and > 30 inches), well distributed; retention of snags and downed wood; retention of understory trees/shrubs ≤ 10" DBH, where feasible; and disturbance to soils will be minimized.
  - d. Seeps and wetlands < 8 acres:
    - i. All sizes of fish stream plus medium and large nonfish streams will receive a minimum 50-foot no-harvest buffer, measured from edge of the seep or wetland;
    - ii. Small nonfish perennial stream - feature will not be disturbed, will be included within buffer (but not buffered), plus 30-foot ELZ to protect soils and understory vegetation;
    - iii. Small nonfish seasonal stream - feature will not be disturbed, plus 30-foot ELZ to protect soils and understory vegetation, and will be a preferential area for additional leave trees; and
    - iv. Isolated - feature will not be disturbed, plus 30-foot ELZ to protect soils and understory vegetation and will be a preferential area for leave trees.
9. Potentially Unstable Slopes will be protected as follows:
- a. At regeneration harvest and partial harvest, road construction or quarry development on or immediately adjacent to any landslide hazard area determined to be a risk to public safety by a regulatory authority, any proposed activity will have a written management plan prepared in consultation with a licensed geotechnical specialist;
  - b. Where bedrock hollows, convergent headwalls, or inner gorge features with slopes > 70% occur within stream valleys of fish-bearing streams, retain all trees within the feature plus a 50-foot no-harvest buffer measured from edge of feature;
  - c. Where bedrock hollows, convergent headwalls, or inner gorge features with slopes > 70% occur within stream valleys of nonfish-bearing streams, retain all trees within feature plus retention of trees along the edges where the crown drips within the feature;
  - d. Where bedrock hollows, convergent headwalls, or inner gorge features with slopes > 70% occur within valleys of disconnected, upland streams priority will be given for upland leave tree patches;
  - e. Deep-seated landslides with > 65% slopes and convex or planar slopes > 80% will be evaluated in coordination with a licensed geotechnical specialist to develop management options which may include ground-based equipment exclusion, vegetation retention during plantation reestablishment, full-suspension of harvested logs in and over feature, and mitigation of disturbed soils if disturbance is > 10% of the feature area;

- f. Quarry's will not be developed within one hundred feet of inner gorges, bedrock hollows and convergent headwalls with slopes > 70% and at far enough from the feature to assure surface runoff does not influence the feature; quarry development at the toe of deep-seated landslides and on convex or planar slopes > 80% will be approved by a licensed geotechnical professional; and
- g. Road construction across inner gorges, bedrock hollows, and convergent headwalls > 70%, and the toes of deep-seated landslides will be avoided unless no alternative routes are available that are cost-effective and/or environmentally sound; road construction inclusive of the preceding and including convex or planar slopes > 80% will be reviewed by a licensed geotechnical professional.

*Fish and Wildlife Habitat Restoration* – Port Blakely has a history of voluntarily supporting watershed restoration and will commit to contributing a minimum of \$10,000 per year and a maximum of \$25,000, annually, to collaborative fish and wildlife habitat restoration projects with goals aimed at improving/restoring complex fish and wildlife habitat where the need occurs in watersheds within the HCP lands, or in watersheds below drainages originating in the HCP area. The minimum contribution of \$10,000 will be adjusted for the rate of inflation every five years based on the Consumer Price Index. Additionally, the restoration contribution maximum will increase at thresholds based on increases in ownership acres as described in Table 6-3, not to exceed 25% based on initial HCP acres. Restoration projects must involve 501(C3) nonprofit organizations, watershed councils, and/or State or Federal natural resource agencies. The \$25,000 may be in the form of a monetary contribution, in-kind staff time, or forest products, e.g., trees and root wads, or some combination, and must be used on an annual basis. In the case that no dollars, in-kind, or material contributions are made in a given year, e.g., due to lack of qualified proposed projects, a minimum of \$10,000 will carry over as additional funds for the following year. In lieu of supporting a restoration project proponent cited above, Port Blakely may choose to collaborate with downstream private landowners to enhance or replace fish passage structures, restoring access to upstream fish habitat. As part of the project evaluation process, Port Blakely will collaborate with NMFS, to the extent possible, to select and award restoration resources.

**Table 6-3. Annual habitat restoration contribution based on ownership acres.**

HCP Acres	Annual Maximum Contribution
30,000 – 32,999	\$25,000
33,000 – 35,999	\$27,500
36,000 – 37,500	\$31,250

On an annual basis, Port Blakely will notify qualified entities of the availability of restoration project support for the upcoming year. As stated above, qualified entities include ODF, ODFW, NMFS, USFWS, watershed councils, and nonprofit organizations with a history of implementing restoration projects and/or preparing bona fide study plans. Notification will be by direct contact through U.S. Postal Service, email, or other acceptable communication avenues. Eligibility and award of Port Blakely restoration support resources will be

determined in collaboration with ODFW, NMFS and/or USFWS depending on the focus of the proposed project and the availability of agency staff to make the determination.

Potential collaborators may include, for example, the Clackamas River Basin Council with whom Port Blakely is currently working to restore and maintain a 50-foot buffer along Little Clear Creek (30 acres total) where native riparian vegetation is sparse and invasive species vegetation is high. This is part of the Shade Our Streams Program where the restoration goal is to restore native plant communities, control invasive species, stabilize banks, and provide long-term recruitment of LWD and floodplain complexity. Clear Creek supports abundant salmon populations in the lower Clackamas and is home to a significant run of late-run Coho. The stream supports 11 different species of fish, including rainbow trout and endangered fall Chinook and Coho salmon, steelhead, and coastal cutthroat trout. More than 100 species of wildlife are found within the Clear Creek watershed, including coyotes, cougar, black tail deer, elk, and 76 species of birds.

Port Blakely has also partnered with ODFW to increase stream habitat complexity through placement of LWD. Surveys were conducted by ODFW along Clear Creek, including reaches undergoing riparian restoration via the effort described above. Reaches were identified that would benefit from habitat improvement strategies based on their landform and location. Input of large woody debris was expected to increase the formation of instream structure complexity, including the formation of deep pools and re-establishment of old side-channels, all that could be used by salmonids.

Potential restoration projects may include, but are not limited, to:

- Re-establishing fish passage where blockages occur;
- Introducing LWD;
- Planting native riparian or terrestrial vegetation; and
- Removing nonnative vegetation.

### **6.3.2 Upland Habitat and Ecosystem Functions**

Under the HCP, measures to improve upland habitat by creation of upland patches, strategic placement of leave trees around ecologically sensitive or unique habitats, retention of legacy trees and snags, and creation of snags will be implemented across the landscape as timber harvest units are managed. Biological legacies include older green trees, snags and downed logs that have been left after past timber harvests or have survived stand-replacing natural disturbances (fire, insects, disease). They can be any native species and are defined as having achieved near-maximum size and age, which is significantly larger and older than the average trees on the surrounding landscape. Legacy trees provide biological, historical, aesthetic, and research values that are difficult to replace. To the extent possible, in the stands burned during the 2020 catastrophic wildfires, these legacies have been protected and retained.

These measures are expected to add complexity to spotted owl dispersal habitat, provide habitat for amphibians, and provide structures, i.e., opportunities, for roosting, nesting, and foraging by spotted owl prey species, bats, and birds. All the HCP upland habitat conservation measures will exceed OFP Rule requirements and vastly improve the HCP forested landscape from current conditions that have developed as a result of past forest management and agricultural practices.

Port Blakely wildlife biologists search for sensitive and unique terrestrial habitats within or associated with harvest units typically 3-5 years prior to harvest operations. As part of this ongoing process, sensitive and unique habitats are classified and mapped into our internal GIS system as described in Section 4.2.2. This data is then communicated to our forestry team to inform harvest layout. Typically, 1-3 years prior to harvest, Port Blakely forest engineers begin designing the layout of the harvest unit. During this phase, potentially unstable slopes and additional sensitive and unique habitats associated with the unit may be identified. Potentially unstable slopes are assessed in consultation with licensed geotechnical professionals, when necessary. Under the HCP, Port Blakely commits to continuing these practices of conducting surveys to determine the location of sensitive habitats, unique habitats, and the location of unstable slopes to determine appropriate protective measures.

The HCP conservation program addressing the habitat requirements of terrestrial Covered Species are described below.

1. Within all harvest types, i.e., stand thinning and regeneration, retain conifer and hardwood biological legacies as follows:
  - a. Legacy trees
    - i. Retain and protect with leave trees when safe and operationally feasible;
    - ii. Retain high wildlife value segments of tree, such as rotting, highly knotted or with multiple tops, if felled for safety or operational reasons.
  - b. Legacy snags
    - i. Retain and protect with leave trees when safe and operationally feasible;
    - ii. Retain on forest floor if felled for safety or operational reasons.
  - c. Downed CWD – when operationally feasible, retain and do not disturb residual large-diameter logs or felled old growth snags  $\geq 30$  inches in diameter (measured anywhere on the log or snag) left behind from past harvest activities.
2. As described in regeneration harvest prescriptions, retain four wildlife TPA ( $\geq 11$ " DBH and  $\geq 30'$  tall) per harvested acre, a minimum of 25% of which will be located in the uplands. Preferential retention of upland leave trees will be located as reserves around ecologically sensitive and unique habitat types, i.e., SMAs. If no upland sensitive or unique habitats exist within the unit, leave trees may be placed in 1/4 acre to 1-acre sized patches and may include scattered individual trees, configured across the landscape in ways that consider habitat connectivity, the needs of Covered Species known to occur in the area and operational efficiency. Consideration will be given to the 500-foot distance measure, i.e., no point within the harvest unit will be  $> 500$  feet from a wildlife tree. For this HCP, SMA reserves will include:
  - a. Sensitive upland aquatic habitats
    - i. Seeps and springs;
    - ii. Wetlands; and
    - iii. Perennial nonfish streams that are disconnected from downstream classified waters ( $> 150$ -foot distance apart).
  - b. Unique terrestrial habitats
    - i. Potentially unstable slopes;
    - ii. Rock outcrops and talus slopes;

- iii. Legacy live or dead trees;
  - iv. Unique trees, nest trees, or large, wolfy trees; and
3. As described in the regeneration harvest prescriptions, retain all safe snags, and create one snag for every 10 acres harvested (at least 50% of which will be conifer). For created snags, mechanically topped trees will be  $\geq 15$  inches DBH and  $\geq 12$  ft tall and girdled trees will be  $\geq 15$  inches DBH and  $\geq 30$  ft tall.
  4. As described in the regeneration harvest prescriptions, at least 30 cu ft of CWD per acre, on average, will be retained or created as follows:
    - a. Provide CWD pieces, with all pieces to be  $> 10$  cu ft in volume ( $\sim 6$  feet long x  $\sim 17$  in diameter); pieces containing  $>20$  cu ft count as the volume of two pieces, and pieces containing  $> 30$  cu ft count as the volume of three pieces; or
    - b. Create woody debris piles, also known as a 'bio-dens', on slopes  $< 35\%$ , that are at least 10 cu ft in volume, 5-10 ft in diameter, comprised of piece sizes that average 10" diameter (but with a 20-inch target) and are 1-3 ft long. piles containing  $> 20$  cu ft count as the volume of two piles, and piles containing  $> 30$  cu ft count as the volume of three piles; piles will also contain an abundance of smaller wood from residual logging debris or
    - c. Provide a combination of both a. and b. above.
  5. As described in the commercial thinning prescriptions, retain two defective trees, or create two snags from the largest diameter class, or provide a combination of defective trees and snags per acre.
  6. As described in the commercial thin prescriptions, CWD will be retained or created as follows:
    - a. Provide two pieces per acre, defective or of the largest diameter class.
  7. Retain understory trees  $< 10$ " DBH in riparian buffers, and in uplands where feasible;
  8. Retain and distribute logging slash throughout unit as feasible;
  9. Leave trees will not be available for harvest for the term of the Plan;
  10. No point in the harvest unit will be  $> 500$  ft from a snag or green leave tree; and
  11. Bridges that are replaced will contain or be equipped with bat roosting structures.

*Biological Function and Role of HCP Upland Habitat and Ecosystem Function Conservation Measures*

Under the HCP, the upland habitat conservation measures to be implemented will be substantially greater than what is currently required under the OFP Rules. The measures are designed to provide woody features that are necessary for ecosystem function. Structural features expected to function as potential nest/den sites and/or foraging habitat for a variety of terrestrial species include snags, large live trees, understory vegetation, leave tree patches that provide interior forest, and forest-floor CWD. Although the catastrophic wildfires of 2020 damaged approximately 28% of HCP area parcels to the east and south at various intensities, all conservation measures will be implemented to the extent possible and that habitat structures exist. As described below, the terrestrial habitat conservation measures are consistent with terrestrial Covered Species recommended

conservation actions designed to improve woody habitat conditions, increasing the biological function for species that rely on terrestrial forest habitat.

*Legacy trees* - Retention of biological legacies, i.e., old growth green trees, snags, and downed logs, remaining after man-made or naturally occurring stand-replacement events, provides opportunities, for terrestrial species to use as den/nest sites, as well as resting, foraging, perching, and roosting. They function to create a more complex forest environment that may be utilized by large and small mammals, birds, and amphibians. The HCP includes this measure to ensure these features remain on the landscape where they occur and where they don't pose a risk to human safety. Protecting these woody features contributes to a complex and diverse forest habitat mosaic beneficial to the spotted owl, its prey, bats, and birds, as well as stream and riparian ecosystems, e.g., providing shade and LWD to streams.

*Wildlife trees and snags* - Measures to improve upland habitat by strategic placement of leave trees, and retention or creation of snags will be implemented across the landscape as timber harvest units are managed. Development of wildlife trees and snags functioning as den/nest sites for Covered Species and their prey over a 10 to 25-year period of the HCP will begin during commercial thinning with ensuring two defective trees or snags are retained on a per acre basis in the managed unit. If snags are unavailable, they will be created. At regeneration harvest, all safe snags including those retained at commercial thin harvest will continue to be protected, if still standing and determined to be safe. These structures will be supplemented with retention of additional wildlife TPA (total of four). For an average 60-acre harvest unit, this will total 240 trees, double the amount required by OFP Rules. In addition, one snag  $\geq 15$  inches DBH and  $\geq 12$  feet tall, will be created for every 10 acres harvested (at least 50% will be conifer). For an average 60-acre harvest unit, created snags will supplement retained legacy snags and wildlife trees with an additional six snags, all of which are more than what is required under OFP Rules. These figures are estimated to be the minimum amount retained because typically in harvest units there are small areas where trees and/or snags are left for various operational reasons and down wood of various sizes is scattered throughout the harvest unit. These measures are expected to add complexity to spotted owl dispersal habitat, and provide structures, i.e., opportunities, for roosting, nesting, and foraging by spotted owl prey species, bats, and birds.

*Upland leave tree patches* – Twenty-five percent of the leave tree commitment will be retained in upland leave tree patches regardless of the number of leave trees retained in riparian buffers. There is no requirement under OFP Rules to retain upland leave tree patches. Preferential retention of upland leave trees will be around SMAs, i.e., ecologically sensitive, and unique habitat types. Where SMAs are absent, leave trees will be retained in upland leave tree patches from  $\frac{1}{4}$  to 1 acre in size, scattered throughout the unit. For an average 60-acre harvest unit, at least 60 trees will be available for placement around SMAs or in one or more upland leave tree patches. These sites typically provide breeding and foraging habitat for amphibians, nesting and perching habitat for raptors, nesting and foraging habitat for forest birds, and roosting and foraging habitat for bats. These habitat types, identified above, will be mapped on a unit-by-unit basis prior to or during commercial thinning and regeneration harvest and will function as reserves for the Permit term.

*Understory vegetation* – Where operationally feasible, all understory vegetation including all trees  $\leq 10$ " DBH will be retained within 25 ft of harvest unit boundaries, and adjacent to

buffers on streams and aquatic habitats. Understory cedar trees are encouraged to be retained throughout the unit to provide additional understory function. The understory layer of vegetation adds complexity and diversity to the managed forest landscape and has the potential to function as perching, foraging, and nesting habitat, as well as hiding cover for small mammal, birds, and amphibians. It also functions to provide shade and moisture retention to the forest floor where it occurs and increases the function of stream and aquatic habitat buffers.

*Forest floor CWD and debris piles* – Coarse Woody Debris is important as hiding cover and den/nest site habitat for small mammals and amphibians. Coarse Woody Debris recruitment and/or retention will have the potential to improve wildlife habitat in young managed stands for spotted owls and other terrestrial Covered Species until later stand development creates a more natural input of larger diameter wood from retained snags and green trees. At commercial thin harvest, two pieces of CWD will be retained or created per acre which will remain until they deteriorate or until regeneration harvest occurs (no requirement under OFP Rules). At regeneration harvest, 30 cu ft of CWD will be retained or created per acre. OFP Rules require two downed logs that each comprise at least 10 cu ft gross volume or one downed log of at least 20 cu ft gross volume. CWD pieces at commercial thin harvest will be of the largest diameter class, while those retained during regeneration harvest will target a diameter of  $\geq 20$  inches. These CWD pieces, totaling 1,800 cu ft for an average 60-acre harvest unit, will be distributed on the forest floor, or retained in woody debris piles. Under OFP Rules, the requirement would result in 1,200 cu ft being retained. However, given the smaller diameter of pieces available, some logs may be piled near one another to simulate larger CWD. The spatial distribution of CWD will be varied, i.e., non-uniform across the harvest unit. This proactive measure ensures CWD on the landscape has the potential to function as habitat for 10-25 years after commercial thin with additional active recruitment occurring at regeneration harvest.

The CWD conservation measure includes the ability to create woody debris piles that are  $> 10$  cu ft each. The piles will be 5-10 ft in diameter, comprised of piece sizes that average 10 inches in diameter (but which target 20-inch pieces) and are 1-3 ft long with an abundance of smaller wood. These piles may be created from residual logging debris on slopes  $< 35\%$  as an alternative to leaving CWD pieces on the ground. The result will be a combination of CWD pieces and piles that will have the potential to improve wildlife habitat in young managed stands across the landscape for spotted owls and other terrestrial species, e.g., small mammals and amphibians, until later stand development creates a more natural input of larger diameter wood from retained snags, green trees, and legacy trees. The spatial distribution of CWD will be varied, i.e., non-uniform across the harvest unit. Retention and creation of CWD features adds diversity to the commercial forest landscape and functions as potential hiding, denning, and foraging habitat for mammals, birds, and amphibians.

### **6.3.3 Timber Harvest**

An important component of Port Blakely's HCP forest management strategy is the implementation of harvest prescriptions that will improve habitat conditions for covered aquatic and terrestrial species. Port Blakely will employ a variety of forest management regimes to ensure the proper growth and health standards of conifer-dominated forest are met. The primary regime will include extending the regeneration harvest age to 50 years instead of harvesting at age 39, and early and mid-rotation management, i.e., thinning,



determined by several factors including tree density, site class, steepness of slopes, and the feasibility of using ground-based logging equipment.

Under the HCP, forest management activities will result in older trees, and increased habitat quality and structural diversity while also increasing the value of individual trees growing within the forest. Stand conditions vary across the covered area due to changes in aspect, elevation, exposure to disease, species composition, and natural events beyond Port Blakely's control. These events, such as windstorms, wildfires, and disease outbreaks, create small-scale openings in the forest canopy and enhance structural complexity and diversity within stands. Commercial thinning operations result in creation of similar openings, increasing sun to the forest floor and promoting understory development which, in turn, increases structural diversity. Stem diameter also varies within and between stands that will be commercially thinned, with stands typically ranging from 8 to 13 inches DBH. Thus, through a combination of extending the age of regeneration harvests, naturally occurring forest processes, and pro-active actions by Port Blakely, the HCP landscape will be managed to provide habitat diversity and complexity with more forest habitat features than what would occur without the HCP. A summary of the results of implementing these different forest management regimes, i.e., the Covered Activities, follows. Covered Activities defined under OFP Rules and enhanced under the HCP are explicitly compared in Appendix C Comparison of HCP Conservation Measures and Oregon Forest Practice Statutes/Rules.

*Pre-commercial Thin* - Candidate stands for enhancement activities via pre-commercial thinning will occur in stands that are between 10 and 20 years old, and in stands that typically have stocking levels greater than 400 TPA. On steep slopes, e.g., stands > 35% slope, the stocking levels typically are > 350 TPA to be considered for pre-commercial thinning. Conifer trees of this age will generally be 3 to 7 inches DBH. After a pre-commercial thinning application, stands on slopes < 35% will have 230 to 330 residual TPA, while stands on slopes > 35% will be thinned to a tree density target of ~257 TPA. This stocking allows for increased sun throughout the stand, resulting in radial growth and understory development.

The acreage of stands pre-commercial thinned in any given year is variable but, on average, ranges from 300 to 600 acres annually. However, as a result of the catastrophic fires of 2020, pre-commercial thinning on an annual basis will be conducted at the lower end of this range because nearly a third of the HCP area will be growing as a single age-class. Thus, there will likely be a spike in this activity as the approximately 8,100 acres of burned stands reach an age where pre-commercial thinning would be advantageous. Although not all the stands will likely require pre-commercial thinning, when it occurs there will be an increase in this activity for a period of several years in the second decade.

Trees cut during this management activity are not removed, providing short-term woody debris input to the forest floor. Pre-commercial thinning is generally accomplished by hand-cutting and does not involve the use of heavy equipment. This forest management activity sets the harvest unit stands on a trajectory to grow bigger trees more quickly resulting in development of forest habitat with sufficient space for terrestrial Covered Species to transit through the stands. As these stands, develop over the next 15-30 years, they will acquire features such as snags and defective trees, as well as an understory resulting in two canopy layers, that will be used by the terrestrial Covered Species, and provide opportunities during commercial thinning for continued retention as terrestrial habitat features on the landscape

until regeneration harvest. The dominant tree in any given forest stand will be prioritized for retention, regardless of species but with a preference for Douglas-fir and western red cedar. Snags, cavity trees and understory shrubs will be retained where operationally possible.

*Commercial Thin* – Port Blakely’s commercial thinning operations involves a set of voluntary forest management activities designed to grow young trees healthier and faster than allowing them to grow as high-density stands. Under OFP Rules, commercial thinning is considered an “unclassified harvest” with no reforestation, wildlife tree or downed log requirements as long as 80 sq. ft of basal area per acre is retained (OAR 529-610-0010). However, under the HCP, Port Blakely will commit to conducting commercial thinning as described below to accelerate tree growth and habitat, retain, or create wildlife trees and downed wood, resulting in forest stand complexity that will benefit Covered Species.

A minimum of 25% of operable lands will be thinned to a stocking level of 180 to 235 TPA. The acreage commercially thinned in any given year is variable but, on average, ranges from 100 to 200 acres annually. However, as a result of the catastrophic fires of 2020, commercial thinning on an annual basis will be conducted at the lower end of this range because nearly a third of the HCP area will be growing as a single age-class. Thus, there will likely be a spike in this activity as the approximately 8,100 acres of burned stands reach an age where commercial thinning would be advantageous. Although not all stands will likely need commercial thinning, when it occurs there will be an increase in this activity for a period of several years in the third decade. Conifer stands on Site Class I and II soils that have < 35% slopes and are between 20 and 40 years are reviewed for relative density (RD), stocking, wood quality characteristics, and health. Stands on Site Class III and IV soils are not thinned because they typically have the spacing and structure to allow growth without being managed. Port Blakely makes commercial thinning decisions based on these stand conditions, as well as market conditions, targeting an average post-thinning RD of 40, ranging from 35 to 50 for residual stand conditions. Stands of this age-class will typically be 8 to 13 inches DBH. On slopes that allow for ground-based harvesting (< 35% slope), conifer stands with RDs > 50 and with stocking > 270 TPA typically will be considered for commercial thinning, given the proper market conditions. Thus, although our HCP commitment is a minimum of 25% of operable forestlands will be commercially thinned, it could be more based on the actual condition of Site Class III and IV that may benefit from thinning and anticipated market conditions that suggest future forest stand value will increase as a result of thinning. Increased amounts of commercial thinning would result in a corresponding increase in forest habitat beneficial to spotted owls and other Covered Species.

During commercial thinning activities, spacing and vigor of trees determine which trees will be retained or cut. Large, healthy, dominant conifer trees are generally selected for retention as future crop trees. However, based on spacing, some larger trees could be removed and other species including hardwoods may be selected for retention. Suppressed, smaller co-dominant and dead or dying trees are generally removed from the stand. Spacing may result in retention of some smaller co-dominant trees, but there is no requirement under OFP Rules to retain wildlife trees. Some smaller sub-merchantable trees, especially shade-tolerant species, are typically retained to accelerate habitat conditions by contributing to the development of a second story. The target stocking of overstory trees for these stands is 180 to 235 TPA after the commercial thinning operation but may vary within and between

stands. Generally, commercial thinning will increase the average diameter of the remaining stand by primarily removing smaller trees.

During commercial thinning, extraction corridors (e.g., skid trails and cable-yarding corridors) create openings in the canopy allowing for improved solar penetration. Extraction corridors average 60 feet apart, although this spacing is dependent on topography, and corridor spacing will vary from 50 to 80 feet apart. Extraction corridors are generally 15 to 20 feet wide. Landings are also required to facilitate thinning activities. Landing placement varies from 400 to 800 feet apart, although this is dependent on topography and soil conditions. Landings generally range from 40 to 60 feet in diameter. Extraction corridors and landings have the effect of creating variable-density stocking throughout the thinned stand when combined with the skips and gaps from normal operations. Together, landings and corridors may occupy 8 to 15% of a thinned stand. The soil disturbance combined with the increased solar penetration encourages understory and groundcover germination.

The specific management considerations and actions related to the decision to conduct commercial thinning described above are designed to provide more diverse habitat conditions than what would occur under baseline OFP Rules. Investigations in western Washington, and applicable to western Oregon, suggest that mid-rotation thinning, in combination with snag and cavity-tree retention and/or creation can accelerate development of late successional habitat features in young forests (Garman et al. 2003, Beggs 2004, Lindh and Muir 2004). Past studies have suggested that thinning and cavity-tree retention are a primary management technique for enhancing forest understories for northern flying squirrels (*Glaucomys sabrinus*) (Carey and Johnson 1995, Carey 2000), the primary prey species of spotted owls in the Oregon Cascade Mountains (Rosenberg et al. 2003). However, recent studies indicate that thinning reduces the abundance of important spotted owl prey species, especially northern flying squirrels and red tree voles (*Arborimus longicaudus*) (Manning et al. 2012, Wilson and Forsman 2013). Densities of northern flying squirrels are particularly sensitive to thinning in young Douglas-fir forests, for at least 12 years after treatment (Manning et al. 2012). The long-term benefits of some thinning treatments may be positive for both flying squirrels and red tree voles but may not be realized for several decades or more, as the development of a mid-story layer of trees may be critical to the success of thinning in promoting habitat for these species (Wilson and Forsman 2013).

Thus, a conservative strategy would strive to maintain adequate area and connectivity of dense, closed-canopy forests within managed landscapes to maintain northern flying squirrel populations, by leaving areas of young forest un-thinned (Manning et al. 2012). Thinning prescriptions should be considered and implemented that lessen the short-term negative effects on arboreal rodents. Long-term goals should focus on creating more structurally and biologically complex forests across the landscape at scales and patterns compatible with the ecologies of spotted owl prey and other organisms (Wilson and Forsman 2013).

While mid-rotation thinning will not explicitly result in late successional conditions, it will set into motion growth of forest stands that are developing with woody features known to be characteristic of older forest conditions. Thinning of second and third-growth coniferous forests is a critical element of an overall landscape strategy for creating and maintaining terrestrial wildlife habitats in young managed forests. Thinning of Douglas-fir/western

hemlock forests allow for competitive release of canopy dominants and shade-tolerant understory trees, resulting in multiple canopy layers, increases in canopy depth, and enlargement of tree crowns (Oliver et al. 1991). These enhancements are associated with spotted owl habitat and tend to increase niche availability for breeding birds.

Port Blakely will commercially thin a portion of qualifying conifer-dominated stands so that they will develop into more complex forest habitat. This effort is not required by OFP Rules but, under the HCP, will result in forest characteristics beneficial to spotted owls (foraging habitat) and other terrestrial wildlife and, generally, healthier conifer stands, with larger tree diameters and wider spacing. The latter characteristic provides the potential for spotted owls to move through these stands as they disperse, and to forage more effectively. With the inevitable defect that develops, due to naturally occurring events such as ice and windstorms in older stands that are left free to grow, as well as the retention of legacy structures, these stands also have the potential to develop structural features available for use by spotted owl prey habitat, as well as forest birds and bats. This is one of the potential benefits to spotted owls from implementing this management strategy in conifer-dominated stands based on foraging and dispersal habitat characteristics.

Stands that are eligible for commercial thinning will be between 20 and 40 years old with relative densities between 50 and 70. They will be primarily Site Class I and II with < 35% slope. Stands of Site Class III and IV are not thinned because they typically have the spacing and structure to allow growth without being managed. For purposes of determining the amount of functional spotted owl dispersal habitat, Port Blakely has identified conifer-dominated stands with 70% crown closure, greater than 130 TPA  $\geq$  10 inches DBH, and a total tree density of  $\leq$  300 TPA, and canopy lift of 20 feet as having conditions necessary to facilitate spotted owl dispersal. These stands also have the potential to provide foraging opportunities, i.e., become foraging habitat, as stands of this age frequently contain dead and defective trees that may provide habitat for spotted owl prey species. Port Blakely will also ensure that two snags per acre are provided, as described below, adding to the potential for thinned stands to function as spotted owl foraging habitat for 15-30 years, depending on age at thinning. Thinning of stands will create these conditions at an earlier age by optimizing natural and created openings in the canopy and leaving existing understory as undisturbed as possible, given the harvest method, to foster continued understory development.

Under Port Blakely's thinning regime, stands older than 35 years of age that have been commercially thinned will likely provide functional dispersal habitat because thinning creates tree spacing and canopy lift, allowing spotted owls to fly into and through the stand. The snag retention and creation prescriptions described below are expected to provide prey habitat structures, thus adding a foraging component to dispersal stands, i.e., it becomes spotted owl foraging habitat.

Habitat characteristics and stand structure are also enhanced by retaining some defective trees during commercial thinning. To increase the probability that wildlife trees will be present at regeneration harvest age, one of the following wildlife tree and snag prescriptions will be applied when conducting commercial thinning management activities:

- Prescription 1: Two defective trees per acre will be retained (largest trees in the stand). Defective trees are defined, but not limited to, damaged, or deformed live

trees in the management unit with characteristics such as broken or multiple tops, bayonet, or candelabra tops, or having sinuosity characteristics.

- Prescription 2: One defective tree per acre will be retained and one snag (largest available) per acre will be created using either mechanical topping at or above 12 feet, or girdling, scarring or chainsaw boring of standing live trees. When selecting trees for mechanical snag creation, priority will be given to residual conifer leave trees from the previous regeneration harvest, not to include legacy trees.
- Prescription 3: Two snags (largest available) per acre will be created using either mechanical topping at or above 12 feet, or girdling, scarring or chainsaw boring of standing live trees. When selecting trees for hand snag creation, priority will be given to residual conifer leave trees from the previous regeneration harvest, not to include legacy trees.

Mechanically topped trees will decay over time and will help to increase the availability of snags over the short term. The severed treetop will be retained on the forest floor to increase the availability of fine and coarse woody debris. Additionally, two TPA, defective of the largest diameter class, will be cut and retained on the forest floor to contribute to overall downed woody debris.

Most, if not all, thinning operations use modern processing machinery capable of felling, delimiting, and bucking trees into various lengths for shipment to markets. Significant amounts of coarse woody debris are created during commercial thinning activities. The actual amount of woody debris created will vary and depends on pulp prices and market conditions at the time. However, it can be calculated that the difference between initial stocking of 285 to 350 TPA and residual stocking of 180 to 235 TPA is roughly 113 stems per acre. Thus, it is estimated that the removal of approximately 113 stems per acre during commercial thinning will create at least 113 tops measuring from 2 to 4 inches DBH and 8 to 16 feet in length per acre. This debris is in addition to the two cut trees and any existing residual downed logs already present in the stand that Port Blakely will leave on the forest floor while conducting commercial thinning management activities.

During the thinning activity, efforts are made to allow understory shrubs and shade-tolerant saplings (e.g., western red cedar and western hemlock) to remain undisturbed. Extraction corridors and landings provide openings for understory development and adjacent trees tend to retain lower branches longer. Areas between extraction corridors that are beyond the reach of equipment (greater than 30 feet) will have higher stocking levels and will further add to canopy diversity. Within many stands, rocky or wet locations will result in natural openings that will also contribute to canopy and within-stand diversity. Larger areas that may fall within harvest units, such as unstable slopes, riparian areas, and logistically unreachable lands, may develop into pockets of habitat that serve as foraging and roosting locations.

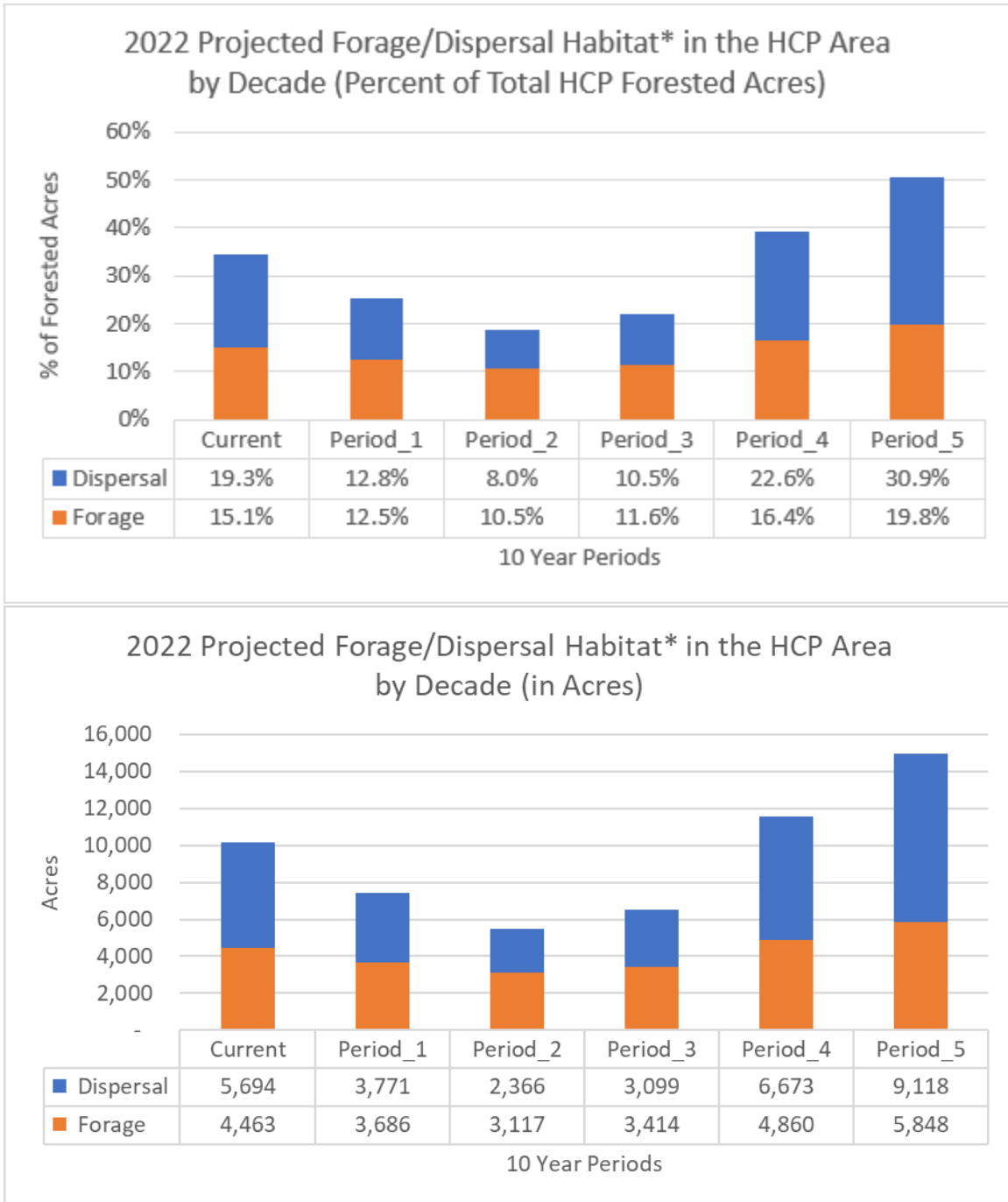
In addition to foraging habitat, a certain number of stands > 35 years of age on slopes > 35% will be pre-commercially thinned but typically not commercially thinned (due to the inability to access steeper slopes with machinery). Because these stands generally will be thinned to stocking levels  $\leq$  300 TPA, over time they will meet dispersal habitat parameters.

We have conservatively estimated these stands to comprise 50% of the stands on slopes > 35%. The minimum acreages of foraging and basic dispersal habitat anticipated to occur over the term of the HCP are shown in Figure 6-1.

Under the HCP, a minimum of 11% of the total HCP forested acreage (~ 3,100 acres) will be available for spotted owls as foraging habitat during the third decade of the HCP term. During this decade, 8% of the total HCP forested acres (~ 2,400 acres) of dispersal habitat will also be available for a total amount of approximately 18.5% of the total HCP forested acres (~ 5,500 acres) as spotted owl foraging/dispersal habitat on the HCP landscape. These values represent a minimum amount of spotted owl foraging and dispersal habitat expected to occur at any time during the Permit period, based on long-term forest management projections, as a result of implementation of HCP conservation measures. In actuality, spotted owl foraging and dispersal habitat will likely be greater on a decadal basis than the projected minimums because some Site Class III and IV stands may be thinned, more opportunities for thinning may be identified based on projected stand values at final regeneration harvest, and/or regeneration harvest of older stands may be delayed for various forest management and revenue purposes.

