Shelton-Fairmount Transmission Line Rebuild and Fiber Optic System Replacement Project

Draft Environmental Assessment

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1.0 Purpose and Need for Action

1.1 Introduction

Bonneville Power Administration (BPA) is a nonprofit federal power marketing agency that operates and maintains more than 15,000 circuit miles of high-voltage transmission lines. The transmission lines move most of the Northwest's high-voltage transmission from facilities that generate power to users throughout BPA's service territory. BPA has obligations to ensure that its transmission system is safe, reliable, and has sufficient capability to serve its customers. For example, the Federal Columbia River Transmission System Act directs BPA to construct improvements, additions, and replacements to its transmission system that are necessary to maintain electrical stability and reliability, as well as to provide service to BPA's customers (16 United States Code [U.S.C.] § 838b(b-d)).

One of these BPA-owned transmission lines is the Shelton-Fairmount No. 1 transmission line, which extends north from BPA's Shelton Substation in Mason County, Washington to BPA's Fairmount Substation in Jefferson County, Washington (Figure 1). Portions of this 60-mile-long, 115-kilovolt (kV) transmission line, in addition to some of its access roads, are in poor condition due to normal deterioration and aging. BPA's 107-mile-long Olympia-Port Angeles Fiber Optic Communication System (or "fiber optic system"), which includes fiber optic cable on the Shelton-Fairmount No. 1 transmission line, is also in need of replacement.

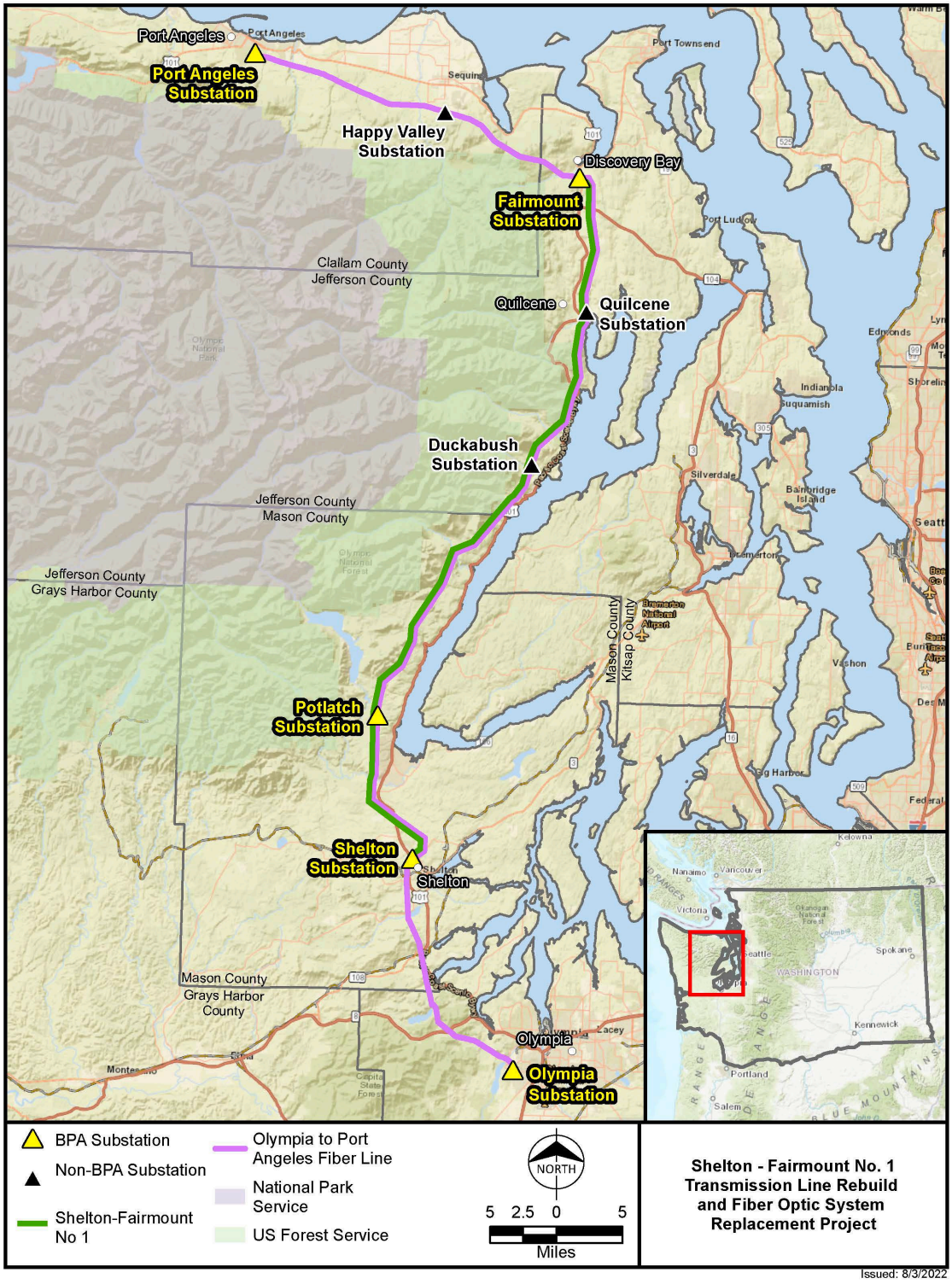
BPA proposes the Shelton-Fairmount Transmission Line Rebuild and fiber optic system Replacement Project (Proposed Action or Project) to replace aged wood-pole transmission structures, conductors, overhead ground wire and associated hardware, disconnect switching facilities, and upgrade or repair portions of the access roads to transmission line structures. As part of the Project, BPA would also replace fiber optic cable and some existing structures on two existing BPA transmission lines (Olympia-Shelton[1] and Fairmount-Port Angeles No. 1), in addition to replacing fiber optic cable and all existing structures on the Shelton-Fairmont No. 1 transmission line (Figure 1). Finally, BPA would upgrade or repair access roads to accommodate fiber optic cable replacement activities.

BPA prepared this Environmental Assessment (EA) to assess the potential impacts of the Project on the environment pursuant to the National Environmental Policy Act (NEPA). This EA will be used to determine if the Project would cause effects of a magnitude that would warrant preparing an Environmental Impact Statement (EIS), or whether it would be appropriate to prepare a Finding of No Significant Impact (FONSI).

This section of the EA describes the need for action that the Project addresses, identifies the purposes (i.e., goals) that BPA is attempting to achieve while meeting that need, and summarizes the public scoping process that was conducted for the EA.

[1] The replacement fiber optic cable between the Olympia and Shelton substations would be attached to structures along two individual single circuit transmission lines (Olympia-Shelton No. 1 115-kV and Olympia-Kitsap No. 1 115-kV) and one double circuit lattice steel tower transmission line (Olympia-Shelton No. 5 230-kV and Satsop-Shelton No. 1 230-kV) that are generally located within a single shared right-of-way. For the purpose of this EA, this segment of the fiber optic system replacement is simply referred to as Olympia-Shelton.

Figure 1: Project Vicinity Map



1.2 Need for Action

The Federal Columbia River Transmission System Act directs BPA to construct improvements, additions, and replacements to its transmission system to maintain electrical stability and reliability in addition to providing service to its customers (16 U.S.C. § 838b(b-d)). Transmission lines consist of upright support structures (wood or steel), insulators, conductors (electrical wires), and other equipment used to transmit power. It is critical for BPA to ensure the integrity and reliability of the Shelton-Fairmount No. 1 transmission line because it is the sole point of service for multiple 115-kV substations and customers along the Hood Canal, including Potlatch Substation, Duckabush Substation, and Quilcene Substation. Potlatch Substation is BPA-owned and serves Mason Public Utility Districts (PUDs) 1 and 3, while Duckabush Substation is owned by Mason PUD 1 and Quilcene is owned by Jefferson PUD.

The Shelton-Fairmount No. 1 transmission line was constructed in 1949 and is nearing the end of its serviceable life. The line was originally constructed with butt-treated cedar poles prone to sap wood weathering and shell rot, which results in significant loss of strength. Additionally, the wood pole structures supporting the conductor have a typical service life of 55 to 60 years.

The transmission line is experiencing worsening performance due to its age, poor grounding, and overall condition. BPA must rebuild the line to guarantee reliable electric service and the safety of the public and transmission line workers.

The existing 36-count fiber optic system was installed in 2002. The fiber optic system consists of overhead and underground fiber optic cable, underground conduit, below-ground concrete vaults, splice enclosures attached to individual transmission structures, Fiber-Only Wood Poles (FOWPs), and other equipment within substations used to transmit data and information over the system. The fiber optic cable is approaching the end of its life (with an approximately 25-year lifespan) and has been designated for an upgraded replacement consisting of a 72-count fiber optic system. The Shelton-Fairmount No. 1 transmission line portion of the fiber optic system—comprising 60 percent of its length—would require a new fiber optic cable because the transmission line rebuild would demolish the existing 36-count fiber. Rather than have mismatched fiber count lines along the system, BPA would upgrade all fiber optic system sections now, reducing the number of future upgrade resource commitments and mobilizations.

BPA also needs safe and reliable access to transmission lines for transporting line crews, material, and equipment to rebuild lines, replace existing fiber optic cable, and for ongoing maintenance and emergency repairs. Portions of the existing road system that BPA uses to access the transmission lines are in poor condition and in need of repair.

1.3 Purpose

In meeting the need for action, BPA has identified the following purposes:

- Ensure that transmission system public safety and reliability standards set by the National Electric Safety Code (NESC) and North American Electric Reliability Corporation (NERC) are met.
- Continue to meet BPA's contractual and statutory obligations to supply safe, reliable power to serve its customers.
- Minimize impacts on the human environment, including the natural and physical environment.
- Demonstrate cost-effectiveness.

1.4 Public Involvement and Consultation

To help determine the issues to be addressed in the environmental review, BPA conducted public scoping outreach via mailings. On March 23, 2022, BPA mailed letters to potentially interested and affected persons, agencies, Tribes, and organizations. The public letter provided information about the Project and environmental review scoping period, requested comments on issues to be addressed in the environmental review, and described how to comment (mail, fax, telephone, and the BPA Project website). The public letter was also posted on BPA's Project website[2]to provide information about the Proposed Action and the environmental review process.

Consistent with the Council on Environmental Quality's (CEQ) November 30, 2022, Memorandum and Guidance for Federal Departments and Agencies on Indigenous Knowledge, BPA engaged Tribes and Indigenous Peoples for information and perspectives regarding environmental, cultural, and community impacts. BPA determined that five American Indian tribes (Tribes) have a potential interest in the Project: Jamestown S'Klallam Tribe, Lower Elwha Klallam Tribe, Skokomish Tribal Nation, Squaxin Island Tribe, and Port Gamble S'Klallam Tribe. BPA requested comments on the Proposed Action from the Tribes in the form of a Section 106 consultation letter dated July 19, 2021, and a public scoping letter dated March 23, 2022. BPA also consulted the Tribes on potential cultural resources to help inform BPA's field investigation methods.

Washington Department of Natural Resources (WDNR) responded to BPA's public scoping letter in the form of a comment letter from its Environmental and Legal Affairs – State Environmental Policy Act (SEPA) Center. WDNR provided comments, posted on BPA's Project website,[2] on resources of concern and suggested mitigation measures for a variety of resources. All best management practices (BMPs) and mitigation (avoidance and minimization) measures requested by WDNR have been incorporated into this EA.

In addition to WDNR's comments, BPA received 17 written comments during the scoping period, posted on the Project website,[2] focused on the following:

- Request to include the fiber optic replacement scope of work in the title of the notice.
- Suggestion that because the original Shelton-Fairmount transmission line was constructed in 1949, it may warrant determination of eligibility for listing in the National Register of Historic Places (National Register).
- Request to update cultural resources surveys and reports due to existing cultural resources study being more than 20 years old.
- Concern about the type of improvements to be made and how the structure type could impact the mountain views for a private landowner who is suggesting the line be placed underground.
- Requests by landowners to be informed of activities as construction progresses, for a new NEPA analysis to be conducted given the age of the transmission line, and for BPA to provide measures to manage public shooting and off-road vehicles along the transmission line.
- Request to incorporate habitat enhancement measures for elk populations, including management of tansy, an invasive blackberry plant and noxious weed.
- Support for the Project from various commenters, landowners, and business owners.
- Request by a concerned landowner for information as to whether the easement is accurate and how BPA would be accessing the area near their property.

[2] Shelton-Fairmount No 1 Transmission Line Rebuild Project - Bonneville Power Administration (bpa.gov)

- Request by a landowner for improved road quality and assessment of wetlands, raptor nesting, and vegetation management.
- Request by a landowner for BPA to remain in their designated right-of-way (ROW) and keep roads maintained.
- Request to inform users about power outages and timeframes for return of service.
- Request by a landowner for appropriate vegetation management practices and road maintenance.

The scoping comments are addressed in the appropriate sections of the EA.

2.0 Proposed Action and Alternative

This section describes the existing Shelton-Fairmount No. 1 transmission line and the fiber optic system, the Proposed Action, alternatives dismissed from further consideration, and the No Action Alternative. It also compares how the Proposed Action and the No Action Alternative meet the Project purposes and summarizes the potential environmental effects of the No Action Alternative.

2.1 Existing Transmission Line and Fiber Optic System

2.1.1 Shelton-Fairmount No. 1 Transmission Line

The existing 60-mile-long, 115-kV Shelton-Fairmount No. 1 transmission line heads northeast from BPA's Shelton Substation, north of the City of Shelton, for approximately 2 miles. The transmission line then turns and extends northwest for 5 miles before it turns north and parallels the west side of the Hood Canal for 53 miles until it reaches BPA's Fairmount Substation (Figure 1). The transmission line and access roads cross through Mason and Jefferson counties, generally between the communities of Shelton, Quilcene, and Discovery Bay. The transmission line crosses U.S. Highway 101 north of Shelton Substation, south of Quilcene, and east of Fairmount Substation. The transmission line also crosses State Route 104 southeast of Fairmount Substation.

The Shelton-Fairmount No. 1 transmission line is located within a 250-foot-wide shared ROW with the Shelton-Fairmount No. 2, No. 3, and No. 4 transmission lines. It runs along the eastern edge of the ROW, typically 50 feet from the edge. Most of the transmission line crosses hilly terrain through private and state-owned forested areas. The transmission line crosses approximately 12 miles of public lands managed by the WDNR, with another 0.25 mile crossing lands managed by other state agencies including Washington Department of Fish and Wildlife (WDFW), Washington State Department of Transportation (WSDOT), and State Parks and Recreation Commission (State Parks and Recreation). Approximately 1.5 miles of the transmission line passes through the U.S. Forest Service (USFS)-managed Olympic National Forest. The transmission line also passes through agricultural and residential areas of Mason and Jefferson counties. BPA has easements or other authorizations with underlying landowners for all the transmission line ROW and access roads. Approximately 144 miles of public and private roads are used to access the transmission line (about 90 miles are in Mason County, with the remaining 54 miles in Jefferson County).

The transmission line consists of 446 two- and three-pole H-frame wood structures. Representative photos of the existing transmission line structures are shown in Appendix D, Figure D-2 and Figure D-3. Other structures in the ROW consist of FOWPs, which are single poles supporting only fiber cable. A diagram of an FOWP is provided in Appendix D, Figure D-4. Many of the structures have anchored guy wires used to increase structure stability.

The Shelton-Fairmount No. 1 transmission line supports three conductors (electrical wires) along its entire length, each carrying one phase in the delivery of three-phase power. Currently, the transmission line has an overhead ground wire installed approximately 0.5 miles outside of the Shelton and Fairmount substations, and there is also fiber optic cable on the transmission line that provides communication across the transmission system.

2.1.2 Olympia to Port Angeles Fiber Optic System

The 107-mile-long fiber optic system and its various access roads cross through federal, state, and private land in agricultural and residential portions of Thurston, Mason, Jefferson, and Clallam counties—generally between the communities of Olympia, Shelton, Quilcene, Discovery Bay, and Port Angeles—and intersect at various points with State Routes 8, 101, 104, 108, and 119, and U.S. Highway 101. Approximately 205 miles of private and public access roads, many of which traverse hilly terrain in private and state-owned forested areas, would be used to perform upgrades on the fiber optic system, including 104 miles in Mason County, 64 miles in Jefferson County, 28 miles in Clallam County, and 9 miles in Thurston County. Private lands consist of agricultural, residential, and forested areas of Thurston, Mason, Jefferson, and Clallam counties. Where BPA does not own land in-fee, it has easements or other authorizations with underlying landowners for all the transmission line ROWs and access roads.

The fiber optic system is attached to transmission structures along three separate BPA transmission lines: Olympia-Shelton, Shelton-Fairmount No. 1, and Fairmount-Port Angeles No. 1. It begins about 3.5 miles southwest of the City of Olympia at the Olympia Substation and continues north past the Shelton Substation for approximately 80 miles before turning west at the Fairmount Substation and running approximately 27 miles to the Port Angeles Substation in the City of Port Angeles (Figure 1). The fiber optic system passes through agricultural and residential areas of Clallam, Jefferson, Mason, and Thurston counties.

The portion of the fiber optic system attached to the Olympia-Shelton transmission line—which crosses both private and state land—is located within a 400-to-600-foot-wide ROW corridor shared with up to eight other BPA transmission lines. The portion of the fiber optic system attached to the Fairmount-Port Angeles No. 1 transmission line—which crosses federal, private, and state land—is located within a 200-foot-wide ROW corridor shared with the Fairmount-Port Angeles No. 2 transmission line. The fiber optic system crosses lands attached to the 60 miles of the Shelton-Fairmount No. 1 transmission line that include state (WDFW, WDNR, WSDOT, State Parks and Recreation) and USFS lands as described in Section 2.1.1.

2.1.3 Maintenance and Vegetation Management

BPA conducts routine periodic inspections, maintenance, and vegetation management for the 15,000-circuit-mile federal transmission system in the Pacific Northwest. When transmission line, access road maintenance, or vegetation management is required for a BPA transmission line, BPA conducts an environmental review process for those site-specific maintenance activities as needed.

BPA conducts vegetation management along the Shelton-Fairmount No. 1, Olympia-Shelton, and Fairmount-Port Angeles No. 1 transmission line ROWs every 3 to 5 years to keep vegetation at a safe distance from the conductors, maintain access to structures, and control noxious weeds. Vegetation management is guided by BPA's *Transmission System Vegetation Management Program Final Environmental Impact Statement/Record of Decision* (BPA 2000). Depending on the vegetation type, environment, and landowner, several different vegetation management methods could be used, including manual (e.g., hand-pulling, clippers, chainsaws); mechanical (e.g., roller-choppers, brush-hog); or chemical (e.g., herbicides).

BPA manages vegetation in the transmission line ROW to ensure that tall-growing species do not grow into or near conductors and to remove select "danger trees" adjacent to the ROW that have the potential to grow or fall into the transmission line. Identifying danger trees includes determining tree height and growth potential, tree lean, tree stability and health (e.g., root pathogen damage), and whether they are located in areas with severe storm damage potential. Sapling red alder (*Alnus rubra*), big-leaf maple (*Acer macrophyllum*), and seedling conifers are routinely removed from the ROW to prevent establishment of tall-growing woody vegetation. Shrubs that are less than about 20 feet at maximum height are allowed to grow, along with herbaceous species. BPA most recently conducted vegetation management in 2021 on the Shelton-Fairmount No. 1 transmission line and the next maintenance is scheduled for 2024. BPA completed vegetation management in 2022 on the Olympia-Shelton and Fairmount-Port Angeles No. 1 segments and both are scheduled to be managed again in 2025.

2.2 Proposed Action

Under the Proposed Action, BPA would rebuild the Shelton-Fairmount No. 1 transmission line—replacing existing H-frame structures, conductors, and hardware, and adding two optical ground wires for the entire length of the line—and upgrade the fiber optic system from a 36-count to 72-count over the 60 miles of the Shelton-Fairmount No. 1 transmission line ROW, as discussed in Section 2.1.2. BPA would also upgrade as needed the access road system that would be used during the Project. BPA would continue to operate the Shelton-Fairmount No. 1 transmission line at 115-kV.

The Proposed Action would include the following:

- Replace the wood-pole transmission line structures in kind and add new structures where needed (structures not always in same location).
- Replace cross arms, insulators, hardware, guy wire, and guy anchors.
- Reinforce existing lattice steel towers by replacing/reinforcing steel members.
- Install dampers on conductors.
- Replace conductors and replace or install overhead ground wire and counterpoise.
- Install two optical ground wires on the Shelton-Fairmount No. 1 segment and replace fiber optic cable on the Olympia-Shelton and Fairmount-Port Angeles No. 1 segments.
- Replace and upgrade substation equipment.
- Establish temporary construction areas including staging areas, helicopter landing zones, and conductor and fiber optic cable pulling/tensioning sites.
- Remove danger trees and other vegetation.
- Upgrade the access road system, including stream crossing facilities such as bridges and culverts.
- Mitigate unavoidable Project impacts to wetlands through the Hood Canal Coordinating Council (HCCC)'s In-Lieu Fee (ILF) Mitigation Program and BPA-led off-site wetland enhancement, restoration, and creation.

Table 2-1 summarizes Project activities under the Proposed Action. All activities are described in detail in the following subsections.

Table 2-1: Summary of Proposed Action

Proposed Action Component	Quantity: Olympia-Shelton	Quantity: Shelton-Fairmount No. 1	Quantity: Fairmount-Port Angeles No. 1
Transmission Structure Replacement[1]			
Replace two- pole wood structures	10	373	27
Replace three-pole wood structures	0	73	1
New single-pole structures	21	7	5
Remove two-pole wood structures	0	0	1
Wood pole structure reinforcements[2]	71	0	103
Lattice steel tower reinforcements (Modifications/Reinforcements)	9/4	0	4/4
Lattice steel disconnect switch	0	2	0
Access Road Activities[3]			
Reconstruction	1 mile	4 miles	7 miles
Improvement	19 miles	37 miles	24 miles
New	210 feet	0.80 mile	0.10 mile
Decommission	0	0.30 mile	0
Gates (Replacements and New)	12	26	11
Gates (Repair)	1	3	0
Cross Drain Culverts (New/Repair/Replace)[4]	4/1/0	140/1/4	5/5/0
Culverts (New/Repair/Replace)	0/1/7	41/3/49	0/2/8
Bridges (New/Replace)	1/0	2/0	0/0
Ford (New/Repair)	0/3	1/0	2/0
Landings (New/Repair)	15/38	151/255	54/7
Permanent Vegetation Removal			
Removal or disturbance of low-growing vegetation in the transmission line ROW for structure work and landings	34 acres	34 acres	34 acres

Proposed Action Component	Quantity: Olympia-Shelton	Quantity: Shelton-Fairmount No. 1	Quantity: Fairmount-Port Angeles No. 1
Temporary Vegetation Removal			
Removal or disturbance of low-growing vegetation in the transmission line ROW for structure work and landings	63 acres	63 acres	63 acres
Vegetation Removal			
Removal of danger trees adjacent to the transmission line ROW	1,000 trees	1,000 trees	1,000 trees

Notes:

[1]There are 446 transmission structures on the Shelton-Fairmount No. 1 transmission line

[2] E.g., Guy/anchor, cross arm, cross brace

[3]Direction of travel roads, existing roads that would be used in their current condition without any upgrades, are not included in this table

[4]Cross drain culverts provide surface water runoff management on access roads and are not located in streams

2.2.1 Replacement of Transmission Structures

Transmission line structures are individually numbered by line mile and structure in the line mile for each circuit (e.g., structure 3/4, or "three over four," is the fourth structure in the third mile of the transmission line). Structure 1/1 is at the Shelton Substation and Structure 60/9 is at the Fairmount Substation. The distance between individual structures is called a span. Spans range from 30 to 1,590 feet, with about six to 10 structures in each line mile.

The Proposed Action would replace all 446 existing wood-pole structures and two lattice steel switch structures on the Shelton-Fairmount No. 1 transmission line with new wood-pole and lattice steel switch structures, respectively. Replacement poles would typically be installed within 5 to 10 feet of their existing location and would avoid sensitive resources (e.g., wetlands) when practicable. The existing holes would be backfilled with soil excavated from the new structure locations. Excess soil remaining after pole replacements would be spread within 5 feet of pole bases or removed from the site. Blasting may be required in some locations where bedrock is present. If necessary, applicable timing and special restrictions would be followed during blasting near sensitive cultural or biological resources.

Because they do not have to withstand the stresses created by angles in the conductors, two-pole wood suspension structures (Appendix D, Figure D-2 and Figure D-5) would be used where structures are in a straight alignment or make a slight turn (turning angles less than three degrees). Three-pole wood dead-end structures are stronger due to their structural configuration and use of guy wires and anchors. They would be placed at intervals along the transmission line to independently hold the weight and tension of the conductors and would also be used at turning angles greater than three degrees or on longer spans (Appendix D, Figure D-3 and Figure D-5).

Structure replacement would include installing steel cross arms and braces, dampers, insulators, and guy wires and anchors (Appendix D, Figure D-5). Cross arms hold up the conductors; braces form an "X" between wood poles for stability; dampers minimize vibration of conductors; and insulators are strings of bell-shaped devices that prevent electricity from moving from the conductors to the structures and traveling to the

ground. On structures that are not replaced, wood cross arms and cross braces would be replaced with steel cross arms and braces as required. Existing porcelain insulators would be replaced with glass insulators that can be more reflective depending on the angle of the viewer and the sun.

Some of the existing transmission structures have one to 10 guy wires depending on the structure type. Guy wires attach at various points along the structure and are anchored at the ground (by plate or screw anchors) to lend stability to structures (see Appendix D, Figure D-5). If anchor locations need to be moved, existing guy wires would be cut off below grade and the anchors left in place. New anchor locations would be placed within 75 feet of new poles. Holes excavated for plate anchors would be 4.5 feet wide by 7 feet long (about 31 square feet of disturbance per anchor). A trench approximately 6 to 12 inches wide by 2 to 3 feet deep would be dug to connect the anchor rod to the plate anchor. Plate anchors would be set in crushed rock and the remainder of the hole would be backfilled with native soil. Helical anchors—which are screwed directly into the soil, minimizing the disturbance area and generating no spoils—would be used in wetland areas where soil conditions permit.

The height of replaced wood-pole structures would be similar to existing structures in most cases, ranging from 45 to 95 feet above ground depending on terrain, requirements for road crossings, and the distance between the top of low-growing vegetation and the conductor (Appendix D, Figure D-5). Proposed wood-pole structure heights in some locations would be increased by approximately 5 to 35 feet to provide increased clearance from the conductor to the ground and allow for the addition of fiber optic cable on the Shelton-Fairmount section.

Temporary disturbance for transmission structure replacement activities would be approximately 100 by 100 feet (0.2 acre) for two- and three-pole H-frame structures. Structures with guy wires would also have a 3 by 7 foot (21 square foot) temporary disturbance footprint for each guy wire anchor. Permanent disturbance would be 10 by 30 feet (0.007 acre) for a two-pole structure and 10 by 50 feet (0.01 acre) for a three-pole structure.