In comparison, under OFP Rules, forest management of the HCP area would result in, at best, ~ 1,600 acres of forest stands (Periods 4 and 5) that might function as spotted owl habitat, based solely on tree age and size, i.e., unmanaged stands in the 41 to 50 and 50+ age-classes. This acreage comprises ~ 5% of the forested HCP area, most of which would be in dense, unmanaged stands distributed throughout the HCP area, and in riparian buffers (described in Section 2.2.2.1 and shown in Figure 2-1).

**Figure 6-1. Spotted owl foraging and dispersal habitat acres and percent, currently and anticipated to occur in the HCP by decade\* over the Permit term.**



\*Acreage and proportion estimated to occur at the end of each 10 Year Period of the HCP based on harvest plan projections and incorporation of results of the catastrophic wildfires of 2020.

*Regeneration Harvest* – Port Blakely will conduct regeneration harvests only on a small fraction of the land base on an annual basis. Stands that typically have a DBH ranging between 14 and 21 inches and at a density range between 180 and 235 TPA are selected for regeneration harvest. Typical harvest unit size will average 60 acres and annual harvests are projected to average 500 acres based on an integration of HCP commitments, company planning, market opportunities and forest health conditions. It is anticipated that in a five-year period, 800 to 5,000 acres could be harvested. If 25% more forestland is acquired and proportionally harvested, up to 1,250 more acres could be harvested in a five-year period. Regeneration harvest under the HCP typically will be applied to stands 50 years of age and older. The anticipated average acreage distribution of forest age-classes for each decade of the Permit term is shown in Figure 6-2. It should be noted that as a result of the catastrophic fires of 2020 there will be a spike in regeneration harvest at the end of the Permit period as the ~8,100 acres of burned stands reach harvest age, i.e., > 50 years of age. A description of the harvest decision-making process and approach is provided in Section 2.2. The forested acreage distribution, graphically depicted as harvest units, from the starting condition through each decade of the Permit term is shown in Figure 6-3 through 6-8.



**Figure 6-2. Forest age-class distribution currently and projected by decade\* during the Permit term.**

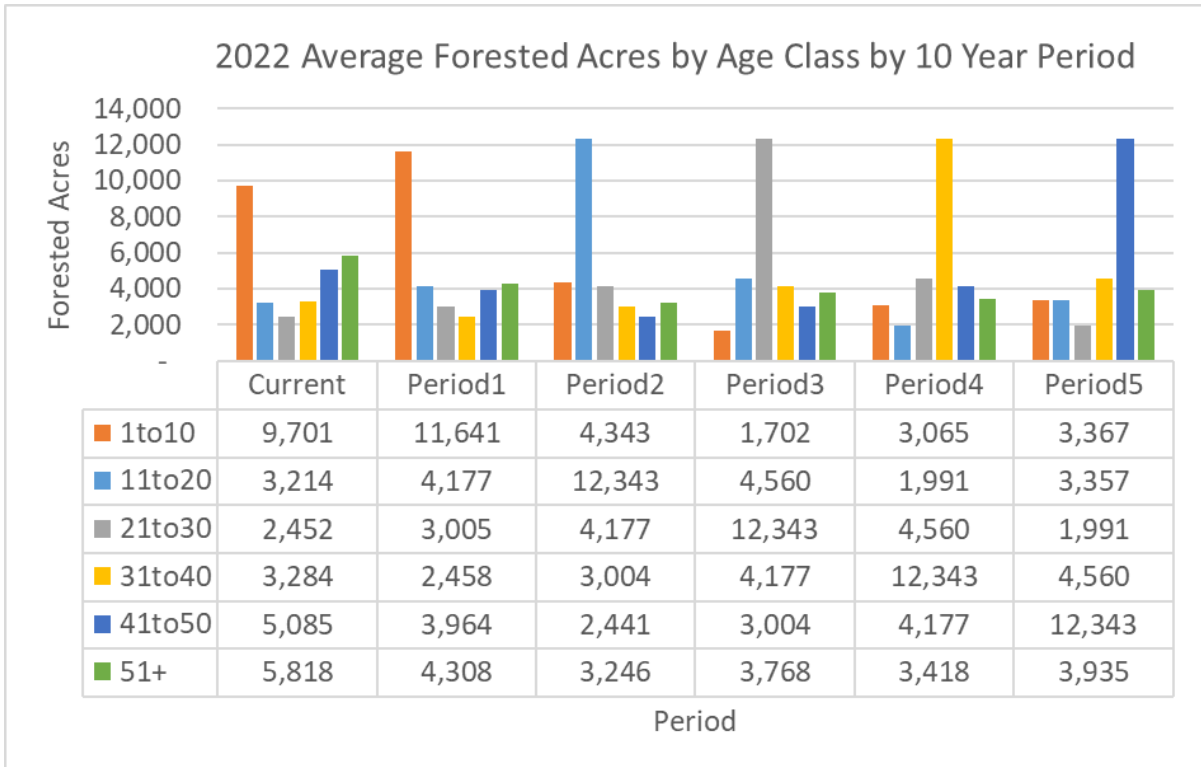


Figure 6-3. Forest Age-classes at Start of the HCP Term.

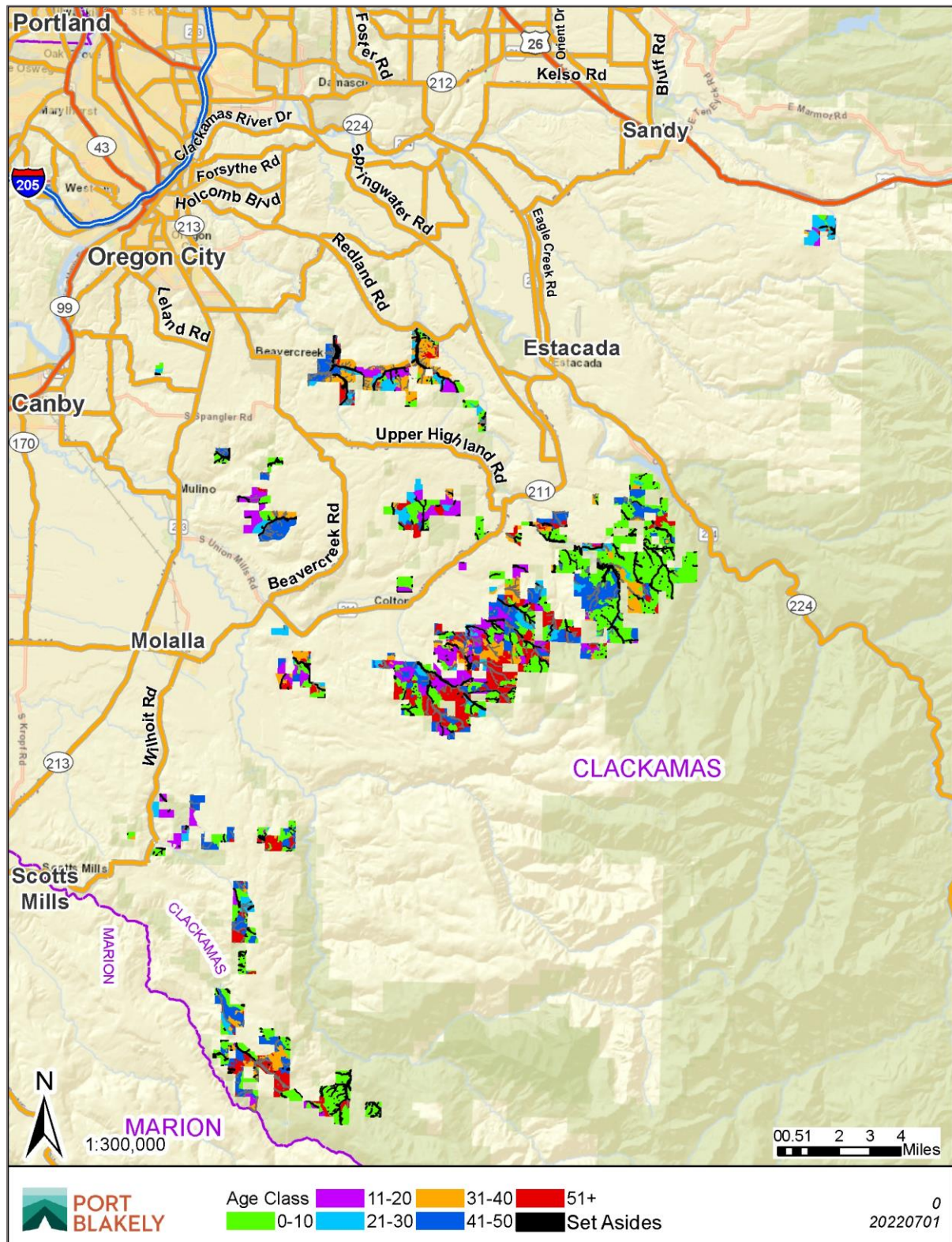


Figure 6-4. Forest Age-classes at End of Year 10 of the HCP Term.

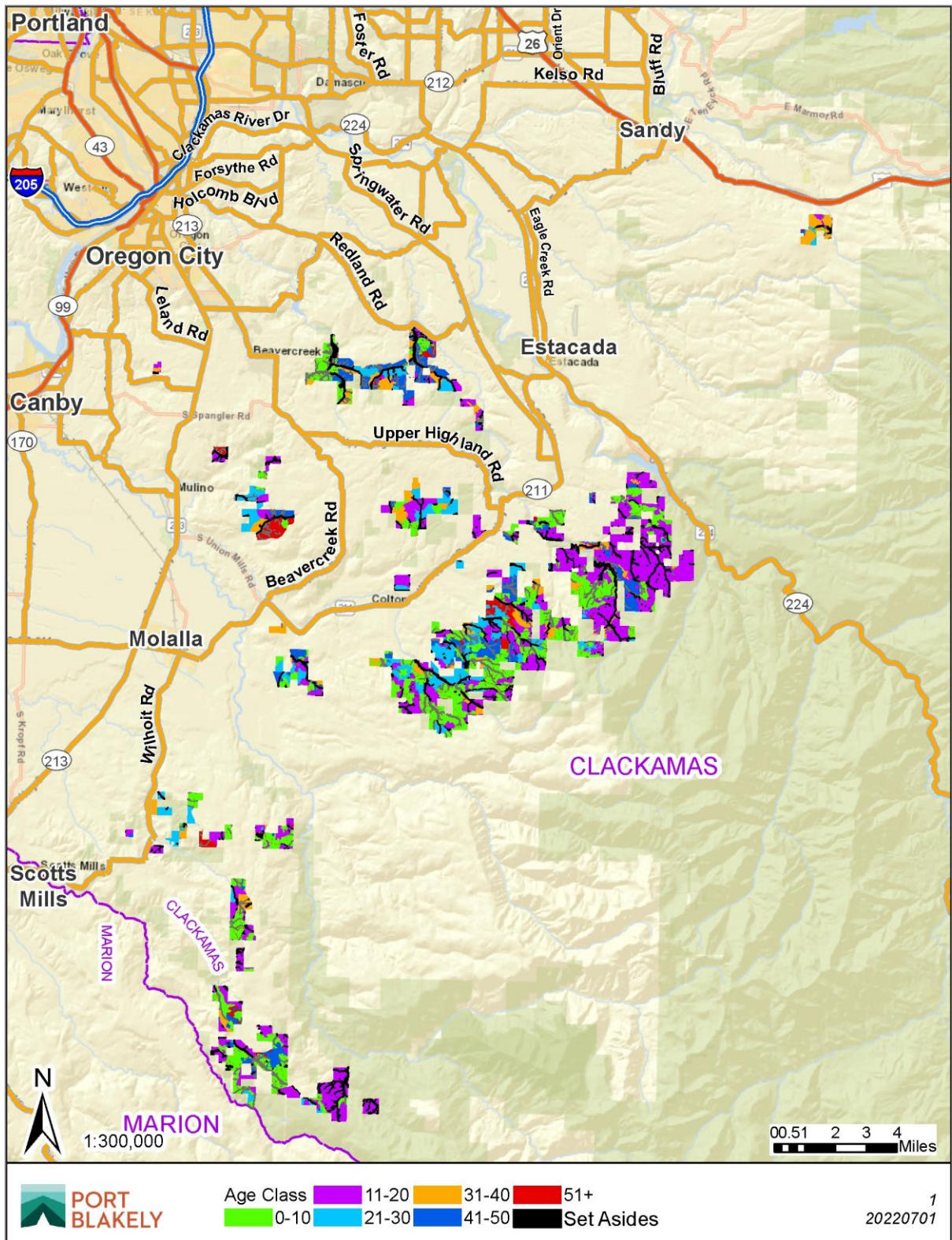


Figure 6-5. Forest Age-classes at End of Year 20 of the HCP Term.

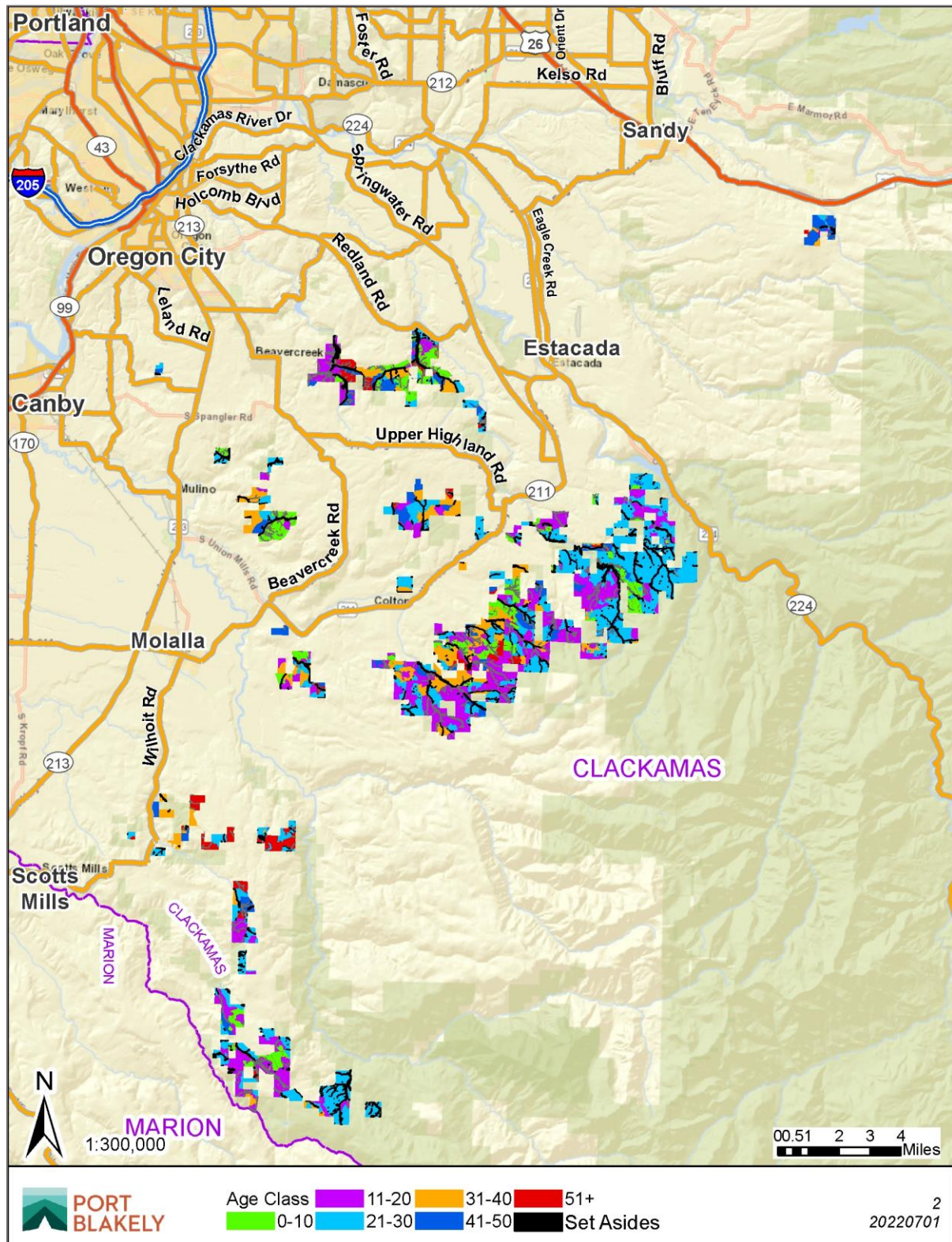


Figure 6-6. Forest Age-classes at End of Year 30 of the HCP Term.

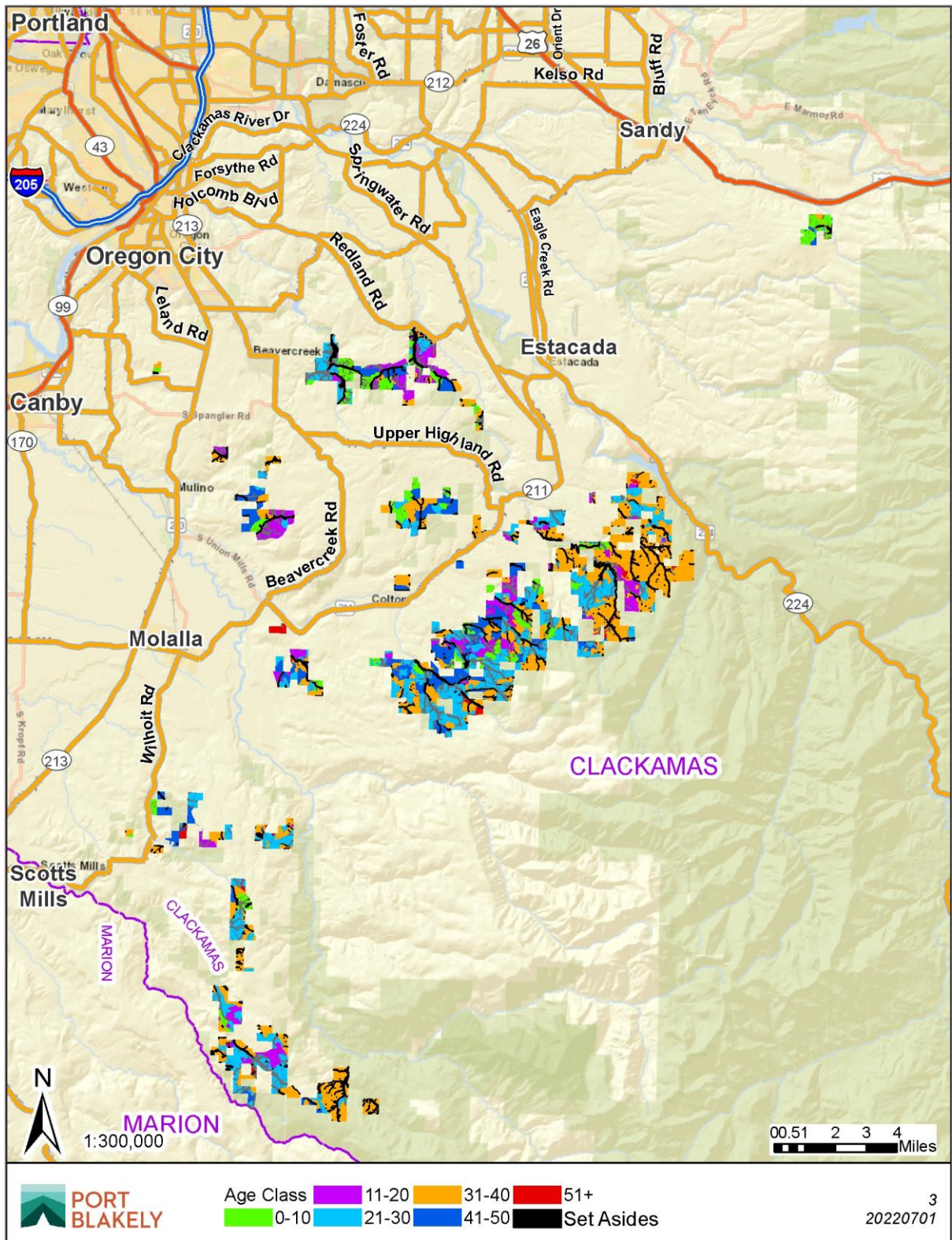


Figure 6-7. Forest Age-classes at End of Year 40 of the HCP Term.

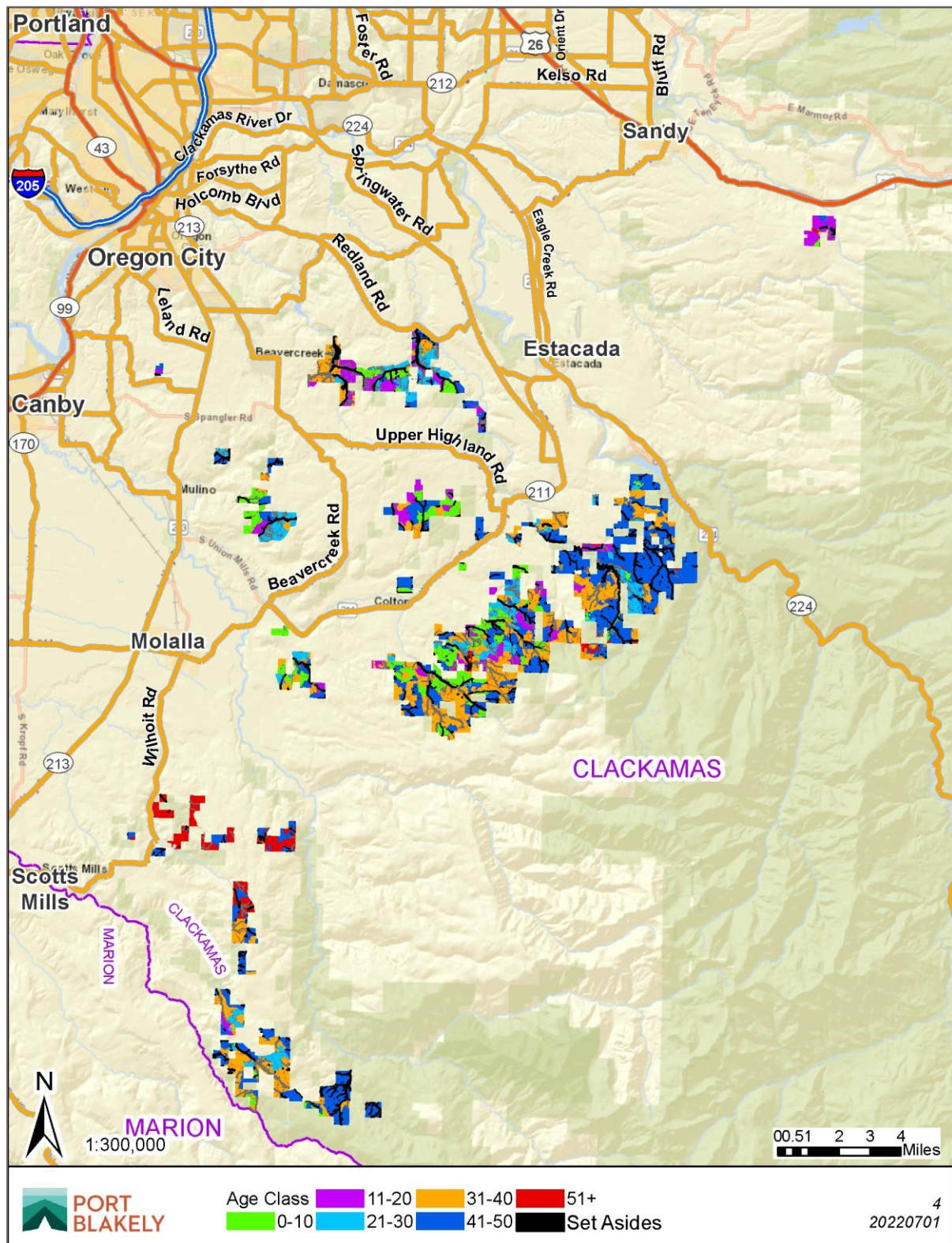
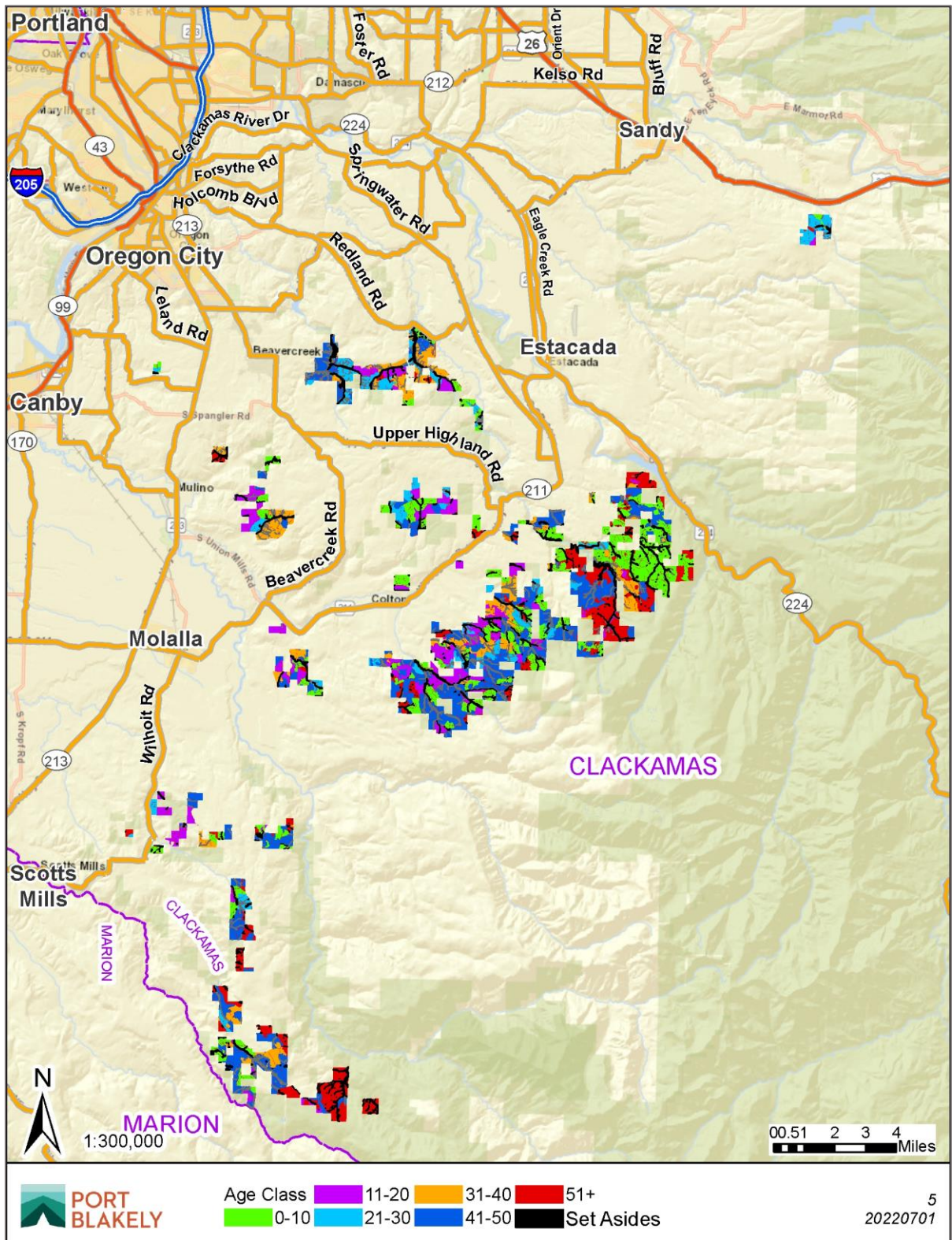


Figure 6-8. Forest Age-classes at End of Year 50 of the HCP Term.



Age-classes 50 years old and older will vary slightly on a decadal basis throughout the term of the HCP ranging from approximately 15% of the HCP forested area at the start of the Permit term to approximately 11% (~ 3,200 acres) in the second decade, 13% during the third decade, 12% during the fourth decade, and 13% (~ 3,900 acres) during the last decade of the Permit term. This habitat will be comprised of stands that have survived the 2020 wildfires and grown into the 51+ age class over the decades, as well as retention of the 60-69 and 70+ year old age-classes retained as riparian and upland leave tree reserves that are guaranteed to remain on the landscape as forested reserves for the Permit term.

Currently, the 51-60, 61-70 and 71+ year old age-classes are comprised of approximately 3,366, 1,741 and 711 acres, respectively (Port Blakely 2023). Approximately 400 acres in these age-classes are located in current riparian reserves and other areas unavailable for harvest, e.g., steep, and unstable slopes. These stands will be managed over time, some harvested, and some retained in riparian areas and other leave tree areas, while at the same time additional stands will become part of the 51+ age-class such that this age-class will remain relatively constant throughout the Permit term (Figure 6-4). The age at harvest will typically be 50-60 years old. By the end of the second decade, the older age class will have shifted across the landscape (Figure 6-5), and retention of age-classes 60-69 and 70+ will, for the most part, be in riparian and upland reserve areas.

The current riparian leave tree areas are comprised of buffers retained under OFP Rules and are estimated to be 4% (~ 1,200 acres) of the HCP area (Port Blakely 2018b, Port Blakely 2018c). These are typically stream buffers that are associated with regeneration harvest units that have occurred over the past two decades (beginning when OFP stream protection rules were enacted). Stream buffers and upland habitat reserves on the future HCP landscape are anticipated to encompass two to three times the retention area (2400-3600 acres) that would occur under OFP Rules by the end of the Permit term (Port Blakely 2018b, Port Blakely 2018c). The reserves along with the harvestable acres comprise the 51+ age-class shown by decade in Figure 6-2. The upland habitat reserves will be ¼ to 1 acre in size or larger, and will be located within the harvest unit, preferably around sensitive or unique habitats, when available. They are expected to contribute significantly to terrestrial habitat complexity.

During regeneration harvest, legacy trees, i.e., residual trees from previous harvest, will be retained, provided the legacy tree does not pose a risk to human safety and does not create an operational hardship. Wildlife trees may be clumped, or randomly distributed as is logistically practicable. Where snags are retained, small clumps of live trees surrounding these snags may be retained for safety considerations and to provide more complex habitat.

For snags without a lean, this patch will generally be circular with a radius equal to one and a half times the height of the snag or from the point of potential breakage to the top. Such retention will add within-stand diversity to the subsequent developing stand. While conducting regeneration harvest, Port Blakely will ensure that wildlife trees are present by implementing the following prescription to enhance the vertical and horizontal diversity in forest stands over the HCP area:



- Retain 4 TPA (alive or dead) per harvested acre and retain all safe snags. Regardless of the number of residual safe snags retained, within a regeneration harvest unit, Port Blakely will create additional snags at a rate of 1 per 10 acres.

Snags are defined as standing dead conifer trees  $\geq 11$  inches DBH and  $\geq 30$  feet tall. Snag creation methods to be employed within the HCP landscape will include mechanically created snags using girdling, scarring, or coring with a chain saw, or mechanical topping, and/or through natural recruitment. Mechanically created snags will be at least 15 inches DBH and 30 feet tall; mechanically topped snags will be at least 15 inches DBH and 12 feet tall. At least 50% of created snags will be conifers representative of the stand.

In order to provide a better level of tree dispersal throughout the harvest unit, no point in the unit will be greater than 500 feet from a snag or wildlife tree. This spacing prescription is expected to improve wildlife tree dispersal on the landscape.

Areas in the Plan forestlands where local terrain features create significant operational constraints or that add significantly to harvest costs will be designated as SMAs (see below) and will be deferred from harvest during the Permit period. Such areas will contribute to the overall availability of mature forest in the HCP area.

*Stand Recovery and Natural Disturbances* – Stand recovery activity refers to the removal of single diseased or damaged stems from a timbered stand without damaging or removing the residual trees to maintain stand health and recover valuable timber. However, affected stands with two acres or less on slopes greater than 35% are generally not recovered until the entire unit is ready for regeneration harvest. This allows for these small patches of defective trees to function as suitable habitat for a variety of terrestrial Covered Species, e.g., forest birds and bats. It is not the intent of the aforementioned to recover every damaged tree and in those instances where damage is minor, recovery efforts will not be initiated, and the defective trees will remain in the stand until it is commercially thinned or regeneration harvested, providing structural features desirable for forest birds, bats, and spotted owl prey species.

As with thinning, stand recovery requires the use of extraction corridors. However, because of the random nature of damage and disease, corridor patterns will vary, creating both large and small openings in the canopy. All efforts are made to recover the merchantable timber throughout the operation, although not all the merchantable timber can be reached due to logistics, topography, and soil conditions. Non-merchantable sections of the damaged or diseased stems are left in the residual stand and they provide important biological benefits such as coarse woody debris. The amounts of non-merchantable tree sections will vary with stand age, the reason for entry, and topography. During stand recovery activities, Port Blakely will leave two downed logs per acre to promote the conservation of biological diversity within managed stands. The downed logs will be defective or represent the largest diameter class available in the stand recovery operation. During stand recovery operations, special efforts are made to avoid disturbing shade-tolerant saplings such as western red cedar and western hemlock. This practice will retain forest understory and promote the development of a more structurally diverse forest canopy. As with thinning entries, existing downed wood is retained and left undisturbed whenever possible.

Wind disturbance events, acting individually or in concert, will increase within-stand forest structural diversity. Wind effects are often unpredictable, affecting both individual trees and

patches of trees. Much of the wind throw and breakage created by wind events goes unnoticed at a stand level and does not warrant stand recovery operations, thus, resulting in habitat complexity and additional features that provide nesting and foraging opportunities for forest birds and bats. Management response of areas effected by wind throw will be determined on a case-by-case basis.

Wildfire disturbance events can cause low to severe forest damage, which can be localized or far reaching. If damage is widespread and warrants a salvage effort, affected lands will be permitted under an OFP alternate practice but will be managed according to conservation measures described in this HCP. Management response in areas affected by wildfire will be determined on a case-by-case basis.

*Special Management Areas* - SMAs include ecologically sensitive and unique habitat types as identified in Section 6.3. These habitat types will be mapped on a unit-by-unit basis prior to commercial thin and regeneration harvest and will be protected by preferential retention of leave trees around or adjacent to the sites, and/or avoidance of harvest around these sites. These sites typically provide breeding and foraging habitat for amphibians, nesting and perching habitat for raptors, nesting and foraging habitat for forest birds, and roosting and foraging habitat for bats. SMA leave trees will be retained as reserves for the Permit term.

#### *Biological Function and Role of HCP Timber Harvest Conservation Measures*

Under the HCP, implementation of timber harvest conservation measures will result in a forest landscape with more diversity and complexity than what is typical of commercial forestlands. The measures are designed to manage stands with structural habitat features for wildlife use during mid-rotation, retain stands longer than the economic rotation-age, and provide more snags and wildlife trees as future snags or den/nest trees than are required at regeneration harvest under OFP Rules. As described below, the HCP timber harvest conservation measures will improve stream and riparian habitat conditions and provide standing and forest floor habitat structures for use by covered wildlife species at various life stages. These measures will increase the biological function of forest habitat across the HCP commercial landscape, contributing to the conservation and/or recovery of the Covered Species.

*Age-class distribution* – Forest stands will be older than typical for a commercial forest landscape with regeneration harvest scheduled for stands 50 years of age or older. These stands will vary slightly throughout the Permit term, ranging from 15% (4,308 acres) of the total amount of forested acres on the HCP lands in the first decade, to 19% (3,246 acres) in the second decade, to 13% in the third decade, 12% in the fourth decade, and 13% (3,935 acres) in the last decade. Under OFP Rules, this age-class would only occur in riparian buffers and comprise ~ 1,400 - 1,600 acres, increasing slightly by decade over the next 50 years (see Figure 2-1).

Wider stream buffers will also retain older trees with structure on all fish streams and perennial nonfish streams across the landscape. Leave trees retained around sensitive sites and in upland patches will also result in older trees on the landscape for use as potential den/nest sites for spotted owls, goshawks, wolves, fisher, and bats. Thus, these stands will remain on the landscape in the form of riparian and upland leave tree reserves for as long as an Incidental Take Permit is in force. Our commercial thinning strategy will result in spotted owl foraging habitat well distributed across the HCP area for 10-25 years. These

stands will become more complex with implementation of the snag and defective tree retention and/or creation strategies during commercial thinning and regeneration harvest management activities.

*Wood structural features and understory vegetation* – As stated above, retention and/or placement of legacy snags and trees, wildlife trees, upland CWD, riparian LWD, and understory vegetation will result in a substantially more diverse and complex commercial forest landscape. These features will become part of the landscape during commercial thinning activities and continue to be retained and supplemented with additional structures at regeneration harvest. Woody features and understory vegetation will become integrated with stream/riparian ecosystems and in a variety of upland forest stands in 30 to 50-year age-classes across the HCP landscape. As the stands and riparian areas mature, the potential for use by the terrestrial Covered Species for foraging, hiding, roosting, nesting, and denning will increase. The benefits to Covered Species will be in the increased amount and complexity of habitat retained, created, or allowed to develop that will facilitate their ability to utilize the HCP area for most, if not all, of their life stages.

*Sensitive site protections* – Establishing SMAs around ecologically sensitive and unique habitat types will protect these sites in the form of reserves for the entire HCP period. Protection will include preferential retention of leave trees around or adjacent to the sites, and/or avoidance of harvest around these sites. These sites typically provide breeding and foraging habitat for amphibians, nesting and perching habitat for raptors, nesting and foraging habitat for forest birds, and roosting and foraging habitat for bats.