The temporary disturbance footprint at structure removal locations would be approximately 75 by 75 feet (0.13 acre) and there would be no permanent disturbance since the structure location would be reclaimed. Structures would be cut off near the base or pulled from the ground and removed using a crane or helicopter. To prevent continued leaching of wood preservative into the soil, any structure bases in the ground following cut-off would be excavated and removed, except in cases where removing them could destabilize a hillside and potentially cause more environmental damage (e.g., Structure 2/2 on the Fairmount-Port Angeles No. 1 transmission line). Old structures would be hauled away via semi-truck and disposed of at a BPA-approved landfill.

Permanent structure landings, used to provide space for equipment and vehicles during construction and maintenance, would be constructed at 207 structures located in steep terrain. These landings would each add approximately 0.07 acre to the permanent disturbance area described above. For structures located in gentler terrain, the existing area around the structures would be used as permanent landings. In addition, there are a total of 263 permanent landings in need of repair, which would consist of grading and fill as needed.

Like most wood poles used for utility or telephone lines, replacement wood poles would be pretreated with the preservatives pentachlorophenol (PCP) and 4,5-Dichloro-2-n-Octyl-4-Isothiazolin-3-One (DCOI) to lessen wood rot and extend the life of the poles. To prevent leaching of PCP and DCOI into waterbodies, pole wraps would be installed for wood poles located within 50 feet of wetlands or streams or poles located in floodplains.

2.2.2 Replacement of Conductors, Overhead Ground Wire, and Counterpoise

The Shelton-Fairmount No. 1 transmission line supports three conductors (wires that carry electrical current) (see Appendix D, Figure D-5). New conductors would be installed with new hardware and insulators. New non-lustrous conductors would be 0.951 inch in diameter and would be installed after the replacement structures are erected.

The NESC and BPA specify the minimum conductor clearance above the ground surface and other features (e.g., streetlights, electrical distribution lines, etc.). Replaced conductors would follow the minimum vertical conductor clearance of 24 feet for new construction of a 115-kV line. Additional conductor-to-ground clearance would be provided over roadways and river crossings.

Where needed, dampers would be installed on conductors that are within 15 feet of insulators. Dampers suppress wind-induced vibrations on taut conductors offering better protection against storms and preserving conductors from wear and premature fatigue failures.

Replacement components would be compliant with the *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Reducing Avian Collisions with Power Lines: The State of the Art* (APLIC 2012). Bird flight diverters would be installed on conductor and/or fiber optic cable spans where an increased risk of bird strikes exists (e.g., wetlands, rivers, and marbled murrelet habitat).

Existing overhead ground wire that protects substation equipment from lightning strikes is present in the first 0.5 mile out from the Shelton and Fairmount substations. The Shelton-Fairmount No. 1 transmission line would have two optical ground wires installed. The optical ground wire is a dual functioning cable, designed to replace traditional overhead ground wires on overhead transmission lines with the added benefit of containing optical fibers which can be used for telecommunications purposes (see Appendix D, Figure D-5). Counterpoise was originally installed at structures within 0.5 mile of the Shelton and Fairmount substations. This existing counterpoise would be replaced, and the new counterpoise installation would be expanded to all new transmission line structures in the Project. New counterpoise would be buried between the poles and connected to grounding rods (see Appendix D, Figure D-5). The disturbance area for counterpoise installation requires buried ground wires installed up to 100-feet ahead and back of a structure with 30-inch-long ground rods connected to the ends of each ground wire.

The last span into Shelton and Fairmount substation would be an overhead ground wire since the fiber would be installed underground prior to being terminated at the substation.

Existing conductors and overhead ground wires would be removed by reeling the wires onto large spools using a large truck called a puller. The puller would be set up with empty reels to hold the old conductors as they are reeled in. Once removed, the old conductors would be delivered to a metal salvage location and recycled.

2.2.3 Installation of the Fiber Optic System

A new fiber optic cable would be attached to transmission structures on the Olympia-Shelton and Fairmount-Port Angeles No. 1 transmission lines while the Shelton-Fairmount No. 1 transmission line would have two fiber optic cables (i.e., optical ground wires) installed along its entire length. The fiber optic cable would be used as part of a communication system that can gather information about the transmission system (such as whether the line is in service, the amount of power being carried, meter readings at interchange points, and status of equipment and alarms). The fiber optic cable would also allow voice communication between power dispatchers and line maintenance crews and would relay instantaneous commands for controlling power system operation.

The fiber optic cable would be less than 1 inch in diameter and would be mounted either above or below the conductors depending on the location and type of structure. Every 3 to 5 miles there would be a fiber optic splice/stringing location that allows tension to be placed on the fiber optic cable. Splice cases, about 40 inches tall by 10 inches in diameter, would be mounted on structures. Fiber optic cable vaults (4-foot-by-4-foot concrete boxes), partially buried, would be located just outside the substation fence. Approximately 33 FOWPs designed to support the fiber optic cable would also be installed. These poles are typically installed to support overhead-to-underground fiber transition and to bypass existing transmission line structures as required.

2.2.4 Establishment of a Temporary Staging Area, Helicopter Landing Zones, and Pulling/Tensioning Sites

Temporary staging areas, usually placed outside of the transmission line ROW, would be used to store and stockpile wood poles and materials, trucks, and other equipment during construction. Currently, one staging area has been identified. It would be located northwest of the Shelton Substation and west of Highway 101 near the Mason County Public Works Department in a cleared area approximately 1 mile from the Shelton-Fairmount No. 1 transmission line. The staging area would occupy approximately 10 to 20 acres. Other staging areas may be identified during construction and would need to be evaluated by environmental specialists.

Approximately 25 helicopter landing zones have been identified along the Shelton-Fairmount No. 1 transmission line in previously cleared areas. Helicopters would be used during stringing of conductor and fiber optic cable. Except when avoiding sensitive areas (marbled murrelet habitat, residences, and schools) or where prohibited by the Federal Aviation Administration (FAA), helicopter flight paths would follow BPA's ROW when in close proximity to the Project area. An FAA congested area plan including the use of flaggers may be required where the transmission line crosses U.S. Highway 101 and Washington State Highways 8, 104, 108, and 119.

The conductor and overhead ground wire would be installed by establishing pulling/tensioning sites at the beginning and end of each identified pulling section. These sites are used for pulling and tightening the conductor and fiber optic cables to the correct tension once they are mounted on transmission line structures. Sites selected can accommodate pulling and tensioning equipment but may first need to be cleared of interfering vegetation and graded (using a chainsaw, mowers, brushing machines, heavy equipment, or hand tools) to position the equipment. These sites would be located in the ROW where possible. Most of the pulling/tensioning sites would be approximately 300 feet long by 100 feet wide (ROW width) ahead or back online of a structure (about 0.70 acre or up to 1.4 acres if both sides are used). Ground disturbance would occur from leveling and grading of the pulling and tensioning sites.

After the equipment (puller and tensioner) is set up, a sock line (usually a rope) would be temporarily strung through all structures on the section using a helicopter or workers on the ground (see Appendix D, Figure D-6). The tensioner is a large piece of equipment with drums that the new conductor is fed through to set the proper tension. The sock line would be connected to a hard line (typically a small, stranded steel wire), which would be connected to the new conductor or fiber optic cables and pulled through the structures. Once the new conductor is pulled into place, it would be tensioned and sagged in place and secured to all the structures.

Guard structures are temporary wood-pole structures with two poles that have a cross arm between the poles and are placed on both sides of a facility (e.g., distribution lines, roads, railroad crossings) to catch conductors, ground wire, or fiber optic cable in the unlikely event that the conductors/wires/cables fall while

being removed or installed. Guard structures would be removed after the conductors/wires/cables are strung. Construction contractors may also choose to use a bucket truck with a folding guard arm or similar device instead of the guard structure.

2.2.5 Upgrade of the Access Road System

The system of roads that provides access to the Olympia-Shelton, Fairmount-Port Angeles No. 1, and Shelton-Fairmount No. 1 transmission lines would be upgraded to help provide safe access while rebuilding the transmission line, replacing the fiber optic system, and performing ongoing operation and maintenance activities. BPA uses this system of access roads through a mix of permits or access road easements across public and private land. Access roads are located within the transmission line ROW as much as possible, but some are located outside of it.

Typical BPA access roads are 14 feet wide with an additional 3-foot offset from each side of the road for slopes or drainage ditches. The total disturbance width for typical BPA access roads is approximately 20 feet. BPA's road standards include installations of rock fords, water bars, drain dips, and cross drain or stream culverts to manage surface water runoff. For joint-use roads located on state-trust and other agency-owned lands, BPA consults with the agency regarding road standards.

There would be a total of approximately 144 miles of access roads used for the Shelton-Fairmount No. 1 transmission line rebuild and fiber optic system installation and a total of 60 miles used for the Olympia-Shelton and Fairmount-Port Angeles No. 1 fiber optic system replacement. Approximately 92 miles of these access roads would need work (either new construction, reconstruction, or improvement) and 112 miles would be used as is (direction of travel roads).

Access road work falls into the following categories (see Table 2-1):

- Access road reconstruction – Approximately 11 miles of existing access roads that have deteriorated to the point of being unusable by construction equipment would be reconstructed. This includes vegetation removal, road prism reconstruction, grading, widening, gravelling, and installing drainage features or culverts. Approximately 4 miles of reconstruction would occur on WDNR-managed land with about 7 miles of access roads reconstructed on private lands.
- Access road improvements – Approximately 81 miles of existing access roads would be improved with minor adjustments, including cleaning, shaping, and compacting the existing road surface, gravelling, or installing drainage features, of which approximately 5 miles would be located on USFS-managed land, 23 miles on WDNR-managed land, and about 51 miles on private lands, with the remainder located on tribal, state parks and recreation, non-government organization, and county lands.
- Access road new construction – Approximately 1 mile of new access roads would be constructed on private and WDNR-managed land. Construction activities would include vegetation removal, road prism shaping, grading, gravelling, and installing drainage features.
- Direction of travel – Approximately 112 miles of direction-of-travel roads would be accessed for construction activities. Direction of travel roads are existing roads that would be used in their current condition without any improvements or upgrades and would be maintained in as good or better condition during and after construction. Aggregate may be added to the existing surface and compacted with a roller, but no clearing or work would occur outside the existing road prism. No new easements or ROWs would be necessary. Two miles of direction-of-travel roads are located on USFS-managed land, 2 miles on tribal land, 36 miles on WDNR-managed land, approximately 69 miles on

private property, and the remaining 3 miles are located on non-government organization land, WDFW land, and state parks and recreation land.

- Decommissioned roads – Approximately 0.3 mile of BPA's existing access roads on the Shelton-Fairmount No. 1 transmission line would no longer be needed and would be abandoned and rehabilitated. BPA would use native seed and weed-free straw and cover abandoned road segments with slash from tree removal to revegetate this decommissioned road. Species compositions and quantities would be determined in coordination with the appropriate landowner.

Other access road work would include installing a total of 50 new and replacement gates at entrances to access roads to prevent public access to private lands and the transmission line ROW. Gate locks would be coordinated with landowners to ensure that both BPA and the landowner can unlock them.

Approximately 41 new culverts would be installed at existing stream or drainage crossings and 70 existing culverts would be repaired or replaced. A total of 149 new cross drain culverts would be installed and 11 would be repaired or replaced. Six fords would be installed or repaired on existing access roads. Each newly constructed and repaired ford would consist of rock (riprap and coarse aggregate) embedded in the stream channel to a depth of approximately 18 inches; the finished grade of the fords would be even with the adjacent stream bed and bank. The fords would be 16 feet wide (i.e., the width of a standard access road), but the length of each feature would vary depending upon the width of the stream channel being crossed.

Three new permanent bridges would be installed to facilitate construction access, two on the Shelton-Fairmount No. 1 transmission line and one on the Olympia-Shelton transmission line. The bridges would be steel-framed structures and may have guard rail or gutters with a graveled or paved surface. The first bridge would be located at an existing culvert crossing in mile 60 of the Shelton-Fairmount No. 1 transmission line. This proposed bridge would be a prefabricated 16-foot-wide by 60-foot-long bridge. The second bridge on the Shelton-Fairmount No. 1 transmission line would be located in mile 31 at an existing road crossing and would consist of a prefabricated 16-foot-wide by 80-foot-long bridge. The third bridge would be a bottomless arch or three-sided box culvert approximately 25 feet wide by 50 feet long in mile 15 of the Olympia-Shelton transmission line. All bridges would fully span the stream channel.

The installation or repair of culverts, fords, and bridges may require isolation of work areas within the stream channel if flowing water is present during construction. Isolation measures may include sandbag coffer dams, turbidity curtains, or similar devices that prevent construction debris, sediment, and turbidity from entering the flowing channel. All construction activities within fish-bearing streams would be conducted utilizing applicable WDFW and federal Endangered Species Act (ESA) conservation measures, and, where applicable, subject to BPA's ESA Section 7 Programmatic Conference and Biological Opinion (WCR-2014-1600) with National Marine Fisheries Service (NMFS).

2.2.6 Removal of Trees and Other Vegetation

Vegetation would be removed or disturbed at structure sites and in temporary work areas to facilitate construction and ensure safe operation of transmission lines. Approximately 63 acres of low-growing herbaceous and shrub vegetation in these areas would be crushed, removed, or cut for rebuild activities within temporary work areas, while approximately 34 acres would be crushed, removed, or cut for rebuild activities within permanent landing areas. Nearly all pulling and tensioning sites are located entirely within the existing ROW and are vegetated with low-growing shrub and herbaceous vegetation. However, three pulling and tensioning sites collectively encompassing about 0.5 acre extend outside the ROW into forested areas and may accordingly require limited tree removal to provide a safe workspace for pulling and tensioning operations.

Trees identified for removal outside the ROW are called "danger trees" because they have the potential to cause flashovers or line outages. Approximately 1,000 danger trees would require removal adjacent to the transmission line ROW with about 248 of these trees located on WDNR-managed lands and 87 on USFS-managed lands. Most danger trees identified for removal are Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), red alder (*Alnus rubra*), and bigleaf maple (*Acer macrophyllum*) trees ranging from 6 to 63 inches in diameter. Danger trees would be removed to allow long construction vehicles, such as trucks with trailers, the ability to navigate turns along the road.

All areas disturbed by tree and vegetation clearing along the edges of the transmission line ROW and access roads and in pulling and tensioning sites would be reseeded following construction (trees would be allowed to regrow in areas located off the ROW). BPA would use a seed mix with a diversity of native species; a source close to the Project area would be sought and, if not available, an appropriate regional native mix would be used. WDNR and USFS would provide a seed source or list for revegetating disturbed areas on those respective lands.

2.2.7 Replacement of Substation Equipment

The fiber optic system upgrade would require work at the Olympia, Shelton, Fairmount, Happy Valley, and Port Angeles substations. This work would include replacing and routing fiber optic cable from the new vaults outside the substations to the control house and replacing patch panels in control houses.

Additionally, the work required at the Shelton and Fairmount substations would include replacement of three disconnect switches and rigid bus risers and rod gaps with seismic risers and surge arresters. Lastly, Supervisory Control and Data Acquisition (SCADA) equipment would be replaced at the Fairmount Substation. No expansion of the substation footprint would be required and all activities would occur entirely within the fenced and rocked substation yard or within the substation control house. Ground disturbance would be limited to replacement of footings associated with equipment replacement and trenching of fiber optic cable where existing conduit cannot be used.

2.2.8 Construction Activities

A typical construction crew for a wood-pole replacement project consists of 50 to 80 people, including transmission line and access road construction workers, inspectors, administrative personnel, surveyors, and other support personnel.

Construction vehicles required for structure replacement could include a bucket truck, a dump truck, an excavator, cranes, and a digger derrick. A helicopter (Type 2 or smaller) may also be used for structure replacement in areas with limited vehicle access or for restringing conductors, fiber optic cable, and ground wire along all, or portions of, the transmission lines. The construction contractor would remove the old conductor with a smaller steel cable and pull the steel cable out with a high-strength nylon rope. After structure replacement, the helicopter would fly in a nylon rope and pull in a steel cable, which then pulls in the new conductor.

A total of seven BPA transmission lines would be taken out of service (power outage) temporarily at various times during construction, including Fairmount-Port Angeles No.1, Olympia-Shelton Nos. 1, 2, and 5; Satsop-Shelton No. 1; and Shelton-Fairmount Nos. 1 and 2. These temporary outages are required to install fiber on existing structures, rebuild the Shelton-Fairmount No. 1 transmission line, and temporarily reconfigure electrical service at Duckabush and Potlatch substations to maintain power to Mason PUD #1 and Mason PUD #3 customers while BPA rebuilds portions of the Shelton-Fairmount No. 1 line. Transmission line outage scheduling is a carefully planned effort that requires BPA Operations and Planning approval and coordination with Jefferson PUD, Mason PUD #1, and Mason PUD #3 to minimize effects of outages to the general public.

BPA may request up to two 12-hour "midnight" outages per year during three of the four construction seasons (six total outages). It's important to note that only some of these outages would interrupt electrical service to PUD customers. BPA, Jefferson PUD, Mason PUD #1, and Mason PUD #3 are coordinating on the timing, quantity, and duration of the planned outages to minimize their effect on PUD customers. Once they reach agreement on the outage schedule, BPA would provide the construction schedule to the PUDs so they can inform their customers in advance of the outages.

Any materials removed during construction (wood-pole structures, hardware, conductors, disconnect switches, culverts, and gates) would be trucked off site for recycling or disposal at an appropriate facility. If any damage to crops, timber, or property occurs because of BPA's construction activities, BPA would compensate landowners for the damage as appropriate.

2.2.9 Compensatory Mitigation for Impacts to Wetlands and Stream/Wetland Buffers

Although construction activities would avoid wetland and stream impacts to the extent practical, some impacts on wetlands, wetland buffers, and stream buffers (see Section 3.4, Wetlands) would be unavoidable, requiring compensatory mitigation through BPA-led restoration of wetland and stream habitat in the affected watersheds and support of the HCCC-led restoration through an approved ILF Mitigation Program.

The HCCC's ILF Mitigation Program conducts aquatic restoration projects in parts of Kitsap, Jefferson, and Mason counties in Washington. The mitigation projects are strategically sited within a watershed to maximize ecological benefits. BPA's purchase of HCCC credits would fund restoration activities that would mitigate impacts to wetlands and wetland and stream buffers from the Shelton-Fairmount transmission line rebuild portion of the Project.

Mitigation for wetland and wetland and stream buffer impacts from the fiber optic system replacement along the Olympia-Shelton and Fairmount-Port Angeles No. 1 portions of the Project would occur through BPA-led aquatic restoration activities based on well-established aquatic and terrestrial restoration techniques of demonstrated effectiveness in supporting and restoring aquatic and upland species and habitats. BPA would conduct site-specific environmental effects analysis upon identification of future mitigation actions to support the Project. Potential wetland and stream restoration activities are summarized below.

BPA-led mitigation efforts may include wetland preservation, restoration, enhancement, and/or creation. Preservation consists of preventing wetland decline or removing a threat to wetland functions. Restoration refers to returning a degraded wetland closer to its pre-disturbance state via physical, chemical, or biological changes. Enhancement involves modifying the structural elements of a wetland to improve one or more of its functions, such as providing fish habitat or water filtration. Creation is the establishment of a new self-sustaining wetland where one did not previously exist.

Stream channel reconstruction, which consists of re-meandering or relocating a primary active channel, is another type of mitigation activity that BPA may pursue. Reconstruction may include adding structural elements to a stream channel, such as streambed simulation materials or hydraulic roughness elements. Stream channel reconstruction is used to improve aquatic and riparian habitat diversity and complexity, reduce bed and bank erosion, increase hyporheic exchange (the exchange of water between the stream and groundwater), provide long-term nutrient storage, provide substrate for macroinvertebrates, moderate flow disturbance, increase retention of organic material, and provide refuge for fish and other aquatic species.

Similarly, mitigation may involve improving secondary stream channel and floodplain interactions. This could be accomplished by re-establishing historical stream channels within floodplains or creating new self-sustaining side channel habitats. It could also involve restoring or modifying hydrologic and other essential

habitat features of historical river floodplain wetlands, swales, and/or historical floodplain channels. Removing fill from past channelization or other earthworks, for example, is a technique that can help restore natural freshwater wetland and floodplain functions.

Another mitigation option would involve installing habitat-forming structures, such as wood and boulders, in floodplain wetlands, swales, and/or historical floodplain channels. The strategic placement of these habitat forming materials increases structural complexity and diversity to benefit aquatic species.

Design criteria for a specific restoration action would be focused on balancing biological benefit, structural resiliency, and enhancing and complementing hydrologic processes; chosen design criteria would be specific to the habitat for which the benefits are intended.

Mitigation may also involve planting trees, shrubs, herbaceous plants, and aquatic macrophytes to help stabilize soils or restore wetland, floodplain, and riparian plant communities. Vegetation management strategies would guide any planting and would specify seed/plant source, seed/plant mixes, and soil preparation needs that conform and are suitable to local native plant community succession and disturbance regimes.

Invasive plant control and vegetation management are also mitigation options for restoring wetland and streambank habitat. There are several potential ways that BPA could control or eliminate non-native, invasive plant species that compete with or displace native plant communities, including manual and mechanical control, herbicide application, or prescribed burning. The particular selection of vegetation management techniques for a specific mitigation site would be based on site-specific analysis of local noxious weed priorities.

2.2.10 Anticipated Construction Schedule

The construction schedule would depend on the completion and outcome of the environmental review process, including the duration of regulatory agency reviews, consultations with Tribes, and timing of permit and consultation approvals. Construction work would be done in phases, with construction occurring on more than one structure at a time in each transmission line ROW segment (see Figure 1). The current construction plan is to perform construction over a 4-year period as follows:

- Shelton-Fairmount No. 1 – Shelton-Duckabush segment (February 2025 to November 2025)
- Shelton-Fairmount No. 1 – Duckabush-Fairmount segment (March 2026 to December 2026)
- Fairmount-Port Angeles No. 1 (March 2027 to October 2027)
- Olympia-Shelton (June 2028 to October 2028)

The following seasonal construction restrictions would be implemented to avoid or minimize impacts on fish and wildlife:

- In-water work: All work within fish-bearing streams would be conducted during dates listed in the most recent version of *Times When Spawning or Incubating Salmonids are Least Likely to be Present in Washington State Freshwaters* (WDFW 2018).
- Marbled Murrelet: Suitable habitat is located at or between Olympia-Shelton structures 6/1 to 6/4 and 7/3 to 9/1; Shelton to Fairmount No. 1 structures 19/4 to 21/2, 32/5 to 33/4, 41/4 to 44/2, 46/7 to 48/3, and 52/8 to 53/3; and Fairmount to Port Angeles No. 1 structures 4/2 to 8/7, 6/8 to 8/4 (occupied habitat), 14/2 to 14/4, 18/1 to 18/6, 19/2 to 19/7, and 20/7 to 21/3. During the nesting period (April 1 to September 23), all construction activities (chainsaw activity, helicopter use, road improvement or reconstruction, culvert replacement or installation, and structure replacement)

within 110 yards of suitable and occupied habitat would begin 2 hours after sunrise and end 2 hours before sunset. No helicopter use would be allowed within 50 yards of suitable or occupied habitat within the nesting period. However, human presence, staging, and vehicle use of existing heavily-used roads can occur during the nesting period without daily timing restrictions as long as no heavy equipment is used.

- Migratory birds and raptors: Tree removal would not occur between March 1 and September 15 as much as practical to avoid displacement of nesting birds. If tree clearing is needed during this time, a pre-construction nesting bird survey would be completed prior to the tree removal.

2.3 No Action Alternative

Under the No Action Alternative, BPA would not rebuild the Shelton-Fairmount No. 1 transmission line, replace the fiber optic system, or upgrade access roads as a single coordinated project. Construction activities described under the Proposed Action would not occur. However, the reliability and safety concerns that prompted the need for the Proposed Action would remain. BPA would continue to operate and maintain the Shelton-Fairmount No. 1 transmission line and fiber optic system in their current condition, replacing components as they fail, replacing aged and rotting structures as they deteriorate, maintaining access roads to allow access to structures on an as-needed basis, and managing vegetation for safe operation.

Given the current poor condition of the Shelton-Fairmount No. 1 transmission line and the fiber optic system, the No Action Alternative would likely cause more frequent and disruptive maintenance activities than previously required. It would be possible to plan some repairs, but many would likely occur on an emergency basis as the transmission line and fiber optic system deteriorate.

The overall scale and scope of emergency and other imminent maintenance repairs would be much narrower than what would be done under the Proposed Action. The maintenance program addresses immediate needs to keep transmission lines functioning and would therefore likely not include more comprehensive improvements such as access road work to improve water runoff, fish-passable culvert replacements, conductor replacement, wetland mitigation, or installation of fiber optic cable. Should the No Action Alternative be chosen, access road work would be limited to repairs necessary to allow access to specific structures for as-needed repairs and maintenance.

2.4 Alternatives Dismissed from Further Consideration

Undergrounding of the transmission line, described below, is an alternative that BPA considered but deemed infeasible and thus eliminated from detailed analysis.

During public scoping, a commenter requested that the Shelton-Fairmount No. 1 transmission line be removed above ground and relocated underground. Because of the high costs associated with undergrounding high-voltage transmission lines, BPA has only used underground cable in limited situations, such as for the long-water crossings in the San Juan Islands of Washington where an overhead route is not possible. For the Shelton-Fairmount No. 1 transmission line, placing the existing line underground would substantially increase costs and environmental impacts compared to merely replacing the existing overhead structures. Some additional costs and impacts that would result from undergrounding the transmission line include the following (described in a white paper by Xcel Energy 2014):

- During outages, the failed equipment that caused the outage would be more difficult to locate and repair, which could result in longer outages.
- Additional equipment would be required on the underground system to compensate for voltage

changes and forced cooling (higher voltages generate heat while transmitting electricity and if not reduced, could lead to failure).

- Construction impacts would be much greater because the entire length of the ROW would be trenched through agricultural fields, wetlands, and waterways; up and down steep terrain; and through sensitive areas.
- Concrete vaults and manholes would be needed at regular intervals along the line for access.
- In addition to the existing substations, transition stations would also be required on either end of the line to terminate the underground cables and connect to the overhead transmission system.
- Construction would take three to six times longer than overhead line construction.
- The life expectancy of the underground line would be about half of an overhead line because the insulation surrounding the conductor breaks down over time and must be replaced.
- Undergrounding the line would cost between four and 15 times more than keeping the line overhead.

Because of the higher construction and maintenance costs, environmental impacts, and reduced life expectancy, BPA did not consider replacing the existing line with an underground cable as a reasonable alternative for ensuring the integrity and reliability of the Shelton-Fairmount No. 1 transmission line. This alternative was therefore not carried forward for detailed analysis.

2.5 Comparison of Alternatives

The potential direct and indirect environmental impacts of the Proposed Action and No Action Alternative—based on the analysis presented in Section 3.0 for soils and geologic hazards, vegetation, water resources and floodplains, wetlands, wildlife and fish, and cultural resources—are summarized in Table 2-2. As described in Table 3-1, BPA did not further evaluate the remaining resources because it determined that they were either not applicable to the Project or that the Project would have a minor or nonexistent impact on them.