#### **6.3.4 Road Management**

In addition to road management provisions of the OFP Rules, Port Blakely has developed management plans for road construction, maintenance, and abandonment, and commits to implementing the practices, described below, to avoid and minimize potential impacts to aquatic resources, i.e., riparian and stream habitat. The road maintenance and abandonment plans Port Blakely will implement in the HCP area are the same as those required to meet Washington Forest Practices Rules. Under Washington rules, forest landowners are required to prepare a Road Maintenance and Abandonment Plan (RMAP) that includes a schedule to fix roads that have the potential to deliver sediment to streams or block fish passage, on a worst-first basis. While Port Blakely does not have a RMAP for our Oregon forestlands, and there are no OFP Rules that require these types of road management plans, we will commit to repairing all roads on a worst-first basis, ensuring that sediment delivery to streams is avoided and fish access to upstream habitats is maximized. Any new discoveries will be added to the priority list the following year unless immediate attention is warranted to prevent sediment delivery.

##### **6.3.4.1 Road Maintenance**

Road maintenance includes any activity that is conducted to maintain or improve the function of the existing road infrastructure. The elements of the road infrastructure described below include consideration to the movement of water and sediment, and which optimize forest management activities.

#### 6.3.4.1.1 Drainage

Maintenance of roads to control water movement, prevent sediment delivery and maintain infrastructure integrity is conducted in a variety of ways depending on topography, geology, proximity to sensitive habitats, and anticipated use of the road. Port Blakely employs a suite of techniques, which aren't explicitly required by OFP Rules, that are site-specific including the following:

*Ditches* - Ditches are constructed to a depth that provides a sufficient area for water to stay within the confines of the ditch. Additional depth is added as an allowance for small blockages created by vegetation or organic debris. All ditches are built and maintained to assure proper drainage. Ditch maintenance can assure the ditch functions as built and to reduce the need for culvert cleaning. In recently cut or logged areas, woody debris is cleaned from ditches. Port Blakely will implement the following commitments to maintain ditches:

- All logging related debris including branches, logs, chunks, and dirt will be cleared;
- Vegetation in ditches will be retained wherever possible as long as the vegetation does not unreasonably impede the function of water flow through the ditch;
- Ditchlines will be cleaned when potential for water to scour the road exists; and
- Ditchlines will not be pulled across clean aggregate.

*Cross drains* - Cross drains function to transmit and disburse water from ditchlines to the forest floor for filtration, preventing erosion and channel creation due to excessive water runoff. Cross drains are installed frequently enough to minimize scouring of the ditch line and are located as close to the stream crossing as possible while still allowing the outfall to deposit sediment on and absorb water in the forest floor. Typically, cross drain outfalls are located 50-100 feet from the stream. The minimum diameter for a newly designed cross drain is 18 inches, and of a length that maintains the integrity of the road prism.

*Energy dissipaters* – Energy dissipaters function to prevent erosion of surface material as the water flows out of the cross drain. Energy dissipaters are composed of large boulders or stumps and are located below the cross-drain outfall and in ditch line settling ponds in locations that are vulnerable to sediment delivery or potential slope movement.

*Water bars* - Water bars are used to disperse ditch or road grade surface water to the forest floor. Water bars are typically directed to the outboard side of the road to disperse water on the forest floor in an un-concentrated manner. Where a water bar is being used as a cross drain, the water bar will intercept the associated ditch line.

*Out-sloped drivable dips* - Out-sloped drivable dips are wide swales in a road grade that divert water without causing a driver to come to a near or complete stop. Out-sloped drivable dips are an effective alternative to culverts, especially in high elevation snow prone areas with light ballast layers where snow and ice may block culverts.

*Shallow road surface water bars* - Road surface water bars can aid in distributing water away from the running surface. Generally, this is a temporary measure. Road surface water bars are constructed at frequent intervals during active haul to intercept wheel track runoff.

*Shoulder water bars on the road surface* - A shoulder bar is a short water bar on the edge of the road surface that helps relieve water from the running tracks. Often a "shoulder bar" can

be installed to direct water from the bottom of the running track through any shoulder berm that is present.

*Berms* - Berms can be used to prevent water from flowing onto the road and in rare instances to prevent drainage onto potentially unstable slopes. Construction is such that water in the outside running track can reach openings in the berm without traveling excessive distances.

*Ditch outs* - Ditch outs are trench like features that help assure ditchwater flows away from the road prism.

*Erosion control* - Unprotected soil in areas vulnerable to sediment delivery is covered. Silt fences, straw wattles, rock check dams, and ditch line settling ponds are used, or other means to prevent sediment-laden water from entering streams.

#### **6.3.4.2 New Road Construction**

New road construction permanently takes forestland out of production. Thus, the decision to construct a new road is carefully considered and only done so when determined to be essential for conducting forest management and future timber harvest. Port Blakely plans road placement so roads will not contribute to the potential for slope failure, to avoid RMAs, and to minimize stream crossings. It is anticipated that in a five-year period, 1.5-5.8 miles of road could be constructed. If 25% more forestland is acquired and roads developed proportionally, 1.45 additional miles could be constructed in a five-year period. New road construction is conducted according to the road management measures described above and construction standards detailed below.

*Clearing and Grubbing* – Clearing and grubbing involves the preparation of the surface for new road construction as follows:

- Right-of-way widths will only be wide enough to accommodate cut and fill depths, handling wood without damaging residual stands, and to allow for sunlight penetration and air flow to the road surface to dry;
- Grubbing limits typically are the width of the embankment and fill slopes; temporary (same year use) road grubbing limits may be narrower;
- Clearing limits are typically between two and five feet beyond the cut or fill slope margin; and
- Woody debris larger than one cu ft will be scattered outside grubbing limits.

*Subgrade Construction* - Subgrade construction is the cutting, filling, and grading of the road prism. The shape of the subgrade is determined by the function of the roads end-use and site-specific conditions. In-sloping, out-sloping, or crowning are the basic subgrade shapes as defined below:

- In-sloping means angling the running surface slope to drain towards the cut edge of the subgrade - this method is typically used where road surface runoff must be diverted away from slope failure vulnerable soil conditions;
- Out-sloping means angling the running surface to drain towards the fill edge of the subgrade - this method is typically applied where a ditch will not be constructed; and
- Crowning means the high point of the subgrade is at the center of the road and the road will drain evenly to both sides of the road - this is the most typical method.

#### **6.3.4.2.1 Road Surfacing**

Roads are surfaced with rock to the extent appropriate for the anticipated hauling use. For all-season roads, and roads that are located in geographical areas of rock source scarcity, crushed rock will be used. Landings can use pit run rock in moderation. Rock will be of sufficient depth and width to meet end-use and site-specific conditions. Rock is typically kept as narrow as necessary on spur roads during the rocking process. Suitable surface material is maintained on the road surface. When surface material is lost through use, it is replaced to sufficiently prevent road rutting and sediment delivery depending upon anticipated traffic use. There are no OFP Rules that require consideration of road surfacing techniques or materials.

#### **6.3.4.2.2 Stream Crossings**

*Fish-bearing stream crossing structures* - Structures are designed to ensure unimpeded passage of fish at all life stages consistent with Forest Practices Rules (ODF 2018a) and Oregon Fish Passage laws (OAR 635-412-0005 through 635-412-0040) and approved by NMFS. However, in addition to designing roads to pass game and salmonid species per OFP Rules, Port Blakely also designs stream crossing to facilitate fish passage of resident non-game species such as sculpin and dace, which exceeds OFP Rules. All structures are periodically inspected, i.e., when forest management activities occur and in response to high precipitation events, to assure fish passage has not been compromised. A stream survey is conducted, and a structure designed for permanent fish crossing installations. Streams are not re-directed out of natural drainages, rather culverts or bridges are installed. All streams will have a structure that will pass 100-year flow events, determined using the U.S. Geological Survey (USGS) magnitude and frequency method most recently described in Appendix A of Weaver et al. (2015). Once the cross-sectional area for accommodating a 100-year flow event is determined, a countersunk full culvert, bottom-less culvert or bridge will be chosen to put in place depending on stream size, flow, and gradient. Designing crossings to allow the movement of 100-year flow events exceeds OFP Rules.

*Nonfish bearing stream crossing structures* – Structures will meet the following criteria, based on stream type which are consistent with Oregon Fish Passage laws (OAR 635-412-0005 through 635-412-0040) but are of greater size than what current OFP Rules (ODF 2018a) require:

- Nonfish perennial (NP) waters will have a 24” diameter culvert minimum to accommodate 100-year event flows and pass debris that could be carried by the stream; and
- Nonfish seasonal (NS) waters - will have an 18” diameter culvert, provided there is enough capacity for 100-year event flow plus debris that could be carried by the stream.

#### **6.3.4.3 Deactivation and Abandonment**

Road deactivation and abandonment activities are not required under OFP Rules. Deactivation is the removal of the road from use by vehicle traffic. Road deactivation may retain some or all drainage structures and include supplemental water drainage measures. Upon deactivation, road maintenance activities are still conducted. Road abandonment is the sufficient removal of the subgrade with provisions made for long-term water runoff

management. Roads will be reviewed for potential abandonment within 5-year planning horizons. Port Blakely' deactivation and abandonment measures are HCP commitments that otherwise may not occur as they are addressed only as guidelines in the OFP Rules.

When making abandonment or deactivation decisions, the following is considered:

- The availability of rock in the area if the road has been rocked, as rock is a finite resource and may be needed for other roads;
- The ability to achieve 16-foot by 16-foot spacing by planting the shoulders and leaving the rock intact;
- The potential for environmental risks; and
- The potential to obtain a Permit in 30 to 60 years to rebuild the road.

Road deactivation is considered when one or more of the following conditions exist:

- The road will not be used for forest management for ten years or more;
- Construction costs are low and reconstruction costs will be relatively low if rebuilt at a later time; and
- The road was built for single-year harvest projects.

Road abandonment is considered when one or more of the following conditions exist:

- The road is adjacent (within 100 feet) to a (fish – nonfish) stream;
- The road is not required for forest management;
- The road will not be extended to another harvest unit;
- The road subgrade has been degraded by logging activities to the extent that expensive repairs are required;
- The road is in a high-risk road failure location; or
- The road was built for single-year use harvest projects.

Road abandonment of Stream Adjacent Parallel Roads (SAPRs) will be actively implemented. SAPRs are defined to be roads within any stream riparian management area (RMA) that is aligned parallel to the general direction of a stream for more than 300 feet on any one side. Where cost-effective and practical, i.e., other routes exist that are easily maintained, stream-adjacent roads are removed or routed outside RMAs to eliminate any potential for sediment delivery. The primary focus is on roads adjacent to fish streams but, where upland route alternatives exist with fewer impacts, roads adjacent to nonfish-bearing streams are also abandoned or rerouted. Stream-adjacent roads have been abandoned as part of Port Blakely's active road maintenance and abandonment plans and will continue under the HCP. Abandonment of stream-adjacent roads returns associated slopes to as near natural grades as feasible and any unnatural materials (e.g., culverts) are removed from the area. Routing an existing stream-adjacent road out of the RMA minimizes road-related stream impacts.

When the length of SAPRs is combined with road mileage associated with stream crossings, approximately 25 miles of road occur within 200 feet of fish bearing streams. Along these road segments and where abandonment of SAPRs is determined to be impractical due to topography, geology, the prevalence of sensitive habitats or the availability of alternative access routes, or is determined to be not cost-effective, Port Blakely will implement the following measures:

- Limit haul use to dry weather conditions;
- Utilize high quality aggregate;
- Suspend hauling when sediment delivery is observed and initiate sediment control methods until the problem is corrected;
- Within buffer areas, only use mechanical roadside brush control methods;
- Maintain vegetated ditch lines to filter and intercept sediment runoff;
- Install erosion and sediment control materials and products to filter and intercept sediment runoff during hauling activities; and
- Use other measures detailed elsewhere in this HCP, where applicable.

#### **6.3.4.4 Quarrying (gravel pits)**

Quarrying and rock pit activities occur throughout the HCP area. Quarry materials are used primarily for forest roads on the Port Blakely ownership with a strict limitation on the amount of materials (5,000 yards annually) available for sale for off-site use (Dept. Geology and Mining Industries ORS 517.753). Rock material sales can only occur if used for forestry purposes only. Rock quarries and gravel pits are typically small in size (< 5 ac) with low activity rates. Activities can occur anytime during the year but are only active when nearby road systems require surface materials. All sites are developed outside of riparian areas and on stable slopes. However, prior to Port Blakely ownership, one site was established within a riparian area. Port Blakely has since discontinued the quarry activities and replanted the riparian area with Douglas-fir and cedar.

#### **6.3.5 Species-specific Nest and Den Site Conservation Measures**

Species-specific conservation measures are designed to provide focused protection on nest/den sites and habitat set-aside areas of high conservation value to several of the Covered Species that are protected for the term of the HCP and Permit. Nest and den sites discoveries are expected to occur from reports by other agency staff, observations made by Port Blakely staff while conducting their forest management responsibilities, results of pre-harvest surveys conducted by Port Blakely typically three years prior to regeneration harvest activities, and observations reported by contractors informed of pertinent HCP elements and Covered Species likely to occur or known to occur in the harvest unit area. The areas and types of species-specific protections are described below.

1. Spotted owl nest sites - Spotted owls are not known to occur on Port Blakely's HCP lands, however, should occupied sites or spotted owl pairs be discovered over the term of the HCP, the following measures will be implemented to facilitate reproductive success:
  - a. Avoiding harvest within the 70 acres of highest quality suitable spotted owl habitat around the nest/pair site for up to three sites;
  - b. Retain up to three spotted owl nest/pair sites for as long as occupied (monitored annually); nest protection will no longer be required after "abandoned" determination, i.e., five years of being verified as unoccupied (ODF 2012);
  - c. If more than three active nest sites, coordinate with USFWS to provide protection where advised; and
  - d. Implement ¼ mile noise disturbance restrictions for spotted owl nest/pair sites from March 1 through September 30 of each year for all timber harvest related activities including chainsaws, log-hauling, heavy equipment, helicopters (except



- Chinook helicopters), pile-driving, rock crushing, normal road maintenance, reforestation, and research/monitoring; and 1 mile for blasting and pile burning (USFWS 2013); and
- e. In areas within the Provincial median annual home range of 1.2 miles from spotted owl nest trees or activity centers (Oregon Cascades Province), include legacy snags as a sensitive habitat feature if within a fish stream buffer, allowing extension of fish stream buffers by an additional 50-foot no-harvest as part of the variable width strategy.
2. Spotted owl foraging habitat - provide habitat conditions as follows:
    - a. As a result of commercial thinning, and the snag and leave tree provisions described above, a minimum of ~5,500 acres of foraging and dispersal habitat will be available to spotted owls across the forested HCP landscape over the term of the Plan.
  3. Additional spotted owl recovery activities – coordinate and participate with USFWS on agency-proposed recovery actions including consideration of the HCP lands for spotted owl research projects and addressing spotted owl threats.
  4. Wolf den sites
    - a. Protect up to two den sites for a minimum of three years but as long as occupied (monitored annually);
    - b. Den site protection and disturbance restrictions will be applied to an area comprising 0.50 miles around den sites;
    - c. If more than two active den sites, coordinate with USFWS to provide protection where advised;
    - d. Implement disturbance timing restrictions from March 15 to July 30; and
    - e. Restrict motorized access to HCP area roads, i.e., locked gates.
  5. Fisher den sites
    - a. Allow USFWS or its agents, with reasonable prior notice (defined as no less than 24 hours), to access HCP lands to perform the monitoring activities described below:
      - i. Determine if female fisher(s) are occupying dens and raising kits; and
      - ii. Evaluate fisher presence as needed to determine the long-term success of recovery efforts in Oregon.
    - b. Protect confirmed denning females and their young by limiting or preventing access and disturbance within 0.25 mile of occupied sites, including the destruction of the denning structure itself, March 15 - September 30.
    - c. Provide protection of denning females by restricting trapping and nuisance animal control activities within 2.5 miles of known occupied dens.
    - d. Create CWD bio-dens for potential use by fishers and/or prey species.
    - e. Report to USFWS within 48 hours of finding any potentially occupied den sites or any dead, sick, or captured fishers.
    - f. Cover all man-made structures on the HCP lands that pose an entrapment risk to fishers (e.g., large water troughs or containers from which fishers cannot escape) or place a device within the structure (e.g., wooden pole to allow fishers to climb out) to prevent mortality of fishers from drowning, starvation, or dehydration.

- g. Where suitable habitat exists and when agreed upon by Port Blakely and USFWS, allow the release of translocated fishers.
6. Northern goshawk
- a. Protect 30 acres of forest habitat around up to two active nest sites for a minimum of three years but as long as occupied (monitored annually);
  - b. If more than two active nest sites, coordinate with USFWS to provide protection where advised;
  - c. Provide forest landscape-wide habitat mosaic; and
  - d. Implement operational disturbance restriction for a distance of 0.50 mile from active nests March 1- August 31.

#### *Biological Function and Role of HCP Species-specific Conservation Measures*

In addition to creating a landscape with diverse habitat conditions from more woody structural structures, wider RMAs with higher potential to deliver LWD, and reduced sediment input potential from enhanced road management measures, the HCP contains species-specific protection measures that fulfil an important biological role. These measures focus on protection of functional den and nest sites.

Disturbance protection will be implemented to ensure specific mammal denning and bird nesting behaviors during the breeding season are not disrupted. Although these disturbance restrictions are not required by OFP Rules, the HCP contains these voluntary measures to ensure a minimal level of protection is provided during a critical stages of the species' life cycle which is expected to contribute to the reproductive success of these Covered Species.

The den/nest site protections are provided to ensure that a minimum number of these critical reproduction areas are protected for as long as they are occupied. Den/nest site success will be facilitated by maintenance of forest habitat buffers around the den/nest feature for as long as they are productive. These measures have the potential to contribute to the biological function of the reproduction habitat areas established by specific Covered Species, thus, making a contribution to the overall success of the species' populations.

#### **6.3.6 Summary of Conservation Program**

The HCP Conservation Program includes numerous avoidance, minimization and mitigation measures that result in a net conservation benefit to the aquatic and terrestrial Covered Species and, for some measures, are expected to contribute to the recovery of the species. That is, Port Blakely has, to the maximum extent practicable, developed conservation measures through proactive forest management that provides substantially more trees and forest structure, older age-classes, enhanced sediment-reducing road management measures and wider riparian buffers than required under baseline OFP Rules and what is commonly found on other industrial forest landscapes. Implementation of the HCP conservation measures will result in more complex and diverse terrestrial and aquatic habitats, guaranteed over the long-term, that will benefit Covered Species at the population scale at a time when many other land use, and management activities are negatively affecting their ability to perpetuate. The conservation measures under this HCP are summarized in Appendix B Summary of Conservation Program Measures. A comparison of

requirements under OFP Rules and HCP Conservation Measures is provided in Appendix C Comparison of HCP Conservation Measures and Oregon Forest Practice Statutes/Rules.

## **6.4 Monitoring**

Port Blakely will monitor compliance of the HCP with the intent to document and evaluate implementation of forest management activities and conservation measures described in the HCP. Compliance monitoring results will be provided to the Services in HCP Implementation and Monitoring Reports.

### **6.4.1 Compliance Monitoring**

Port Blakely will conduct compliance monitoring activities as follows:

- Conduct periodic forest inventories to monitor changes in the amount and distribution of forest stand characteristics on the covered area;
- Map all SMA's following regeneration harvest including leave tree reserve areas containing snags and defective trees;
- Document the snag and leave tree prescriptions employed during commercial thinning and regeneration harvest;
- Conduct pre-harvest surveys for sensitive habitats prior to regeneration harvest;
- Monitor any known nest sites for spotted owl and goshawk while located on Covered Lands;
- Monitor any known den sites of wolves or fishers while located on Covered Lands;
- Document the creation of bio-dens;
- Document the results of stream surveys, including fish distribution and the prevalence of year-round flow;
- Document large woody debris placement in small and medium fish streams associated with regeneration harvest;
- Document road construction, deactivation, and maintenance;
- Document the presence of crevices suitable for roosting bats on newly replaced bridges; and
- Document fish passage structure improvements.

### **6.4.2 Biological/ Effectiveness Monitoring**

In an industrial forest landscape, the quality and quantity of functional aquatic and terrestrial habitat elements shift around the landscape based on management activities. Port Blakely's conservation measures contain commitments to provide specific habitat features, diversity and quantities across the industrial forest HCP landscape that are known to be beneficial to the fish and wildlife species likely to occur in the HCP area. That is, the conservation measures are designed specifically to improve habitat conditions known to be important to Covered Species whose range includes the HCP area. As with many forestland HCPs in the Pacific Northwest, Port Blakely's HCP will provide habitat that could be used by the Covered Species, if and when they occur in the HCP area now or in the future, based on their known habitat needs. Thus, due to the relatively certain effects the forest management activities and conservation measures are expected to have on forestland function and the ability to improve habitat quality for Covered Species' populations overtime, a focused effectiveness monitoring program is proposed for this HCP.

The stream habitat effectiveness monitoring program will be finalized in coordination with NOAA Fisheries within the first year of HCP implementation. A stream habitat monitoring program will be established to survey summer stream high temperatures and water quality parameters on a subset of streams that flow through the HCP area. Additionally, coordination will occur with ODFW, to the extent possible, to measure changes in the quality of the substrate on streams of mutual interest. As part of the monitoring program Port Blakely will:

- Monitor annual summer stream temperatures at 20 sites within Jackson, Canyon, and Alder Creeks (tributaries to the Molalla River), using Onset hobo data loggers. These are watersheds where a reasonable portion of the headwaters originate within Port Blakely's forestlands.
- Locate monitors throughout the portion of the watersheds that occur on Port Blakely forestlands, from the headwaters to the downstream mainstems.
- Monitor annual summer ambient temperatures at a subset of 5 locations, using Onset hobo data loggers.
- Monitor the pH, conductivity (mS/cm), dissolved oxygen (mg/L) and turbidity (NTU) two times per year, once in late May and once in early October, using an YSI pro digital sampling system water quality meter.
- Collect stream and ambient temperatures (C) every 15 minutes, June 1<sup>st</sup>- October 1<sup>st</sup>.
- Place in-stream data loggers in active areas of the stream at sufficient depth and flow to ensure the water is well-mixed and remains under water throughout the summer, are away from the influence of tributaries, eddies, and backwaters, and are away from direct solar radiation to the extent possible.
- Place ambient dataloggers in the associated riparian area at 5 sites, away from the input of direct solar radiation and at a height of approximately 2 meters.
- Report on the following:
  - A summary of stream characteristics including elevation, aspect, bank full width, valley width, gradient, dominant substrate, and stream type classification.
  - Temperature data including thermographs with associated ambient data to illustrate inter-annual variation.
  - Stream temperature including an analysis to determine the 7-day average maximum temperature, with associated discussion in relation to DEQ water quality standards.
  - A summary of water quality parameter data (pH, conductivity, DO, turbidity) in tabular format, with associated discussion in relation to DEQ water quality standards where they exist.
  - The year that sites received adjacent forest harvest.

This monitoring program will be implemented to gain an understanding of the fluctuations that exist in stream temperatures and water quality parameters between and amongst years within the HCP area although the result may be caused by many factors. The intent is to inform Port Blakely and NOAA Fisheries of how stream temperature and water quality parameters shift in a managed forest setting. The monitoring program will be revisited after the first ten years of the HCP to consider extending the monitoring program and/or to make monitoring adjustments.

As part of its monitoring program, Port Blakely will assess the occurrence of shallow-rapid landslides and deep-seated failures, via annual review of aerial photography.

### **6.5 Adaptive Management Strategy**

Although there is relative certainty of the biology and biological needs of the Covered Species, and there are relatively certain effects of the forest management activities and conservation measures on forestland terrestrial and aquatic habitat functions, habitat quality and Covered Species populations overtime, there are several conservation measures where adaptive management may be implemented to improve habitat conditions for some of the Covered Species. These adaptive strategies are as follows:

- Adapt bio-den creation measures to achieve functions scientifically shown to be beneficial to fisher and other terrestrial Covered Species;
- Adapt snag creation measures to increase height and diameter of snags as made possible by technological advances in harvesting equipment;
- Adapt LW placement measures to provide best functional use of LWD commitments as proven by best available science; and
- Adapt harvest and road management activities to reflect changes in stream classification, including fish distribution and occurrence of year-round flow;
- Adapt strategies to increase development of forest habitats, such as spotted owl dispersal and forage habitat, to reflect improved forest management techniques and best available science.

### **6.6 Reporting**

Port Blakely will submit HCP Implementation and Compliance Reports (Report) to the Services, documenting forest management activities and implementation of conservation measures described in the HCP and identified above. Reports will be submitted annually for the first five years of the Permit period, biennially for the following ten years, and then every five years for the remainder of the Permit term which, based on Port Blakely's ongoing ESA Section 10 Permit implementation experience, has proven to be a sufficient timeframe to review forest management activities and document implementation results of the conservation measures.

Port Blakely reporting will include, but not be limited to, the following:

- Forest management activities, including thinning and regeneration harvests that occurred;
- The amount of functional spotted owl foraging and dispersal habitat on the Covered Lands;
- Maps showing the locations of current and newly established RMAs and SMAs;
- The snag and leave tree prescriptions implemented during commercial thinning and regeneration harvest;
- Any new data on Covered Species occurrences and/or habitat use and protective measures implemented;
- The nest protection strategy being implemented for new spotted owl and goshawk nest sites;
- The den protection strategy being implemented for new wolf or fisher den sites;

- The location of created bio-dens;
- The location of large woody debris placement in streams associated with regeneration harvest;
- The occurrence and location of road construction, deactivation, and maintenance;
- The occurrence and location of fish passage structure improvements; and
- The contribution towards watershed restoration projects including the location, recipient, and type of support (in-kind, monetary, or product).
- The results of the stream habitat effectiveness monitoring program, as described above.
- The occurrence of shallow-rapid landslides and deep-seated failures.

### **6.6.1 Changed Circumstances**

If a changed circumstance is triggered as described in Section 8, the circumstances and Port Blakely's response will be described and reported in the Report immediately following the changed circumstance event.

### **6.6.2 Funding**

Port Blakely has been in the forest products business for over 150 years. The company is solvent, and we will continue to conduct our forest products business to remain operational through the term of the Permit. As such, we are committed to providing the funding necessary to implement the HCP.

As described in detail in Section 9, Port Blakely will, at the time of submission of monitoring reports, provide the Services with certifications updating the estimated costs of HCP implementation and the projected revenues. If changes in funding occur such that there is a potential to affect the ability of Port Blakely to implement the Conservation Program as described in Section 6, the Federal agencies will be notified immediately. Documentation of the notification and subsequent coordination activities between Port Blakely and the Federal agencies will be provided in the Report immediately following the year of notification.

## SECTION 7 TAKE OF COVERED SPECIES AND IMPACTS OF THE TAKE TO COVERED SPECIES POPULATIONS

This section describes the take anticipated to occur to the Covered Species from conducting the Covered Activities. The discussions and analyses of take for both aquatic and terrestrial Covered Species is relative to incidental take only. That is, take that may occur incidental to the otherwise lawful forest management activities. The term “incidental take” is understood with the use of the simple term “take” throughout the HCP. Following the take assessment for each species or groups of species is the anticipated impacts of the take to the species population.

*Approach to Assessing Take* - For highly mobile animals like salmon and steelhead that reside in dynamic habitats in which the functional processes that create and maintain habitat are fluid and continuous, estimating the amount of anticipated take of individual fish by implementation of the HCP Covered Activities, resulting in habitat modification, is not possible (NMFS 2006b, NMFS 2016e). Port Blakely believes that an assessment of take of salmon and steelhead for HCP Covered Activities across a 124,000-acre landscape that includes a 0.5-mile buffer and future acquisition lands, will be similar to the assessments conducted in the Biological Opinions (BOs) for the BLM Resource Management Plan (RMP) for Western Oregon and the Washington Forest Practices HCP (FPHCP), albeit smaller in scale (NMFS 2006b, NMFS 2016e). Both these BOs explain similar rationales and approaches to assessing take for large landscape-scale management plans.

The NMFS states that estimating take of salmon and steelhead from implementation of a landscape-scale management plan is problematic because fish population sizes, as well as their distribution, fluctuate annually and seasonally within a watershed, basin, and species, depending on many complex environmental variables (NMFS 2016e). Further, take caused by habitat-related pathways cannot be accurately predicted as a number of fish because the relationship between habitat conditions and the distribution and abundance of those individuals in the action area are affected by habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes interact in ways that may be random or directional and may operate across far broader temporal and spatial scales than are affected by the actions described for landscape scale management plans. Thus, the distribution and abundance of fish within [large scale] action areas cannot be attributed entirely to habitat conditions, nor can the number of fish that are reasonably certain to be injured or killed if their habitat is modified or degraded, by actions that will be completed under the management plan, be precisely predicted. In such cases, we use a take surrogate or take indicator that rationally reflects the incidental take caused by the proposed action (NMFS 2016e).

The NMFS also states that for large-scale landscape management plans it would be impossible to discern the number of animals injured or killed as the result of habitat modified during implementation of the Covered Activities, and separately identify that number from the take caused by habitat modified from any of the numerous habitat-affecting actions (such as those identified in HCP Section 5, e.g., agriculture, hydropower, and urbanization) (NMFS 2006b). Another problem in estimating the number of individuals taken by HCP Covered Activities is that it requires distinguishing between habitat modifications that would occur if the ITP were issued and the Port Blakely HCP was implemented, versus habitat

modifications that would occur if they weren't. Thus, in instances where the number of individual animals to be taken cannot be reasonably estimated, NMFS relies on the relationship between fish and their habitat (in the form of the extent of habitat likely to be modified under the proposed action) to identify indicators of the extent of take (NMFS 2006b). This approach is consistent with guidance provided in the revised HCP Handbook (USFWS and NOAA Fisheries 2016).

Given this approach and guidance, we believe any take of aquatic species estimated to occur will be in the form of "harm" from habitat modified during implementation of our forest management and conservation plan, i.e., forestry and road management activities. Because the relationship between habitat conditions and the distribution and abundance of fish wherever these activities will occur over the Permit term is unpredictable, a specific number of individuals taken cannot be practically estimated, as mentioned above. We will, therefore, use the predicted extent of habitat modification to describe the extent of take. The prediction is based on the general relationship between habitat function and the extent to which normal behaviors can be expressed relative to habitat function. Thus, the extent of incidental take anticipated for aquatic Covered Species under NMFS purview will be the amount of habitat modification that is expected to occur on the current Port Blakely HCP lands, i.e., miles of streams within an ESU and miles of forest roads near streams within an ESU, as well as a 0.5-mile distance of influence beyond the current ownership and the maximum anticipated increase in HCP lands of 25% over the Permit term. To conduct the take assessment that includes streams and roads beyond the current ownership and future land (and stream) acquisitions, we use the same proportions of streams by stream type and roads that exist on the current HCP ownership (190 miles of streams and 251 miles of active roads).

The USFWS takes an approach for estimating take of species under their purview similar to NMFS. That is, given the complexities of implementation of Covered Activities under a landscape scale management plan, the difficulty in determining species occupancy, distribution and use of available habitats, and the effects to Covered Species from numerous other sources, USFWS typically uses acres of habitat affected as a surrogate for take estimates of Covered Species. Once again, this is consistent with guidance provided in the HCP Handbook wherein it states, "Numbers of individuals, nesting territories, breeding pairs, etc. often come to mind first, but it is not always practical to conduct surveys and count affected wildlife populations directly. More often we use a surrogate measure, such as acres of habitat or a measurable ecological condition that we define and use to express incidental take authorized by a permit" (USFWS and NOAA Fisheries 2016). Thus, the extent of incidental take anticipated for terrestrial Covered Species under USFWS purview will be the amount of habitat modification that is expected to occur on the current Port Blakely HCP lands, i.e., miles of streams, miles of forest roads, and acres of forest habitat, as well as a 0.5-mile distance of influence beyond the current ownership and the maximum anticipated increase in HCP lands of 25% over the Permit term. To conduct the take assessment that includes streams, roads, and forest habitat beyond the current ownership and with future land acquisitions, we use the same proportions of streams by stream type, roads and acres of forest habitat that exist on the current HCP ownership, i.e., 190 miles of streams, 251 miles of active roads, and 29,553 acres of multiple-age forest stands (ODF 2009, Port Blakely 2018a, Port Blakely 2018b, Port Blakely 2018d).



## 7.1 Aquatic Species

*Anticipated Take of Aquatic Covered Species* - Take is likely to occur in the form of harm to aquatic Covered Species from implementation of covered forest management activities over the term of the HCP. Stream and riparian habitat will be degraded as trees are harvested in and near RMAs and roads are constructed, maintained, and used. These activities have the potential to deliver sediment to tributary streams, reduce potential for LWD input and increase temperatures, as described in Section 5. However, the HCP contains conservation measures that are expected to avoid, minimize, and mitigate most of the potential impacts from implementing the covered forest management activities. OFP Rules and Port Blakely conservation measures focus on avoiding or minimizing the potential for impacts to streams and stream-associated wetlands through the implementation of riparian buffer protections and sediment-reducing road management activities.

*Anticipated Impacts of the Taking to Aquatic Covered Species Populations* - Our assessment of the impacts of the taking focuses on the increase in HCP protection measures over current forest practices being implemented by commercial forest landowners throughout Oregon, Recovery Plan recommendations for each of the listed aquatic Covered Species, as well as the occupied habitat in the HCP area as a proportion of the habitat available to the species' population, to the extent possible. Thus, the assessment of the anticipated impacts of the taking considers the amount of stream miles of fish and nonfish-bearing streams, as well as isolated and stream-associated wetlands, in the HCP area, which includes the distance of influence and future land acquisitions, that will receive increased protections (intensity), over the life of the Permit term (duration), and what that means to aquatic Covered Species. This assessment will address salmon species within the LCR and UWR ESUs, bull trout within the NEP Clackamas subbasin, Pacific lamprey within the Lower Columbia/Willamette Region, and the Cascades frog, coastal tailed frog, Cascade torrent salamander, and western pond turtle within wetlands and upper watershed streams, respectively, throughout the HCP area that are also being impacted by numerous other land management activities conducted by a broad range of landowners and/or land managers (context).

### 7.1.1 Listed Anadromous Salmonids

The impacts to listed anadromous salmonids, i.e., excluding bull trout, from implementation of the Covered Activities resulting in take is discussed below by ESU, or DPS in the case of steelhead. The LCR ESU/DPS includes coho, fall-run Chinook and steelhead while the UWR ESU/DPS includes spring-run Chinook and steelhead. The known occurrences (distribution) of these species in the LCR and UWR ESUs are not entirely certain, and they differ with respect to occupancy of the mainstem and tributaries of the Clackamas and Molalla Rivers, respectively. However, for purposes of assessing take, we are conservatively assuming, i.e., applying the Federal worst-case scenario assessment approach used in ESA Section 7 Biological Opinions, that all stream miles on the Port Blakely HCP lands that deliver to these two river systems are affected by the Covered Activities and, thus, some associated level of take of the covered anadromous salmonid species could occur. For purposes of assessing take that includes effects to streams immediately downstream of the current ownership and an additional 25% of lands (and streams) acquired, we assume the same proportions for these areas for each stream type existing on the current HCP ownership.

*Type of Take Anticipated* - Take in the form of harm is anticipated to result from reduced function of watershed processes that create and maintain habitat that is contributing to the ecological needs of the Covered Species. Harm could accrue from the environmental effects of timber harvest and road management activities on the HCP lands. Specifically, habitat modifications that may cause take could occur in the form of: (1) sediment inputs into water; (2) reduction in riparian vegetation resulting in increased water temperatures; and (3) reduction in the sources of LWD recruitment.

*Take Associated with Sediment Input to Streams* - Sediment inputs will be either chronic or acute. Chronic sediment inputs could occur at low levels where roads cross streams and less so for roads adjacent to streams. Sediment inputs could also occur from the continuing use of these roads throughout the term of the HCP. Chronic input is expected to decline over the life of the Permit as HCP measures such as construction of roads away from RMAs, abandoning roads in the uplands and adjacent to streams when practicable, implementing enhanced road management measures that focus on sediment reduction, and making stream-crossing improvements.

Sedimentation from the use of roads enters the stream system and adversely affects those species inhabiting streams in close proximity to the source (NMFS 2016e). Sediments generated by use of roads that enter the streams have lethal and sub-lethal effects, including direct physical harm to species, as well as indirect effects due to changes in the prey base, feeding behavior, embeddedness of the substrate, and reduction of oxygen transfer in redds.

Acute sediment input is likely to occur during and immediately after road decommissioning work on stream-adjacent roads, stream-crossing improvements or replacements, and repair of fish passage blockages. Road decommissioning is expected to focus primarily on roads adjacent to small fish streams and nonfish streams in the uplands where the anticipated need for the road is projected to be far into the future.

Acute sediment input could harm low numbers of juvenile life stages of Chinook, steelhead, and coho, which reside in the Molalla and Clackamas River systems throughout the year. Adults of these species would avoid harm, as they are capable of leaving disturbed habitat areas during the short-term periods of high turbidity. Numbers of juveniles that could be harmed by acute sediment loading from road crossing or decommissioning work is anticipated to be low wherever effects arise because the HCP includes measures to reduce the extent of effects to fish.

The LCR salmonid recovery plan states that roads along streams in the Clackamas River and tributaries restrict channel movement and access to off-channel areas that historically provided important overwintering habitat for juvenile coho salmonids (ODFW 2010a). Impaired physical habitat quality due to fine sediment from forest and rural roads affects coho, and juvenile winter and summer steelhead, abundance, and productivity in the Clackamas, as well as other, population areas. Forest and rural roads have altered sediment routing and led to an overabundance of fine-grained sediments, excess of coarse-grained sediments, inadequate coarse-grained sediments, and/or contaminated sediment. Excessive fine sediment reduces egg development and survival during the coho and steelhead incubation life stage (ODFW 2010a). Degraded physical habitat quality, excessive fine sediment due to roads is a secondary threat for Clackamas River fall Chinook and

spring Chinook (NPCC 2004, ODFW 2010a). Reduced physical habitat quality/habitat access, e.g., sediment input and fish passage blockages from roads, due to past and/or current land use practices is a key threat to winter steelhead in the Clackamas and other drainages. Reduced habitat quality and complexity, and connectivity with off-channel habitats significantly limit juvenile winter and steelhead viability in most population areas, including the Clackamas watershed (ODFW 2010a). Because steelhead are stream-type fish that typically rear in tributary reaches for a year or more, they depend heavily on tributary habitat conditions for their early survival (LCFRB 2010a). Loss and degradation of tributary habitat is one of the main threats to LCR steelhead. Sediment conditions are identified as a limiting factor for juveniles in all Cascade winter steelhead populations (NMFS 2013).

In the UWR ESU, road crossings and other passage impediments such as small dams and irrigation diversions, related to land use restrict juvenile and adult steelhead access to habitat on wadable-sized tributaries of the Molalla River basin (ODFW and NMFS 2011). Subbasin channels in the lower Molalla River, particularly near the city of Molalla (RM 20), and in some tributaries have been simplified through revetments, roads, riprap, and other actions that restrict channel movement. High erosion and destabilized stream banks release excess sediment, causing turbid water and silt deposits that harm aquatic life and violate water quality standards. These conditions are considered secondary threats to UWR Spring Chinook and steelhead in the Molalla River basin (ODFW and NMFS 2011). Harm from sediments is anticipated to include the more sensitive young life stages of rearing and out-migrating juvenile, eggs, embryos, and emerging fry of salmon and steelhead in both the LCR and the UWR ESUs.

While there are numerous publications identifying the effects of forest roads on water quality and fish habitat, there are no definitive studies that we are aware of that correlate sediment input from roads with distance to streams (Gucinski et al. 2001). Harm to fish-bearing streams from sediment input from roads likely depends on many factors including, but not limited to, slope, RMA width and tree density resulting from past harvest activities, road material composition and how the road may be hydrologically connected to the stream. For purposes of this assessment, based on the prevailing low gradient slopes in the HCP area, we are assuming roads farther than 200 feet from a fish-bearing stream are hydrologically disconnected from the stream and, thus, unlikely to contribute sediment. The length of roads that occur within this distance from fish-bearing streams in the current ownership totals 24.6 miles (Port Blakely 2018d). By ESU, there are 12.3 miles of road in the LCR ESU and 12.3 miles of road in the UWR ESU that are within 200 feet of fish-bearing streams (Note: the fact that each ESU within the current ownership has the same mileage of roads within 200 feet of a fish-bearing stream is purely coincidental). Port Blakely has virtually no control of the effects of roads to fish-bearing streams located beyond the current ownership. HCP measures to reduce potential sediment delivery involve active road maintenance to ensure the latest techniques are implemented to prevent sediment movement downhill and/or to channel sediment into the forest floor, as described in Section 6. These measures are unlikely to precipitate effects from roads that extend from the current ownership onto adjacent ownerships. Thus, a discussion of effects of roads within 200 feet of fish-bearing streams is limited to the current length of these roads and an additional road length of 25% (6.15 miles) for anticipated future land acquisitions over the term of the Permit which totals 30.75 miles, or approximately 15.5 miles per ESU.

Maintenance work on roads within 200 feet of fish-bearing streams that has the potential to result in sediment input to the stream will be conducted during the “work window” recommended by ODFW (ODFW 2008). The timing of in-water work is provided as guidelines to protect fish streams. For streams within the HCP Plan area that flow into the Willamette River, i.e., the Molalla and Clackamas River systems, Port Blakely adheres to a work window of July 15 through September 30. The activity period occurs when stream flows are lowest and salmon are unlikely to be present in the smaller fish-bearing streams, i.e., the most prevalent fish-bearing streams on the ownership. Although numerous measures will be implemented to avoid and/or minimize the potential for sediment input to streams, it is anticipated that some chronic sediment input resulting in harm could occur from implementation of road management measures associated with 15.5 miles of road occurring within 200 feet of fish-bearing streams in the LCR ESU and in association with 15.5 miles of road occurring within 200 feet of fish-bearing streams in the UWR ESU. Such road management measures will include improving road crossings, and removal of approximately two miles of stream-adjacent parallel roads along fish-bearing streams that will reduce potential impacts over the long-term.

The LCR ESU contains 50 active road crossings of fish-bearing streams in the HCP area, i.e., abandoned, deactivated or inactive roads are not included (Port Blakely 2018d). Five of these crossings are creating fish passage blockages within the LCR ESU that are scheduled for repair within the first five years of the Permit term (see Table 6-1). The UWR ESU contains 60 active road crossings of fish-bearing streams in the HCP area (Port Blakely 2018d). Six of these crossings are creating fish passage blockages within the UWR ESU that are scheduled for repair within the first five years of the Permit term (see Table 6-2). Additional roads will be constructed during the life of the plan, potentially doubling the number of fish-bearing stream crossings in each ESU and equaling a combined total of 220 crossings.

Assuming a 25% increase in road crossings in each ESU as a result of future land acquisitions, the total number within the Plan area will be 276 for the LCR ESU and UWR ESU, combined. It is anticipated that each of these crossings will be replaced or upgraded at least once during the 50-year term of the Port Blakely HCP. Each replacement or upgrade will likely include some amount of in-water work. These actions could result in a single acute turbidity event that may have some impact downstream for a short period of time. The downstream extent of turbidity (the physical area where harm from turbidity is most likely to occur) is influenced by the size and velocity of the waterbody. Acute turbidity is not expected to harm juvenile steelhead or salmon in fish-bearing streams, as work timing restrictions will focus work of this type during times when the juveniles are unlikely to be present, i.e., during the July 15 to September 30 work period. Over the long-term, these replacement and upgrade measures are expected to eliminate and/or minimize future take of salmon and steelhead by improving fish habitat conditions and tributary connectivity. These measures include larger culverts accommodating 100-year flow events of fish-bearing and perennial nonfish-bearing streams, ditch line disconnections, cross-drain culverts at increased frequencies, and fish passage blockage fixes. The latter measure is to be initiated within the first year and completed within five years of Permit issuance, thus, take associated with these conditions will be short term. Additional fish passage blockages are likely to exist on any additional lands acquired. This amounts to one or two, if the land were managed like Port Blakely manages their stream passage impediments. However, since acquired lands

will likely be from small and industrial landowners, there may be substantially more fish passage blockages than occurs on current Port Blakely lands. These would all be repaired within three years of discovery on the acquired lands, thus, improving fish habitat conditions as land is acquired. Additional measures include implementing road management measures that limit road use on primary and secondary forest roads including closing roads to the public when not needed for Port Blakely timber forest management activities.

Timber harvest practices and other land use patterns on unstable slopes adjacent to riparian habitat, contributes to an abundance of fine sediment in tributary streams which is a concern for LCR coho, Chinook and steelhead (NMFS 2013). Port Blakely will not harvest timber on unstable slopes thereby avoiding this potential to effect salmon and steelhead habitat. No-harvest buffers of 75, 90 and 100 feet on Small, Medium, and Large fish streams, respectively, will likely prevent sediment input into to these streams. RMAs on Large and Medium nonfish streams are comprised of a 55-foot no-harvest zone and limited-harvest management zones of 25 feet, which will function to minimize sediment input to these streams. Timber harvest within the 25-foot managed zone of the 50-foot RMAs adjacent to Small nonfish streams, could decrease the sediment capturing capacity of these riparian areas until subsequent riparian revegetation regains the capture function, and thus some sediment input to Small nonfish streams could occur. However, the 25-foot managed zone with a maximum harvest of 50% of trees, and the ELZs on both perennial and season nonfish streams are expected to filter sediment and minimize disturbance to the ground and vegetation thereby reducing the potential for sediment delivery downstream.

Juvenile fish might be harmed by acute sediment input from riparian timber practices near perennial nonfish streams, but the extent of harm would be low because turbidity will decrease as the water from nonfish streams reaches fish-bearing waters. The type of harm would be in the form of temporary distress fish (injury). Acute sediment loading from riparian timber practices could last through the first growing season following the timber practices.

Take associated with sediment input to streams from timber harvest activities is expected to be minimal from small nonfish-bearing streams that comprise 55% (~ 105 miles) of the current HCP area. These streams will receive a 50-foot buffer, the inner-most 25 feet of which will be a no-harvest zone. However, 29.7 miles of small nonfish-bearing streams (16% of all streams) are in stands that burned across both ESUs at various intensities during the catastrophic fires of 2020 (Port Blakely 2020). HCP buffers will still be applied to these streams when the harvest units are salvaged but it is expected that an increased level of sediment delivery may occur compared to what will occur in these streams running through unburned harvest units, although the difference in the level of sediment input is unknown.

Medium and Large nonfish-bearing streams will receive 80-foot buffers with an inner 55-foot no-harvest zone. Given the predominately low gradient, narrow stream widths of these streams, the potential for delivery to fish-bearing streams from Covered Activities occurring on the current HCP lands is likely low and negligible in streams within a 0.5 mile of the HCP lands. Thus, a very small amount of take in the form of harm to listed salmonids in the LCR ESU would be associated with 36.4 miles of nonfish-bearing streams on the current HCP ownership within the LCR ESU and an additional 9.1 miles assumed to occur on the 25% of lands acquired and added to the HCP in the future (Port Blakely 2018b). A very small amount of take in the form of harm to listed salmonids in the UWR ESU would be associated with 68.2 miles of nonfish-bearing streams on the current HCP ownership within the UWR

ESU and an additional 17.1 miles assumed to occur on the 25% of lands acquired and added to the HCP in the future (Port Blakely 2018b).

Fish-bearing streams comprise 45% (~ 85 miles) of the current HCP lands of which small fish-bearing streams comprise half of these streams (22.5% of total streams). Take associated with sediment input to streams from timber harvest activities is expected to occur from small amounts due to chronic delivery. However, most small fish-bearing streams are low gradient and narrow in width. Thus, the 75-foot no-harvest riparian buffers is expected to prevent sediment delivery to small fish-bearing streams. It is anticipated that larger no-harvest riparian buffers on medium and large fish-bearing streams, i.e., 90 and 100 feet, respectively, will function similarly. Thus, the potential for sediment delivery to fish-bearing streams after timber harvest is likely low on most of the current HCP lands and negligible in streams within a 0.5 mile of the HCP lands. However, the potential for sediment delivery to these streams from adjacent stands that burned in the 2020 fires is likely higher than unburned stands even though they will receive the same HCP buffers as unburned stands. The mileage of streams running through stands that burned at various intensities are 5.4, 5.2 and 13.6 miles for Large, Medium, and Small fish streams, respectively. This mileage (24.2 miles) comprises 28% of these stream types in the HCP area that are likely to deliver more sediment than streams with adjacent vegetated buffers, but the difference is unknown. Thus, a very small amount of take in the form of harm to listed salmonids in the LCR ESU would be associated with 38.9 miles of fish-bearing streams on the current HCP ownership within the LCR ESU and an additional 9.7 miles assumed to occur on the 25% of lands acquired and added to the HCP in the future. A very small amount of take in the form of harm to listed salmonids in the UWR ESU would be associated with 46.4 miles of fish-bearing streams on the current HCP ownership within the UWR ESU and an additional 11.6 miles assumed to occur on the 25% of lands acquired and added to the HCP in the future.

*Take Associated with Increased Water Temperatures* - Reduced riparian vegetation is expected at all road crossings that block or impede fish passage at the time that the blockage is repaired, or the crossing is replaced. Reduction in riparian vegetation may occur as a result of from timber harvest and related activities within the RMAs adjacent to nonfish streams. Reduced riparian vegetation diminishes habitat value in several ways, described in this take assessment, including water quality (increased temperature from decreased shade). Reduced shade and cover are expected to persist for several years at each site where riparian vegetation is removed. When replanting occurs in the riparian area, lost shade and cover begin to return within several years, but do not recover to full function for many years.

Elevated stream temperatures often exist because of a lack of intact, functional, and contiguous RMAs and sufficient streamside buffers. The high-water temperatures affect salmon population abundance, productivity and spatial structure which are considered secondary threats to Clackamas coho populations and fall and spring Chinook in the LCR ESU (ODFW 2010a). The EDT results for the Clackamas watershed identify summer water temperature as limiting juvenile spring Chinook summer rearing (Primozych and Bastasch 2004). Adult fall Chinook are also affected by high summer and fall water temperatures in the lower river, which occur during their spawning period and reduce egg survival. These high-water temperatures are in part the result of decreased riparian forest in the tributaries and mainstem, and other upriver factors (Primozych and Bastasch 2004). Degraded riparian

conditions and channel structure and form issues are a primary limiting factor for fall-run Chinook salmon in the Clackamas River, as well as other Oregon populations. In addition, water quality, specifically elevated water temperature brought about through timber harvest and other land uses, and lack of functioning riparian habitat are specifically identified as threats to the Clackamas (and other) Chinook populations (NMFS 2013). Forest management and timber harvest are one of several land uses that have led to the conditions limiting habitat productivity in the Cascade stratum (NMFS 2013).

Degraded water quality and elevated water temperatures due to land use practices are a secondary threat to winter steelhead in the Clackamas and other watersheds. High summer water temperatures affect juvenile steelhead productivity in these LCR river systems. The temperatures can be lethal, contribute to disease, and/or act as temporary adult migration barriers (NMFS 2013).

Elevated water temperatures from land use practices, including timber harvest, are known to decrease survival and/or growth of juvenile Chinook and steelhead in the UWR ESU. High water temperatures are common in the lower Molalla subbasin and are aggravated by loss of riparian cover, reduced wetland areas, channel simplification and increased impervious surfaces (WRI 2004). Elevated water temperatures during the late spring and early summer associated with habitat modification and insufficient stream flows contribute to poor adult condition and increase pre-spawning mortality of adult Chinook in the Molalla River system.

Land use management activities in the Clackamas River subbasins, including timber harvest, are cited as impairing physical habitat quality and are a key concern for Clackamas spring Chinook (UWR ESU) winter parr and fry (ODFW and NMFS 2011). High summer water temperatures caused by land management activities are considered a secondary concern for Clackamas spring Chinook. The high-water temperatures are primarily the result of decreased riparian forest in the tributaries and the mainstem Clackamas River, ponding in reservoirs behind the hydroelectric dams, and other upriver factors. Riparian and upslope conditions in the lower Clackamas subbasin have only a minor impact on the elevated temperatures conditions (NPCC 2004).

Elevated stream temperatures caused by a lack of intact, functional, and contiguous RMAs are addressed by the HCP buffer strategy and road management activities. The HCP contains measures that connect all streams on Port Blakely's ownership, focusing on fish passage blockages early in the HCP term, i.e., repairs to be completed within five years of Permit issuance. Road improvements ensure that the potential for sediment delivery is reduced or eliminated through use of 100-year event culverts, and increased ditch line disconnections and cross-drain culvert installations.

Riparian habitat harvest could reduce shade, to varying degrees, on all streams as a result of applying different HCP stream buffers widths dependent upon the following: 1) whether the stream is fish-bearing or nonfish-bearing; 2) the size of the fish-bearing stream; and 3) whether or not the nonfish-bearing stream flows year-round. However, HCP stream buffers are designed to provide sufficient shade where it is most beneficial in maintaining cooler stream temperatures. Distances reported in the literature as providing adequate shade in riparian areas range between 11-30 m (35-100 ft) (Brown and Krygier 1970, Brazier and Brown 1973, Steinblums et al. 1984). Brazier and Brown (1973) found that 60 to 80% shading on stream surfaces controlled stream temperature. They found that to maintain

instream temperatures, the maximum shading capability of an average buffer strip was reached within 25 m (82 ft), and 90% of that maximum was reached within 17 m (56 ft).

All HCP stream buffers are wider than current Forest Practices requirements, providing more shade and, thus, increasing the potential to reduce or maintain stream temperatures beneficial to all fish. Take in the form of harm could occur from minimally increased water temperatures on Large and Medium fish-bearing streams in the current HCP area (17.7 miles and 24.9 miles, respectively). This mileage comprises 21.8 stream miles in the LCR ESU and 20.8 stream miles in the UWR ESU. Of these stream miles, stands with 5.4 miles and 5.2 miles of Large and Medium fish-bearing streams, respectively, were damaged by the catastrophic fires of 2020 at various burn intensities across both ESUs. All streams will receive the same buffers whether adjacent riparian habitat was burned or unburned. Additional acquired lands would increase this mileage in future HCP lands by 4.4 and 6.2 miles, respectively, for Large and Medium streams. However, the HCP measure to provide no-harvest buffers of 100 feet and 90 feet for Large and Medium fish-bearing streams, respectively, which are as wide or wider than those cited above and consistent with other published data (Broderson 1973, Cristea and Janisch 2007, Beschta et al. 1987, Beechie 2015) will reduce the potential effects of direct exposure to sun and increased stream temperatures. Some streams in burned stands will still have intact or partially intact riparian buffers that will protect these streams from temperature increases to various extents. Harvest units that were completely burned will still receive the HCP buffers but will likely not provide much shading until understory vegetation and trees regrow over the next 5-10 years.

Streams temperatures are not expected to increase from application of stream buffers on Small fish-bearing streams (42.6 miles total or 21.6% of stream miles in the HCP area) comprising 17.0 stream miles in the LCR ESU and 25.6 stream miles in the UWR ESU. This is because the 75-foot no-harvest stream buffers are believed to be wide enough to provide the maximum shading capability on streams that are typically less than 10 feet wide within the HCP area (Broderson 1973, Brazier and Brown 1973, CH2M Hill 2000, Castelle and Johnson 2000, Christensen, 2000). The 75-foot-wide no-harvest zone will provide nearly 100% shading of the narrow small fish streams prevalent on the HCP landscape, thus, the level of take of salmonids as a result of instream temperatures is expected to be small. Note that stands with 13.6 miles of Small fish-bearing streams (32% of the total of this stream type) were damaged by the catastrophic fires of 2020 at various burn intensities across both ESUs. All Small fish-bearing streams will receive the same buffers whether adjacent riparian habitat was burned or unburned. Some streams in burned stands will still have intact or partially intact riparian buffers that will protect these streams from temperature increases to various extents. Harvest units that were completely burned will still receive the HCP buffers and, because of the small stream size, are still likely to provide some shading especially when understory vegetation regrows in the next 5 years.

Small nonfish-bearing streams comprise 104.4 miles (55%) of streams on the HCP lands. There are virtually no Large or Medium nonfish streams on the HCP lands. Of the small nonfish-bearing stream mileage, 29.7 miles (28% of the total of this stream type) are in stands burned at various intensities. Perennial nonfish streams, whether in stands that were burned or unburned, will have RMAs applied to both sides of the entire length of the stream consisting of a 25-foot no-harvest zone and a 25-foot managed zone, as well as a 30-foot



ELZ. These RMAs are expected to adequately shade the small tributary streams in the upper watersheds of the Molalla and Clackamas River systems, thus, ameliorating the potential for elevated stream temperatures on fish-bearing stream as result of timber harvest. Perennial nonfish streams in Oregon with low discharge may be warm, but their ability to affect the temperature of downstream receiving waters is a function of the relative size of the receiving waterbodies which, for the HCP area, are typically very narrow on low gradient ground. Thus, some take in the form of harm to listed salmonids is expected to occur from warm water temperatures in 104.4 miles of nonfish streams on the current HCP lands, but it is expected to be minimal, i.e., limited to a small proportion of the streams at the confluence of nonfish and fish-bearing streams. The take would be associated with 36.4 miles of Small nonfish streams on the current HCP ownership within the LCR ESU and an additional 9.1 miles assumed to occur on the 25% of lands acquired and added to the HCP in the future (Port Blakely 2018b). The take would be associated with 68.2 miles of nonfish-bearing streams on the current HCP ownership within the UWR ESU and an additional 17.1 miles assumed to occur on the 25% of lands acquired and added to the HCP in the future (Port Blakely 2018b). The level of take occurring in fish streams downstream of nonfish streams as a result of temperature increases will be less that what is occurring under OFP Rules and is expected to be low as a result of nonfish stream buffers with a no-harvest component, and retention of understory vegetation and slash, that provide adequate shade on these narrow streams (Brown and Krygier 1970, Brazier and Brown 1973, Steinblums et al. 1984, Macdonald et al., 2003; Gomi et al., 2006, Kibler et al. 2013, Jackson et al. 2001).

*Take Associated with Reduced Riparian Large Woody Debris* - Low rates of LWD recruitment will persist throughout the HCP area where riparian harvest occurred under previous forest practices regulations, and on lands previously managed for agricultural purposes. These conditions will improve with time during the term of the HCP on all fish streams as result of the no-harvest buffers applied to all fish streams which are expected to provide from 70-90% of the LWD needed, depending on stream size, for functional salmonid habitat (McDade et al. 1990, Beechie 2015) and the proactive LWD mitigation placement strategy. The effect of less large wood to recruit from Type N streams can affect fish-bearing waters downstream; without large wood to contribute to the processes that make and maintain habitat complexity in fish-bearing streams, the rate at which streams recover from the shortage of recruitable large wood will be slower, exposing more fish to simplified habitat, for a longer period of time. However, many of the HCP area Type N streams are very small (< 2 feet wide) and on low-gradient ground limiting the potential for LWD of functional size to deliver to fish streams in the lower watersheds. The potential for LWD delivery is increased by the 50-foot RMA applied to the entire length of perennial nonfish streams. Thus, harm from reduced LWD input potential from perennial nonfish streams is expected to be extremely low since the effects are not as acute below the confluence of Type N streams with fish-bearing streams.

The lack of LW and appropriately sized gravel has significantly reduced the amount of suitable spawning and rearing habitat for LCR coho and tule fall Chinook salmon (NMFS 2013). In the Clackamas basin, loss of habitat diversity primarily reflects a reduction in large wood in the streams due to degraded riparian condition and large wood recruitment (Primozych and Bastasch 2004). The limited supply of wood in the Clackamas River and tributaries has reduced formation of complex habitats that create deep pools and retain spawning gravels (ODFW 2010a). Degraded riparian conditions and channel structure and

form issues are also primary limiting factors for juveniles of all summer steelhead populations and most winter populations including the Clackamas. A lack of LWD and appropriately sized gravel in the remaining accessible tributary habitat has significantly reduced the amount of suitable spawning and rearing habitat for winter steelhead (NMFS 2013).

Habitat degradation is considered the primary factor limiting future production and recovery of the Chinook population in the Molalla River, i.e., UWR ESU (ODFW and NMFS 2011). Impaired physical habitat degrades rearing potential for the winter parr life stage. Aquatic habitat in the forested upper Molalla/Pudding subbasin remains closer to the historical baseline, with the highest proportion of functioning riparian areas, the largest amounts of large wood in the river and tributary channels, and higher quality aquatic habitats. Historical and, in some places continued, wood removal from streams and riparian harvest has reduced large wood in the channels, though riparian areas in the forested upper subbasin have more conifer trees than in the lower subbasin. Reduced wood in stream channels limits pool formation, thus reducing hiding areas for adult fish and restricting the quality and quantity of juvenile Chinook rearing habitat (ODFW and NMFS 2011). Land use management activities in the Clackamas River subbasins, including timber harvest, stream cleaning, straightening and channelization, diking, wetland filling, and lack of large wood recruitment are cited as impairing physical habitat quality and are a key concern for Clackamas spring Chinook winter parr and fry (ODFW and NMFS 2011). Changes in riparian condition, loss of large wood in tributary streams and the Clackamas River, and modified in-channel and side channel habitats limit Chinook production.

HCP stream buffers are designed to provide not only sufficient shade where it is most beneficial in maintaining cooler stream temperatures but to accommodate the potential for LWD delivery to fish streams from the no-harvest buffers on either side of the streams. A small amount of take from reduced amounts of LWD associated with timber harvest in riparian zones could occur during HCP implementation over the period of the ITP on 38.8 miles of Small, Medium and Large fish streams in the LCR ESU and on 46.4 miles of similar streams in the UWR ESU with additional miles for acquired lands comprising 9.7 and 11.6 miles of stream for the LCR ESU and the UWR ESU, respectively. However, this take is minimized by the no-harvest buffers on fish streams, 100 feet, 90 feet and 75 feet for Large, Medium, and Small fish streams, respectively, and managed buffers on perennial nonfish streams. The Large and Medium nonfish streams have 25-foot managed zones and 55-foot no-harvest zones, while the Small nonfish streams have a 25-foot managed zone and a 25-foot no-harvest zone that will be a source of LWD to streams over the long-term.

The 100-foot and 90-foot no-harvest buffers on Large and Medium fish streams are expected to provide 100% of the mature hardwood LWD and 90% of the mature conifer LWD, respectively (McDade et al. 1990). The 75-foot buffer on Small fish streams is expected to provide > 90% of the mature hardwood LWD and > 80% of the mature conifer LWD, respectively, necessary for spawning and rearing habitat (McDade et al. 1990). On Port Blakely's HCP lands in Washington, the cumulative proportion (%) of conifer and hardwood LW recruited within 65 feet from stream bank was 90% and 95% for conifer and hardwood trees, respectively (Murden et al. 2016). The Port Blakely data was collected on their coastal Washington stands comprised primarily of Douglas-fir. Although these stands

are not exactly similar to the Douglas-fir stands in the current Oregon HCP lands, the results are consistent with the LW curves found in McDade et al. (1990).

Thus, most of the LW will be provided from trees retained in the no-harvest buffers of the fish streams but may also be supplemented with LW input from the 80-foot and 50-foot managed buffers of perennial nonfish streams (comprised of an inner no-harvest zone). However, because the landscape is typically low gradient and these streams are narrow, delivery of LWD to fish streams from the nonfish streams is not expected to be great.

Streams flowing through stands burned in the recent wildfires of 2020 will receive the same riparian buffers as unburned stands. These streams are expected to receive larger amounts of LWD as standing burned trees in the buffers collapse over the next several years. Although nutrient input may not be the same as vegetated buffers, the amount of structure and wood pieces will likely be greater.

In addition to the LWD input that is expected to occur naturally, as cited above, Port Blakely's HCP mitigation measure to proactively add LWD to small and medium fish streams, at a rate of one piece for every 300 feet of riparian buffer on each side of the stream, will supplement the naturally occurring LWD input. Proactive LWD input will be applied under specific criteria and conditions provided in state guidance that recommends the appropriate size of LWD pieces for specific streams sizes be placed where it will benefit salmon and steelhead the most (ODF and ODFW 2010a). Because the landscape is fairly low gradient, overall, it is anticipated that LW contributions from small fish and nonfish streams to fish habitat downstream will not be substantial. Rather, LW inputs to small fish streams will create better localized habitat conditions, i.e., provide sufficient LW to increase pool formation, retain spawning gravels and add side channels, benefitting salmon that utilize small fish streams for spawning and rearing. Together, the no-harvest riparian buffers and the supplemental LW mitigation measures are expected to provide nearly all the LW input potential of a fully functioning riparian/stream ecosystem beneficial to salmonid species.

*Impacts of the Take to Lower Columbia River Salmonid Populations* - The LCR recovery plan focusing on coho and Chinook salmon tributary habitat strategy in the Cascade stratum, includes consideration to management of state and private forestland to protect and restore watershed processes. The main elements of the recovery strategy for LCR coho salmon most pertinent to the HCP area and forest management activities recommend protection and improvement of populations that have a clear record of continuous natural spawning and are likely to retain local adaptation (the Clackamas and other rivers) along with populations where there is documented natural production, and restoration of tributary habitat (particularly overwintering habitat) to the point that each subbasin can support coho salmon at the target status for that population (NMFS 2013). In addition to the actions described as part of the regional strategy for tributary habitat, addressing passage barriers such as culverts will benefit coho and fall Chinook salmon by restoring access to habitat. The recovery strategy for LCR fall Chinook recommends that management unit plans set a high priority on reducing sedimentation on survival, emergence and on improving juvenile rearing habitats, including reconnecting or restoring side channels and marsh habitats that are particularly critical to juvenile rearing of fall Chinook salmon (NMFS 2013).

To contribute to LCR coho and fall Chinook restoration, habitat improvements are needed in numerous watersheds in Washington and Oregon. It should be noted that Oregon estimated that, for the coho Clackamas population, existing habitat is adequate to achieve a very high probability of persistence (NMFS 2013). While for the fall Chinook Clackamas population, existing habitat is adequate to achieve the targeted medium persistence probability, assuming that all other targeted threat reductions for that population are achieved. However, the Oregon plan notes that, because of multiple uncertainties, efforts should still be made to protect and restore habitat in the Clackamas subbasin (ODFW 2010a).

The recovery strategy for the LCR steelhead DPS states that the most crucial element of the LCR steelhead DPS recovery strategy, pertinent to the HCP area, includes protection and improvement of specific winter steelhead populations, including the Clackamas, which currently are the best-performing winter populations, with a high probability of persistence. This is accomplished through population-specific combinations of threat reductions to include protection and restoration of tributary habitat (NMFS 2013). Actions of particular benefit to steelhead focus on protecting and restoring habitat complexity and diversity, access to side channels and off-channel habitats, and improving riparian cover and recruitment of large wood to streams (NMFS 2013). Tributary habitat recovery strategies for summer and winter steelhead do not specifically mention the Clackamas subbasin, however, a regional strategy recommends addressing passage barriers such as culverts which will benefit winter steelhead by restoring access to habitat (NMFS 2013).

The Large and Medium fish stream totals in the current HCP area as a proportion of all known Large and Medium fish streams in the LCR (Oregon portion) ESU is 0.95 and 2.24%, respectively. While the proportion of Small fish streams in the current HCP area within the Oregon LCR ESU is 3.29% (ODF 2018b; Port Blakely 2018b). This data is presented in Table 7-1. The proportion of small nonfish streams in the current HCP area within the Oregon LCR ESU is 4.32% (Table 7-2). For purposes of estimating take that may occur in future HCP land acquisitions, we assume 25% additional miles by stream type (fish and nonfish streams) based on future land acquisitions that total 25% of the current HCP lands. For example, small fish streams covered by the HCP within the LCR ESU (17.0 miles) are anticipated to increase in the future HCP lands by 4.3 miles for a total of 21.3 miles of small fish streams. This would comprise 4.12% of the total small fish streams within the LCR ESU. Thus, the amount of take associated with implementation of the HCP conservation measures on all fish and nonfish streams, and the impacts of the take to LCR salmonid populations, is very small at the ESU scale when considering the effects of numerous land management practices and other activities occurring in these ESUs that result in take of the covered salmonid species.

**Table 7-1. Miles of fish streams by stream type within the LCR ESU<sup>1</sup> (Oregon Portion) and on the current HCP ownership<sup>2</sup> within the ESU.**

<b>Fish Stream Type</b>	<b>Total LCR ESU (miles)</b>	<b>HCP Area (miles) within the LCR ESU</b>	<b>HCP Proportion of LCR ESU (%)</b>
Large	1001.2	9.5	0.95
Medium	554.6	12.4	2.24
Small	516.5	17.0	3.29

1 ODF Hydro Layer (ODF 2018b).

2 Port Blakely Hydro Layer (Port Blakely 2018b).

**Table 7-2. Miles of nonfish streams by stream type within the LCR ESU<sup>1</sup> (Oregon Portion) and on the current HCP ownership<sup>2</sup> within the ESU.**

<b>Nonfish Stream Type</b>	<b>Total LCR ESU (miles)</b>	<b>HCP Area (miles) within the LCR ESU</b>	<b>HCP Proportion of LCR ESU (%)</b>
Large	0.0	0.0	0.00
Medium	9.5	0.0	0.00
Small	843.2	36.4	4.32

1 ODF Hydro Layer (ODF 2018b).

2 Port Blakely Hydro Layer (Port Blakely 2018b).

*Impacts of the Take to Upper Willamette River Salmonid Populations* – The UWR Chinook and steelhead recovery plan makes similar recommendations as the LCR recovery plan for restoring salmonid habitat (ODFW and NMFS 2011). There are numerous actions related to hydropower, dikes, levees, and land management activities that can be implemented to restore habitat. For example, eliminating dams and dikes, reducing sediment inputs, reconnecting streams, and channels, restoring riparian areas to increase potential for LWD input and provide shading to reduce temperatures. Subbasin habitat actions are focused on protecting existing functional physical habitat, restoring degraded habitat reaches (adequate pools/glides/riffles, side channels, cover structures, spawning gravels) and improving water quality/quantity. There are short-term and long-term strategies and actions that can be located and scaled sufficiently to create complex stream habitat features intended to restore hydrologic connectivity with the adjacent riparian area and floodplain. In the short-term, subbasin habitat actions are proposed to help encourage the placement of large wood in streams to create reach complexity, and to protect key stream reaches that contain summer holding pools for spring Chinook adults. These actions are intended to bridge the gap until long-term habitat actions begin restoring natural habitat forming processes. In the long-term, the UWR recovery plan proposes creating or improving/maintaining riparian areas to provide a continual source of large wood and other functions (example: shade and filtering functions) that benefit water quality/quantity and complexity. Subbasin habitat actions within smaller tributaries are more focused on steelhead, as Chinook do not often spawn in smaller

tributaries. However, Chinook that spawn and rear in larger order streams downstream of steelhead will benefit indirectly from the actions identified and implemented in upstream steelhead habitat, as water quality improvements and habitat forming processes are transmitted downstream (ODFW and NMFS 2011).

Land uses, other than forest management and timber harvest, that have led to the conditions that limit tributary habitat productivity include agriculture and associated diking and channeling of streams, rural residential and urban development, and gravel extraction. A mix of private, state, and federal forestland predominates in the upper mainstem and headwater tributaries, i.e., most streams within the HCP area, of the Cascade subbasins, while the lower mainstem and tributary reaches of most subbasins are characterized by agricultural and rural residential land use, with some urban development, especially in the Salmon Creek and Clackamas subbasins (NMFS 2013). The Port Blakely HCP Covered Activities will occur in the upper tributary reaches of the Clackamas and Molalla subbasins and are associated with threats and recovery recommendations for those areas of the ESUs.

The Large and Medium fish stream totals in the current HCP area as a proportion of all known Large and Medium fish streams in the UWR ESU is 0.36 and 0.78%, respectively. While the proportion of Small fish streams in the current HCP area within the UWR ESU is 0.94% (ODF 2018b; Port Blakely 2018b). This data is presented in Table 7-3. The proportion of small nonfish streams in the current HCP area within the UWR ESU is 0.81% (Table 7-4). For purposes of estimating take that may occur in future HCP land acquisitions, we assume 25% additional miles by stream type (fish and nonfish streams) based on future land acquisitions that total 25% of the current HCP lands. For example, small fish streams covered by the HCP within the UWR ESU (25.5 miles) are anticipated to increase in the future HCP lands by 6.4 miles for a total of 31.9 miles of small fish streams. This would comprise 1.17% of the total small fish streams within the LCR ESU. Thus, the amount of take associated with implementation of the HCP conservation measures on all fish streams and nonfish streams, and the impacts of the take to UWR salmonid populations, is very small at the ESU scale when considering the proportion of occupied fish streams affected, and the effects of numerous land management practices and other activities occurring in these ESUs that result in take of the covered salmonid species.

**Table 7-3. Miles of fish streams by stream type within the UWR ESU<sup>1</sup> and on the current HCP ownership<sup>2</sup> within the ESU.**

<b>Fish Stream Type</b>	<b>Total UWR ESU (miles)</b>	<b>HCP Area (miles) within the UWR ESU</b>	<b>HCP Proportion of UWR ESU (%)</b>
Large	2317.8	8.3	0.36
Medium	1625.5	12.6	0.78
Small	2726.4	25.5	0.94

<sup>1</sup> ODF Hydro Layer (ODF 2018a).

<sup>2</sup> Port Blakely Hydro Layer (Port Blakely 2018b).

**Table 7-4. Miles of nonfish streams by stream type within the UWR ESU<sup>1</sup> and on the current HCP ownership<sup>2</sup> within the ESU.**

Nonfish Stream Type	Total UWR ESU (miles)	HCP Area (miles) within the UWR ESU	HCP Proportion of UWR ESU (%)
Large	7.9	0.0	0.00
Medium	172.2	0.2	0.12
Small	8356.9	68.0	0.81

<sup>1</sup> ODF Hydro Layer (ODF 2018a).

<sup>2</sup> Port Blakely Hydro Layer (Port Blakely 2018b).

### 7.1.2 Bull Trout

Given the condition of streams and adjacent riparian areas on non-Federal lands managed under OFP Rules, it is unlikely that bull trout from the original release have expanded to areas below the confluence of the Clackamas River and the Collawash River where Port Blakely HCP lands occur or are likely to occur. However, there is bull trout habitat available in the Clackamas River and bull trout could occur in suitable habitat downstream of their current range within the NEP sometime in the future. Currently, no fish-bearing streams on the HCP lands deliver to the upper Clackamas River (see Figure 4-4). There are only nine segments of nonfish-bearing streams on the HCP lands that flow into the Clackamas River totaling 1.36 miles (Port Blakely 2018b). It is highly unlikely that future HCP lands will be acquired in the upper Clackamas River watershed due to the current prevalence of federal land ownership throughout the upper drainage, however, land could be acquired in the lower watershed, downstream of Port Blakely’s current ownership. Thus, for purposes of assessing take, we are assuming that only the nonfish stream miles on the Port Blakely initial HCP lands and a small unknown amount of connected fish-bearing stream located downstream of the initial ownership that are part of the Clackamas River subbasin, i.e., the geographic boundaries of the NEP, are affected by the Covered Activities. Thus, some small level of take of bull trout could occur in the future if bull trout expand their local range downstream of their current location in the upper Clackamas River to occupy fish-bearing streams that receive flows from the nonfish-bearing streams in the HCP area.

*Type of Take Anticipated* - Take of bull trout within the experimental NEP area is not currently prohibited provided that the take is unintentional, not due to negligent conduct, or is consistent with State fishing regulations that have been coordinated with the Service. The USFWS expects the overall levels of incidental take from all activities within the NEP will be low because the reintroduction is compatible with existing activities and practices in the areas of USFS lands where it was reintroduced. And it is likely their expansion to other areas on nonfederal lands downstream, such as Port Blakely HCP lands, will only occur in areas where there are suitable habitat conditions. Since it is uncertain if the status of the NEP will change in the future and take prohibitions could be changed such that restrictions on land management activities may be imposed that could affect the ability of Port Blakely to manage our HCP lands as intended, we address the potential for take of the bull trout NEP as if Section 9 take prohibitions are in effect.