Table 2-2: Comparison of the Potential Direct and Indirect Environmental Impacts by Alternative

Resource	Proposed Action Direct and Indirect Impacts	No Action Alternative Direct and Indirect Impacts
Soils and Geologic Hazards	Impacts would be low to moderate during transmission structure work, which would include ground clearing, soil piling, and compaction from heavy equipment for road reconstruction, improvements, and new roads; or potential contamination from wood-pole preservative or accidental equipment spills. About 63 acres of soils would be temporarily disturbed during structure work, with about 34 acres permanently impacted adjacent to structures and at their landings. Approximately 24 acres of soils would be permanently disturbed and 66 acres temporarily disturbed for road reconstruction, road improvements, and new roads.	Impacts would be low to moderate and similar to those of the Proposed Action but would be spread out over a longer timeframe as emergency repairs are needed. Emergency repairs during wet seasons could increase risks of erosion and soil compaction.

Resource	Proposed Action Direct and Indirect Impacts	No Action Alternative Direct and Indirect Impacts
Vegetation	Impacts would be low to moderate during construction requiring clearing and crushing of vegetation. About 63 acres of vegetation would be impacted at structure sites. Access road reconstruction would remove vegetation within a width of 20 feet (about 0.1 acres of vegetation removed). About 1,000 danger trees would be removed along the ROW. Impacts to special-status plants would be low because either suitable habitat is lacking or identified populations would be avoided. Construction activities would increase the potential for the spread of noxious weeds.	Impacts would be low to moderate and similar to those of the Proposed Action during maintenance activities because they would likely increase as structure repair or replacement and road work are required. Emergency maintenance, especially during the wet season, could limit the ability to avoid sensitive plant species or sensitive habitats. Emergency repair activities could also require unplanned vehicle use through existing noxious weed infestations, potentially allowing the spread of noxious weeds.
Water Resources and Floodplains	Impacts would be none to low during construction, as temporary disturbance of vegetation and soils would occur during the dry season, when erosion and sedimentation from precipitation events are less likely to occur. Access road improvement, including replacement, repair, or installation of 111 culverts, would occur in already-disturbed areas. Replacement of culverts in fish-bearing streams would maintain or improve fish passage and fish access to upstream aquatic habitats. Installing three new permanent bridges, three new fords, and repairing three existing fords would impact minor amounts of vegetation, soils, and water resources. However, these features would be installed within an existing road prism, and mitigation measures, including appropriate design features to protect these resources, would minimize impacts during and following construction.	Impacts would be none to moderate depending on timing and location. Impacts could occur as existing structures and access roads continue to deteriorate and emergency structure repair and replacement or road work in streams is required.
Wetlands	Impacts would be low to moderate during construction. About 7.7 acres of native and non-native wetland vegetation would be permanently disturbed, while 11.4 acres would be temporarily disturbed as a result of access road improvements and construction and repair of landings. Most impacts would result from repair of existing facilities (e.g., access roads), as opposed to construction of new facilities. BMPs, impact avoidance and minimization, and compensatory wetland mitigation would minimize impacts and maintain wetland function in the project watersheds.	Impacts would be low to moderate and similar to those of the Proposed Action. Existing structures and access roads would continue to deteriorate and emergency structure repair and replacement or road work may require that work be conducted in wetlands, limiting the ability to avoid wetland impacts.

Resource	Proposed Action Direct and Indirect Impacts	No Action Alternative Direct and Indirect Impacts
Wildlife and Fish	Impacts would be low to moderate during construction. Danger tree and vegetation removal could affect common wildlife species. Because construction is expected to move through any potential habitat areas at a moderate pace, disturbance is expected to be temporary. Bird flight diverters would be installed along certain spans of transmission lines near waterbodies and other features with high potential for flight zones to reduce the likelihood of collisions. Fish and aquatic species habitat could be temporarily degraded by sedimentation introduced during instream work and disturbance near waterbodies. Fish and aquatic species (e.g., amphibians) could be harmed when handled during capture and removal activities within isolated instream work areas. Installation of fish passage culverts would benefit fish and aquatic species in the Project area, allowing improved access to upstream habitat.	Impacts would be low to moderate and similar to those of the Proposed Action depending on the timing of normal or emergency activities. Vegetation removal or heavy equipment use could disturb nesting birds, especially during critical nesting/breeding periods and increase erosion entering waterbodies in the event of riparian ground disturbance or clearing during the wet season.
Federally Listed Fish and Wildlife Species	Impacts would be low to moderate during construction. Danger tree removal could affect marbled murrelet and northern spotted owl. Approximately 535 danger trees would be removed within marbled murrelet habitat, 266 danger trees would be removed within low-quality habitat and 269 would be removed within marginal-to-high-quality habitat. No marbled murrelet or northern spotted owl habitat would be converted from forested to non-forested habitat. Marbled murrelet, assumed present in occupied habitat and likely present in suitable habitat, could be disturbed during the nesting season (April 1 to September 23). Construction would move through potential habitat areas at a moderate pace and disturbance is expected to be temporary. Bird collisions could occur along certain spans of the transmission line near marbled murrelet habitat, but the installation of bird diverters would reduce bird strike risk. There would be minimal disturbance or habitat alteration for ESA-listed Oregon spotted frog and Olympia pocket gophers. Construction work near waterways containing ESA-listed fish species would consist of minor clearing of the shrub-dominated riparian buffer at the outer edge of the buffer, which may introduce	Impacts would be low to moderate and similar to those of the Proposed Action depending on timing of normal or emergency activities. Vegetation removal or heavy equipment use could result in disturbance to marbled murrelet populations during critical nesting/breeding periods.

Resource	Proposed Action Direct and Indirect Impacts	No Action Alternative Direct and Indirect Impacts
	sedimentation during in-stream work and disturbance near waterbodies, resulting in a low effect to ESA-listed fish species. Implementation of erosion and sediment control BMPs and working during the dry season would mitigate impacts to federally-listed fish species.	
Cultural Resources	Impacts would be none to low during construction. Replacement structures would be the same type and the Shelton-Fairmount No. 1 transmission line would retain its current alignment; the line's visual uniformity and integrity would remain intact. While no known cultural resources sites would be impacted by the Project, unknown cultural resources could be inadvertently discovered, in which case BPA would implement its Inadvertent Discovery Plan.	Impacts would be none to low and similar to those of the Proposed Action from ongoing maintenance and emergency repairs.
Noise, Public Health, and Safety	Impacts would be low to moderate during construction. Blasting would be required in some locations, resulting in temporary noise impacts. Increased noise levels due to construction would be temporary and limited to areas where work is occurring. Outages that pose a risk to public health and safety would be planned during non-peak periods. BPA would mitigate threats to public health and safety resulting from outages and construction with public noticing, signage, and safety measures implemented during the Proposed Action.	Impacts would be low to moderate and similar to those of the Proposed Action from ongoing maintenance and emergency repairs. Depending on the location and magnitude of the emergency repair, power to surrounding communities could be interrupted, resulting in localized power outages. Outages could occur with minimal advanced notice to the public.

2.6 Best Management Practices and Mitigation Measures

BMPs and mitigation measures have been identified for the Project (see Table 2-3). Some are design features that have been incorporated into the design of the Project, while others are BMPs that are typically used by BPA. Other mitigation measures were identified through the NEPA process and are intended to reduce or eliminate potential impacts from the Proposed Action on resources discussed in this EA.

Table 2-3: Best Management Practices and Mitigation Measures

BMP/Mitigation Measure Category
Soils and Geologic Hazards
• Stabilize permanent disturbance areas by applying weed-free gravel (if available) to the top layer of roadways. • Conduct Project construction, including tree removal, during the dry season when rainfall, runoff, and stream flow are low to minimize erosion, compaction, and sedimentation to the extent practicable. This measure would not apply to Project construction within marbled murrelet occupied habitat because of conflicts with the nesting season of April 1 to September 23.

BMP/Mitigation Measure Category
• Contact BPA geotechnical specialists if geotechnical issues, such as new landslides, arise during construction. • Install appropriate erosion-control devices where needed to minimize soil transport. • Retain vegetative buffers where possible to prevent sediments from entering waterbodies. • Include water control structures on reconstructed and improved access roads using low grades, water bars, and drain dips to help control runoff and prevent erosion. • Properly space and size culverts on access roads. • Apply water to access roads and work areas on an as-needed basis to minimize dust and reduce erosion due to wind. • Revegetate disturbed areas to help stabilize soils as soon as work in that area is completed and appropriate environmental conditions exist, such as moderate temperatures and adequate soil moisture. • Inspect revegetated areas to verify adequate growth and implement contingency measures as needed. • Verify access road improvements are constructed per engineer design specifications to ensure proper function and nominal erosion levels after construction. • On WDNR-managed land, backfill or otherwise replace all soil removed from excavation at the end of each day as practicable.
Vegetation
• Use the existing road system to access work locations to the greatest extent practicable. • Minimize the construction area and disturbance to vegetation to the extent practicable, especially in marbled murrelet and northern spotted owl habitat, wetlands, and waterbody crossings. • Where practicable, locate materials storage and staging areas in previously disturbed or developed areas to minimize soil and vegetation disturbance. • Conduct Project construction, including tree removal, during the dry season when rainfall, runoff, and stream flow are low to minimize erosion, compaction, and sedimentation to the extent practicable. This measure would not apply to Project construction within marbled murrelet occupied habitat because of conflicts with the nesting season of April 1 to September 23. • Conduct tree removal in a manner that minimizes disruption to remaining trees and shrubs. • Leave existing root system intact when cutting trees to help prevent erosion. • Prepare timber cruise or assessment for any trees removed outside the current easement area that are covered by the Washington Forest Practices Act in accordance with the WDNR Memorandum of Agreement (MOA). • Return temporarily disturbed areas to their original, pre-construction contours and conduct site restoration and revegetation measures before or at the beginning of the first growing season following construction. • Revegetate disturbed areas with species suitable to the location (e.g., wetland or upland) to ensure appropriate vegetation coverage and soil stabilization prior to the start of rainy season (November 1). • Keep pulling/tensioning equipment inside the transmission line ROW for pulling/tensioning sites located on ROW. • Conduct monthly post-construction site restoration monitoring until site stabilization is achieved. • Prior to construction, identify noxious weed infestation areas for avoidance and/or treatment (as practicable). • Implement measures to minimize noxious weed spread, including washing vehicles before entering work areas, washing vehicles that have been operating in weed infested portions of the Project area prior to transporting them to other portions of the Project area, and inspecting vehicles before entering construction areas.

BMP/Mitigation Measure Category
• Do not use paint or other types of markers within Natural Area Preserves (NAPs) and Natural Resource Conservation Areas (NRCAs) that cannot be removed on the landscape or vegetation on WDNR-managed land. • Use BPA-approved herbicides and weed control methods to control noxious weeds within the Project area.
Water Resources and Floodplains
• Use and/or upgrade existing access roads where possible to avoid additional stream crossings or impacts on floodplains. • When possible, conduct soil-disturbing activities during the dry season and culvert work when streams are dry. • Comply with applicable Clean Water Act (CWA) permits for work in streams. • Divert stream flow around work areas and maintain downstream flow if construction occurs during times when streams are flowing. • Isolate in-water work areas prior to culvert installations, dewater work area as necessary for construction and to minimize turbidity, and do not discharge turbid water to streams. • Return temporary disturbance areas for culvert and road work to pre-construction contours and perform mulching, seeding, and planting in accordance with plans and specifications. • When restoring vegetative cover in or near riparian zones, replace removed tree species with a species that would provide riparian function while limiting transmission line hazards. • Restrict construction vehicles and equipment to access roads and designated work areas. • Store, re-fuel, and maintain all vehicles and other heavy equipment in a designated upland staging area located at least 150 feet away from any stream, waterbody, or wetland, or where spilled material cannot enter natural or manmade drainage conveyances or well head protection areas. • Dispose of waste material generated from access road work in a stable upland site (in gentle terrain more than 200 feet from waterbodies or wetlands) approved by the BPA environmental lead, smooth to match adjacent grades, and seed for stability. In steep terrain or near waterbodies or wetlands, haul waste material offsite. • Design culverts (non-fish drainages) for the 100-year storm event to minimize future maintenance needs. • Adhere to BPA's Spill Prevention and Response Procedures to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. • Confirm equipment is clean (e.g., power-washed) and does not have fluid leaks prior to contractor mobilization of heavy equipment to the site; inspect equipment and tanks for drips or leaks daily and make necessary repairs within 24 hours. • Contain petroleum product spills immediately, eliminate the source, and deploy appropriate measures to clean and dispose of spilled materials in accordance with federal, state, and local regulations. • Maintain emergency spill control materials, such as oil booms and spill response kits, on-site at all times and ready for immediate deployment at each ford or culvert replacement site. • Install cross-drains per BPA access road design specifications. • Revegetate disturbed areas using a slow-release fertilizer. • Locate water drafting sites (locations where contractors may fill water trucks) where they would minimize adverse effects on stream channel stability, sedimentation, and in-stream flows. • Limit the placement of fill for access road work in floodplains to the minimum required. • Install erosion-control measures prior to work in or near floodplains. • Prepare and implement a Storm Water Pollution Prevention Plan (SWPPP).

BMP/Mitigation Measure Category
• Use pole wraps and vertically sheath poles inside corrugated metal pipe on structures located within 50 feet of streams and within the 100-year floodplain.
Wetlands
• Comply with applicable CWA permit conditions for all work in wetlands, including compensatory wetland mitigation, use of wetland matting when appropriate, and installation of erosion-control measures prior to work in or near wetlands if there is risk of sediment-laden water entering wetlands. • Avoid depositing excavated material in wetland areas. • Avoid locating construction staging, equipment or materials storage, or vehicle fueling within 150 feet of wetland areas. • Mark work areas to limit vehicle and equipment access to designated routes and prevent entry into wetlands and wetland buffers. • Use existing roads to access structure locations where possible. • Remove any temporary equipment mats and revegetate. • Restore all temporary disturbance areas to original contours and decompact, if necessary. • Reseed all temporary disturbance areas in wetlands with species suitable to the location and monitor revegetated wetland areas to ensure adequate cover. • Use herbicides to control vegetation near wetlands in accordance with BPA's *Transmission System Vegetation Management Program Final Environmental Impact Statement/Record of Decision* (BPA 2000) to limit impacts on water quality. • Use pole wraps and vertically sheath poles inside corrugated metal pipe on structures located within 50 feet of wetlands.
Federally Listed Fish and Wildlife Species, and Other Fish and Wildlife
• Install bird flight diverters, as practicable when considering safety and operational requirements, where the transmission line crosses rivers, wetlands, or other high bird-use areas, including marbled murrelet flight corridors. • Restore areas disturbed by construction to pre-construction or better condition. • Remove danger trees (including from occupied and suitable marbled murrelet and northern spotted owl habitat) outside the combined marbled murrelet / northern spotted owl nesting season (March 1 to September 30). • Avoid the use of chain saws and heavy equipment within potential suitable northern spotted owl Nesting, Roosting, and Foraging (NRF) habitat during the critical breeding season (March 1 to July 15) if feasible, or conduct surveys to clear the area for construction (see bullet below). • Conduct U.S. Fish and Wildlife Service (USFWS) Autonomous Recording Unit (ARU)-protocol surveys in suitable northern spotted owl NRF habitat the year prior to Project activities that have the potential to cause impacts on nesting northern spotted owls. Project activities would commence in said areas if no northern spotted owls are detected. If northern spotted owls are detected, conduct work in these areas outside of the breeding/nesting season (March 1 to September 30), or consult with USFWS. Due to the lack of recent northern spotted owl activity in the Project area, no northern spotted owl detections during surveys are expected. • Do not fly helicopters in areas designated for avoidance to minimize impacts on wildlife; request maps as necessary and communicate measure to pilot and other crew. • Where permitted, schedule work as late in the marbled murrelet nesting season as practicable, while still ensuring work is completed prior to the start of the wet season.

BMP/Mitigation Measure Category
• Schedule work in suitable and occupied marbled murrelet habitat during the nesting season (April 1 to September 23) to begin 2 hours after sunrise and end 2 hours before sunset. Schedule pre-work meetings off site at a developed location. • Minimize excavation and soil compaction in potential suitable pocket gopher habitat to the greatest extent practicable. • Conduct protocol-level surveys for Olympia pocket gophers near the Olympia Substation in the year prior to construction to clear the area for soil disturbance. If Olympia pocket gophers are detected, consult with USFWS. • Install erosion and sediment control measures prior to construction in or adjacent to wetlands in the Black Lake basin to minimize impacts to the Oregon spotted frog. • Remove all food scraps and food packaging from Project sites and transport off-site after each workday; do not leave food exposed and unattended for any amount of time; do not feed wildlife or leave food for wildlife. • Provide a Worker Environmental Awareness Program to all Project personnel. • The BPA environmental lead will inspect the work area and provide trash management recommendations anytime they are on-site and find trash or food being improperly managed. • Avoid blasting and construction within 660 feet of active bald eagle, peregrine falcon, or other sensitive raptor species nests during the nesting period (January 1 to August 31), unless otherwise authorized by WDFW and/or the USFWS. • Avoid blasting within 0.25 mile of potential marbled murrelet and northern spotted owl habitat during the breeding seasons, April 1 to September 23 and March 1 to September 30, respectively. The northern spotted owl timing restriction may be waived if preconstruction surveys demonstrate no owls are present. • Avoid removal of large snags and trees that are not hazardous to transmission line operation and worker safety and that may support nesting habitat for bald eagle and other bird species. • To the extent practicable schedule tree and other vegetation removal between September 15 and March 1 in areas with supporting habitat features to minimize impacts on migratory birds. If tree clearing is needed outside of that time, conduct a pre-construction nesting bird survey prior to tree removal. If active nests are found, do not remove trees until the young have fledged. • Complete all work within fish-bearing streams during dates listed in the most recent version of *Times When Spawning or Incubating Salmonids are Least Likely to be Present in Washington State Freshwaters* (WDFW 2018). • Install culverts in accordance with WDFW fish passage requirements. • Salvage fish present during in-water work according to WDFW and ESA guidelines.
Cultural Resources
• Locate transmission structures, equipment and material storage area, and access roads to avoid known cultural resource sites and limit ground disturbance. • Conduct archaeological monitoring in areas designated as high probability for containing unidentified archaeological resources. • Follow BPA's Inadvertent Discovery Procedure, which requires that all work in the vicinity stop immediately if an inadvertent discovery of cultural resources is made and immediately notify the BPA archaeologist, Washington Department of Archaeology and Historic Preservation (DAHP), affected Tribes, and federal and state archaeologists, if applicable. • Stop all operations immediately within 200 feet of the inadvertent discovery of human remains, suspected human remains, or any items suspected to be related to a human burial encountered during Project construction. Secure the area around the discovery and immediately contact local law enforcement, the BPA archaeologist, the Washington DAHP, the affected Tribes, and federal and state archaeologists, if applicable.

BMP/Mitigation Measure Category
• Provide cultural resources awareness training to explain cultural resource-related avoidance and mitigation measures to the BPA transmission line maintenance crew, construction contractors, and inspectors during preconstruction meetings. • Depict cultural sites as sensitive areas to avoid in construction documents, on construction maps, and in the field.
Other Resources
• Prepare a Project-specific Public Safety Plan that includes measures to control wildfire ignition, limit public access to the Project area, and notify the public of any planned electrical outages. • Adhere to BPA Transmission Line and Fiber Optic Cable Master Specification Section 01 66 05 Material Yards requiring safe storage and handling of wood poles and other construction materials in material storage yard. • Provide a construction schedule, including timing of any planned power outages, to all potentially affected stakeholders. • Maintain existing access to residences and other areas during construction. • Coordinate with commercial timber landowners to ensure that access road enhancements, gates, and construction and maintenance activities would minimize disruptions to commercial forestry operations. • Adhere to State Forest Practices Act on roads built or used within WDNR-managed land. • On WDNR-managed land, keep gates closed and park vehicles where they do not block gates. Travel off established roads by foot only. • Compensate landowners for the value of any property damaged by construction activities, as appropriate. • Use traffic safety signs and flaggers to inform motorists and manage traffic during construction activities on affected roads. • Install permanent gates at selected locations to minimize unauthorized use of BPA access roads and unauthorized entry to BPA ROW. • Where existing rural roadways are narrow, provide traffic control to ensure traffic safety. • Follow the applicable state, county, and city requirements for traffic control and lane closures. • Follow fire prevention laws and rules of the state (RCW 76.04 and WAC 332-24) to reduce the risk of wildfires. • Use water trucks to control dust during construction, as needed. • Keep all vehicles in good operating condition to minimize exhaust emissions. • Turn off construction equipment during prolonged periods of non-use. • Drive vehicles at low speeds on access roads and in the ROW to minimize dust. • Locate staging areas as close to construction sites as practicable to minimize driving distances between staging areas and construction sites. • Encourage the use of the proper size of equipment for the job to maximize energy efficiency. • Recycle or salvage non-hazardous construction and demolition debris where practicable. • Dispose of wood poles at an appropriate facility in the local area where practicable. • Use local rock sources for road construction that meet road material and weed free standards, if possible. • Use non-reflective conductors. • Focus security lighting at staging areas and the material storage yard inward to minimize spillover of light and glare. • Require that contractors maintain a clean construction site and remove all construction debris. • Use sound-control devices on construction equipment with gasoline or diesel engines and limit construction noise to daylight hours to reduce noise impacts.

BMP/Mitigation Measure Category
• Develop and implement a blasting plan that identifies blasting procedures such as safety, use, storage, and transportation of explosives where blasting is needed, if necessary. The blasting plan would specify the locations where blasting is needed and require the use of a registered licensed blaster who would be required to secure all necessary permits and comply with regulatory requirements in connection with the transportation, storage, and use of explosives, and blast vibration limits for nearby structures, utilities, and wildlife. • Coordinate with the Squaxin Tribe's Salish Gold Club, Little Creek Casino Resort, and RV Park regarding timing and nature of construction activities to minimize disruption to these businesses during construction. • In agricultural lands, restore compacted soils, use BMPs to limit spread of noxious weeds, separate topsoil in croplands, and minimize disturbance to agricultural activities in farmlands.

3.0 Affected Environment and Environmental Consequences

This section describes the environment and resources that the Proposed Action and No Action Alternative could impact, including the Proposed Action's potential and cumulative impacts on these resources.

Impact levels, based on the provided analysis, are characterized as high, moderate, low, or no impact. Mitigation measures and BMPs that would help reduce or avoid impacts are identified in Table 2-3.

The Project area includes the existing 100-foot-wide ROW for the Olympia-Shelton, Fairmount-Port Angeles No. 1, and Shelton-Fairmount No. 1 transmission lines (including access roads in the ROW), pulling and tensioning sites, danger tree removal areas adjacent to the ROW, substations, staging areas and helicopter landing zones, and the area within 15 feet of the centerline (for a total width of 30 feet) of access roads that extend outside the ROW. In some instances (e.g., botanical or biological surveys), survey areas may have extended beyond these limits. Initial field surveys were conducted in summer and fall of 2021 to identify the presence and habitat of marbled murrelet, northern spotted owl, and other wildlife, as well as vegetation, wetlands, and noxious weeds. Cultural resources surveys were conducted in spring of 2022, along with surveys to identify wildlife habitat, wetlands, streams, sensitive plants, and noxious weed occurrences where additional access roads were added to the Project area.

Table 3-1 identifies resources initially considered for impact analysis. Not all resources present in the Project area would be affected by the Proposed Action because there would be either no impact or an insignificant impact on the resource from the Proposed Action or the No Action Alternative. Resources in Table 3-1 that have a resource status of Present, Not Affected were not further evaluated.

Table 3-1: Resources Initially Considered for Impact Analysis

Resource	Resource Status	Resource Evaluation
Soils and Geologic Hazards	Present, Affected	Impacts are further disclosed in Section 3.1.
Vegetation	Present, Affected	Impacts are further disclosed in Section 3.2.

Resource	Resource Status	Resource Evaluation
Water Resources and Floodplains	Present, Affected	Impacts are further disclosed in Section 3.3.
Wetlands	Present, Affected	Impacts are further disclosed in Section 3.4.
Wildlife and Fish	Present, Affected	Impacts are further disclosed in Section 3.5.
Cultural Resources	Present, Affected	Impacts are further disclosed in Section 3.6.
Noise, Public Health, and Safety	Present, Affected	Impacts are further disclosed in Section 3.7.
Environmental Justice	Present, Affected	Impacts are further disclosed in Section 3.8.
Land Use	Present, Not Affected	Because the existing Shelton-Fairmount No. 1 transmission line would be rebuilt or repaired and the fiber optic system installed in the same location, existing and future land uses would not change in the Project area. The Project would not impact Devils Lake NRCA or Hamma Hamma Balds NAP. Devils Lake NRCA is located to the west of and adjacent to the Shelton-Fairmount No. 1 ROW and Hamma Hamma Balds NAP is adjacent to a direction-of-travel road that would be used to access the ROW. Kennedy Creek NRCA overlaps the Olympia-Shelton ROW in mile 10 where no construction would occur except for installation of fiber optic cable on existing structures 10/7 and 10/8; these work areas would be accessed via a direction-of-travel road and helicopter. With the implementation of mitigation measures provided in Table 2-3 for soils and vegetation, impacts would be negligible.
Recreation	Present, Not Affected	Existing and future recreational uses would not be affected because Project activities would take place in the existing Project area. There are two state parks located in the vicinity of the ROW, Dosewallips and Potlach State Parks, with a small portion of the ROW overlapping Doswallips State Park. There are 0.06 miles of road in Dowesallips State Park and 0.02 miles in Potlach State Park that the Project would use for direction-of-travel routes. Within Dowesallips State Park, there is approximately 1 mile of road requiring improvement within BPA's ROW. However, no State Park or other land manager-designated trails, campgrounds, or other developed recreation facilities intersect the Project area, including the direction-of-travel routes. No designated recreational use areas are located in the Project area except dispersed recreational use on USFS and WDNR lands.