An extremely small amount of take in the form of harm could occur as a result of reduced function of watershed processes that create and maintain habitat contributing to the ecological needs of the Covered Species. Harm could accrue from the environmental effects of timber harvest and road management activities on the HCP lands where they may have an impact on streams occupied by bull trout. Specifically, habitat modifications that may cause take could occur in the form of: (1) sediment inputs into water; (2) reduction in riparian vegetation resulting in increased water temperatures; and (3) reduction in the sources of LWD recruitment.

*Take Associated with Sediment Input to Streams* - The discussion of take associated with sediment input to streams is generally similar to that for anadromous salmonids (Section 7.1.1). However, an assessment is provided below that addresses take from sediment specific to bull trout.

Acute sediment input could harm low numbers of bull trout which may have migrated to smaller streams within the Clackamas River system throughout the year that receive flows from nine segments (1.36 miles) of perennial nonfish streams on the current HCP lands and any additional lands acquired in the future. Adults of these species would avoid harm, as they are capable of leaving disturbed habitat areas during the short-term periods of high turbidity. Numbers of juveniles that could be harmed by acute sediment loading from road crossing or decommissioning work is anticipated to be low wherever effects arise because fewer roads are present in the upper watersheds where the majority of the HCP lands occur, and the HCP includes measures to reduce the extent of effects to fish.

Harm from sediments is anticipated to include the more sensitive young life stages of rearing and out-migrating juvenile, eggs, embryos, and emerging fry of bull trout in the Clackamas River subbasin. Harm from sediment could occur from roads where they occur within 200 feet of fish-bearing streams that contain bull trout overwintering, foraging, spawning and rearing habitat in the upper Clackamas watershed. Although initially, there are no fish-bearing streams in the Clackamas River subbasin that occur on the HCP lands, some could be acquired in the future.

Although numerous measures will be implemented to avoid and/or minimize the potential for sediment input to streams, it is anticipated that some chronic sediment input resulting in harm could occur from implementation of road management measures associated with a very small amount of roads occurring within 200 feet of the 1.36 miles of nonfish-bearing streams on the HCP lands in the upper Clackamas River subbasin where bull trout have been introduced.

Timber harvest practices and other land use patterns on unstable slopes adjacent to riparian habitat, contributes to fine sediment in tributary streams which is a concern for salmonids including bull trout (NMFS 2013). Port Blakely will not harvest timber on unstable slopes thereby avoiding this potential to effect bull trout habitat. No-harvest buffers on fish streams will likely prevent sediment input into to these streams. RMAs on Large and Medium nonfish streams are comprised of a 55-foot no-harvest zone and limited-harvest outer management zones which will function to minimize sediment input to these streams. Timber harvest within the 25-foot managed zone of the 50-foot RMAs adjacent to Small nonfish streams could decrease the sediment capturing capacity of these riparian areas until subsequent riparian revegetation regains the capture function, and thus some sediment input to Small nonfish



streams could occur. However, the 25-foot managed zone with a maximum harvest of 50% of trees on perennial nonfish streams and the ELZs on both perennial and seasonal nonfish streams are expected to filter sediment and minimize disturbance to the ground and vegetation thereby reducing the potential for sediment delivery downstream.

Although we have no explicit data, the map showing the area of burn in the eastern portion of the HCP area appears to include the bull trout experimental NEP area. Although Port Blakely will implement HCP riparian buffers to all stream types whether the stands were burned or not, any streams running through burned stands that are connected with the bull trout NEP streams will likely deliver more sediment than streams running through unburned stands. Since there are only nine segments of nonfish-bearing streams on the HCP lands that flow into the Clackamas River totaling 1.36 miles, it is unlikely that sediment delivery to bull trout streams will occur (Port Blakely 2018b).

Juvenile fish might be harmed by acute sediment input from riparian timber practices near perennial nonfish streams, but the extent of harm would be low because sediment input will be minimal since the entire length of perennial nonfish streams will be buffered. Any turbidity will likely decrease as the water from nonfish streams reaches fish-bearing waters. The type of harm would be in the form of temporary distress fish (injury). Acute sediment loading from riparian timber practices could occur through the first growing season following the timber practices.

*Take Associated with Increased Water Temperatures* - The discussion of take associated with increased stream water temperatures is generally similar to that for anadromous salmonids (Section 7.1.1). However, an assessment is provided below that addresses take from increased water temperature specific to bull trout.

Reduced riparian vegetation is expected at all road crossings that block or impede fish passage at the time that the blockage is repaired, or the crossing is replaced. Reduction in riparian vegetation is also expected from timber harvest and related activities within the RMAs adjacent to all streams. Reduced riparian vegetation diminishes habitat value in several ways, described in this take assessment, including water quality (increased temperature from decreased shade). Reduced shade and cover are expected to persist for several years at each site where riparian vegetation is removed. When replanting occurs in the riparian area, lost shade and cover begin to return within several years, but do not recover to full function for many years.

Elevated stream temperatures often exist because of a lack of intact, functional, and contiguous RMAs and sufficient streamside buffers. In the LCR spawning and rearing habitats and migratory corridors continue to be degraded from a range of related impacts including increases in water temperature (USFWS 2015a). However, the Clackamas River core area is cited in the Recovery Plan as having no primary habitat threats because of bull trout's status as a NEP (USFWS 2015a). Nevertheless, at some point in the future, the status of bull trout in the Clackamas River subbasin may change, and effects to its habitat may be considered a concern and an important issue relative to its recovery.

Land use management activities in the Clackamas River subbasins, including timber harvest, are cited as impairing physical habitat quality and are a key concern for Clackamas spring Chinook (UWR ESU) winter parr and fry (ODFW and NMFS 2011). High summer water temperatures caused by land management activities are considered a secondary

concern for Clackamas spring Chinook. The high-water temperatures are primarily the result of decreased riparian forest in the tributaries and the mainstem Clackamas River, ponding in reservoirs behind the hydroelectric dams, and other upriver factors. We assume that these conditions are a concern for bull trout, as well.

Elevated stream temperatures caused by a lack of intact, functional, and contiguous RMAs are addressed by the HCP buffer strategy and road management activities. The HCP contains measures that connect all in-stream habitat on the ownership, focusing on fish passage blockages early in the HCP term. Road improvements ensure that the potential for sediment delivery is reduced or eliminated through use of 100-year event culverts, and increased ditch line disconnections and cross-drain culvert installations.

Riparian harvest could reduce shade, to varying degrees, on streams as a result of applying different HCP stream buffers widths dependent upon 1) whether the stream is fish-bearing or nonfish-bearing; 2) the size of the fish-bearing stream; and 3) year-round flow regimes on nonfish streams. However, HCP stream buffers are designed to provide sufficient shade where it is most beneficial in maintaining cooler stream temperatures.

All HCP stream buffers are wider than current Forest Practices requirements, providing more shade and, thus, increasing the potential to reduce or maintain stream temperatures beneficial to all fish. Take in the form of harm could occur from minimally increased water temperatures on 1.36 miles of small nonfish-bearing streams in the HCP area within the Clackamas River subbasin. However, the HCP measure to provide a 50-foot buffer with a 25-foot no-harvest zone and a 25-foot managed zone on both sides of the entire length of nonfish perennial streams, as well as a 30-foot ELZ, will reduce the potential effects of direct exposure to sun and increased stream temperatures, and are expected to adequately shade the small tributary streams (typically less than two feet wide) in the upper watersheds of the Clackamas River system. Harvest units along the nonfish-bearing streams that deliver to the NEP area that were burned will still receive the same HCP buffers as unburned stands. Though they likely won't have the same shade capability, the effects to bull trout are expected to be low because the streams are small nonfish-bearing and contribute very little to the bull trout stream network. Thus, take from warm water temperatures of nonfish streams is expected to be minimal, i.e., limited to small areas at the confluence of nonfish and fish-bearing streams.

*Take Associated with Reduced Riparian Large Woody Debris* – The discussion of take associated with reduced riparian LWD is generally similar to that for anadromous salmonids (Section 7.1.1). If bull trout should ever occupy fish streams on the HCP lands, the LWD provisions, and associated benefits, would be the same as for other salmonids. However, since there are only nonfish streams on HCP lands in the upper Clackamas River watershed that are highly unlikely to deliver LWD to fish streams in the lower watershed, we anticipate no take of bull trout will occur relative to reductions in LWD input in the upper watershed streams of the HCP area where bull trout are likely to occur.

*Impacts of the Take to Bull Trout Populations* – The only bull trout population likely to occur in the HCP area is the limited distribution of the introduced experimental population in the Clackamas River (USFWS 2011a). The Clackamas River is not a unique or unusual ecological setting or geographical context for bull trout as this species occurs in other portions of the Willamette River basin and in other nearby tributaries to the Columbia River.

Thus, the introduced experimental population was designated as not essential, i.e., NEP, to the continued existence of the species in the wild (USFWS 2011a).

The USFWS released bull trout into areas of suitable spawning and rearing habitat in the mainstem Clackamas River and its tributaries in the upper headwaters of the subbasin, upstream of the Collawash River confluence (USFWS 2011a). This portion of the subbasin, referred to as the upper Clackamas River subbasin, contains a total of 70.1 river miles of suitable spawning and rearing habitat. Most of the area containing suitable release sites with high potential for bull trout establishment is managed by the USFS and is protected from major development activities and timber harvest through a variety of mechanisms.

Nevertheless, if the introduction is successful, bull trout could expand into other tributaries and eventually occupy streams in the initial and potential future HCP area. Even though take of bull trout within the experimental NEP area is not currently prohibited provided that the take is unintentional and not due to negligent conduct, this status could change in the future. Thus, we have assumed that some of the harm from Covered Activities that could occur to individuals of the species could rise to the level of incidental take that might require take authorization in the future.

The amount of take that is expected as result of future occupancy of small streams within Port Blakely HCP lands is minimal because stream functions will be protected under the HCP conservation measures. The level of take is less significant when considering that it may occur to a reintroduced population that, if present in the HCP area, would suggest an expansion of the local population to suitable habitat that increases the overall viability of the bull trout, and is meeting the recovery goal for distribution and abundance in Clackamas River core habitat (USFWS 2011a). Considering these factors, as well as the HCP conservation measures designed to minimize impacts to small fish and nonfish streams, the impacts of the take of bull trout are expected to be negligible.

### **7.1.3 Pacific Lamprey**

For purposes of assessing take, we are conservatively assuming that stream miles on the Port Blakely initial and potential future HCP lands that deliver water to the lower Molalla River, Clear Creek, and in the upper watershed of the Clackamas River basin, where Pacific lamprey are known to occur, are affected by the Covered Activities. Future acquired lands are not expected to occur in the upper Clackamas River watershed due to the prevalence of federal ownership, however, acquisitions in the Molalla River and Clear Creek watersheds could occur. Initial HCP lands are located considerably high up in the Molalla and Clackamas systems relative to where Pacific lamprey are known to occur in these watersheds (see Figure 3-6). Clear Creek is the only stream with existing known spawning occurrences where the HCP lands are in close proximity, i.e., HCP lands within 200 feet of streams in the Clear Creek watershed, and where Covered Activities may result in take. The amount of Clear Creek stream miles within this distance is 2.85 miles. An additional 0.7 miles may be affected by an expansion of HCP lands within this distance to Clear Creek in the future. Thus, some low level of take of Pacific lamprey could occur as a result of Covered Activities occurring in the Clear Creek watershed.

*Type of Take Anticipated* - Take in the form of harm could result from reduced function of watershed processes that create and maintain habitat contributing to the ecological needs of

the Covered Species. Harm could accrue from the environmental effects of timber harvest and road management activities on the HCP lands. Specifically, habitat modifications that may cause take could occur in the form of: (1) sediment inputs into water and fish passage barriers; (2) reduction in riparian vegetation resulting in increased water temperatures; and (3) reduction in the sources of LWD recruitment.

*Take Associated with Sediment Input to Streams and Stream Blockages* – The impacts on lamprey of sediment and turbidity in streams are not well documented (Luzier 2011). Lamprey spawn and rear in low gradient stream reaches with complex channel structure, pools, and riffles, and side channels with finer sediment and detritus (Luzier 2011). These features are frequently found in lower gradient areas with wider floodplains. Given that certain levels of sediment are required for specific Pacific lamprey life stages and that most streams in the HCP area are small and in the upper watersheds lacking the complexity and low gradient stream reaches, take associated with sediment input to streams is likely de minimus. Although some take in the form of harassment (potential to disrupt normal behavior patterns) from sediment could occur from roads where they occur within 200 feet of fish-bearing streams that contain habitat for Pacific lamprey adults and ammocoetes in the Clear Creek watershed (2.85 miles in the current HCP land and 0.7 miles in potential future HCP land), it is considered minimal since sediment input will be low and the species requires some sediment for spawning and rearing.

However, passage issues appear to be more important than issues related to sediment input (USFWS 2016e). Artificial barriers impact distribution and abundance of Pacific lamprey by impeding upstream migrations by adults and downstream movement by ammocoetes and macrophthalmia. The excessive use of swimming energy required by Pacific lampreys to negotiate fish ladders or culverts combined with sharp angles and high-water velocities, effectively block or restrict passage (Luzier 2011). Pacific lampreys persist for only a few years above impassable barriers before dying out (USFWS 2016e).

The HCP lands currently contain 11 fish passage blockages: five in the lower Columbia River system and six in the Willamette River system. Of these, five blockages are located in the Molalla River and Clear Creek subbasins. However, most of these blockages are located on small fish streams in the upper watersheds above where lampreys and suitable lamprey spawning areas are likely to occur. Nevertheless, these blockages will be replaced or repaired beginning the year of Permit issuance and be completed within five years of Permit issuance. Thus, the potential to prevent lamprey from migrating to spawning areas is low. Take in the form of harassment could occur in the future if lands with blockages are acquired or if blockages develop on low gradient fish-bearing streams resulting in injury or reducing the ability of lamprey to utilize suitable habitat upstream. However, this take would be temporary as all newly discovered fish barriers will be removed or repaired within one to three years of discovery.

*Take Associated with Increased Water Temperatures* - The discussion of take associated with increased stream water temperatures is generally similar to that provided above for anadromous salmonids (Section 7.1.1). However, an assessment is provided below that addresses take from increased water temperature specific to Pacific lamprey.

Elevated water temperatures have been documented as a mortality factor for eggs and early stage ammocoetes under laboratory conditions. Water temperatures of 72°F (22°C) may

cause significant death or deformation of eggs or ammocoetes (Luzier 2011). This may be a common occurrence in degraded streams during the early to mid-summer period of lamprey spawning and ammocoete development. Ammocoetes are especially vulnerable as they tend to concentrate in the lower portions of streams and rivers where gradients are low and stream temperatures tend to be warmer (USFWS 2016e).

Low gradient stream reaches are typically characteristic of medium and large streams such as the Molalla River, Clear Creek, and the Clackamas River, where Pacific lamprey are known to occur. Take in the form of harm from increased water temperatures could occur on some proportion of the 42.6 miles of Medium and Large streams in the HCP area, i.e., 22.4% of total streams in the HCP area. Additional acquired lands would increase the mileage in the HCP area by 10.7 miles. However, relative to the proximity to the HCP lands to known Pacific lamprey occurrences, only those activities on HCP lands in the Clear Creek drainage are likely to result in take. This potential level of take is likely small due to the small amount of initial and potential future land with streams delivering flows to Clear Creek, and is ameliorated by the no-harvest buffers on Medium and Large streams that will be implemented under the riparian conservation measures.

Streams temperatures are not expected to increase from application of no-harvest stream buffers on Medium and Large fish streams with buffers that are 90 and 100 feet, respectively. The shade provided by these buffers will prevent temperature increases in larger low gradient streams. In addition, no-harvest buffers on small fish streams and a combination of no-harvest and managed buffers on small nonfish streams contribute to reducing the potential for temperature increases to streams lower in the watershed. Some streams in burned stands will still have intact or partially intact riparian buffers that will protect these streams from temperature increases to various extents. Harvest units that were completely burned will still receive the HCP buffers but will likely not provide much shading until understory vegetation and trees regrow over the next 5-10 years. Thus, elevated stream temperatures may occur to habitat occupied by Pacific lamprey. These events may result in impacts to Pacific lamprey; however, they are not a result of implementation of Covered Activities. In fact, the effects are ameliorated to some extent by applying HCP buffers as these stands are salvage harvested.

*Take Associated with Reduced Riparian Vegetation and Large Woody Debris* – The discussion of take associated with reduced riparian LWD is generally similar to that for anadromous salmonids (Section 7.1.1). However, an assessment is provided below that addresses the potential for take from reduced LWD specific to Pacific lamprey.

Lamprey spawn and rear in low gradient stream reaches with complex channel structure, pools, and riffles, and adjacent stream margins and side channels with finer sediment and detritus. The loss of these habitats reduces areas for spawning and rearing. Loss of riparian vegetation and shading also likely negatively impact lamprey (Luzier 2011). Because lamprey ammocoetes colonize areas and are relatively immobile in the stream substrates, they are prone to effects from channel alterations. In addition, the loss of riffle and side channel habitats may reduce areas for spawning and for ammocoete rearing (USFWS 2016e). Take may occur from timber harvest that removes vegetation and LWD that provide shade and, especially, from a loss of in-water LWD structures that help to create complexity characteristics in the stream. However, HCP stream buffers, especially along lower gradient medium and large streams, contribute shading and maintain the

integrity of stream meanders and side channels. Naturally occurring LWD input from HCP no-harvest stream buffers, as well as the mitigation measure to manually provide LWD, will ensure that woody structures occur in streams that result in pools, riffles, and channel complexity. Given the low amount of HCP lands within 200 feet of streams in the Clear Creek watershed, i.e., 2.85 miles in the current HCP land and an additional 0.7 miles in future acquired HCP land, that have substantial no-harvest buffers sufficient for providing 70-90% LWD (McDade et al. 1990), it is expected that the amount of take in the form of harm of reduced riparian vegetation and LWD will be very low.

*Impacts of the Take to Pacific Lamprey Populations* – The predicted short-term Pacific lamprey population trend is difficult to interpret because lampreys perhaps may produce stronger year-classes in some years than in others. The trend over the past three generations (estimated to be 27 years) is uncertain, but distribution and abundance likely have declined in most stream systems across the range, and overall population decline may exceed 30 percent (Luzier et al. 2011). Many or most areas with a stable recent trend underwent declines more than three lamprey generations ago (Luzier et al. 2011). The predicted long-term trend is a decline in the population >50% (NatureServe 2018a).

Take of Pacific lamprey is expected to be very low as a result of the low level of Pacific lamprey occurrences relative to the HCP lands, and the conservation measures that reduce sediment input, remove fish passage blockages and add LWD to fish-bearing streams. In addition, the larger Medium and Large Type low gradient streams in the HCP area where Pacific lamprey are likely to occur, i.e., lower Molalla River, Clear Creek, and Clackamas River, will receive 90 and 100-foot no-harvest buffers, respectively. Thus, very little, if any, contribution to the declining population trend should occur with implementation of the HCP stream protection measures. Given the low amount of take anticipated, and that information suggests thousands of Pacific lampreys are still widely distributed in the Willamette Valley, the impacts of the take of Pacific lamprey populations are expected to be negligible.

#### **7.1.4 Cascades Frog**

Although no specific records of Cascades frogs are known to exist that suggests this species occurs in the HCP area, it is identified as occurring in the Molalla-Pudding and Clackamas Rivers watersheds and, therefore, could occur in the initial and potential future HCP area (NatureServe 2018a). Thus, for purposes of assessing take, we assume that this species could occur in or near wetlands associated with streams in the HCP area.

*Type of Take Anticipated* - Take in the form of harm is anticipated to result from reduced function of watershed processes that create and maintain habitat meeting the ecological needs of the Covered Species. Harm could accrue from the environmental effects of timber harvest and road management activities on the HCP lands. Specifically, forest management activities that may cause take could occur in the form of modifications and/or degradation of lakes, bogs, ponds, and wet meadows, as well as flowing streams in open coniferous forests, and floating logs that may be used as basking opportunities and foraging sites.

*Take Associated with Increased Water Temperatures* – Cascades frogs, including tadpoles, can tolerate a wide range of water temperatures. They tend to aggregate in the warmest areas of ponds and lakes during the day; this generally consists of wind-protected, gently sloping, shallow near-shore areas where temperatures can warm to more than 20 °C on a

sunny afternoon but drop to near freezing at night (Pope et al. 2014). As such, take as a result of water temperature increases is likely to only occur when temperatures are consistently high throughout the year. Exposure to sun may result in drying up of lakes, ponds and wetlands creating shorter hydroperiods in breeding pools that result in poor annual survival of eggs and tadpoles. Road construction will not occur in lakes and wetlands and are unlikely to occur near stream associated wetlands as a result of the HCP road construction measures and the goal of locating roads outside stream riparian zones. Thus, take from road construction activities is unlikely to occur. Some unknown level of take of Cascades frogs may occur as a result of timber harvest but this potential is ameliorated by the lake and wetlands protection measures that apply a minimum 50-foot no-harvest buffer around these special habitats when associated with fish-bearing streams. Additionally, no-harvest buffers will be retained around all lakes greater than ½ acre and bogs of any size. Aquatic waters that have been classified as nonfish bearing, including lakes that are ¼ acre to ½ acres, stream associated wetlands and seeps that are less than 8 acres, and isolated wetlands and seeps that are ¼ acre to 8 acres will be left undisturbed, maintain the integrity of the feature itself. Thus, an unknown amount of take of Cascades frogs from temperature increases or desiccation of wetland habitat could occur but is likely to be low.

*Take Associated with Reduced Wetlands, Riparian Vegetation and Large Woody Debris –* As described above, lakes, ponds and other wetlands are unlikely to be reduced in the HCP area because of measures that will be applied to avoid disturbance and leave protective forest buffers within and around these features. The combination of no-harvest buffers and retention areas associated with stream-associated lakes and wetlands as well as isolated lakes and wetlands will retain the integrity and ecological function of these aquatic habitats upon which the Cascades frog depends. Where these features are in association with fish streams, the quality may be enhanced by the mitigation measure designed to add LWD to streams in key areas. However, an unknown amount of take may occur where Cascades frogs occupy aquatic features that are in association with some nonfish streams and waterbodies, where the integrity of the feature will be protected from disturbance, but no buffer will be applied.

*Impacts of the Take to Cascades Frog Populations –* The population size of Cascades frogs is widely estimated at 10,000 - 1,000,000 individuals (NatureServe 2018a). The species is abundant in many parts of its range (Leonard et al. 1993). For example, in mountain meadows in Oregon, numbers were estimated to be hundreds within an area of less than 2.5 acres (Nussbaum et al. 1983). The overall short-term trend over the past 10 years or three generations is uncertain, but area of occupancy, population size, number of occurrences, and habitat quality likely are slowly declining or relatively stable in the large majority of the range. Despite good local population densities, 22% of historical populations have disappeared in Oregon, however, viability appears to be good in areas of occurrence (Fite et al. 1998; NatureServe 2018a). Declines in Oregon were cited by Nussbaum et al. (1983) and Blaustein and Wake (1990), but other data do not suggest exceptionally low site occupancy rates, and the species remains widespread in some areas of the northern and central Oregon Cascades, and it has shown a capacity to rebound from short-term declines (Olson 1992, Brown 1997, Pearl and Adams 2005). Nevertheless, the long-term trend is for a population decline of 30-50% (NatureServe 2018a).

Take of Cascades frogs in the HCP area is expected to be very low due to the protections provided to suitable habitat, i.e., riparian/riverine corridors, wetlands, and wetland/upland mosaics. Riparian and wetlands buffers, whether isolated or in association with fish and nonfish streams, protect potentially suitable habitat. Given the HCP conservation measures that will protect suitable habitat and could facilitate Cascade frogs occupancy, and the local abundance within its range in Oregon, the impacts of the take likely to occur in the initial and potential future HCP area are considered to be negligible to Cascades frog populations.

### **7.1.5 Coastal Tailed Frog**

Although no specific records of coastal tailed frogs are known to exist that suggests this species occurs in the HCP area, it is identified as occurring in the Molalla-Pudding and Clackamas Rivers watersheds and, therefore, could occur in the initial and potential future HCP area (NatureServe 2018a). Thus, for purposes of assessing take, we assume that this species could occur in the small fish and perennial nonfish streams in subbasins of the upper watersheds of these rivers where they occur in the HCP area.

*Type of Take Anticipated* - Take in the form of harm is anticipated to result from reduced function of watershed processes that create and maintain habitat meeting the ecological needs of the Covered Species. Harm could accrue from the environmental effects of timber harvest and road management activities on the HCP lands. Specifically, forest management activities that may cause take could occur in the form of modifications and/or degradation of cascade and step-pool aquatic habitats, with cobbles, boulders, pocket pools, and underlying channel-spanning pools, as well as reductions in the extent of riparian forests and the amount of large, downed wood in general. Some harm may occur as a result of forest management activities and road construction that reduce stream connectivity and increase water temperatures and siltation (Nussbaum et al. 1983, Welsh and Ollivier 1998). Despite negative effects of logging, this species frequently occurs in many young forests that have been harvested one or more times in the past. Sensitivity to timber harvest may depend on surface geology and harvest practices (Adams and Bury 2002, Welsh and Lind 2002).

*Take Associated with Increased Water Temperatures* - The discussion of take associated with increased stream temperatures is generally similar to that for other aquatic species described above that prefer cool water temperatures. However, an assessment is provided below that addresses take from increased water temperature specific to coastal tailed frogs.

Elevated stream temperatures caused by a lack of intact, functional, and contiguous RMAs are most likely to be affected by road management activities. However, implementation of HCP road management measures will result in minimal stream crossings, a reduction in road construction adjacent to streams and removal of some roads within 200 feet of streams. The measures serve to reduce or eliminate the potential to disturb and/or degrade coastal tailed frog habitat. The HCP also contains measures that ensure connectivity of all in-stream habitat on Port Blakely's ownership, focusing on fish passage blockages early in the HCP term. Road improvement activities such as the use of 100-year event culverts ensure that the potential for fish passage blockages and disconnected streams are eliminated.



Riparian harvest could reduce shade, to varying degrees, on all streams as a result of applying different HCP riparian stream buffers widths dependent upon the following: 1) whether the stream is fish-bearing or nonfish-bearing; and 2) the size of the fish-bearing stream. However, HCP riparian stream buffers are designed to provide sufficient shade where it is most beneficial in maintaining cooler stream temperatures. In particular, substantially wider no-harvest buffers (than what is required under Oregon Forest Practices) will be applied to small fish streams and 50-foot managed buffers will be applied to perennial nonfish streams in the upper watershed streams where coastal tailed frogs are likely to occur.

Take in the form of harm could occur from minimally increased water temperatures on a proportion of 42.6 miles of small fish streams on current HCP lands and 10.7 miles of additional small fish streams on lands acquired in the future that will be buffered with a 75-foot no-harvest zone. Some unknown level of take may also occur on a proportion of 104.5 miles of perennial nonfish streams on current HCP lands and 26.1 miles of additional nonfish streams on lands acquired in the future where coastal tailed frogs occur. However, the HCP measure to provide a 50-foot buffer with a 25-foot no-harvest zone and a 25-foot managed zone, on both sides of the entire length of nonfish streams, as well as a 30-foot ELZ, will reduce the potential effects of direct exposure to sun and increased stream temperatures, and are expected to adequately shade the small tributary streams (typically less than five feet wide) in the upper watersheds of the HCP area. Thus, although the level of take over the Permit term is unknown, it is expected to be low as a result of HCP conservation measures designed to prevent temperature increases as much as possible.

*Take Associated with Reduced Stream Connectivity, Riparian Vegetation and Large Woody Debris* – The HCP contains measures that connect all in-stream habitat on the ownership, focusing on fish passage blockages early in the HCP term. Road improvements ensure that the potential for fish passage blockages and disconnected streams are eliminated through use of 100-year event culverts.

Additional conservation measures that improve habitat conditions in commercially managed forests include retaining canopy cover in riparian areas, protecting aquatic habitats, in association with streams and isolated features in the uplands (e.g., seeps and wetlands), and retention and recruitment of important structural attributes, such as LWD and shrub understory, which facilitate frog movement through forests. No-harvest stream buffers along small fish streams and 50-foot contiguous buffers along the entire length of perennial nonfish streams will minimize the potential level of take of coastal tailed frogs in commercial managed forests. Thus, a small unknown amount of take of coastal tailed frogs is likely to occur where they occur in small fish and perennial nonfish streams but this potential for take will be offset by the buffers applied to these streams, as well as the pro-active mitigation measures that reconnect streams and provide addition LWD.

*Impacts of the Take to Coastal Tailed Frog Populations* – The total population size of coastal tailed frogs is unknown but likely exceeds 10,000 (NatureServe 2018a). This species is common in suitable habitat, i.e., clean, and cold streams necessary for all life stages, and upland habitat used by adults for foraging during cool, wet weather (Nussbaum et al. 1983). Although few population data are available, the short-term trend is probably declining (10-30%) based on habitat trends (NatureServe 2018a).

Take of coastal tailed frogs in the initial and potential future HCP area is expected to be very low due to the protections provided to small fish and nonfish streams in the upper watersheds throughout the HCP area which are expected to maintain cooler water temperatures and the integrity of in-stream habitat such as cascades, pools, and rocky substrates. Nonfish streams will receive protection along the entire stream length contributing to cooler temperatures in the downstream small fish streams creating potential habitat for the coastal tailed frog. Given the HCP conservation measures that will protect suitable habitat and facilitate occupancy by coastal tailed frogs, the impacts of the take that could occur in the HCP area are considered to be negligible to coastal tailed frog populations.

#### **7.1.6 Cascade Torrent Salamander**

Although no specific records of Cascade torrent salamander are known to exist in the current HCP area, its range includes Multnomah, Clackamas, Marion, and Linn Counties (Howell and Maggiulli 2011) that include the current and potential HCP lands. Within this area, the species is patchily distributed (Howell and Maggiulli 2011); the number of occurrences in Oregon was estimated to be between 21 and 100 (NatureServe 2018a). In managed forests of western Oregon, Russell et al. (2005) found that the occurrence and abundance of Cascade torrent salamander at the stream-reach scale was associated with streams in close proximity to the stream origin (i.e., headwaters). They prefer rapidly flowing water and, thus, are restricted to high gradient (steep) areas and are absent from flat areas or areas with gentle slopes (Good and Wake 1992). Even though much of the current HCP area is comprised of low gradient slopes, there are headwater areas occurring in the current HCP area and could occur in future HCP lands. Therefore, this species could occur in HCP area, especially given the HCP measures that protect riparian vegetation intact adjacent to small fish streams and nonfish streams and retain in-stream structures. Thus, for purposes of assessing take, we assume that this species could occur in the small fish and perennial nonfish streams in subbasins of the upper watersheds within the HCP area.

*Type of Take Anticipated* - Take in the form of harm is anticipated to result from reduced function of watershed processes that create and maintain habitat meeting the ecological needs of the Covered Species. Harm could accrue from the environmental effects of timber harvest and road management activities on the HCP lands. Specifically, forest management activities that may cause take could occur in the form of modifications and/or degradation of cascade and step-pool aquatic habitats, with cobbles, boulders, pocket pools, and underlying channel-spanning pools, as well as reductions in the extent of riparian forests and the amount of large, downed wood in general. Some harm may occur as a result of forest management activities and road construction that reduce stream connectivity and increase water temperatures and siltation (Nussbaum et al. 1983, Welsh and Ollivier 1998). Despite negative effects of logging, this species persists in managed forests especially at higher elevations where forest cover may not be a critical habitat (Jones et al. 2005).

*Take Associated with Increased Water Temperatures* - The discussion of take associated with increased stream temperatures is generally similar to that for other aquatic species described above that prefer cool water temperatures. However, an assessment is provided below that addresses take from increased water temperature specific to Cascade torrent salamanders.

Elevated stream temperatures caused by a lack of intact, functional, and contiguous RMAs are most likely to be affected by road management activities. However, implementation of HCP road management measures will result in minimal stream crossings, a reduction in road construction adjacent to streams and removal of some roads within 200 feet of streams. The measures serve to reduce or eliminate the potential to disturb and/or degrade Cascade torrent salamander habitat. The HCP also contains measures that ensure connectivity of all in-stream habitats on Port Blakely's ownership, focusing on fish passage blockages early in the HCP term. Road improvement activities such as the use of 100-year event culverts ensure that the potential for fish passage blockages and disconnected streams are eliminated. Most of these activities are likely to occur downstream of the higher gradient headwater streams preferred by Cascade torrent salamander, thus, take from road management activities is anticipated to be very low.

Riparian harvest could reduce shade, to varying degrees, on all streams as a result of applying different HCP riparian stream buffers widths dependent upon the following: 1) whether the stream is fish-bearing or nonfish-bearing; and 2) the size of the fish-bearing stream. However, HCP riparian stream buffers are designed to provide sufficient shade where it is most beneficial in maintaining cooler stream temperatures. In particular, substantially wider no-harvest buffers (than what is required under Oregon Forest Practices) will be applied to small fish streams and 50-foot managed buffers (with a 25-foot inner no-harvest zone) will be applied to perennial small nonfish streams in the upper watershed streams where coastal tailed Cascade torrent salamanders are likely to occur. These buffers will function in maintaining the stable humidity and substrate temperatures in wet seeps, stream corridors, and riparian areas containing Cascade torrent salamanders.

Take in the form of harm could occur from minimally increased water temperatures on a proportion of 42.6 miles of small fish streams on current HCP lands and 10.7 miles of additional small fish streams on lands acquired in the future that will be buffered with a 75-foot no-harvest zone. Some unknown level of take may also occur on a proportion of 104.5 miles of perennial nonfish streams on current HCP lands and 26.1 miles of additional nonfish streams on lands acquired in the future where Cascade torrent salamanders occur. However, the HCP measure to provide a 50-foot buffer with a 25-foot no-harvest zone and a 25-foot managed zone, on both sides of the entire length of nonfish streams, as well as a 30-foot ELZ, will reduce the potential effects of direct exposure to sun and increased stream temperatures, and are expected to adequately shade the small head-water streams (typically less than five feet wide) in the upper watersheds of the HCP area. Thus, the level of take over the Permit term although not explicitly known, is expected to be low as a result of HCP conservation measures designed to prevent temperature increases as much as possible, and the fact that only a small proportion of the small fish and nonfish streams will have the high gradient, and stream substrate characteristics preferred by Cascade torrent salamanders.

*Take Associated with Reduced Stream Connectivity, Riparian Vegetation and Large Woody Debris* – The HCP contains measures that connect all in-stream habitats on the ownership, focusing on fish passage blockages early in the HCP term. Road improvements ensure that the potential for fish passage blockages and disconnected streams are eliminated through use of 100-year event culverts.

Additional conservation measures that improve habitat conditions in commercially managed forests include retaining canopy cover in riparian areas, protecting aquatic habitats, in association with streams and isolated features in the uplands (e.g., seeps and wetlands), and retention and recruitment of important structural attributes, such as LWD and shrub understory, which facilitate Cascade torrent salamander movement along streams. No-harvest stream buffers along small fish streams and 50-foot contiguous buffers along the entire length of perennial small nonfish stream, the inner-most 25 feet of which is a no-harvest zone, will minimize the potential level of take of Cascade torrent salamanders in commercially managed forests. Thus, a small unknown amount of take of coastal tailed frogs is likely to occur where they occur in small fish and perennial nonfish streams but this potential for take will be offset by the buffers applied to these streams, as well as the proactive mitigation measures that reconnect streams and provide additional LWD.

*Anticipated Impacts of the Take to Cascade Torrent Salamander Populations* - Long-term population data collected from rigorous monitoring studies do not exist for the Cascade torrent salamander. No specific inference can be made on population trends either locally or range-wide based on available data (Howell and Maggiulli 2011). However, the species has a decreasing population trend on the IUCN Red List (Geoffrey Hammerson 2004), and it is possible that numbers are decreased from historical levels due to anthropogenic influences on both public and private lands (Howell and Maggiulli 2011).

Because these salamanders have small home ranges, relatively small patches of high-quality riparian habitat within refugia may contain viable populations and may be able to support salamander populations until the surrounding landscape recovers from timber harvest. In some situations, refugia along small streams in the form of discontinuous clumps of trees large enough to encompass all known habitat requirements of these salamanders may be a viable alternative to leaving a continuous, narrow strip of marginal riparian habitat (Bury and Corn 1988). However, HCP buffers along small fish and nonfish streams are expected to be wide enough to provide the riparian vegetation necessary to protect the stream functions needed by the Cascade torrent salamanders. Road management measures, as well as mitigation measures to reduce stream disconnections and add LWD, will also increase stream habitat quality beneficial to Cascade torrent salamanders. Low acreage harvest rates and the matrix of different age-classes across the landscape will minimize the impacts of the take. Uncut areas may help reduce substrate temperature fluctuations and stream sedimentation and may also provide a source of amphibians for recolonization of clear-cut areas (Bury and Corn 1988, Gomez and Anthony 1996).

Take of Cascade torrent salamanders in the initial and potential future HCP area is expected to be very low due to the protections provided to small fish and nonfish streams in the upper headwaters throughout the HCP area which are expected to maintain cooler water temperatures and the integrity of in-stream habitat such as cascades, pools, and rocky substrates. Nonfish streams will receive protection along the entire stream length contributing to cooler temperatures in the downstream small fish streams creating potential habitat for the torrent salamander. Given the HCP conservation measures that will protect suitable habitat and facilitate occupancy by Cascades torrent salamanders, the impacts of the take that could likely to occur in the HCP area are considered to be negligible to Cascade torrent salamander populations in Oregon.

### 7.1.7 Western Pond Turtle

The western pond turtle is known to occur in Clackamas County, Oregon and more specifically in both the Clackamas and Molalla-Pudding Watersheds, in which the Port Blakely HCP lands are included and could expand (NatureServe 2018a). Some of the HCP area contains suitable aquatic habitat such as low-velocity waters, deep pools of streams, and small lakes and ponds. Terrestrial habitat used for nesting, overwintering, dispersal, and basking is also available. A variety of substrates are used by western pond turtles for these activities, such as solid rock, boulders, cobbles, gravel, sand, mud, decaying vegetation, and combinations of these. Nesting typically occurs within approximately 600 feet of aquatic habitat in areas with compact soil, sparse vegetation, and good solar exposure. Given their occurrence in the HCP area watersheds and the presence of suitable habitat, it is possible that the western pond turtle could occur on Port Blakely forestlands. Thus, for the purposes of assessing take, it is assumed western pond turtles could occur in suitable habitat in the HCP area.

*Type of Take Anticipated* – Take in the form of harm could occur from forest management activities conducted in areas upslope from stream and wetland buffers when turtles are utilizing terrestrial habitat for nesting, overwintering or dispersal. Harm to turtles utilizing aquatic habitat is less likely because streams and wetlands are protected with no-harvest buffers, and LWD that could be used for basking is retained and supplemented in riparian zones. Take in the form of disturbance could occur to turtles dispersing in terrestrial habitat or using wetland/stream habitat for foraging or basking when forest management activities are conducted close to these habitat types.

*Take Associated with Forest Management Activities* – Regeneration timber harvest has the potential to remove trees in the outer margins of riparian habitat. This activity can reduce the quality of aquatic habitat by potentially removing future LWD or expose streams and wetlands to solar radiation that may warm waters beyond their suitability for turtles. Timber harvest also results in ground disturbance which may result in harm from destruction of turtle nests and/or overwintering sites especially where these occur near aquatic habitat. Forest road construction would have similar impacts, although at a more limited level. Take in the form of disturbance (harassment) could occur when conducted near enough to aquatic habitat as to cause turtles to move from basking sites or wetland/stream edges. Forest management activities could also cause disturbance to dispersing turtles, interrupting their movements and/or changing their direction to an extent that they become disoriented or expend excessive energy to avoid the disturbance.

The HCP includes measures to maintain or improve the health of riparian habitats, which play an integral role in the life of the western pond turtle. Stream and wetland no-harvest buffers are designed to maintain the integrity of aquatic habitats. LWD in streams as well as CWD in the uplands are protected and created where determined to be needed. These measures help to reduce the potential for take from forest management activities by maintaining habitat features important to the western pond turtle's life cycle. Thus, a small unknown level of take in the form of harm and harassment may occur periodically across the HCP landscape where western pond turtles occur but it is expected to be at a very low level over the Permit term.

*Anticipated Impacts of the Take to Western Pond Turtle Populations* - The total population of the western pond turtle is broadly estimated at 10,000 - 1,000,000 individuals (NatureServe 2018a). The total adult population size is unknown but probably large (certainly greater than 10,000 and presumably greater than 100,000). This species occurs in many areas and often is abundant in hill and mountain habitats (Bury and Germano 2008). In Oregon, this turtle occurs widely in low to very low densities (Holland 1993).

Take of western pond turtles in the initial and potential future HCP area is expected to be low due to the protections provided to suitable habitat, i.e., streams, wetlands, and large downed wood in both aquatic and terrestrial habitats. Given the HCP conservation measures that will protect suitable habitat, facilitate western pond turtle occupancy, and its large, wide-spread population occurrence, the impacts of the take likely to occur in the HCP area are considered to be insignificant to western pond turtle populations.

*Summary of the Impacts of the Take to Aquatic Covered Species Populations* - Take is likely to occur in the form of harm as a result of the Port Blakely Covered Activities. However, the impacts of the take are small when placed in context that considers: 1) Port Blakely's initial and potential future forestlands represent a very small proportion of the forested area of the Molalla and Clackamas Basins, and the western Oregon Cascades; 2) the streams and waterbodies affected represent a very small proportion of waters within the conservation/recovery-relevant geography, e.g., LCR and UWR ESUs, of each species addressed; 3) occurrences and numbers of individuals (within the HCP area) of most affected species are likely limited and/or represent only a small portion of regional populations; 4) the incidental take resulting from HCP activities is likely a very small incremental increase to impacts already occurring to regional populations from numerous other land management activities; 5) the incidental take resulting from HCP activities is likely less than would occur if Port Blakely managed its lands in the absence of the HCP; and 6) the overall maintenance, restoration and improvement of aquatic species habitat functions on the Covered Lands that will accrue from long-term implementation of the HCP conservation measures. The conservation measures that will be implemented under the HCP are consistent with the recommendations of the recovery plans and/or assessments for anadromous salmonids, bull trout and Pacific lamprey, as well as Cascades frogs, coastal tailed frogs, Cascade torrent salamanders, and western pond turtle to the limited extent that recommendations are available. Thus, we believe that the amount or extent of anticipated take associated with implementation of the Port Blakely HCP, and the impacts of the take, are highly unlikely to result in jeopardy to any of the aquatic Covered Species populations.

## **7.2 Terrestrial Species**

*Anticipated Take of Terrestrial Covered Species:* Take could occur in the form of harm and/or harassment to terrestrial Covered Species from implementation of covered forest management activities over the term of the HCP. Forested habitat, including riparian habitat, will be degraded as trees are harvested in the uplands and near RMAs, and as roads are constructed, maintained, and used. These activities have the potential to degrade or eliminate the second and third growth stands prevalent in the HCP area and older stands greater than 50 years of age. In commercial forests, diversity and woody structural features that provide nesting, denning, roosting, and hiding habitat for amphibians, birds, bats, and other mammals are reduced. However, the HCP contains conservation measures that are

expected to avoid, minimize, and mitigate many of the potential impacts from implementing the covered forest management activities.

*Anticipated Impacts of the Taking to Terrestrial Covered Species Populations:* Our assessment of the impacts of the taking focuses on the increase in protection measures over current forest practices that are being implemented by commercial forest landowners throughout Oregon, as well as the occupied habitat in the initial and potential future HCP area as a proportion of the habitat available to the species' population, to the extent possible. Thus, the assessment of the anticipated impacts of the taking considers the amount, structure and distribution of forest habitat in the initial and potential future HCP area that will receive increased protections (intensity), over the life of the Permit term (duration), and what that means to the terrestrial species that could occur within the HCP that are being impacted by numerous other activities conducted by a broad range of landowners and land managers within the range of these species' populations.

### **7.2.1 Gray Wolf**

For purposes of assessing take, we are focusing on forest management activities that could result in some impact to gray wolves, such as timber harvest and road management. These activities are likely to result in some disturbance to wolves should they be in the area where humans are active. Habitat changes in the HCP area from harvest activities result in a matrix of age-classes, riparian and road corridors that facilitate development of prey species forage habitat, and wolf movement, hiding cover and, potentially, den site characteristics beneficial to wolves.

*Type of Take Anticipated* - Den site protections offer assurances that direct take of individual wolves is highly unlikely. Thus, no take is anticipated as a direct result of habitat manipulations. Take in the form of harassment is anticipated to result from disturbances to wolves from human activity associated with forest management activities. The take from disturbance may displace wolves or cause them to move away from hunting areas, rendezvous sites or travel corridors. However, the take is expected to be temporary, lasting only as long as humans are in the vicinity of wolf occupancy, but this level of take could occur throughout the Permit term.

*Take Associated with Forest Management Activities* – Any human activity associated with forest management activities, especially timber harvest and road management, will likely cause some disturbance to wolves that transit through and/or are using the HCP area in the vicinity of the activities. The level of take is difficult to determine because the forest management activities are sporadic, occur over a period of time from only minutes (road travel) to several weeks (timber harvest unit activity). However, take from disturbance can be estimated with assumptions about the frequency and intensity of specific forest management activities for which we have metrics, i.e., timber stand management activities.

Disturbance to wolves that occupy or move through the HCP area could occur while regeneration harvest, thinning operations and replanting activities are conducted. Regeneration harvest activities typically occur throughout the year and involves 5-10 people depending on whether the stand is harvested using heavy equipment or is hand-felled. At a rate of 500 acres harvested annually, with harvest units averaging 60 acres, the number of units harvested in any given year will be about eight, some of which could occur

simultaneously. Regeneration harvest takes 30 to 60 days to complete. Assuming a 25% increase in the HCP area, and similar harvest rates, an additional two harvest units could be regeneration harvested annually for a total of approximately ten regeneration harvests occurring throughout the year across the HCP landscape at some point in the future.

Reforestation activities, i.e., planting, occurs within four years of regeneration harvest. Thus, approximately eight harvest units per year are replanted. This activity is accomplished by crews of 12-24 people over a period of 2-4 days. Replanting at the same rate on an additional 25% of acquired lands in the HCP area will increase this activity by an additional two harvest units for a potential total of ten units being replanted annually across the HCP landscape.

Pre-commercial thinning activities involve crews of ten people thinning 300 to 600 acres per year. However, the fires that occurred in 2020 likely reduced the number of harvest units that require pre-commercial thinning such that the actual number that will occur annually will be at the lower end of this range. For purposes of a take estimate, we are using a worst-case scenario such that, with an average unit size of 60 acres, the maximum number of units expected to be pre-commercially thinned on an annual basis is ten. Each unit takes 3-6 days to thin depending on unit size. A 25% increase for additional HCP land acquisitions would increase the number of units by 2-3 for a potential total of 13 units being pre-commercially thinned annually across the HCP landscape. In addition, as a result of the catastrophic fires of 2020, approximately 8,100 acres will have been managed (harvested) over a short duration of time, i.e., 2-3 years. Thus, during the second decade of the HCP, a spike will occur in pre-commercial thinning activities. It is uncertain how many replanted harvest units will require pre-commercial thinning, but it is anticipated that human activity in the eastern and southern portions of the HCP area, where the fires occurred, will receive a substantial amount of human activity over a duration of several years during the second decade of the HCP. This activity will likely deter wolves from using these areas. However, once the activities cease, there will be a 10–15-year period where very little human activity will occur, and wolves will be able to use these forested acres without being disturbed by human activities.

Commercial thinning operations ranging from 100 to 200 acres will occur in 2-5 units, annually. This activity typically involves crews of 2-3 people for approximately 25 days. A 25% increase for additional HCP land acquisitions would increase the number of units by two, at the most. However, the catastrophic fires that occurred in 2020 likely reduced the number of harvest units that require commercial thinning such that the actual number that will occur annually will be at the lower end of this range. For purposes of a take estimate, we are using a worst-case scenario such that a potential total of seven units are anticipated to need commercial thinning annually across the HCP landscape. In addition, the 2020 fires resulted in the need to manage (harvest) approximately 8,100 acres over a short duration of time, i.e., 2-3 years. Thus, during the third decade of the HCP, a spike will occur in commercial thinning activities. It is uncertain how many replanted harvest units will require commercial thinning, but it is anticipated that human activity in the eastern and southern portions of the HCP area, where the fires occurred, will receive a substantial amount of human activity over a duration of several years during the third decade. This activity will likely deter wolves from using these areas. However, once the activities cease, there will be



a 20–25-year period where very little human activity will occur, and wolves will be able to use these forested acres without being disturbed by human activities.

It is unlikely that the number of people in a crew is a factor in disturbing wolves that may be in the area of forest management activity. Rather, it is the mere presence of human activity with or without heavy equipment that is likely to disturb wolves to the extent that they exhibit avoidance behavior. The level of activity across the current HCP landscape, excluding the burned areas, would occur in approximately 31 forest stand units in any given year. Using the maximum range of forest acres managed in each category and harvest units averaging 60 acres, the amount of forest stands being managed, on average, throughout the year is ~1,860 acres across the HCP landscape. Thus, these activities will occur on approximately 6.3% of the current forested HCP area. With the addition of 25% more HCP forest land and assuming the same rate of activity for each forest management category, the total number of units with human activity that could rise to the level of disturbance would be 40 on 2,400 acres of forest stands which would be 8.2% of the maximum total future HCP area.

As stated above, the approximately 8,100 acres of burned stands that were salvaged, i.e., regeneration harvested (28% of the total HCP area) will receive mid-stand pre-commercial and commercial thinning, as needed, over a short period of time. This will likely occur over a 2–3-year period in the second and third decades for pre-commercial thinning and commercial thinning, respectively. It is uncertain how many harvest units or the number of acres will require these treatments, but it is expected that an intense level of human activity will occur in confined areas of the HCP landscape for several years in each of these decades. Although wolves may be precluded from using these areas during these periods of human activity, they will be able to use these forested areas for 10-20 years periods with little or no human disturbance following completion of the management activities.

Thus, potential disturbance activities could occur at any time throughout the year, but they would occur across a wide landscape of HCP lands, excluding the burned areas, intermixed with land ownerships being managed for a variety of uses. Given that some of these forest stand management activities will be conducted at the same time and that wolves are such habitat generalists, opportunistic, and highly transitory with the ability to freely move away from disturbance, the small amount of take anticipated from disturbance is unlikely to diminish the ability of gray wolves to hunt, hide or den within the HCP area, i.e., will not negatively affect wolf behavior and productivity.

This estimated level of take is ameliorated by several specific mitigation measures designed to preclude or prevent disturbance to wolves. Den site protection and disturbance restrictions will be applied to an area comprising 0.50 miles around den sites, from March 15 to July 30. Also, access to HCP area roads will be restricted by maintaining locked gates so motorized public access will not be a disturbance factor. Implementing a sustainable forest management plan that results in fairly even amounts of 10-year age-classes up to 50 years of age, distributed across the HCP area, with clearcut size averaging 60 acres will result in a forest landscape mosaic that may facilitate use by wolves. Leave tree patches will provide interior cover that should function as hiding cover and potential den site habitat. Riparian corridors in commercial forest landscapes will likely provide some hiding and travel cover for wolves though this would likely be on large and medium streams due to the wider buffers prescribed on these stream types.

*Anticipated Impacts of the Take to Gray Wolf Populations* – Gray wolf pack boundaries and territory sizes may vary from year to year. Similarly, a wolf pack may travel in its territory differently from one year to the next because of changes in prey availability or distribution, intraspecific conflict with nearest neighbors, or the establishment of a new neighboring pack (ODFW 2010b). Human disturbance may also factor into wolf pack movement and territory establishment. However, in Montana, wolves demonstrated a greater tolerance of human presence and disturbance than previously thought characteristic of the species (ODFW 2010b). While some packs have established territories in backcountry areas, most prefer lower elevations and gentle terrain where prey is more abundant, particularly in winter (ODFW 2010d). In some settings, geography dictates that wolf packs use or travel through private lands and co-exist in close proximity with people and livestock. Wolves have been known to utilize land uses ranging from dispersed outdoor recreation, timber production or livestock grazing to home sites within the rural-wildland interface, hobby farming/livestock, or full-scale resort developments with golf courses.

Given the great flexibility the gray wolf has demonstrated in selecting territories over a broad range of landscapes, and the fact that reintroduced wolves in Montana and Wyoming have dispersed across multiple Federal and private land ownerships, establishing new packs in Idaho, Washington, and Oregon as they expand their range, human disturbance is unlikely to be a big factor affecting their ability to reproduce. Because gray wolves are opportunistic, adaptable, and able to live in fairly close proximity to humans if sufficient prey and habitat conditions are available, the small level of take associated with forest management activities in the HCP area are highly unlikely to have a noticeable impact on the species. Rather, the habitat conditions and den site protections of the HCP conservation measures are likely to facilitate expansion into the HCP area. Thus, the impacts of the take from Covered Activities in the HCP area on the gray wolf population in the Rocky Mountain Recovery area are likely negligible.

### **7.2.2 Pacific Fisher**

There are only two fisher populations known to occur in western Oregon, an indigenous Siskiyou population located in the Klamath Mountains and a southern Oregon Cascades population, located near Crater Lake National Park. No fishers are known to currently occur in the initial or potential future HCP area. However, reintroduction efforts may result in fishers occupying the HCP area in the future. Thus, for purposes of assessing take, we assume eventual occupancy of suitable habitat that will be retained and/or created in the HCP area.

*Type of Take Anticipated* - Take in the form of harm is not anticipated because of the species-specific measures designed to create potential den sites and protect den sites wherever they occur. Habitat degradation from road construction and timber harvest could occur but fishers utilize and hunt in a variety of stand types including early, mid, and late successional stands in managed or unmanaged forest landscapes, as stated in Section 3.2.8, some of which is available in the HCP area, i.e., suitable habitat will be retained and/or created under the HCP.

Take in the form of harassment is anticipated to result from disturbances to fishers from human activity associated with forest management activities, i.e., timber harvest and road use. The take from disturbance may displace fishers or cause them to move away from

hunting areas or den sites even though there will be species-specific disturbance restrictions implemented. Thus, the take is expected to be temporary, lasting only as long as humans are in the vicinity of fisher occupancy, but may occur over the entire Permit term.

*Take Associated with Forest Management Activities* - Any human activity associated with forest management activities, especially timber harvest, and road construction, maintenance, and use, will likely cause some disturbance to fishers that may occur in the vicinity of the activities. The level of take is difficult to determine because the forest management activities are sporadic and occur over a period of time from only minutes (road travel) to several weeks (timber harvest unit activity). In addition, it is unknown when fisher will become established in the initial or potential future HCP area but, when they do, disturbance could occur for the remainder of the Permit term.

Although fishers are not as mobile as wolves relative to distances moved daily, the fact that they are small roaming carnivores capable of moving away from human disturbance suggests disturbance from forest stand management activities described above for wolves would also result in disturbance to fishers.

Human activity associated with stand management activities, with or without heavy equipment, is likely to disturb fishers to the extent that they exhibit avoidance behavior. The level of activity across the current HCP landscape, excluding the burned areas, would occur in approximately 31 forest stand units in any given year. Using the maximum range of forest acres managed in each category and harvest units averaging 60 acres, the amount of forest stands being managed throughout the year is ~1,860 acres across the HCP landscape. Thus, these activities will occur on approximately 6.3% of the current forested HCP area. With the addition of 25% more HCP forest land and assuming the same rate of activity for each forest management category, the total number of units with human activity that would rise to the level of disturbance would be 40 on 2,400 acres of forest stands which would be 8.2% of the maximum total future HCP area.

As stated above, the approximately 8,100 acres of burned stands that were salvaged, i.e., regeneration harvested (28% of the total HCP area) will receive mid-stand pre-commercial and commercial thinning, as needed, over a short period of time. This will likely occur over a 2–3-year period in the second and third decades for pre-commercial thinning and commercial thinning, respectively. It is uncertain how many harvest units or the number of acres will require these treatments, but it is expected that an intense level of human activity will occur in confined areas of the HCP landscape for several years in each of these decades. Although fishers may be precluded from using these areas during these periods of human activity, they will be able to use these forested areas for 10-20 years periods with little or no human disturbance following completion of the management activities.

Thus, potential disturbance activities could occur at any time throughout the year, but they would occur across a wide landscape of HCP lands, excluding the burned areas, intermixed with land ownerships being managed for a variety of uses. Given that some of these forest stand management activities will be conducted at the same time and that fishers are capable of freely moving substantial distances away from disturbance, the small amount of take anticipated from disturbance is unlikely to diminish the ability of fishers to hunt, hide or den within the HCP area, i.e., will not negatively affect fisher behavior and reproduction.

This level of take is ameliorated by several specific mitigation measures designed to preclude or prevent disturbance or harm to fishers. Destruction of known den sites will be prohibited, and den site disturbance restrictions will be applied to an area comprising 0.25 mile around occupied sites. Trapping and nuisance animal control activities will be restricted within 2.5 miles of known occupied dens. Coarse woody debris piles will be created to facilitate use by fishers as denning, resting, or hiding habitat. Motorized access to HCP area roads will be restricted by maintaining locked gates so motorized public access will not be a disturbance factor. These measures are designed to prevent disturbance to fishers, especially when denning. Thus, a small level of take in the form of harassment (disturbance) may occur periodically across the HCP landscape during the time fishers become established in the central Cascades and the HCP area through the end of the Permit term.

Potential fisher dens, in the form of slash or brush piles, may be created during regeneration harvest and retained. Resting and den structures retained in stream buffers, and snag and wildlife tree retention requirements, may result in use by fishers in the future as the stand regenerates but this may take decades to occur if not located near mature stands. Timber harvest, whether it is regeneration or a commercial thin, will generally result in long-term effects because of the removal of trees and snags that function as den and maternal structures, even though some of these structures will be retained depending on their location within the harvest unit and if there are no safety issues. The creation of slash or brush piles, while having the potential to function as fisher habitat, require the correct complex of habitat features, such as continuous canopy cover and/or older forests, to be effective. Creation of such structures will become more beneficial as the surrounding stands mature.

*Anticipated Impacts of the Take to Pacific Fisher Populations* – The two fisher populations in western Oregon have seemingly not increased in size or expanded their range over at least the past two decades; however, there has been limited monitoring (USFWS 2016b). Port Blakely anticipates that efforts to reintroduce the fisher to the west central Cascade Mountains will occur sometime during the Permit term. If successful, fishers will become established and could potentially expand their range to include the initial or potential future HCP area. As a result of the HCP measures to create a mosaic of younger age-classes, retain CWD distributed on the ground and in piles, retain and create snags, retain upland leave tree patches, and to implement wider riparian corridors with older trees, suitable fisher habitat will be available to reintroduced individuals. Any subsequent take through disturbance will be minimal and is not likely to negatively affect an expanding Pacific fisher population. Rather, the habitat conditions created and den site protection measures in the HCP area are likely to facilitate this expansion and, thus, the impacts of the take to fisher populations will be negligible.

### **7.2.3 Townsend's Big-eared Bat**

Although no specific records of Townsend's big-eared bat are known to exist that suggests this species occurs in the HCP area, it is identified as occurring in the Molalla-Pudding and Clackamas Rivers watersheds and, therefore, could occur in the HCP area (NatureServe 2018a). Thus, for purposes of assessing take, we assume that this species could occur in the initial or potential future HCP area where suitable maternity roosts and hibernacula are located, and where foraging habitat occurs near these features and older stands on adjacent Federal and State lands.

*Type of Take Anticipated* – Townsend’s big-eared bats roost and hibernate primarily in caves and mines, although they are also known to use other types of habitat. Along the Pacific coast, Townsend’s big-eared bats utilize basal hollows of trees instead of rock features for roosts. In Oregon and Washington, records indicate that there is significant use of buildings, bridges, tunnels, and mines for roosting by this species, as caves are limited throughout much of these states, particularly west of the Cascades. Take in the form of harm is not anticipated where roosts are located in caves because these are typically a part of rocky features considered special habitats that will be protected under the HCP. Harm is not anticipated from the removal of foraging habitat because by its nature, timber harvest creates forest edges where foraging occurs. Wetlands and riparian corridors used for foraging will be protected under the HCP. Harm could occur if a bridge were being used as a roost and required replacement. Take in the form of harassment could occur from forest management activities that occur near a cave or bridge that is occupied by Townsend’s big-eared bats. Timber harvest occurring near large trees with basal hollows (which would be protected to the extent safely possible) also could cause some disturbance.

*Take Associated with Forest Management Activities* - Any human activity associated with forest management activities, especially timber harvest, will likely cause some disturbance to Townsend’s big-eared bats that may occur in the vicinity of the activities. Buffers retained adjacent to rocky features and to protect large legacy trees will minimize the potential for harm or harassment to some extent. Bridges remain intact for decades so the potential for harm or harassment to an established roost is low but, should a bridge require replacement, harm could occur. There are nine permanent steel bridges in the HCP area. For take estimation purposes, the number of bridges to be replaced over the 50-year Permit period is estimated to be, at most, four in the initial HCP area and an additional one in the potential future HCP area, for a total of five bridge replacements. Steel bridges are less likely to be as suitable as concrete or wood bridges for bat roosts because steel bridges have smoother surfaces and are unlikely to retain temperatures well. However, assuming steel bridges could be utilized as day/night roosts, bridge replacements could result in permanent removal of Townsend’s big-eared bat roosts. However, depending on when during the year the replacement occurs, planned bridge replacements are more likely to result in only temporary removal of roost sites, if occupied. Prior to replacement operations, the bridges will be surveyed for bat use. If being used for roosts, bridge replacement will be conducted during the year when they are less likely to be used as day/night roosts. In addition, new bridges will be constructed that include structures for roosting bats. Thus, take would be in the form of temporary habitat removal and, thus, displacement of a few hundred bats but would unlikely result in actual harm to Townsend’s big-eared bat at these structures.

In the West, this species forages in closed-canopy forests, canopy gaps, forest edges and riparian corridors in a variety of forest age-classes, but a preference was shown for large conifers with complex branch systems along the edges of 60-80-year-old forests. Some use of clear-cuts and pre-commercially thinned stands 12-20 years old has also been exhibited. It is likely, therefore, that Townsend’s big-eared bats could forage in the HCP area, especially when these stands are near an existing roost in the HCP area or near older stands on adjacent Federal lands. Since foraging occurs at night, they are unlikely to be disturbed. Disturbance could occur when forest management activities occur near legacy trees that have cavities or basal hollows used as day roosts, but this would be temporary and infrequent as they are uncommon on the landscape and would be designated for

protection should they occur. These conditions make the level of take in the form of harassment difficult to determine but is likely low because potential roosts or hibernacula will, for the most part, be protected and foraging activities occur when no human activity is occurring.

*Anticipated Impacts of the Take to Townsend's Big-eared Bat Populations* – The total adult population size of Townsend's big-eared bat is uncertain but definitely exceeds 10,000 and probably exceeds 100,000 (NatureServe 2018a). Overall, Townsend's big-eared bat is characterized by numerous relatively small colonies (Gruver and Keinath 2006). During a 1989-1990 hibernacula survey of 14 localities in Oregon and southwestern Washington, a total of 1,481 individuals were counted; these numbers compared favorably to 1980-1985 counts of 1,305 (Perkins 1990). The maximum hibernacula and maternity roost-counts in Oregon were reported to be at most a few hundred individuals (Perkins and Levesque 1987). This is consistent with a report of a maternity colony in the attic of a ranch building in Oregon included about 300 adults (Betts 2010). The range-wide short-term trend for Townsend's big-eared bat populations over the past 10 years or three generations is uncertain, but it is likely that the population recently has been relatively stable or slowly declining (NatureServe 2018a). The short-term trend is predicted to range from a decline of <30% to relatively stable over the next several generations while the long-term trend is a decline of 10-50%.

The primary threat to Townsend's big-eared bats is disturbance and/or destruction of roost sites resulting from human activities, and it has been reported that both roosting and foraging areas may be negatively impacted by timber harvest practices and loss of riparian habitat (Western Bat Working Group 2005). The amount of take in the form of harm associated with degradation of roost and hibernacula sites in the initial and potential future HCP area is estimated to be very low because HCP measures will be implemented that protect rocky features and old legacy trees, and bridge replacements will be conducted seasonally and with bat roosting structures resulting in displacement of less than a hundred bats if the steel bridges are actually being used. Thus, the HCP is unlikely to contribute to the predicted declining trend, and the impacts of the take to Townsend's big-eared bat populations will be insignificant.

#### **7.2.4 Migratory Tree-roosting Bats**

Although no specific records of the hoary bat or silver-haired bat are known to exist that suggests these species occur in the HCP area, they have both been identified as occurring in Clackamas County. The initial and potential future HCP area includes potentially suitable night and maternity roosting, and hibernaculum habitat in the form of tree foliage, cavities, and loose bark of coniferous and hardwood forests adjacent to lakes, ponds, and streams. Rocky crevices are also available for use as an occasional roost site. Foraging habitat includes various open areas, including spaces over open water, streams and along riparian corridors which is present across the entire HCP ownership and adjacent Federal lands. Thus, for purposes of assessing take, we assume that this species could occur in the initial and potential future HCP area where suitable maternity roosts and hibernacula are located, and where foraging habitat occurs.

*Type of Take Anticipated* – Take in the form of harm is likely to occur as timber stands are regeneration harvested during the Permit term, removing older trees that may contain

cavities and/or loose bark used as roosts. Harm is unlikely to occur to roosts located in rocky features. Take in the form of harassment is also likely to occur over the Permit term as stands are commercially thinned and regeneration harvested. Foraging habitat will be disturbed through human activity and partial removal adjacent to lakes, wetlands, and riparian areas.

*Take Associated with Forest Management Activities* – Harm is likely to occur when timber stands that are  $\geq 50$  years of age are harvested. The average acreage of these stands on a decadal basis ranges from approximately 4,300 acres in the first decade of the Permit term to a low of approximately 3,200 in the second decade, and to approximately 3,700, 3,400, and 3,900 acres in the third, fourth and fifth decades, respectively. Subsequent growth of younger stands that develop defects that provide roosting opportunities will replace the older harvested stands. Conservation measures that protect defective trees and snags, create snags, and provide upland leave tree patches will ameliorate some of the potential take. Riparian and wetland buffers will also result in retention of existing roosting structures and foraging habitat. Thus, although take from harm is expected to occur, it is difficult to determine the amount of take from timber harvest that eliminates tree roosts in these stands because of the uncertainty associated with actual occupancy, and the positive effect of conservation measures that result in retention and replacement of potential roosting opportunities.

Any human activity associated with forest management activities, especially timber harvest, will likely cause disturbance to tree-roosting bats that may occur in the vicinity of the activities. Disturbance would likely only occur to bats occupying roosts during day light hours. Although foraging habitat and opportunities are likely more abundant than roosting habitat, i.e., over open wetlands and along streams and riparian habitat, this type of habitat is protected under the HCP conservation measures and foraging bats are unlikely to be disturbed since foraging occurs at night.

*Anticipated Impacts of the Take to Migratory Tree-roosting Bat Populations* – Both the hoary bat and silver-haired bat populations are roughly estimated at 100,000 - 1,000,000 individuals (NatureServe 2018a). Total adult population size for both species is unknown but presumably exceeds 100,000 each based on their wide range. Both species are seasonally (summer in Oregon), locally common and generally solitary, i.e., do not form substantial aggregations. Roosting aggregations are transient and include only small numbers of individuals (usually fewer than 20). The short-term and long-term Hoary bat population trend is unknown. The trend over the past 10 years or three generations (short-term) is uncertain, but distribution and abundance probably have been relatively stable or slowly declining (NatureServe 2018a). The short-term and long-term silver-haired bat population trend is estimated to be 10-50%. The long-term silver-haired bat population trend is unknown, but the area of occupancy and population size presumably have declined in conjunction with historical deforestation, consequent change in forest structure and composition, and recent fatalities at wind energy facilities (NatureServe 2018a).

The primary threat to these two tree-roosting bats is mortality from wind turbines at energy facilities but habitat loss and fragmentation as a result of clearcutting and other forest management activities is also a threat, reducing the amount and quality of habitat for these species (NatureServe 2018a). However, for the hoary bat, much suitable forest habitat remains, and they do not require pristine habitat (e.g., they may inhabit managed forests)

(NatureServe 2018a). The amount of take in the form of harm associated with degradation of roost sites in the HCP area is unknown but is considered to be low. This is based on the conservation measures that protect and create snags, protect legacy trees, and provide for older commercial forest age-classes, all of which have the potential to provide roost sites, and that provide foraging opportunities by protection of wetlands and riparian habitat, and creation of forest edges. Given the conservation measures, the fact that forest degradation is not the primary threat, and the small number of bats that will be affected at any one time in the initial or potential future HCP area, the amount of take is estimated to be very low and the impacts of this take on the total population of both hoary bats and silvery-haired bats will be correspondingly low.

### **7.2.5 Myotis Bats**

Although no specific records of the fringed myotis, long-eared myotis and long-legged myotis bats are known to exist that suggests these species occur in the HCP area, they are identified as occurring in Clackamas County and, therefore, could occur in the initial or potential future HCP area (NatureServe 2018a, ORBIC 2016). Thus, for purposes of assessing take, we assume that these species could occur in the initial or potential future HCP area where suitable roost habitats are located, and where foraging habitat occurs near these features and older stands on adjacent Federal and State lands. Suitable night and maternity roosting, and hibernaculum habitat in the form of tree foliage, cavities, and loose bark of coniferous and hardwood forests adjacent to lakes, ponds, and streams occurs throughout the HCP area. Rocky features occurring in the HCP area are also available for the occasional roost site. These features and characteristics are likely more abundant in the form of substantially older trees, on nearby Federal lands. Foraging habitat includes various open areas, including spaces over open water, streams and along riparian corridors which is present across the entire HCP ownership and adjacent Federal lands.

*Type of Take Anticipated* – Take in the form of harm is likely to occur as timber stands are regeneration harvested during the Permit term, removing older trees that may contain cavities and/or loose bark used as daytime roosts. Harm is unlikely to occur to roosts located in rocky features such as rock crevices because of the protection measures applied to these special habitats. Take in the form of harassment is also likely to occur over the Permit term as stands are commercially thinned and regeneration harvested. Foraging habitat will be disturbed through human activity and partial removal adjacent to lakes, wetlands, and riparian areas.

*Take Associated with Forest Management Activities* – Harm is likely to occur when timber stands that are  $\geq 50$  years of age are harvested. The average acreage of these stands on a decadal basis ranges from approximately 4,300 acres in the first decade of the Permit term to a low of approximately 3,200 acres in the second decade, and to approximately 3,700, 3,400 and 3,900 acres in the third, fourth and fifth decades, respectively. Subsequent growth of younger stands that develop defects that provide roosting opportunities will replace the older harvested stands. Conservation measures that protect defective trees and snags, protect rock crevices, create snags, and provide upland leave tree patches will ameliorate some of the potential take. Riparian and wetland buffers will also result in retention of existing roosting structures. Thus, although take from harm is expected to occur, it is difficult to determine the amount of take from timber harvest that eliminates tree roosts in these stands because of the uncertainty associated with actual occupancy and the



positive effects of conservation measures that result in retention and replacement of potential roosting opportunities. Take from harm could occur on some small proportion of the 50+ age-classes when regeneration harvested over the Permit term.

Any human activity associated with forest management activities, especially timber harvest, and road construction, maintenance, and use, will likely cause disturbance to bats using tree roosts that may occur in the vicinity of the activities. Disturbance would likely only occur to bats occupying roosts during day light hours. Although foraging habitat and opportunities are likely more abundant than roosting habitat, i.e., over open wetlands and along streams and riparian habitat, this type of habitat is protected under the HCP conservation measures and foraging bats are unlikely to be disturbed since foraging occurs at night.

*Anticipated Impacts of the Take to Myotis Bat Populations* – The fringed myotis bat population is roughly estimated at 10,000 - 1,000,000 individuals. The population size is unknown but presumably exceeds 10,000 and may exceed 100,000 (NatureServe 2018a). The population size of long-eared and long-legged myotis bats is roughly estimated at 100,000 - 1,000,000 individuals each. Total adult population size of the long-eared myotis bat is unknown but undoubtedly exceeds 10,000 and presumably exceeds 100,000. It is considered a widespread but relatively uncommon species in Oregon. Roosting and maternity colonies are typically comprised of < 30 individuals. Total adult population size of the long-legged myotis bat is unknown but apparently quite large (likely greater than 100,000). The short-term and long-term population trend for all three myotis species is considered to range from relatively stable to <30% decline (NatureServe 2018a). In the short-term, the trend over the last 10 years or three generations is uncertain, but distribution and abundance probably have been relatively stable or slowly declining.

Threats to all three myotis species are numerous including forest management activities that result in loss of snags and trees with loose bark, as well as bridges, that serve as roost sites. Forest management that reduces riparian habitat and foraging habitat quality or increase habitat fragmentation also negatively affects these bat species. The amount of take in the form of harm associated with degradation of roost sites in the HCP area is unknown but is considered to be low. This is based on the conservation measures that protect and create snags, protect legacy trees, and provide for older commercial forest age-classes, all of which have the potential to provide roost sites, and that provide foraging opportunities by protection of wetlands and riparian habitat, and creation of forest edges. Given the conservation measures, the fact that forest degradation is not the primary threat, and the small number of bats that will be affected at any one time in the initial or potential future HCP area, the amount of take is estimated to be very low and the impacts of this take on the total population of each of the myotis bats is correspondingly low.

### **7.2.6 Northern Spotted Owl**

No spotted owls or activity centers are currently known to occur on the HCP lands, and OFP Rules place no harvest restrictions on Port Blakely's forestlands. Two spotted owl sites have been identified on lands adjacent to the HCP lands; one on Federal land about 0.40 miles to the east of the easternmost parcel, and one on State land (Gawley Creek Site) located about 0.50 miles south of the southeasternmost parcel of the HCP lands. The Federal land owl site to the east is believed to be nonexistent due to the large wildfire, known as the 36 Pit Fire, that occurred in the Clackamas River basin in 2014 that burned through the area

where the site center was located. The owl site on State lands to the south is considered an existing site center. Annual surveys have been conducted at the Gawley Creek Site since 1988. The site center was moved ~3/4 of a mile in 2014 when nesting was confirmed (both owls were banded in 2016 by BLM, so identification was confirmed). However, no nesting has been confirmed since 2014 and there were no detections in 2019 (Coe 2019). None of the 70-acre core protection areas required by Oregon Forest Practices Rules falls on Port Blakely land. However, of the HCP lands closest to the Gawley Creek Site that are comprised of intermixed stands of various age-classes, there are some 58-62 years old stands that may have survived the 2020 wildfires. These stands, and the associated riparian zones aged 62-82 years that have been retained in recent years, may complement the habitat in the Gawley Creek Site by providing roosting and foraging habitat.