Resource	Resource Status	Resource Evaluation
Transportation	Present, Not Affected	Use of, and access to, private, county, or state roads would not change in or near the Project area. Temporary traffic delays during conductor stringing could occur where the Shelton-Fairmount No. 1 transmission line crosses state highways and county and local access roads (e.g., Highways 101, 104, and 119), Linger Longer Road, Duckabush Road, and Center Road. Residents would be notified of upcoming construction activities and potential disruptions. A more detailed description of mitigation measures to address transportation concerns is provided in Table 2-3.
Visual Quality	Present, Not Affected	Existing views of the Project area would not change because wood poles would be replaced in kind with similar components and existing access roads would be improved. Structure heights would not change substantially (5 to 10 feet). The conductor would be non-lustrous and the total number of transmission structures in the Project area would not increase. However, about 32 new single wood poles (FOWP) would be installed along the entire Project. Glass insulators would replace porcelain insulators that are the same size but may be more reflective. Some spans of the Shelton-Fairmount No. 1 transmission line and fiber optic system would have bird flight diverters installed but these would have minimal impacts on the visual area since the Shelton-Fairmount No. 1 transmission line is being rebuilt within the same corridor. Security lighting at staging areas and material storage yards would be focused inward to minimize spillover of light and glare. Within the Olympic National Forest along Highway 101, the Shelton-Fairmount No. 1 transmission line is obscured by dense trees and topography from various points along the highway. While the height of new structures in this area would increase from 5 to 25 feet and structure locations would shift 5 to 35 feet, visual impacts would be minimal. Views of construction work areas would be temporary with all equipment and materials removed after construction and thus, would not result in significant impacts on visual quality.
Air Quality	Present, Not Affected	Temporary, localized air quality impacts from ground-disturbing activities and use of construction equipment could occur that would not violate air quality standards. Impacts would be similar to other BPA transmission line rebuild projects of similar length (BPA 2012, 2014, 2016a, 2016b, 2016c) and thus, would not result in significant impacts.
Greenhouse Gases	Present, Not Affected	Temporary, localized emissions from construction equipment would occur. Most of the danger trees slated for removal under the Project are dead or dying, and their removal would have a nominal effect on greenhouse gas sequestration. Carbon dioxide equivalent emissions are estimated to be about 4,500 metric tons, which is the equivalent of about 970 gasoline-powered passenger vehicles driven for 1 year (EPA 2022a). Other BPA transmission line rebuild projects of similar length had similar levels of carbon dioxide equivalent emissions ranging from 1,250 to 8,800 metric tons of carbon dioxide equivalent (BPA 2012, 2014, 2016a, 2016b, 2016c). Emissions from transmission line rebuilds tend to be well below the Environmental Protection Agency (EPA) 25,000 metric ton reporting threshold. Therefore, the Project would not result in significant impacts.

Resource	Resource Status	Resource Evaluation
Socioeconomic and Public Services	Present, Not Affected	Public services would not be affected in the Project area. There are estimated to be less than 400 occupied residences within 500 feet of the Shelton-Fairmount No. 1 transmission line and fiber optic system. Any impacts to public services to these residences would be minimized and would occur with ample early coordination. Construction labor would likely be supplied from within the Puget Sound region. There would not likely be a positive impact on hotels or motels in the Project area as laborers would likely travel to and from their home each day. Project construction would provide employment and would have a positive but very small impact relative to the macro regional economy.

3.1 Soils and Geologic Hazards

3.1.1 Affected Environment

The Project is located in the Pacific Border physiographic province. Elevation within the Project area ranges from approximately 10 to 1,960 feet. Very gravelly loam to gravelly sandy loam soil types are predominately present in the Shelton-Fairmount No. 1 transmission line with varying slopes. The Olympia-Shelton transmission line is comprised mostly of gravelly sandy loam, very gravelly loam, and gravelly sandy loam on low-to-moderate slopes. The major soil types within the Fairmount-Port Angeles No. 1 transmission line are gravelly loam to gravelly sandy loam on moderate-to-steep slopes. Soils classified as prime farmland and farmland of statewide importance are present along transmission lines in the Project area (NRCS, 2019). There are 153 acres of prime farmland, 887 acres of farmland of statewide importance, and 1,124 acres of prime farmland if irrigated within the Project area (NRCS 2019).

On slopes less than 8 percent, soils are susceptible to slight-to-moderate levels of erosion when exposed to water or wind. Areas with slopes greater than 8 percent are susceptible to severe levels of erosion when exposed to water or wind (NRCS 2019). Eighty-seven percent of soils in the Project area have a severe erosion hazard rating and 13 percent have a slight-to-moderate erosion hazard rating (NRCS 2019).

Ground compaction degrades the soil structure and reduces soil productivity and the soil's ability to absorb water. Reduced soil productivity in prime farmland and farmland of statewide importance areas crossed by the Project area likely occurred when transmission lines and roads were constructed and trees were removed. Soils have likely recovered adjacent to these facilities since the original construction in 1949.

The Shelton-Fairmount No. 1 transmission line and access roads cross 3 acres of landslide deposits classified as debris flow, deep-seated, and deep-seated earthflow. Landslide deposits occur within spans 8/5 to 8/6; 20/4 to 20/5; 26/4 to 26/5; and 34/2 to 34/3 of the Shelton-Fairmount No. 1 transmission line. There are a total of six earthquake faults identified along the transmission line and fiber optic system: Olympia structure, two unnamed faults, and three Dabob Bay faults (Brocher et. al., 2001; Blakely et. al., 2009; Gower et. al., 1985; and Contreras et. al., 2014). These faults are within moderate shaking hazard areas (WDNR, 2018). Liquefaction is a process in which loose, granular soils below the groundwater table temporarily lose strength during strong earthquake shaking. A majority of the Project area is within areas of very-low-to-low or low-to-moderate areas of liquefaction susceptibility. Areas with liquefaction susceptibility ratings of moderate to high are present where transmission line or fiber optic system segments are in proximity to canals, waterways, or lakes and these areas are mostly located near the Fairmount-Port Angeles No. 1 transmission line segment (WDNR 2018).

3.1.2 Environmental Consequences

3.1.2.1 Proposed Action

Soil impacts would result from auguring structure holes; constructing landings; removing vegetation; blasting in specific areas; temporary soil piling; compaction or rutting from heavy equipment and construction vehicle operation on roads; spreading of excess soils around the base of the structures; burying guy wire anchors; reconstruction or improvement of roads; compaction in areas used as staging areas and pulling/tensioning sites; or potential contamination from wood-pole preservative or accidental equipment spills. Ground cleared of vegetation would be susceptible to erosion and establishment of invasive plants (see Section 3.2).

At structure sites, construction equipment use, auguring, and structure removal would temporarily disturb approximately 63 acres of soils. In sensitive habitats such as wetlands, compliance with CWA Section 404 permit conditions, including the required use of temporary matting to provide ground stabilization under large construction equipment, would help mitigate impacts. Excess soil removed by the auger would be used as overburden at the base of the poles and spread evenly around the structure site.

Soil compaction from the use of heavy machinery at each structure site would be limited to areas immediately adjacent to the structures. An area measuring approximately 10 by 30 feet (0.007 acre) at two-pole structures, and approximately 10 by 50 feet (0.01 acres) at three-pole structures, would be permanently disturbed at structures without guy wires, while disturbance areas at structures with guy wires would measure approximately 3 by 7 feet (less than 0.01 acres). Excess soil removed during plate or screw anchor installation would be spread around the structure site. Compaction would gradually ease as vegetation reestablishes, organic matter accumulates, and soils regain water absorption capacity.

Typical landings at structures would permanently compact a total of approximately 0.07 acres of soil because these areas would be reused during transmission line maintenance activities following Project completion. Prompt mulching and seeding of exposed soils and following BMPs would reduce the potential for erosion from disturbance. Once vegetation establishes, soil erosion would likely cease. Implementing BMPs and mitigation measures (see Table 2-3) and conducting peak construction work during the dry season would help ensure low impacts to soils from structure replacements and landing construction due to the small acreage affected.

As discussed in Section 2.2.1, new wood poles for transmission structures would be pretreated with the preservatives DCOI and PCP to lessen wood rot and extend their lifespans. Both preservatives have the potential to leach from underground portions of poles into adjacent soils or water (including wetlands). DCOI is expected to have slight mobility if released into soil and based on its vapor pressure would not volatilize from dry soils (National Library of Medicine 2018). Biodegradation of DCOI averages 22 hours in activated sludge and less than 24 hours in seawater with the preservative expected to adsorb suspended solids and sediment. PCP rapidly degrades, with as much as 55 percent of added PCP in a sandy clay loam soil photodegrading in 14 days (National Library of Medicine 2022). Photolysis is the main biodegradation pathway for PCP and it is degraded within 14 days to 5 years depending on conditions. Pole wraps would be used on structures located within 50 feet of wetlands and streams or floodplains to help prevent DCOI and PCP from leaching into surrounding soils (see Section 2.2.1).

Soils would be excavated, compacted, and/or subject to erosion from ground clearing, soil piling, and use of heavy equipment due to road reconstruction, improvements, and new road construction (see Section 2.2.5) within the 95 miles of the existing road system and 1 mile of new road construction. Soils disturbed temporarily (66 acres) due to road reconstruction, improvements, and new road construction would be

stabilized with the implementation of BMPs and reclamation including reseeding and allowing vegetation to regrow. Reconstruction and improvements on existing roads would not result in a new permanent impact on soils because the roads already exist and soils are already compacted and/or covered with gravel. However, erosion associated with their use would have the greatest impact in areas where roads are on soils with a severe erosion hazard rating and slopes greater than 8 percent.

Access road improvements and reconstruction would occur during the dry season and would include installing water bars, drain dips, and new gravel surfacing. These features are designed to reduce erosion and minimize impacts on soil and adjacent water bodies. Additionally, erosion and sediment control BMPs would be implemented prior to and during road work. There would still be a low erosion risk on slopes 8 percent or less and a moderate erosion risk on slopes greater than 8 percent.

Transmission line work within landslide hazard areas could increase the risk of landslides. However, geotechnical BMPs would be followed during construction to avoid overburdening unstable areas (Section 2.6). Therefore, there is a low risk for landslides to occur from construction of the Proposed Action.

Soil compaction could occur where staging areas and pulling/tensioning sites are located. The staging area near Shelton Substation and Highway 101 would be located in a previously disturbed parcel of land, so soils are either already disturbed or compacted. Soil disturbance and compaction would also occur at pulling/tensioning sites from grading and use of the puller, tensioner, and reel equipment. The likelihood for disturbance at helicopter landing zones would be slight but could include wind erosion during landings. Use of BMPs prior to and after use of these temporary sites would result in a low impact from staging, pulling, and tensioning.

Impacts to farmland soils would include temporary and permanent disturbances to soils and crops from replacement of structures and improvements to access roads. Construction activities during the growing season may damage or remove agricultural soils in order to access work sites. Temporary disturbance would impact, through compaction or excavation, about 10 acres of prime farmland, 77 acres of farmland of statewide importance, and 80 acres of prime farmland, if irrigated. The replacement of structures and construction of access roads would permanently disturb 2 acres of prime farmland, 21 acres of farmland of statewide importance, and 17 acres of prime farmland, if irrigated. Implementation of mitigation measures, including restoring compacted soils, use of BMPs to limit spread of noxious weeds, separating topsoil in croplands, and minimizing disturbance to agricultural activities, would minimize temporary impacts. Given the small amount of permanent disturbance to farmland throughout the entire 107-mile-long Project, coupled with its location within an existing transmission line corridor, proposed use of existing access roads where soil productivity was previously impacted through original road construction, and the temporary nature of construction-related disturbance, impacts to farmland would be low to moderate.

Impacts from danger tree removal could include soil erosion and dust generation. Trees would be removed in a relatively small area, adjacent vegetation would be left in place, vegetation would grow in areas where tree canopy is lost over time, and BMPs such as leaving stumps in place to minimize soil impacts would be used (see Table 2-3). Therefore, impacts would be low-to-moderate from danger tree removal.

Overall, low-to-moderate soil impacts, including soil compaction and reduced soil productivity around structures and along access roads and soil erosion in areas with steep slopes, would remain after mitigation.

Effects of Compensatory Wetland Mitigation on Soils

Off-site BPA-responsible wetland mitigation actions would likely affect soils during construction. Effects could include, but are not limited to, temporary soil disturbance (such as compaction and erosion) from grading, excavating, and installing plants, constructing habitat features, or removing invasive species. Mitigation actions could temporarily increase the potential for soil erosion or compaction. Mitigation measures such as replanting disturbed areas and using BMPs such as erosion and sediment control measures would be implemented, and other mitigation measures identified in Table 2-3 would be used as appropriate to minimize short-term temporary adverse effects on soils at wetland mitigation sites. Depending on the nature of the mitigation action, the short-term temporary adverse effects on soils at wetland mitigation sites could be moderate to high; however, with the application of the mitigation measures, soil impacts would be low to moderate and in the long-term effects would be beneficial. Beneficial effects would include stabilizing soils, improving soil structure, improving infiltration and percolation of water through soil, and improving soil nutrient cycling.

3.1.2.2 No Action Alternative

Under the No Action Alternative, the existing transmission line would not be rebuilt and access roads would not be improved so impacts related to Project construction would not occur. However, as existing structures deteriorate, conductor fittings fail, and access road work is needed, soils would be disturbed. Although roads would be repaired as needed to access structures, comprehensive road improvements to improve drainage and increase culvert size would not likely be made, increasing the risks for slumping and erosion. If emergency repairs to transmission lines were required during storm events (when structures are more likely to fail), saturated soil conditions would increase site-specific erosion risk and compaction. Overall, impacts on soils from the No Action Alternative would be low to moderate for planned activities during the dry-season work; however, should work occur during the wet season under emergency conditions, impacts would be moderate.

3.2 Vegetation

3.2.1 Affected Environment

3.2.1.1 General Vegetation

Forest management practices, road and transmission line construction and maintenance, and residential development have extensively modified vegetation in the Project area, particularly rural developments throughout the Project area and, to a more limited extent, suburban development near the Olympia and Port Angeles substations.

The existing transmission line ROW and access roads receive regular vegetation management, resulting in plant communities that are generally less than 20 feet in height. Tall saplings and trees are regularly trimmed and/or removed within the ROW to prevent interference with overhead transmission lines. Refer to Section 2.1.3 for vegetation maintenance schedules and methods. Exceptions for vegetation maintenance include woody vegetation in deep valleys that are spanned by overhead lines.

Throughout the Project area, altered soils and extensive road access create opportunities for introduction of undesirable plant species to establish and spread. Non-native plants, including some noxious weeds, have displaced some of the native plant species that occur in the Project area. Despite past and ongoing disturbances, several hardy native species persist (ESA 2023c and ESA 2023d).