Due to minimal regulatory protection and low levels of habitat in the HCP area, currently and projected into the future, it is not reasonably certain that the HCP area is used or will be used by spotted owls. However, because of Port Blakely's commitment to 1) manage our commercial forestlands for longer rotations than the typical 40-45-year rotation 2) implement additional conservation measures that provide potential habitat for spotted owls and their prey, and 3) protect nest sites as long as they are occupied, should they occur, it is possible that spotted owls could occupy the HCP area in the future.

These measures are consistent with spotted owl Recovery Plan goals for private lands. That is, the Recovery Plan recommends conserving occupied sites and unoccupied, high-value spotted owl habitat on State and private lands wherever possible. This recommendation is primarily driven by the concern associated with displacement of spotted owls by barred owls, the need to retain good quality habitat to allow for displaced or recruited spotted owls to reoccupy such habitat, and the need to retain spotted owl distribution across the range where Federal lands are lacking (USFWS 2011d). Voluntary recovery actions included in an HCP can promote recovery. These plans generally are designed to provide: (1) high-quality habitat and retain spotted owl sites; or (2) foraging and dispersal opportunities to make important contributions to spotted owl recovery. The HCP is consistent with the provisions for providing foraging and dispersal habitat, as well as protecting occupied sites.

If spotted owls should occupy the HCP area or adjacent lands in the future, it is possible that incidental take of spotted owls could occur. Thus, for the purposes of addressing take, we analyze the potential for the covered forest management activities to harm and/or harass spotted owls that may occur on the HCP lands during the Permit term.

*Type of Take Anticipated* - Take would likely be in the form of harm from covered forest management activities that result in habitat degradation, and/or harassment from forest management activities that cause disturbance to spotted owls. Incidental take in the form of harassment by disturbance could occur anywhere in the covered area although it is most likely to occur in habitat and on roads near the spotted owl nest sites on adjacent ownerships. Pre-commercial and commercial thinning, as well as regeneration harvest, will occur in every decade of the Permit term. Harm and harassment could occur when these activities are conducted. Port Blakely will conduct routine road management activities, including rock pit development, that may disturb spotted owls.

*Take Associated with Forest Management Activities* –Through Port Blakely’s enhanced forest management efforts, functional spotted owl foraging habitat in the HCP area will range from approximately 13, 11 and 12% (~ 3,700, 3,100, and 3,400 acres, respectively) during the first three decades of the HCP, then increase to approximately 16% (~ 4,900 acres) in the fourth decade and to approximately 20% (5,800 acres) during the last decade of the Permit term.

The older stands in the block near the Gawley Creek Site may provide complementary habitat to the site that can be used by spotted owls for roosting and foraging. These stands range from 58 to 62 years of age. This habitat was severely impacted by the 2020 wildfires, but riparian buffers and upland patches will be retained that currently range from 62-82 years of age.

Dispersal habitat has a corresponding retention by decade of the Permit term. Together, these two types of spotted owl habitat range from a minimum total of approximately 19% of the forested HCP area during the second decade of the Permit term to 39% (~11,500 acres) and 51% (~15,000 acres) in the fourth and fifth decades, respectively. Acquired lands will be managed in a similar manner as existing HCP lands. That is, stands that will benefit from and receive a commercial thinning application will result in dispersal and forage habitat conditions as they grow to 50 years old. It is difficult to predict what age of stands will be acquired and what management activities will be implemented and whether or not spotted owls occupy the acquired lands or stands in the vicinity. For the purposes of estimating take, Port Blakely assumes that acquired lands will not be occupied but could function as dispersal/foraging habitat and would be managed such that the newly acquired stands will be in a proportion comparable to the current decadal average of dispersal/foraging habitat.

In the future, spotted owls will likely find suitable habitat for dispersal and foraging purposes on the HCP area as the stands grow older, stream buffers are retained, and as a result of commercial thinning coupled with snag and defective tree protection and creation. Older forest reserves will occur in riparian areas and be dispersed in patches throughout the HCP area as a result of the RMAs and the upland leave tree strategy. Thus, the probability of an owl pair nesting on the property is possible, although the likelihood is low, because nearby Federal lands will contain larger patches of higher quality NRF habitat. However, because of the proximity of the lands to existing spotted owl sites, some spotted owl use of the HCP area is likely to occur for roosting, foraging and dispersal.

Dispersing juveniles are likely to use the habitat provided in the HCP area because of its proximity to areas that could contain nesting owls, the availability of foraging and dispersal habitat distributed throughout the HCP area, and the stands 51 years and older that will occur or be retained in the no-harvest stream buffers and upland leave tree patches. The 51+ older stands will begin at approximately 15% (4,308 acres) of the forested HCP area during the first decade, then vary slightly from approximately 11 and 13% in the second and third decades, to 12 and 13% in the fourth and fifth decades (~3,400 and 3,900 acres respectively). These forestlands have the potential to provide roosting opportunities. Except for the stream buffers required by OFP, forest stands 51+ years of age would not occur on the HCP landscape if not for the HCP conservation measures, i.e., under current OFP Rules, this age-class will remain < 1,600 acres.

Incidental take of spotted owls, should it occur, would likely be in the form of disturbance (harassment) to dispersing owls associated with the covered forest management activities on an annual basis, including but not limited to commercial thinning, regeneration harvest, and road management activities, once larger blocks of contiguous mature stands have developed. Subsequent harm may occur as roosting, foraging, and dispersal habitat is degraded across the Covered Lands when commercially mature forest stands are harvested. However, there will always be foraging/dispersal habitat available for spotted owls to move to when disturbed and this habitat will be at least 18.5% of the total forest acreage in a ten-year period, well distributed across the HCP area. That is, the dispersal/foraging habitat will always be available across the HCP landscape. Take in the form of harassment associated with removal of foraging/dispersal habitat is difficult to quantify because this habitat will develop and be harvested at different rates throughout the Permit term. Port Blakely will maintain a base level of foraging habitat, but it can be assumed that all foraging habitat across the Covered Lands, except where it occurs in riparian and upland reserves, will be harvested at some point in time throughout the Permit term. An unknown level of take in the form of harm could occur in association with the decadal changes in foraging habitat quantities that range from approximately 11% to 20%, i.e., a change of 9% (~ 2,700 acres). Newly acquired lands over the Permit term up to 25% of the current HCP lands would increase the level of take in association with approximately 675 acres of foraging habitat.

If owls are discovered to be nesting on the HCP area, Port Blakely will implement measures, in coordination with USFWS to protect the nest site. Protection measures will be implemented with consideration of the level of importance of the nest. It is expected that only a few spotted owls may nest on the ownership, likely in Port Blakely's existing older stands or in the RMAs near existing owl circles on adjacent ownerships. Should they occur, Port Blakely will protect up to three spotted owl nest sites with a 70-acre core around the nest site of the highest quality habitat for a minimum of five years but for as long as the sites are occupied. No take is anticipated in association with the protection of three nest sites. If additional sites occur on the HCP lands, Port Blakely will confer with USFWS to develop a strategy that protects the most valuable nest sites based on viability and importance to the spotted owl population.

*Anticipated Impacts of the Take to Spotted Owl Populations* – There are no spotted owl sites known to occur in the HCP area, and the current condition of the older commercial forest stands are not conducive for their use. Although approximately 37% of the forested HCP area currently consists of stands 41 years of age and older, which could potentially function as spotted owl foraging habitat, most of it is second and third growth managed under OFP Rules. In addition, some of the existing stands were not previously commercially thinned. Thus, the majority of the HCP area is lacking in woody features that provide functional habitat characteristics necessary for use by spotted owls and their prey (flying squirrels). The HCP area lacks the snags, defective trees and CWD that are typical of naturally regenerated forest stands.

If spotted owls use the HCP area for roosting, foraging or dispersal, or actually nest in the older upland tree patches or riparian stands, it will likely be because of the conservation measures implemented to provide the forest stand structures typically required by spotted owls for these biological activities. Since there are no spotted owls currently known to use

the HCP area, any subsequent use would be a benefit to the spotted owl population and potentially could contribute to their recovery. That is, they could potentially successfully disperse through the HCP area and/or establish a nest site.

The HCP area would actually contribute to spotted owl conservation for an uncertain amount of time over the Permit term, which would benefit their populations in the western Oregon Cascade Region. The impact of any take that may occur in the future, therefore, would be very small because it would be to spotted owls that would likely not have inhabited the HCP area were it not for the HCP conservation measures that provided suitable habitat features and species-specific protection measures. Thus, the impacts of the take to spotted owl populations will likely be negligible.

### **7.2.7 Northern Goshawk**

Goshawks can occur in all forested regions of Oregon, and it has been reported to occur in Clackamas County and Clackamas River watersheds (NatureServe 2018a; ORBIC 2016). The HCP area currently contains a mosaic of conifer stands with a range of age-classes that includes some mature stands, thinned stands with openings, and some legacy snags and older trees scattered throughout the landscape, especially in riparian areas. These stands and structural features have the potential to provide nest sites and prey foraging opportunities. Thus, for purposes of assessing take, we assume that the northern goshawk could occur in the initial or potential future HCP area where suitable nesting and prey species habitat is located throughout the HCP area and/or where it occurs on adjacent Federal and State lands that have older age-class stands.

*Type of Take Anticipated* - Take would likely be in the form of harm from covered forest management activities that result in habitat degradation, and/or harassment from forest management activities that cause disturbance to northern goshawks. Pre-commercial and commercial thinning, as well as regeneration harvest, will occur in every decade of the Permit term. Harm and harassment could occur when these activities are conducted. Incidental take in the form of harassment by disturbance could occur anywhere in the covered area although it is most likely to occur in or near suitable habitat and on roads near the northern goshawk nest sites in older stands in the HCP area. Port Blakely will also conduct routine road management activities that may disturb northern goshawks.

*Take Associated with Forest Management Activities* – As regeneration harvest occurs, some older potential nest trees or existing nest trees could be removed, although they will be retained whenever possible as single leaf trees, in leaf tree patches, or in stream buffers. Harm is likely to occur when timber stands that are  $\geq 50$  years of age are harvested. The acreage of these stands on a decadal basis ranges from lows of approximately 3,200 and 3,400 acres in the second and fourth decades of the Permit term, respectively, to highs of 4,300 and 3,900 acres in the first and fifth decades of the Permit period, respectively. Conservation measures that protect defective trees and snags, create snags, and provide upland leaf tree patches allowed to mature will ameliorate some of the potential take. Riparian and wetland buffers will also result in retention of existing older trees, defective trees, and understory vegetation that provide prey species habitat. Thus, although take from harm is expected to occur, it is difficult to determine the amount of take from timber harvest that eliminates nest trees in these stands because of the uncertainty associated with actual occupancy and the positive effects of conservation measures that result in retention and

replacement of potential nest trees. Although older forest habitat, i.e., 50+ years of age, will remain relatively stable over the Permit term, the HCP focuses on protecting trees that are more likely to function as nest trees for goshawks.

Take from harassment (disturbance) may occur during commercial thinning but it will likely result in benefits to the northern goshawk through retention of older, defective trees and snags. While timber management has been demonstrated to affect the northern goshawk at least at local levels, forest management practices, such as the selective thinning, may also make habitats more suitable to goshawks by opening up dense understory vegetation, creating snags, down logs, and woody debris, and creating other conditions conducive to northern goshawks and their prey (USFWS 1998c). Any human activity associated with forest management activities, especially timber harvest, and road construction, maintenance, and use, will likely cause disturbance to nesting northern goshawks that may occur in the vicinity of the activities. Northern goshawks have been observed to adapt to road construction and forestry activities such as hauling and tree falling, and successfully fledge their young (McLaughlin 2002). Individual goshawks vary in their sensitivity to noise disturbance and differences in perceived nest vulnerability, which is influenced by landscape context features such as habitat cover/density around nests, topographic position of nest trees, and nest height within trees (McClaren 2001, Morrison et al. 2006). Goshawks may habituate to some types of noise disturbance, such as weaker noises farther from nests and those of a constant, predictable nature, compared to unpredictable and erratic louder noises closer to nests (McLaughlin 2002). The variability of northern goshawks responses to disturbance makes estimating the level of take difficult to determine in addition to the reality that forest management activities are sporadic and occur over a period of time from only minutes (road travel) to several weeks (timber harvest unit activity). Also, the potential for disturbance will be offset to some extent by HCP mitigation measures designed to prevent disturbance to nesting northern goshawks. Active nest sites will be protected from with a 30-acre protection buffer around the site, and an operational disturbance restriction will be implemented for a distance of 0.50 mile from active nests March 1- August 31. These measures are designed to prevent harm and/or harassment to northern goshawks, especially when nesting. Thus, a small unknown level of take in the form of harassment may occur periodically across the initial or potential future HCP landscape where unknown northern goshawk nesting occurs but it is expected to be at a very low level over the Permit term.

*Anticipated Impacts of the Take to Northern Goshawk Populations* – The northern goshawk is considered relatively common in the main part of its range (NatureServe 2018a). Population trends are difficult to determine due to the paucity of historic quantitative data and because of biases inherent in the various methodologies used to track bird populations (NatureServe 2018a).

Timber harvest has been identified as the principal threat to breeding populations of goshawks (Graham et al. 1999, Squires and Reynolds 1997). In addition to the relatively long-term impacts of removing nest trees and degrading habitat by reducing stand density and canopy cover, logging activities conducted near nests during the incubation and nestling periods can have an immediate impact, i.e., nest failure due to abandonment (Boal and Mannan 1994, Squires and Reynolds 1997). While timber management has been demonstrated to affect goshawks at least at local levels, forest management practices, such

as the selective thinning, may also make habitats more suitable to goshawks by opening up dense understory vegetation, creating snags, down logs, and woody debris, and creating other conditions conducive to goshawks and their prey (USFWS 1998c).

The amount of take due to harm, i.e., suitable habitat or nest site degradation or removal, is expected to be low because much of the HCP area is second or third growth with few legacy features suitable for nesting, and HCP conservation measures will improve habitat conditions for the northern goshawk. Leave tree retention will focus on trees that are older and/or have defects that are beneficial to goshawks and their prey. Larger stream buffers will also retain trees that may be used for goshawk nesting. Commercial thinning results in openings that allow the understory to develop and has provisions to retain mature trees which benefit prey species and potential nesting sites for goshawks, respectively. Nest site protection and disturbance restrictions will minimize the potential for take due to harm or harassment. Given the HCP conservation measures that will likely increase suitable habitat over current conditions, protect existing potential nest site structures, and occupied nest disturbance restrictions, the impacts of the take likely to occur in the initial and potential future HCP area are considered to be negligible to northern goshawk populations.

#### **7.2.8 Oregon Slender Salamander**

The HCP lands are within the range of the Oregon slender salamander population occurrence, including the Clackamas and Molalla-Pudding watersheds (NatureServe 2018a), and includes habitat characteristic suitable for this species. As stated in Section 3.2.5, Oregon slender salamanders are reported to be common in second growth forest stands, persist in units following harvest and/or were able to recolonize units as they regenerated over time. They have been confirmed to occur at thirteen research study forest stands on Port Blakely's HCP lands (Garcia et al. 2018, Homyack and Kroll 2014). This species is a terrestrial salamander, with no aquatic larval stage, and nests are found under bark and in rotten logs (NatureServe 2018a). Thus, for purposes of assessing take, it is assumed this species continues to occur in areas previously confirmed and could also occur on additional or potential future HCP lands where suitable habitat such as logs, bark and moss, and decaying stumps and logs are available.

*Type of Take Anticipated* – Take in the form of harm is likely to occur from forest management activities that remove trees and cause ground disturbances that damage and/or remove suitable habitat features such as logs and old, decaying stumps. Since the Oregon slender salamander is not a highly mobile species, forest management activities are not likely to cause take in the form of disturbance (harassment), i.e., cause them to move any great distance away from suitable habitat. Rather, if the habitat feature remains intact, the species is likely to continue to occupy the habitat structure.

*Take Associated with Forest Management Activities* - Regeneration harvest typically results in substantial ground disturbance that can destroy coarse woody debris such as logs, stumps, and exfoliated bark. This is especially likely in low-gradient forest stands that are harvested with ground-based equipment. Ground disturbance also occurs in association with road construction when trees are removed, and the ground is prepared for road surfacing. The level of take from harm would be minimized by conservation measures that protect and create snags (and stumps) that could become future CWD, retention of upland leave tree patches, and the commitment to protect and/or provide CWD and slash on the

forest floor during regeneration harvest activities. No-harvest stream buffers and the associated snags and LWD that occurs would also likely serve as suitable habitat structures. The amount of take is difficult to determine because of the unknown level of occupancy and location of Oregon slender salamanders in the HCP area although we know from an ongoing study that the Oregon slender salamander occurs at thirteen different sites within the current HCP area (Kroll and Jones 2018). All research stands were greater than 10 acres in size above 2,500 feet in elevation and known to be occupied by Oregon slender salamander OSS (Garcia et al. 2018). Assuming this species is most likely to occur in the 51+ age-class, some of which is comprised of no-harvest riparian buffers, take in the form of harm could occur annually at some unknown proportion of the 51+ age-class forest stands scheduled for regeneration harvest in any given year. The acreage of these stands on a decadal basis ranges from a minimum of approximately 3,200 acres in the second decade of the Permit term to 4,300 acres in the first decade of the Permit period. Conservation measures that provide debris piles, retain slash, and provide upland leave tree patches allowed to mature will ameliorate some of the potential take. Thus, although take from harm is expected to occur, it is difficult to determine the amount of take from timber harvest that eliminates older forest and causes ground disturbance because of the uncertainty associated with actual occupancy and the positive effects of conservation measures that result in retention and replacement of potential suitable habitat. Although older forest habitat, i.e., 50+ years of age, will vary during the permit term, the HCP focuses on retention of older leave tree patches and coarse woody debris on the ground.

*Anticipated Impacts of the Take to Oregon Slender Salamander Populations* – The total population of the Oregon slender salamander is broadly estimated at 1,000 - 10,000 individuals (NatureServe 2018a). The total adult population size is unknown but presumably is at least a few thousand. This salamander is generally scarce, but sometimes it is locally common (Stebbins 2003). In the core of its range, the Oregon slender salamander is the most numerous salamander species in late successional forest (Vesely 1999).

At stand scales, a mosaic of riparian reserves, upslope patch reserves and partial harvest areas may contribute to the retention of habitat for this species (Clayton and Olson 2009). Some harvest practices may have a reduced impact on Oregon slender salamanders. Salamanders may persist at sites, or recolonization may be accelerated, with retention of down wood, slash and standing trees that reduces ground disturbance, ameliorates microclimate alteration, and offers recruitment of future down wood. Standing trees may be dispersed (i.e., via thinning) and/or aggregated (i.e., leave islands, patch reserves or riparian reserves). Green tree retention may retain connectivity among suitable habitat patches, either via providing continuous habitat or by providing “stepping-stones” of habitat patches through which animals may traverse to larger habitat blocks. The HCP conservation measures include provisions that retain these habitat features unlike typical private commercial timberlands with clear-cut rotations that are  $\leq 40$  years of age. Given the HCP conservation measures that are designed to retain suitable habitat features required by Oregon slender salamanders, and that the species is likely abundant locally in older forests on adjacent Federal lands, the overall impacts of the take to the Oregon slender salamander in the initial and potential future HCP area are likely not significant.



### 7.3 Effects to Critical Habitat

Port Blakely believes the anticipated take associated with implementation of the HCP is not likely to result in destruction or adverse modification of critical habitat for any Covered Species.

#### 7.3.1 Listed Salmon Species Critical Habitat

We believe that the amount or extent of anticipated take associated with implementation of the Port Blakely HCP is not likely to result in destruction or adverse modification of critical habitat for listed salmonid species. Critical Habitat designations, for the most part, are limited to mainstem rivers, such as the Molalla and Clackamas Rivers, very little of which occurs on Port Blakely land (Table 7-5).

**Table 7-5. Critical habitat stream miles by species within the ESU and HCP lands.**

ESU	Species	CH Stream Miles in ESU	CH Stream Miles in HCP Land	HCP CH Percent of ESU CH
LCR	Chinook	370.38	0.00	0.00
LCR	Coho	762.91	5.56	0.73
LCR	Steelhead	694.59	5.25	0.76
UWR	Chinook	622.07	0.00	0.00
UWR	Steelhead	1,135.47	3.26	0.29

#### 7.3.2 Listed Terrestrial Species Critical Habitat

There is no designated Critical Habitat for listed terrestrial species that encompasses the HCP area. Thus, no assessment of impacts is necessary.

## **SECTION 8 CHANGED AND UNFORESEEN CIRCUMSTANCES**

Federal No Surprises Assurances (codified at 50 CFR 17.3, 17.22(b)(5), 17.32(b)(5); 50 CFR 222.307(g)) provides assurances to Section 10 permit holders that, as long as the permittee is properly implementing the HCP and the ITP, no additional commitment of land, water, or financial compensation will be required with respect to Covered Species, and no restrictions on the use of land, water, or other natural resources will be imposed beyond those specified in the HCP without the consent of the permittee. The No Surprises rule has two major components: changed circumstances and unforeseen circumstances. Changed and unforeseen circumstances are typically required to be included in HCPs and are discussed below (USFWS and NOAA Fisheries 2016).

### **8.1 Changed Circumstances**

Changed circumstances are defined in the No Surprises rule as “changes in circumstances affecting a species or geographic area covered by an HCP that can reasonably be anticipated by the Applicant and the Services and that can be planned for (e.g., the listing of new species, fires or other natural catastrophic events in areas prone to such events).” (50 CFR 17.3). If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances, and such measures were provided for in the HCP, the permittee will be required to implement such measures (50 CFR 17.22(b)(5)(i), 17.32(b)(5)(i); 50 CFR 222.307(g)(1)) (USFWS and NOAA Fisheries 2016). If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances, and such measures were not provided for in the HCP, the Services will not require any additional measures beyond those provided for in the HCP, without the consent of the permittee, provided the HCP is being properly implemented (50 CFR 17.22(b)(5)(ii), 17.32(b)(5)(ii); 50 CFR 222.307(g)(2)) (USFWS and NOAA Fisheries 2016).

Natural catastrophic events, such as fires, drought, severe wind or water erosion, floods, and landslides, expected to occur during the term of the Permit, will be considered for classifying the event as a changed circumstance. The magnitude of natural catastrophic events will be evaluated on the basis of historical records of such events. Events with a frequency and magnitude likely to occur during an average 50-year period that have the potential to significantly affect populations of Covered Species or their habitats throughout a substantial portion of their distribution in the HCP area, will be considered changed circumstances. Events expected to occur with a frequency of less than once during an average 50-year period will be considered unforeseen circumstances.

Changed circumstances for this HCP include those relatively predictable events that are likely to occur on the Port Blakely landscape (HCP covered area) during the Permit period. The HCP area is noted for having only a few types of natural vegetation-disturbing events that are low in frequency and intensity/severity. For the purposes of this HCP, changed circumstances include:

- Windstorms;
- Ice storms;
- Low severity fires;
- Insect and disease infestation;
- Moderate climate change trends; and

- Listing of a new species not covered by this HCP.

Changed circumstances and the conditions that would trigger classifying natural or legal events as a changed circumstance, and Port Blakely's potential response to each type of event, are described below. In addition to the specific response described for each type of changed circumstance, Port Blakely will do the following for all changed circumstances.

1. Within 60 days of the occurrence of the changed circumstance, provide information about the nature and extent of the event to the Services and confer with the Services about potential responses.
2. Incorporate input from the Services about how to respond to the changed circumstance in ways that (to the greatest extent and as quickly as practicable):
  - Avoid and minimize additional adverse impacts, including incidental take, to covered species;
  - Retain or return the covered lands to conditions anticipated prior to the changed circumstances; and
  - Achieve commensurability between incidental take (including authorized take that has already occurred) and mitigation equivalent to that anticipated prior to the changed circumstances.
3. Prior to finalizing and implementing a proposed response to the changed circumstance, receive confirmation from the Services that the response:
  - Has been developed with appropriate consideration of the goals in #2, above; and
  - Is likely to achieve outcomes for the covered species better than if the permit/HCP no longer applied and better for the long-term conservation of covered species than the conditions produced by the changed circumstance.

A summary of changed circumstances and Port Blakely's likely responses to them is provided in Table 8-1 at the end of this subsection. Conditions that exceed the identified range of changed circumstances will be considered unforeseen.

### **8.1.1 Windstorms**

One of the primary weather-related damaging agents in western Washington and Oregon affecting Port Blakely forestlands has historically been windthrow resulting from strong windstorms (Port Blakely 2018a). There have been a number of catastrophic wind events in the Northwest in recorded history. The 1962 Columbus Day storm is the classic windstorm that has become the standard against which all other Northwest disasters are now measured. There have been other very damaging windstorms in 1981, 1995, 2002, 2005, and 2007. However, most of these windstorms had little impact on the HCP area in Oregon. In fact, in the past 30 years there has been only one notable windstorm event that caused significant windthrow (blowdown).

Small-scale windthrow is not expected to have a long-term significant adverse impact on stream shading or water temperatures and will have the beneficial effect of introducing LWD into streams that currently lack this habitat-forming element. Similarly, small-scale windthrow in the uplands is not expected to have a long-term significant adverse impact on upland

habitat reserve patches or older stands and may have the beneficial effect of introducing additional CWD to the forest floor and creation of snags and large trees with defect. Thus, small-scale windthrow does not pose so substantial an impact as to threaten an adverse change in the status of any covered aquatic or terrestrial species in the HCP area and may actually benefit these species through natural modifications to stream and upland habitat conditions.

Thus, for purposes of addressing windstorms as a changed circumstance, we anticipate this type of event will occur 2-3 times over the 50-year Permit period. If the windstorm event results in windthrow conditions that exceed the conditions described below, it will be considered an unforeseen circumstance.

Changed circumstance - A windstorm constitutes a changed circumstance if one or more of the following conditions apply:

- Riparian Habitat
  - Windthrow of > 75% of riparian stand density and > 20% of contiguous riparian habitat acres over a 0.25 mile (1,320 feet) of stream length within a watershed;
  - A watershed is any single stream system within an ownership block beginning at perennial nonfish headwaters and ending at the largest size perennial water;
- Upland habitat
  - Windthrow of > 75% of upland stand density on > 100 acres but < 500 acres of upland stands.

*Port Blakely Response* – For windstorms that result in windthrow that is less than the triggers above, i.e., magnitude is small-scale, Port Blakely will salvage the merchantable timber and replant to the extent practicable, while continuing to implement all HCP conservation measures in the riparian and upland stands. For windstorms that are classified as changed circumstances, Port Blakely will confer with the Services within 60 days following the event and present an evaluation of the event and proposed minor modifications to riparian or upland prescriptions, if any.

### **8.1.2 Ice Storms**

Another weather-related damaging agent in western Washington and Oregon affecting Port Blakely forestlands in recent years has been ice damage resulting from strong ice storms (Port Blakely 2018a). Ice storms seem to be particularly damaging to younger trees and to hardwoods more than conifers. Douglas-fir in the ten to thirty-year-old category seems to be vulnerable to more severe damage than either younger or older trees. Also, stands recently thinned are very susceptible to damage although, as they grow, they can withstand damage better than overstocked stands. The resulting damaged tops of trees cause significant defect and reduction of usable volume in these trees.

Western Washington experienced a severe ice storm in mid-January 2012. This storm came just after very large snowfalls in the Washington lowlands. Even more damaging ice storms occurred in 1955 and 1996 in western Washington. These storms did not affect HCP area forestlands in Oregon, and it is anticipated that an ice storm occurring in the HCP area will be an infrequent occurrence. Thus, for purposes of addressing ice storms as a changed circumstance, we anticipate this type of event will occur only 1-2 times over the 50-year

Permit period. If the ice storm event results in tree damage that exceeds the conditions described below, it will be considered an unforeseen circumstance.

*Changed circumstance* - If an ice storm event results in damage to < 5% of forestland within the HCP area, Port Blakely will provide the Services with information regarding such damage within 60 days of its discovery and integrate salvage operations into the existing harvest plan. With respect to an ice storm event considered to be a changed circumstance, where damage occurs to > 5% but < 10% of forested acres within the HCP area, Port Blakely and the Services will confer to establish appropriate supplemental or changed prescriptions for salvage harvest of damaged trees or restoration work in the younger plantations which will be incorporated into the existing harvest plan. These additional or changed prescriptions will be established consistent with the HCP conservation measures to the extent practicable. If the ice storm event results in conditions that exceed the conditions above, i.e., >10% of the HCP area, it will be considered an unforeseen circumstance.

### **8.1.3 Small and Low Severity Fires**

Fire has been a prominent natural disturbance of PNW forest ecosystems since the end of the last glaciation period over 12,000 years ago. Projected temperature increases for the 21<sup>st</sup> century could lead to larger and/or more frequent fires in drier climates if trends forecast from climate models occur, especially if precipitation does not increase. The fire season is lengthening due to declining mountain snowpack and earlier spring melt (Westerling et al 2006). Although most fires are started by humans, cooler, wetter springs allow for fine fuels to build up. When followed by hotter temperatures and increasingly severe droughts, fire risk and severity are exacerbated.

Despite the prevalence of fire in this region's history, Port Blakely actively works to prevent and extinguish fires on its property. In the five years preceding 2020, Port Blakely lost approximately 360 acres to wildfire; one in Washington that burned 165 acres and one in Oregon that burned 195 acres. Until the occurrence of several catastrophic wildfires in the western Cascades in 2020, the Oregon fire was the only significant fire to occur in the HCP area since the land was acquired in 1987. The overall wildfire probability for northwest Oregon remains relatively low (Parisien et al. 2012). Fires in the HCP area landscape have a frequency interval of 35 to 200 years with a low to mixed severity (Wolf et al. 2015). Fire severity is a term that describes the effects of fire on soil (sometimes called burn severity) or on fuels and vegetation and measures the degree to which an area has been altered or changed by fire. Fire severity descriptors may include loss of or change in organic matter, both above ground and below ground, with indicator measures such as bark char and foliage scorch. Fire severity often is incorrectly used interchangeably with fire intensity which is a measure of the energy (rate of heat) released during a fire (Wolf et al. 2015). A low severity fire has limited effect on overstory trees, understory vegetation, and soils. Small, low severity fires are anticipated to occur 1-2 times within the 50-year Permit term.

*Changed circumstance* – The ability to accurately predict the frequency and severity of wildfire in this region, especially in light of changing temperature and precipitation regimes, is an evolving science and has an associated level of uncertainty. Existing historical records and the limited trend data for the Port Blakely area suggests low severity fire burns greater than 50 acres but less than 300 acres may be expected on Port Blakely forestlands. While the catastrophic wildfires of 2020 were in excess of this range and occurred in weather

conditions that may become more common as a result of climate change, it is not reasonably foreseeable that such large-scale, stand-replacing fires will be a common occurrence on Port Blakely lands during the HCP term. It is also not foreseeable how Port Blakely will adjust its management in response to additional fires of that scale. Accordingly, a changed circumstance will occur if a small, low severity fire burns greater than 50 acres but less than 300 acres on Port Blakely forestlands. Fires burning less than 50 acres are considered to result in forest stand conditions similar to normal forest management conditions and will be integrated into the existing timber harvest plan and continue to be managed according to HCP conservation measures. A changed circumstance will also occur if a fire of any size, by itself or cumulatively with previous fires, reduces by  $\geq 10\%$  but  $< 25\%$  the amount of either 40–50-year-old forests, 51+ year-old forests, or NSO foraging habitat that will exist on the covered lands in any period/decade of the permit term compared to amounts projected at time of permit issuance. Fire in excess of these parameters on Port Blakely forestlands will be considered an unforeseen circumstance.

If a fire event classified as a changed circumstance occurs, Port Blakely will maintain its commitment to the biological goals and objectives described in this HCP, including to achieving the currently anticipated amounts and distributions of habitats and forest-age classes (as biologically and silviculturally practicable). To do so, Port Blakely will implement the following measures:

- Make every effort to extinguish the fire;
- Provide the Services with information regarding the fire within 60 days;
- Confer with the Services in considering adjustments to timber harvest and implementation of conservation in the fire zone. Potential changes will be established consistent with existing conservation measures as follows:
  - Adjustments to landscape scale management plans will occur in consideration of habitat needs of covered species and associated HCP goals, objectives, and targets;
  - Trees damaged by fire will be considered for salvage while patches of green, live timber will be retained;
  - Salvage removal of standing or downed trees will occur consistent with existing HCP conservation measures ensuring structural features are retained within the stand; upland habitat patches will be located around live tree areas where they exist;
  - Habitat legacies created by the fire will be retained (e.g., upland snags, habitat patches) consistent with future management of the stand and the conservation measures; and
  - Reforestation (planting) will occur as soon as possible to ensure re-establishment of stands affected by the fire.

#### **8.1.4 Douglas-fir Bark Beetle and Disease Infestations**

*Insects* - There are a few westside insects that periodically cause significant tree damage and mortality (Port Blakely 2018a). The most significant insect risk for westside Douglas-fir in recent years has been the Douglas-fir beetle. These beetles are native to our forests and are always present in low levels. Their favored host trees are large diameter, freshly fallen, shaded Douglas-fir logs, preferring older age-class (40-50 years old) trees. Douglas-fir

beetles normally kill small groups of trees, i.e., small pockets of trees that can be widespread across the HCP area, but during outbreaks 100-tree groups are not uncommon. Outbreaks in standing trees last from two to four years. Other potential insect outbreaks are unlikely to occur or be of such low effect that they don't qualify as a changed circumstance. We anticipate this type of event will occur only 1-2 times over the 50-year Permit period.

*Changed circumstance* – If Douglas-fir beetle outbreaks occurs causing significant tree damage to > 10% but < 25% of trees > 40 years of age within the HCP area, it will be considered a changed circumstance. Insect outbreaks affecting < 10% of the trees > 40 years of age within the HCP area will be managed as small-stand timber harvest subject to the timber harvest and conservation measures of the HCP. If an insect outbreak affects > 25% of trees > 40 years of age within the HCP area, it will be considered an unforeseen circumstance because it is not reasonably foreseeable that large-scale outbreaks will occur on Port Blakely's Oregon forestlands during the term of the HCP. Port Blakely will respond to an insect outbreak classified as a changed circumstance as follows:

- Provide the Services with information regarding the insect outbreak within 60 days;
- Confer with the Services in considering adjustments to timber harvest and implementation of conservation in the outbreak area. Initiate forest management actions consistent with existing conservation measures to the extent possible as follows:
  - Salvage downed timber to the extent possible with adherence to CWD measures of the HCP;
  - Ensure decks of logs are removed as soon as practicable;
  - Remove standing dead trees;
  - Ensure Douglas-fir stand densities are below 250 ft<sup>2</sup> basal area; and
  - Use "trap trees" to attract beetles in an infested area to remove them before the next flight.

### **8.1.5 Disease**

Unlike insect outbreaks, forest disease problems in western Oregon are more predictable and persistent and represent significant damaging agents where they are present (Port Blakely 2018a). Diseases that present the greatest risk to Port Blakely's HCP lands include two root diseases: laminated root rot and Armillaria, and a foliage disease: Swiss needle cast. Laminated root rot is the most common disease affecting Douglas-fir and is estimated to occur on 8% of the forestland in Washington and Oregon (Port Blakely 2018a). Root rot typically occurs in small patches of trees but may be distributed throughout a large area. Port Blakely forestlands in Oregon are not affected to any significant degree by Swiss needle cast (Port Blakely 2018a). The primary solution for fighting this disease is changing tree species, or conducting pre-commercial thinning, if possible (Port Blakely 2018a). We anticipate this type of event will occur only 1-2 times over the 50-year Permit period.

*Changed circumstance* – If a disease infestation occurs causing significant tree damage to < 2% of the HCP area, salvage operations will be incorporated into the harvest plan and function as commercial thins or small clear-cuts. If a disease infestation occurs causing significant tree damage to > 2% but < 10% of the HCP area, it will be considered a changed circumstance. Disease infestations will be managed as small-stand timber harvest subject to

the timber harvest and conservation measures of the HCP as described below. If a disease infestation affects > 10% of the HCP area, it will be considered an unforeseen circumstance because it is not reasonably foreseeable that large-scale infestations will occur on Port Blakely's Oregon forestlands during the term of the HCP. Port Blakely will respond to disease infestations classified as a changed circumstance as follows:

- Provide the Services with information regarding the disease infestation within 60 days;
- Confer with the Services in considering adjustments to timber harvest and implementation of conservation in the infestation area. Initiate forest management actions consistent with existing conservation measures to the extent possible as follows:
  - Salvage clumps of diseased dead, dying, and adjacent trees on flat slopes if the area cannot be entirely harvested;
  - Consider early harvest in heavily infected areas and change species; and
  - Uproot stumps to the extent practicable in areas with very high infection levels and high Douglas-fir productivity.

#### **8.1.6 Moderate Climate Change Trends**

Moderate climate change trends are likely to occur within the 50-year period of the HCP and Permit, owing in part to the year-to-year and decade-to-decade climate variability associated with the Pacific Ocean. Periods of prolonged drought are projected to be interspersed with years featuring heavy rainfall driven by powerful atmospheric rivers and strong El Niño winters. Additionally, less precipitation is falling as snow and more as rain in winter months, leading to a longer and drier summer season. Forest watersheds moderate the effects of climate change such as drought and heavy rainfall, thus minimizing downstream impacts on aquatic ecosystems such as flooding, low flows, and reduced water quality. Disturbance and periodic droughts affect streamflow and water quality, as do changes in forest structure that are influenced by climatic variability and change, such as leaf area and species distribution and abundance. Although changes in the periodicity and intensity/severity of natural events such as fires, droughts, floods, and windstorms are likely, accurately predicting and reversing any effects of climate change in the HCP area is very difficult if not impossible. These changes could result in loss of Covered Species habitat if the forest stands do not continue to provide suitable habitat conditions. We have addressed many of the potential manifestations of climate change, e.g., wildfires, drought, wind throw, flooding, as natural-occurring events in the changed and unforeseen circumstances sections of the HCP. However, we have not addressed the likelihood that warmer climates may result in changes to forest species composition over the 50-year Permit term. That condition is addressed here.

*Changed circumstance* - If it becomes clear that the current forest composition of the HCP area, comprised primarily of Douglas-fir, is trending to less than 70% Douglas-fir with replacement by species suited to warmer temperatures, Port Blakely will consider this a changed circumstance. In this event, Port Blakely may take the following action:

- Consider changes to forest management that result in planting of species adapted to warmer climates;



- Manage for species diversity to ensure increased forest tolerance to environmental impacts;
- Continue to review and evaluate existing science in consultation with Federal and State natural resource agencies to determine if we should take other actions; and
- Meet with the Federal and State natural resource agencies at 10-year intervals after Permit issuance to determine whether, by mutual agreement, we should modify any conservation measures because of climate change.

### 8.1.7 New Species Listing

Subsequent to Permit issuance for this HCP, the listing of an additional species, i.e., not a Covered Species, as threatened or endangered by NMFS or USFWS, and the species is likely to occur in the HCP area, will constitute a changed circumstance. The Federal agencies will immediately notify Port Blakely if they plan to list a new species that may occur on the Covered Lands. In the event a new species is Federally-listed that may occur on the HCP Covered Lands, Port Blakely will take the following action:

- Seek technical assistance from the Federal agencies to determine if HCP Covered Activities have the potential to affect the newly listed species and/or suitable habitat;
- If effects are anticipated, implement take-avoidance measures prescribed by the Federal agencies, as necessary, for the newly listed species;
- Consult with USFWS and/or NMFS to determine if existing conservation measures are adequate, or if additional conservation measures are necessary to add the species as a Covered Species;
- Coordinate with the Federal agencies to determine the appropriate mechanism as provided in Section 10 of this HCP to add the species as a Covered Species to the Permit; and
- Decide whether to pursue an amendment to the HCP and Permit in order to obtain coverage for the newly listed species or continue to implement the HCP Covered Activities and conservation measures in a take-avoidance manner.

**Table 8-1. Changed circumstances checklist.**

Changed Circumstance	Trigger	Port Blakely Response
<b>All</b>		Confer with Services and provide applicable information; collaborate with Services to avoid/minimize additional impacts, retain/recover previously anticipated conditions as practicable, and ensure mitigation remains commensurate with incidental take; and receive applicable confirmations from the Services about adequacy of proposed response measures.
<b>Windstorms</b>	Riparian Habitat - windthrow of > 75% of riparian stand density	Confer with the Services within 60 days of event to present an evaluation of the event and proposed minor modifications to riparian

	<p>and &gt; 20% of contiguous riparian habitat acres over a 0.25 mile of stream length within a watershed;</p> <p>Upland habitat - windthrow of &gt; 75% of upland stand density on &gt; 100 acres but &lt; 500 acres of upland stands.</p>	<p>or upland prescriptions to salvage damaged trees consistent with HCP conservation measures.</p>
<b>Ice Storms</b>	<p>Damage occurs to &gt; 5% but &lt; 10% of forested acres within the HCP area.</p>	<p>Confer with the Services within 60 days of event to establish appropriate supplemental or changed prescriptions for salvage harvest or restoration work in the younger plantations consistent with the HCP conservation measures.</p>
<b>Small, Low Severity Fire</b>	<p>Small, low severity fire burns &gt; 50 acres but &lt; 300 acres.</p> <p>Any fire that, by itself or cumulatively with previous fires, reduces by <math>\geq 10\%</math> but &lt; 25% the amount of either 40–50-year-old forests, 51+ year-old forests, or NSO foraging habitat that will exist on the covered lands in any period/decade of the permit term compared to amounts projected at time of permit issuance.</p>	<p>Confer with the Services within 60 days of event to establish appropriate supplemental or changed prescriptions for salvage harvest consistent with the HCP conservation measures as follows: 1) adjustment of landscape scale management plans will occur in consideration of habitat needs and associated HCP goals, objectives, and targets; 2) trees damaged by fire will be considered for salvage and patches of green, live timber will be retained; 3) salvage will occur consistent with HCP conservation measures, ensuring structural features are retained; 4) habitat legacies created by the fire will be retained (e.g. upland snags, habitat patches); and 5) reforestation (planting) will occur as soon as possible to ensure reestablishment of stands affected by the fire.</p>
<b>Douglas-fir Bark Beetle and Disease Infestation</b>	<p>Douglas-fir bark beetle outbreak causing significant tree damage to &gt; 10% but &lt; 25% of trees &gt; 40 years of age within the HCP area;</p>	<p>Confer with the Services within 60 days of event to establish appropriate supplemental or changed prescriptions consistent with the HCP conservation measures as follows: 1) salvage downed timber to the extent possible with adherence to CWD measures of the HCP; 2) ensure decks of logs are removed as soon as practicable; 3) remove standing dead infected trees; 4) ensure Douglas-fir stand</p>

	Disease infestation causing significant tree damage to > 2% but < 10% of the HCP area.	<p>densities are below 250 ft<sup>2</sup> basal area; and 5) use “trap trees” to attract and remove beetles before the next flight.</p> <p>Confer with the Services within 60 days of event to establish appropriate supplemental or changed prescriptions consistent with the HCP conservation measures as follows: 1) salvage clumps of diseased dead, dying, and adjacent trees on flat slopes if the area cannot be entirely harvested; 2) consider early harvest in heavily infected areas and change species; and 3) uproot stumps to the extent practicable in areas with very high infection levels and high Douglas-fir productivity.</p>
<b>Moderate Climate Change Trends</b>	Current forest composition is trending to < 70% Douglas-fir with replacement by species suited to warmer temperatures.	Confer with the Services to consider the following: 1) changing forest management to plant species adapted to warmer climates; 2) manage for species diversity to ensure increased forest tolerance to environmental impacts; 3) continue to review and evaluate existing science in consultation with Services and State natural resource agencies to determine other options; and 4) agree to meet with the Services and State natural resource agencies at 10-year intervals after Permit issuance to determine whether, by mutual agreement, we should modify any conservation measures because of climate change.
<b>New Species Listing</b>	New listed species not considered a Covered Species.	Confer with the Services to determine: 1) likelihood of occurrence in HCP area; 2) if so, likelihood of effects from Covered Activities; 3) existing habitat available; 4) take-avoidance measures; 5) if existing conservation measures are adequate, or if additional conservation measures are necessary to add the species as a Covered Species; and 6) whether to pursue an amendment to add the newly listed species as a Covered Species or continue to implement the HCP Covered Activities and conservation measures in a take-avoidance manner.

## 8.2 Unforeseen Circumstances

On February 23, 1998, the Services codified a final rule (63 FR 8859) to provide certain regulatory assurances to permittees under section 10(a)(1)(B). These assurances are called No Surprises assurances and essentially mean that “a deal is a deal.” As long as the permittee is properly implementing the HCP, the Services will not impose additional requirements or restrictions. If an unforeseen circumstance occurs, unless the permittee consents, the Services will not require them to commit additional land, water, or financial compensation or impose additional restrictions on the use of land, water, or other natural resources beyond the level agreed to in the HCP. The Services will honor these assurances as long as a permittee is implementing the requirements of the HCP, permit, and other associated documents in good faith, and their permitted activities will not jeopardize the species.

Unforeseen circumstances are defined as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the Services at the time of the negotiation and development of the plan and that result in a substantial and adverse change in the status of the Covered Species (50 CFR 17.3). The Services bear the burden of demonstrating that unforeseen circumstances exist using the best available scientific and commercial data available while considering certain factors (50 CFR 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C); 50 CFR 222.307(g)(3)(iii)) (USFWS and NOAA Fisheries 2016).

In deciding whether unforeseen circumstances exist, the Services shall consider, but not be limited to, the following factors (50 CFR 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C); 50 CFR 222.307(g)(3)(iii)):

- The size of the current range of the affected species;
- The percentage of the range adversely affected by the Covered Activities;
- The percentage of the range that has been conserved by the HCP;
- The ecological significance of that portion of the range affected by the HCP;
- The level of knowledge about the affected species and the degree of specificity of the conservation program for that species under the HCP; and
- Whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the species in the wild.

In negotiating unforeseen circumstances, the Services will not require the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water or other natural resources beyond the level otherwise agreed upon for the species covered by the HCP without the consent of the permittee (50 CFR 17.22(b)(5)(iii)(A); 50 CFR 222.307(g)(3)(i)) (USFWS and NOAA Fisheries 2016). If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the Services may require additional measures of the permittee where the HCP is being properly implemented only if such measures are limited to modifications within conserved habitat areas, if any, or to the HCP’s operating conservation program for the affected species, and maintain the original terms of the plan to the maximum extent possible (50 CFR 17.22(b)(5)(iii)(B) and 17.32(b)(5)(iii)(B); 50 CFR 222.307(g)(3)(ii)). If unforeseen circumstances are found, the permittee is not required to come up with additional resources or funds to remedy unforeseen circumstances, but the Services and the permittee should

work together to determine an appropriate response within the original resource commitments in the HCP. Notwithstanding these assurances, nothing in the No Surprises rule “will be construed to limit or constrain the [Services], any Federal agency, or a private entity, from taking additional actions, at its own expense, to protect or conserve a species included in a conservation plan” (50 CFR 17.22(b)(6) and 17.32(b)(6); 50 CFR 222.307(h)).

For purposes of this HCP, unforeseen circumstances include extreme flooding, drought, earthquakes, volcanic eruption, and economic downturn. The reasons for identifying these events as unforeseen circumstances are described below.

### **8.2.1 Flooding**

A flood can occur when climate or weather patterns, geology, and hydrology combine and create conditions where water flows outside of its usual course. In Clackamas County, seasonal flooding is a chronic condition and most common between October and April when intense rainfall is most common (CCEM 2012). Riverine flooding, or overbank flooding of rivers and streams, and channel migration and bank erosion are the two most common effects of flooding with the potential to impact HCP land. Stretches of the Clackamas River, Molalla River, and Pudding River including the confluence of the Willamette and Clackamas Rivers have identified flooding problems (CCEM 2012). The flood hazard of Clackamas County is rated with a high probability of occurrence, but due to the limited number of residents and facilities directly exposed to flood hazards, the vulnerability is ranked as medium. Climate change will likely influence future flooding probabilities and could mean less accumulated snowpack and faster storm runoff in the upper water sheds, leading to flashier flood events (CCEM 2012). The flooding potential described above is county-wide and from a perspective of impacts to populate areas. The likelihood of a flood causing damage in the HCP area is extremely low. Most flooding occurs in the downstream areas in flood plains along the valley bottom. The HCP lands are located at higher elevations and > 75% of the streams are small (< 10 feet) fish and nonfish, therefore if a flood event occurred that was so extreme as to damage habitat in the ownership beyond what may occur normally on an annual basis, it would be considered an unforeseen circumstance.

### **8.2.2 Drought**

A drought is a period of drier than normal conditions which can range in severity and cause a number of water-related problems (CCEM 2012). There are four types of drought considered by the National Drought Mitigation Center and the National Center for Atmospheric Research for categorizing “type of drought”. Meteorological or Climatological Droughts, defined by their departure from a normal precipitation pattern and the duration of the event, typically have a slow onset and can last for several seasons or years. Agricultural Droughts link meteorological drought to agricultural impacts and focuses on precipitation shortages and soil-water deficits. Hydrological Droughts apply to deficiencies in surface water and sub-surface water supplies. And, lastly, Socioeconomic Droughts which occur when water shortage begins to affect people, both individually and collectively (CCEM 2012).

Historically, Clackamas County has experienced annual dry conditions during the summer months, but significant regional drought events have occurred only four times since 1928. Regional droughts occur on an average interval between 8 and 12 years and include state-

wide droughts (CCEM 2012). Droughts are not uncommon in Oregon and regularly occur in all parts of the state. Clackamas County has determined that there is a high probability of severe extended drought conditions and propose that one drought event is likely to occur within the next ten to thirty-five years (CCEM 2012). Droughts are often an “incremental” hazard, in that the onset and end can be difficult to determine, though the city of Molalla and Clackamas County are in agreement that there is a “moderate” probability of a drought occurring within a 35 to 75-year period. Molalla estimates a “moderate” vulnerability to drought conditions, meaning up to 10% of the population could be affected in a large-scale regional event, which is higher than the county’s overall “low” rating (CCEM 2012). Prolonged droughts in forests can promote an increase of insect damage, which can increase the incidence of fires during extended droughts. If a drought persists, wildlife habitat may be degraded, however many species eventually recover from this temporary deviation (CCEM 2012). Port Blakely does not rely on the surface water supply in the same way neighboring agricultural practices do, and instead relies on precipitation, snowpack in higher elevations, and groundwater recharge for forest growth and management. Droughts may cause some forest habitat degradation that results in dying trees, disease, and higher potential for fire. Trees that that develop defects are likely to provide better habitat conditions than if they didn’t occur. Port Blakely has operational management processes in place to address diseased stands and to protect against fire. According to predicted probabilities, a significant regional moderate or severe drought is expected to occur in the area of the HCP lands once during the HCP period. The timing and intensity of a significant regional drought is impossible to predict, and its effects are difficult to determine. However, at a minimum we would expect the flow of streams and rivers to decline. Implementation of the HCP measures would not contribute to the degradation of the habitat for the listed and unlisted species covered in the Plan. Thus, a persistent and long-lasting drought, resulting in a dramatic environmental change and destruction of habitat to Covered Species is unlikely, and would be considered an unforeseen circumstance should it occur.

### **8.2.3 Earthquakes**

Earthquakes in Oregon are caused by three fault types. Shallow Crustal Earthquakes are the most common to occur and are relatively shallow. Clackamas County has seven known crustal faults which could generate earthquakes of a 6.5 magnitude or larger, but typically occur around a magnitude 4. Deep Intraplate Earthquakes occur deeper than crustal earthquakes which can reach magnitudes of 7.5 and can be felt over a broad area. Subduction Zone Earthquakes occur at a convergent plate boundary. This boundary is where subduction of the Juan de Fuca Plate below the North American Plate occurs and is known as the Cascadia Subduction Zone, which extends from northern California to British Columbia. Similar Subduction Zones have produced earthquakes of magnitude 9 or above (CCEM 2012).

In Clackamas County, a moderate to high earthquake hazard is concentrated in areas along rivers, floodplains, and hill slopes due to lack of stability in those areas. Related hazards include ground shaking, which causes the most damage in earthquakes; liquefaction, which results in loss of soil strength and ability to support weight; amplification, which occurs in soils and soft sedimentary rocks and increases the magnitude of the seismic waves; and earthquake-induced landslides, which can destroy roads, and the likelihood of risk increases in areas with steep slopes (CCEM 2012).

There have been three historical earthquakes in Clackamas County, with a recorded magnitude of 3.5 or above since 1961 (World Media Group, Disasters 2018). The last known earthquake along the Cascadia Subduction Zone occurred in January of 1700, more than 300 years ago, and is generally accepted to have been a magnitude 9.0 or larger. On average, these Cascadia earthquakes have a recurrence interval of approximately 500 years, with gaps ranging from 200 years to 1,000 years (CCEM 2012).

Oregon is a seismically active state, adjacent to a subduction zone boundary, and with numerous faults across the landscape, thus there is always potential for an earthquake with a magnitude large enough to cause some amount damage to structures and the natural environment. If a large enough earthquake in the Clackamas County area should occur, the most likely damage would be in the form of landslides. Landslides are more prone to occur in areas with steep slopes and sedimentary bedrock or thick, less consolidated soils. Landslides could damage or destroy Port Blakely-owned roads, or delay access to ownership land. They can also impact streams and rivers, adding large amounts of sediment to waterways, or damming channels, causing fish passage barriers. Molalla, specifically, has a “high” vulnerability to landslides, meaning more than 10% of the population or community assets would be affected by a major landslide event, which is higher than the rest of the county’s “low” vulnerability estimate (CCEM 2012).

Overall, Clackamas County is rated “low” for the potential of an earthquake happening within a 75-100-year timeframe. However, Molalla and Estacada, the two towns closest to the HCP area, have their own estimates for the probability of occurrence. Molalla rates itself as “high,” meaning one event is likely to happen within a 10-35-year period. Estacada estimates a “moderate” probability that an earthquake will occur within a 45-75-year period (CCEM 2012). Due to the unpredictable nature of earthquakes, and the severity depending on type, magnitude, and proximity of HCP land to the earthquake, as well as a low probability that an earthquake would have a long-lasting effect on the ability to continue implementing covered forest management and conservation activities, the occurrence of an earthquake and resulting damage is considered to be an unforeseen circumstance.

#### **8.2.4 Volcanic Eruption**

An eruption of any Cascades volcano could have a direct or indirect impact on Clackamas County, though, only Mount Hood and Mount St. Helens have been known to have direct effects in the county (CCEM 2012). Ash fallout has the highest potential to impact the county. When fine ash from an eruption column meets high altitude prevailing winds the ash can be carried tens to hundreds of miles from the volcano. Fine ash in the water supply can cause muddiness and chemical contamination. There can be an economic fallout caused by eruptions, due to the disruption of the normal flow of commerce and daily human activity (CCEM 2012).

Volcanoes like Mount Hood, which is the nearest volcano to Port Blakely HCP land, have an episodic eruptive behavior, with periods of frequent eruptions over decades to centuries, and separated by dormant periods that can last centuries to millennia. There have been two eruptive periods in the past 1500 years, the most recent occurring in the late 18<sup>th</sup> Century (USGS 2014a). The Port Blakely ownership is not in any of the Mount Hood volcano hazard zones, and would unlikely be affected by lahars, lava flows, or pyroclastic flows (USGS 2014b). Thus, a volcanic eruption is considered an unforeseen circumstance based on the

extremely low likelihood of occurrence, the fact that the HCP area is not in a volcano hazard zone, and the low potential for Covered Species' habitat to be affected by a volcanic eruption, should it occur.

### **8.2.5 Economic Downturn**

Oregon is one of the most trade dependent states in the country, exporting over \$20 billion in goods to foreign countries, the largest trading partners being China, Canada, Malaysia, Japan, and South Korea, and to an extent these countries help drive Oregon's economy (OSS 2018). In the early 1980's, the state worked to develop new economic sectors and transition from a resource-based economy to a more mixed manufacturing and marketing economy as basic changes were occurring in the traditional resource sectors - timber, fishing, and agriculture (OSS 2018). In Clackamas County educational services, health care, and social services is the highest employed industry, followed by professional, scientific, management, administrative, and waste management services. Agriculture, forestry, fishing, hunting, and mining make up a small percentage of workers in the county (World Media Group, Income and Careers). Oregon last experienced an economic downturn in 2008, which was a country-wide recession that devastated the economy, saw the highest unemployment rate in decades, and stalled job-growth. By 2013, all major sectors began adding jobs, and the unemployment rate began to fall, helping to restore national, state, and local economies (OSS 2018).

Any economic downturn at the local, state, or federal levels would not likely result in any impact on the HCP lands or result in changes to the budget proposed to maintain the HCP for the next 50 years. If timber harvest were to be deferred, under an economic downturn, forested stands would continue to provide habitat longer than planned. The low cost of HCP implementation relative to overall company revenue would not preclude funding of the HCP. Thus, an economic downturn is considered an unforeseen circumstance due to these conditions and a multitude of factors that drive the economy.

### **8.2.6 Catastrophic Wildfires**

Due to the trend of increasingly warmer and drier summers, and lower accumulation of snowpack in the winter, the risk of wildfires will likely increase in all Oregon forest types in the coming decades (CCEM 2012). Large fires could become more common in western Oregon forests and could include the HCP land. Lightning strikes on public (State) lands account for a large number of wildfires (CCEM 2012). Little can be done to stop or prevent all wild land fires but on ownerships adjacent to public lands, specifically federal lands, Port Blakely incurs a higher risk of exposure to wildland fires in part due to lower road density, a less aggressive firefighting approach and generally older forests with more fuel (Port Blakely 2018a).

Port Blakely has a firefighting response plan and staff prepared to fight fires on the HCP lands. A catastrophic wildfire in most cases will be prevented in coordination with other private and public entities. Only two significant wildfires have occurred on Port Blakely forestlands in Oregon in the 35 years since we acquired the lands in 1987. One was a small low severity fire and the second was the catastrophic wildfire complex of 2020. Given the low likelihood of occurrence (Parisien et al. 2012; Wolf et al. 2015) and the ability to prevent wildfires, as well as the occurrence in 2020 of the catastrophic wildfire complex, which was



due to a set of weather-related and adjacent forestland conditions that have historically been rare for the western Cascades of Oregon, the likelihood of a catastrophic wildfire event, i.e., burn greater than 300 acres within the Port Blakely forestlands, occurring during the 50-year term of the HCP is considered an unforeseen circumstance. Notwithstanding the unlikely occurrence of a catastrophic wildfire, Port Blakely will, nevertheless, strive to meet the biological goals and objectives described in this HCP and will confer with the Services to discuss considerations regarding the implementation of the HCP conservation measures.

### **8.2.7 Climate Change**

Climate change affects many factors in our day-to-day life. Even small changes to overall climate can impact many of the above listed circumstances, such as frequency and severity of wildfires, drought, disease and infestation, introduction of new and invasive species, flooding, and extreme weather (windstorms, snowstorms, etc.). Since 1895, the temperatures in the northwest have risen approximately 1.5°F, with winter temperatures rising the fastest at approximately 0.2°F per decade. The last freeze in spring is occurring earlier, while the first freeze in fall is happening later (OHA 2014). In a climate projection model generated by the Oregon Health Authority, the mean temperature is expected to increase by 4.3°F from 2014-2070 under a medium emissions scenario or “best case” scenario. In a high emissions scenario or “worst case”, temperatures would increase by 5.8°F (OHA 2014). If global warming occurs at these predicted levels, it could result in a gradual change in forest species composition. Additionally, aquatic resources could be impacted by climate stressors, including low snowpack, decreasing summer streamflow, habitat loss through increased storm intensity and flooding, and increased mortality due to warmer stream temperatures. However, this is an unknown potential chain of events that may or may not occur over the next 50 years. Climate changes occurring at rates that result in a dramatic change to forest composition, or at a rate not predicted or in directions that currently are not or cannot be anticipated would be considered an unforeseen circumstance.

## **SECTION 9 FUNDING**

### **9.1 Costs and Budget for the Conservation Program and Plan Implementation**

Conservation measures, monitoring, and reporting will be conducted by Port Blakely's staff and contractors as a routine business practice. The HCP will require Port Blakely to defer some timber harvests beyond the economic rotation age, apply intensive silviculture prescriptions, designate, and reserve harvestable timber in all harvest units and along all fish-bearing streams, conduct enhanced road management measures, and expend extra personnel time and expense for monitoring and reporting — all of which will be accomplished as described in the HCP Sections above. These actions represent either a direct financial expense to the company or an indirect cost in forgone revenue. Indirect costs through lost opportunity to harvest timber are considerable but not easily quantified, and Port Blakely elects not to make those figures public.

The direct costs for preparation of this HCP and accompanying NEPA document were not more than \$325,000, and the estimated direct costs for ongoing implementation of the HCP will be no more than \$50,000 per year on a five-year basis, not including the \$25,000 annual cost made available for fish and wildlife habitat restoration. Port Blakely's stable financial condition stands as an assurance that it has the resources to fund implementation of this HCP. Funding for the costs will come from Port Blakely's continued commercial operations on the ownership. Given conservative estimates of timber markets and projections of future harvest rates under the HCP, Port Blakely estimates that future revenues from timber harvest on the HCP area, on average will exceed \$9,000,000 on a five-year basis. Thus, implementation of the HCP can be comfortably supported by projected revenues from commercial operations in the HCP area. Our estimates of implementation costs for this HCP have been borne out by our cost estimates for implementing two previous Section 10 conservation plans. Based on this experience and our cost/revenue data from prior years, Port Blakely we will have enough sufficient funds to cover HCP implementation costs.

The Chief Executive Officer and General Partner of Port Blakely has represented that the company's forecast of available cash flows can comfortably support this investment and will update and confirm the above estimates at five-year intervals. To this end, Port Blakely has agreed to provide the Services, at the time of submission of monitoring reports (Section 6.6 Reporting), with information that suggests an issue with funding HCP implementation activities.

### **9.2 Funding Sources**

Port Blakely has been in the forest products business for over 150 years. The company is solvent and will continue to conduct our forest management and forest products business to remain operational through the term of the ITPs. Implementation of the HCP forest management and conservation measures is not a substantial deviation from the manner in which Port Blakely currently operates in our Oregon forestlands. Implementation of the HCP measures involves the same sustainable forest management practices as are currently being implemented but results in more riparian and upland habitat that conserve and protect covered fish and wildlife species. Timber harvest operations and the sale of forest ecosystem services and products generate revenue that will pay for implementation of all

forest management activities including the conservation measures. As such, they are committed to providing the funding necessary to fully implement the HCP.

### **9.3 Funding Mechanisms**

Funding of the HCP will be accomplished by managing and implementing sustainable timber harvest operations which may include revenue generated by the sale of ecosystem services and forest products.

### **9.4 Funding Assurances**

Port Blakely warrants that it has, and shall expend, such funds as may be necessary to fulfill its obligations under its ITPs and the HCP. Port Blakely shall promptly notify the Services of any material change in its financial ability to fulfill its respective obligations.

## **SECTION 10 PERMIT/HCP IMPLEMENTATION**

The Services' take the lead in overseeing implementation and coordination with ESA Section 10 permittees in accordance with any established implementation schedules. To identify the implementation roles and processes, the first resources will be the HCP and the Permit. The HCP and any permit conditions will provide the implementation steps, monitoring, and reporting requirements, and scheduled reviews. The sections below describe specific provisions relative to implementation inherent in this HCP and Permit.

### **10.1 No Surprises**

On February 23, 1998, the Services codified a final rule (63 FR 8859) to provide certain regulatory assurances to permittees under section 10(a)(1)(B). These assurances are called No Surprises assurances and essentially mean that "a deal is a deal." As long as Port Blakely is properly implementing the HCP, the Services will not impose additional requirements or restrictions. If an unforeseen circumstance occurs, unless Port Blakely consents, the Services will not require Port Blakely to commit additional land, water, or financial compensation or impose additional restrictions on the use of land, water, or other natural resources beyond the level agreed to in the HCP. The Services will honor these assurances as long as Port Blakely is implementing the requirements of the HCP, permit, and other associated documents in good faith, and their permitted activities will not jeopardize the species.

### **10.2 Permit Term**

*Duration* - The ITPs and the HCP will remain in effect for fifty (50) years from the Effective Date unless: (1) extended or renewed upon the mutual agreement of the Parties or (2) earlier relinquished or terminated by Port Blakely as described in Section 10.5 below.

*Extension/Renewal* - Upon the mutual written agreement of the Parties, and compliance with all laws then applicable, the USFWS and the NMFS may extend the ITPs and the HCP beyond their initial terms. In furtherance of this provision, the Parties shall meet on or about September 1 of the fortieth (40th) anniversary of the Effective Date to discuss potential extension or renewal of the ITPs and the HCP.

### **10.3 Occupation of Non-covered or Newly-listed Species**

After the ITPs are issued, a listed species not addressed in the HCP may occupy Covered Lands. Should this occur, Port Blakely may request that the USFWS or NMFS add the species to the appropriate ITP as described in Section 8 of this HCP. If, after compliance with all applicable laws, the USFWS or the NMFS, as applicable, concludes that a listed species is present on Covered Lands, and that the addition of the species to the ITP would be consistent with ESA §§ 7(a)(2) and 10(a)(1)(B), the USFWS or the NMFS, as applicable, will promptly amend the ITP to include the newly listed species as a Covered Species.

### **10.4 Land Transactions**

*General* - Nothing in the ITPs or this HCP shall limit the rights of Port Blakely to acquire additional lands in and around the Permit Area, or elsewhere. Unless such lands are within the Boundary of Potential Acquisition Lands as shown in Figure 1-5, however, any such lands as may be acquired by purchase, exchange, or otherwise will not be covered by the

ITPs. Nothing in the ITPs or the HCP shall require Port Blakely to include in the Covered Lands or to add to the ITPs any additional lands it may acquire. Any nonfederal and nonstate forestlands, e.g., small landowner or industrial forestland, within the Boundary of Potential Acquisition Lands that Port Blakely elects to include and the Services agree to include in its ITPs and the HCP shall thereafter constitute a portion of the Covered Lands, and all references to the Covered Lands shall be deemed to include a reference to such acquired lands.

*Inclusion of Additional Port Blakely Property as Covered Lands* - If Port Blakely wishes to include any nonfederal forestland within the Boundary of Potential Acquisition Lands as Covered Lands under the HCP as described in Sections 1.3.1 and 1.3.2, Port Blakely shall provide written notice to the Services of the proposed inclusion of additional lands, along with a legal description, specific description of the location, baseline conditions of the additional property, and any known Covered Species or Critical Habitat occurrences, including an assessment of the following required criteria:

- Nonfederal and nonstate (small landowner or industrial) forestlands;
- Similar characteristics as the initial plan area:
  - Similar vegetative and aquatic features;
  - No areas in Critical Habitat of species not included in this HCP;
  - Similar ratios of Critical Habitat as the 2021 ownership;
  - Age-class distribution of forested lands to be added;
  - Within the western Oregon Douglas-fir Zone;
  - Similar forest stand conditions (mostly lower-quality and degraded habitat; previously harvested, etc.) as the 2021 ownership;
  - Similar ratio of stream types and length as the 2021 ownership;
  - Similar ratio of roads and road crossings as in the 2021 ownership; and
  - Similar characteristics in terms of recreational use, viewsheds, and historical or cultural resources;
- Within the UWR or LCR ESUs;
- Within the 25% acreage limit analyzed; and
- Not increase the authorized level of take permitted.

Consistent with Section 10.7, the Services shall use reasonable efforts to notify Port Blakely within sixty (60) days of receipt of such notice regarding whether the inclusion is consistent with the HCP or the ITPs, and if the inclusion of acres should be processed as a minor modification or amendment to the HCP. The parties will follow the procedures outlined in Section 10.7 to modify or amend the HCP and ITPs accordingly. The Services may request, and Port Blakely will provide additional time, if such time is needed to adequately assess whether the revision can be processed as a modification and if the new lands are consistent with the criteria above and the NEPA analysis.

*Removal of Property from Covered Lands* - Port Blakely may not sell any lands included in the Covered Lands to, or exchange any portion thereof with, any other party during the term of this HCP and the ITPs unless (a) the ITPs and the HCP are modified to delete such lands or (b) the lands are transferred to a third party who has agreed in writing to be bound by the terms of the HCP and otherwise meets the requirements set forth in the following paragraph.

*Transfers to New Landowner Bound by the HCP* - Port Blakely may sell or exchange lands comprising a portion of the Permit Area to a Permitted Transferee. As used herein, a “Permitted Transferee” shall mean a transferee who has elected in writing to be bound by the ITPs and the HCP as they apply to the transferred lands, who is qualified to hold a permit under 50 CFR § 13.21 (USFWS) and 50 CFR § 222.301 (NMFS), who has sufficient financial resources to adequately fund its affirmative obligations under the HCP, and who has entered into an agreement with the USFWS and the NMFS to implement the terms of the ITPs and the HCP. Upon request of the Permitted Transferee and compliance with all applicable laws, the USFWS and the NMFS will issue ITPs to the Permitted Transferee covering the transferred lands. Port Blakely will not be responsible for the performance of the ITPs or HCP on lands transferred to a Permitted Transferee, and a failure of the Permitted Transferee to comply with the ITPs or the HCP shall not be deemed a default by Port Blakely with respect to its ITPs or the HCP.

*Casualty Losses to Covered Lands* - If Covered Lands are destroyed by casualty such as wind, fire, insect infestation or other causes, whether similar or dissimilar to those listed or whether foreseen, foreseeable, or unforeseeable, that are beyond the control of Port Blakely and are not caused by the negligence of Port Blakely, then Port Blakely will respond in a manner consistent with Section 8 and Table 8-1 of the HCP. In addition, in the event of a casualty loss, Port Blakely reserves the right to notify the Services of the casualty loss to Covered Lands and to have the Parties deal with the casualty loss as if such lands were proposed for removal from the Covered Lands as described above.

### **10.5 Rights to Terminate and Relinquish the ITP**

*Rights of Port Blakely* - Port Blakely reserves the right to relinquish its rights under its ITPs prior to expiration. Until relinquishment, termination, revocation, or expiration of their respective ITPs, Port Blakely may use its Covered Lands in any otherwise lawful manner consistent with this HCP including entering into agreements related to carbon sequestration or the provision of ecosystem services or participating in other market-based mechanisms for enhancing environmental resources. These assurances remain valid for as long as Port Blakely complies with the HCP and the terms of the ITPs. In return for Port Blakely’s efforts, the USFWS and the NMFS will authorize incidental take of Covered Species under Section 10(a)(1)(B) of the ESA and will comply with all other No Surprises policies and regulations then in force. The resulting ITPs shall permit Port Blakely to lawfully take Covered Species or to modify habitat of Covered Species on the Covered Lands.

*Effect of Termination, Relinquishment, and Revocation* - Any termination, relinquishment, or revocation of the rights of Port Blakely under an ITP automatically terminates the HCP. Activities thereafter conducted within the Permit Area or Plan Area will be subject to all applicable provisions of the ESA and related regulations as if the ITPs had never been issued. At such time, Port Blakely may return to managing the former Covered Lands under baseline conditions, i.e., OFP Rules. *No Post-Termination Mitigation* - The Parties acknowledge that Port Blakely’s compliance with its ITPs and this HCP will result in Port Blakely having fully mitigated for any incidental take of the Covered Species during the term of the ITPs, simultaneous with or prior to the occurrence of such take. Therefore, if Port Blakely is in compliance with the terms of the HCP and ITP, upon termination, relinquishment, or revocation of its ITP, Port Blakely shall have no further mitigation

obligations under the HCP, or the ESA with regard to the Covered Species that occurred during the term of HCP and ITP.

### **10.6 Dispute Resolution**

The Parties recognize that good-faith disputes concerning implementation of, or compliance with, or suspension, revocation, or termination of this HCP or the ITPs may arise from time to time. The Parties agree to work together in good faith to resolve such disputes, using the dispute resolution procedures set forth below or such other procedures upon which the Parties may later agree. However, if at any time any Party determines that circumstances so warrant, it may seek any available remedy without waiting to complete dispute resolution.

If the USFWS or the NMFS has reason to believe that Port Blakely may have violated its ITPs or this HCP with respect to the Covered Species, the Agency will notify Port Blakely in writing of the specific provisions that may have been violated, the reasons the Agency believes Port Blakely may have violated them, and the mitigation the Agency proposes to impose to correct or compensate for the alleged violation. Port Blakely will then have such time as may be mutually acceptable, to respond. After Port Blakely has responded, if any issues cannot be resolved within a mutually acceptable reasonable time, the Parties will consider non-binding mediation and other alternative dispute resolution processes. The Parties reserve the right, at any time without completing informal dispute resolution, to use whatever enforcement powers and remedies are available by law or regulation, including but not limited to, in the case of the USFWS or the NMFS, suspension or revocation of the ITPs.

### **10.7 Modifications and Amendments**

*Modifications* - Any Party may propose minor modifications to this HCP or the ITPs by providing written notice to the other Parties. Such notice shall include a statement of the reason for the proposed modification and an analysis of its environmental effects, including its effects on operations under the HCP and on Covered Species. The Parties shall use reasonable efforts to respond to proposed modifications within sixty (60) days of receipt of such notice. Proposed minor modifications shall become effective, and the HCP shall be deemed modified accordingly, immediately upon all Parties' written approval. Among other reasons, a Party may object to a proposed minor modification based on a reasonable belief that such modification would result in adverse effects on the environment that are new or significantly different from those analyzed in connection with the original HCP, or additional take not analyzed in connection with the original HCP. If a Party objects to a proposed minor modification, the proposal is not approved as a minor modification but may be processed as an amendment of the ITP as described below.

Examples of minor modifications to the HCP or ITPs include, but are not limited to:

- corrections of typographic, grammatical, and similar editing errors that do not change the intended meaning;
- clarification of vague or undefined language or phrases;
- correction of any maps or exhibits to correct errors in mapping or to reflect previously approved changes in the ITPs or the HCP;
- slight modifications to avoidance and minimization measures;
- minor changes to survey, monitoring, or reporting protocols; and

- addition or removal of Covered Lands in accordance with Section 10.4 above.

*Amendments* - Any revisions to the HCP or the ITPs, other than those described above, shall be processed as an amendment of the HCP and/or ITPs in accordance with all applicable legal requirements, including but not limited to the ESA, the National Environmental Policy Act, and applicable USFWS and NMFS regulations.

Any Party may propose an amendment to this HCP or the ITPs by providing written notice to the other Party. The Parties will identify in the written notice what aspects of the HCP and ITPs they seek to amend and the basis and rationale for amending the HCP and ITPs. The Services will decide the level of review needed to satisfy ESA statutory and regulatory requirements. Amendments may be approved by an exchange of formal correspondence, addenda to the HCP, revisions to the HCP, or permit amendments. Document amendments are memorialized by specifying the old text, proposed new text, the reason for the change, intended effects, and justification for the modification. Except for permit amendments, changes to the HCP will typically not require reprinting the entire document. The Services will determine whether public notice of an HCP amendment is needed.



## SECTION 11 REFERENCES

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## 11.2 Personal Communications

Kim Garner, 2018. Email to Craig Hansen at Port Blakely dated November 8, 2018. Subject: Latest Fisher Info. Kim Garner, Supervisory Fish and Wildlife Biologist, Forest Resources Division, Manager, Oregon Fish and Wildlife Office, Portland, OR.

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## APPENDIX A COVERED LANDS (LEGAL DESCRIPTIONS)



## APPENDIX B SUMMARY OF CONSERVATION PROGRAM MEASURES

**APPENDIX C COMPARISON OF HCP CONSERVATION MEASURES AND OREGON  
FOREST PRACTICE STATUTES/RULES**