Vegetation types and dominant species within the Project area include the following (native species in bold) (ESA 2023c and 2023d):

- Upland herbaceous land
    - Tall fescue (*Schedonorus arundinaceus*), bentgrass (*Agrostis* spp.), bluegrass (*Poa* spp.), **bracken fern** (*Pteridium aquilinum*), Queen Anne's lace (*Daucus carota*), English plantain (*Plantago lanceolata*), and oxeye daisy (*Leucanthemum vulgare*)
- Shrubland and thickets – non-wetland
    - Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus bifrons*), **salal** (*Gaultheria shallon*), **rose** (*Rosa* spp.), **common snowberry** (*Symphoricarpos albus*), **trailing blackberry** (*Rubus ursinus*), **sword fern** (*Polystichum munitum*), and **low Oregon grape** (*Mahonia nervosa*)
- Streambanks and riparian areas
    - **Salmonberry** (*Rubus spectabilis*), **vine maple** (*Acer circinatum*), **red alder** (*Alnus rubra*), and **big-leaf maple** (*Acer macrophyllum*)
- Forests and woodland (along the ROW margins)
    - **Douglas fir** (*Pseudotsuga menziesii*), **western hemlock** (*Tsuga heterophylla*), and **western redcedar** (*Thuja plicata*)
- Emergent wetlands
    - Reed canarygrass (*Phalaris arundinacea*), **soft rush** (*Juncus effusus*), **slough sedge** (*Carex obnupta*), **skunk cabbage** (*Lysichiton americanus*), and **lady fern** (*Athyrium cyclosorum*)
- Scrub-shrub wetlands
    - **Douglas spirea** (*Spiraea douglasii*), **rose**, **red-osier dogwood** (*Cornus alba*), and **willows** (*Salix* spp.)
- Roadsides
    - Weedy/ruderal species including common dandelion (*Taraxacum officinale*), herb Robert (*Geranium robertianum*), oxeye daisy, common tansy (*Tanacetum vulgare*), western bittercress (*Cardamine oligosperma*), and pasture grasses (various species)

See Section 3.4 for the full analysis of Project effects on wetlands.

3.2.1.2 Sensitive Plant Species

Sensitive plant species include state and federally designated threatened and endangered species or species proposed for listing as such. Twenty-one sensitive plant species were identified as having the potential to occur in the Project area based on habitat preferences and documented occurrences in the vicinity of the Project (Appendix E). Surveys were performed in the Project area in 2021 and 2022 with special emphasis in potentially suitable habitats to document sensitive plant species. No sensitive plants were identified during Project field surveys (ESA 2023c).

3.2.1.3 Undesirable Plant Species

Undesirable plant species are non-native/invasive plants typically classified as noxious weeds (ESA 2023d). The terms "undesirable plant species," "noxious weed species," and "noxious weeds," are used interchangeably in this EA. Noxious weeds are ranked by the state as Class A, B, or C, with Class A weeds having the most limited distribution and the highest priority for prevention and eradication. Eradicating Class A weeds is required pursuant to Washington State Weed Laws (NWCB 2002). Class B weeds may be regionally

abundant but are not yet widespread. Preventing new infestations and containing existing Class B weed infestations are high priorities at the local level. Class C weeds are widespread and a lower priority for control.

Several populations of Class B noxious weed species and one Class C noxious weed species were found in the Project area (ESA 2023d). All identified species are considered aggressive and detrimental to native plant communities; however, Japanese knotweed (*Reynoutria japonica*) and Bohemian knotweed (*Fallopia × bohemica*) deserve special attention because they are extremely invasive and very difficult to eradicate once established (King County 2022). Several other Class B and C noxious weed species are present in the Project area, such as common teasel (*Dipsacus fullonum*), reed canarygrass, Canada thistle (*Cirsium arvense*), Himalayan blackberry, common tansy, herb Robert, oxeye daisy, and Scotch broom (ESA 2023d). No Class A noxious weeds were identified.

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

General Vegetation

Low-growing vegetation would be removed or disturbed in the transmission line ROW at structure sites and in temporary work areas to facilitate construction and ensure safe operation of transmission lines. A total of approximately 97 acres of vegetation would be crushed, removed, or cut for rebuild activities, including approximately 34 acres of permanent vegetation impacts and approximately 63 acres of temporary vegetation impacts for staging and construction activities and access. See Section 3.4 for discussion and analysis of wetland vegetation and wetland buffer impacts.

A permanent impact on vegetation is defined as converting an area that is currently vegetated to a non-vegetated surface such as gravel or asphalt pavement. Permanent impacts on vegetation would occur from new, improved, and reconstructed access roads, drainage upgrades, new and existing (repaired) structure landings, and from transmission poles. Approximately 30 acres of shrub and scrub vegetation and approximately 4 acres of herbaceous vegetation would be permanently converted to a non-vegetated condition. Most Project activities would predominantly occur along or adjacent to existing access roads, road prisms, or near existing structures. Impacts would be low to moderate because although work would occur near existing roads and structures where vegetation communities have been previously disturbed and degraded, vegetation would be permanently removed and would not be expected to reestablish in those areas.

A temporary impact on vegetation is defined as short-term disturbance during construction, followed by re-seeding or replanting once the Project is completed. Temporary impacts on vegetation would occur from establishment of material and equipment staging areas, helicopter landing zones, and conductor pulling/tensioning sites. Temporarily disturbed vegetation would be re-seeded or replanted with an appropriate native groundcover to prevent erosion and to limit the introduction of undesirable plant species. Impacts would be low because vegetation would be expected to reestablish and because these activities would occur in previously disturbed and degraded vegetation communities near existing access roads, structures, substations, and previously cleared areas.

Along access roads proposed for reconstruction or improvement outside of the ROW, trees identified for removal (i.e., danger trees) would be directionally felled away from roads. Approximately 1,000 danger trees would be removed adjacent to the transmission line ROW (fewer than 10 trees per mile); about 87 trees are located within Olympic National Forest and 248 are within WDNR-managed lands (see Table 2-1). Danger

trees identified for removal include 523 Douglas-firs, 134 bigleaf maples, 122 western redcedars, 100 red alders, and 79 western hemlocks. Trees range in size from 6 inches to 63 inches diameter at breast height. Single trees rather than groups of trees would be removed, with the exception of small groupings (typically three to four trees in a cluster) near structures 39/1 to 39/3, 40/1 to 40/4, 42/6, and 46/9 on the Shelton-Fairmount No. 1 transmission line. Removal could create small openings for sunlight in forested areas, which could make those areas slightly more susceptible to invasion by undesirable plant species. Because relatively few trees would be removed compared to the size of the Project area, trees would be allowed to regrow, and the potential for undesirable plant species to invade forest understories would be slight, therefore vegetation impacts from danger tree removal would be low to moderate.

Sensitive Plant Species

No impacts to sensitive plant species would occur because no sensitive plants were identified within the Project area. Habitat associations for the 21 sensitive plant target species generally include bogs, wetlands, wet meadows/prairies, streambanks, forest edges/mature forest, woodlands and open areas, thickets/shrubby areas, grassland and dry slopes, and balds/outcrops (ESA 2023c). No bogs or balds/outcrops were found in the Project area. Only 15 wetlands with undisturbed host plant habitat were identified as possible habitat associations that would support sensitive species; however, no sensitive plants were identified. Consequently, no adverse impacts to sensitive plant species are anticipated to result from the Project.

Undesirable Plant Species

Construction activities could introduce or expand noxious weed populations by clearing existing vegetation, exposing soils, and operating mechanized vehicles and equipment that may transport seeds and plant parts into the Project area. Several populations of undesirable plants mapped within the Project area have the potential to expand and spread due to the Proposed Action. Additionally, undesirable plant species could be introduced into areas where they do not currently exist. The potential for spreading Japanese or Bohemian knotweed and yellow iris is not likely due to the small size and limited distribution of these populations that were mapped in the Project area. By implementing BMPs such as vehicles inspections and equipment-cleaning measures where practicable, impacts from undesirable plant species would be low to moderate.

Effects of Compensatory Wetland Mitigation on Vegetation

Off-site BPA-responsible wetland mitigation actions would likely affect vegetation as mitigation is constructed. Effects could include but are not limited to temporary vegetation disturbance, such as crushing or removal, from grading, excavating, installing plants, constructing habitat features, or removing invasive species. Mitigation measures such as replanting disturbed areas and other mitigation measures identified in Table 2-3 would be used as appropriate to minimize short-term temporary adverse effects on vegetation at wetland mitigation sites. Depending on the nature of the mitigation action, the short-term temporary adverse effects on vegetation at wetland mitigation sites could be moderate to high; however, these effects would be lessened to low to moderate with the implementation of the mitigation measures. In the long-term, beneficial effects would result in more diverse, native plant communities.

3.2.2.2 No Action Alternative

Under the No Action Alternative, existing vegetation within the transmission line ROW would continue to be periodically sprayed, trimmed, or cut, including removal of danger trees. The next maintenance period for the Shelton-Fairmount No. 1 transmission line is scheduled for 2024. Maintenance for the Olympia-Shelton and Fairmount-Port Angeles No. 1 segments occurred in 2022 and is scheduled again for 2025. The No Action Alternative has the potential to spread weeds, although at a smaller scale than the Proposed Action, due to

the use of mechanized vehicles and construction equipment for regular vegetation maintenance, as well as smaller-scale emergency repairs that would likely be needed if the Project is not built.

Overall, depending on the timing, location, and nature of emergency repairs, the No Action Alternative could result in low-to-moderate impacts, but would likely be restricted to only discrete areas.

3.3 Water Resources and Floodplains

3.3.1 Affected Environment

3.3.1.1 Water (Streams)

A total of 310 stream crossings and their buffers occur within 100 feet of work areas in the Project area. Streams were assigned a preliminary stream type according to the Washington Administrative Code 22-16-030 requirements and include 22 Type S (Shorelines of the State, fish-bearing; 7 percent of the total stream crossings) and 147 Type F (fish-bearing; 47 percent of the total stream crossings) (ESA 2023a). A total of 141 non-fish-bearing (Np and Ns) streams (46 percent of total stream crossings) occur in the Project area. Stream buffer widths vary between 50 feet to 250 feet depending on the stream type and jurisdictional requirements.

A total of 20 streams that are on the Washington Department of Ecology's 303(d) list cross the Project area. The 303d list is a list of impaired waters (i.e., where pollution controls are not sufficient to attain or maintain applicable water quality standards) that all states submit to the EPA every 2 years, as required by Section 303(d) of the CWA (Hruby 2014). Of these 20 streams, five occur near work areas associated with the Proposed Action. Black Lake Ditch, which crosses the Olympia-Shelton transmission line between structures 1/7 and 2/1, is listed for temperature, dissolved oxygen, and pH. An unnamed tributary to McLane Creek, which crosses the Olympia-Shelton line between structures 3/6 and 3/7, is listed for bacteria. Skookum Creek, which crosses the Olympia-Shelton transmission line between structures 13/1 and 13/2, is listed for dissolved oxygen. The Big Quilcene River, which crosses the Shelton-Fairmount No. 1 transmission line between structures 49/4 and 49/5, is listed for temperature. Lees Creek East Fork, which crosses the Fairmount-Port Angeles line, is listed for bacteria. None of these five streams have a total maximum daily load (TMDL) plan. Three streams with TMDL plans cross the Project area, including Ten Acre Creek, Weaver Creek, and the Skokomish River; however, no work areas occur near these streams or in their buffers.

3.3.1.2 Floodplains

Federal Emergency Management Agency (FEMA) designated floodplains occur along 21 streams and rivers in the Project area. Approximately 161 acres in the 100-year FEMA floodplain and 0.07 acres in the 500-year FEMA floodplain occur in the Project area. Where it crosses floodplains, the transmission line ROW is generally already cleared of tall-growing vegetation and undergoes periodic vegetation maintenance or consists of agricultural fields.

3.3.1.3 Groundwater Resources

Eight groundwater wellhead protection areas occur in the Project area (WDOH 2021), the majority of which are community wells located in the Shelton-Fairmount No. 1 transmission line segment (see Table 3-2). These areas are managed in wellhead protection programs to protect groundwater and prevent contamination of drinking water.

Table 3-2: Wellhead Protection Areas in the Project Area

County	Segment	Line Mile/Structure No.	Well Description
Mason	Shelton-Fairmount	Miles 1-4	City of Shelton community wells
Jefferson	Shelton-Fairmount	40/2-40/5	Jefferson County PUD community well
Jefferson	Shelton-Fairmount	42/5-42/7	Brinnon Beach Estates Association private well
Jefferson	Shelton-Fairmount	44/6-45/7	Trout Lodge well
Jefferson	Shelton-Fairmount	48/6-50/6	Quilcene School District well
Clallam	Fairmount-Port Angeles	9/8-10/3	Louella Heights community well
Clallam	Fairmount-Port Angeles	14/4	City of Sequim community well field
Clallam	Fairmount-Port Angeles	23/9-25/5	Four Seasons Park community well

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

The Proposed Action would involve construction activity in and around water resources, including streams and stream buffers, groundwater, and floodplains. A description of impacts to each type of resource is provided in this Section. Impacts to fisheries resources are discussed in Section 3.5.

Stream Impacts

Drainage improvements (installation of either resized or fish-passable culverts) and access road work would result in instream excavation, riparian ground disturbance, and riparian vegetation removal at 76 stream crossings. Fish-bearing streams would be impacted as follows: nine would be impacted from culvert work, 17 would be impacted from access road work, and two would be impacted from new bridges in the Project area. The remainder of direct impacts would occur from work in 48 non-fish-bearing streams, including one from a new bridge, six from new or repaired fords, 39 from new or replacement culverts, and two from access road work. In addition to work occurring directly in streams, temporary periods of elevated sediment and turbidity would impact 138 streams, including 56 fish-bearing streams (Type S and Type F) and 82 non-fish-bearing streams.

Temporary stream impacts such as increases in sediment and turbidity, would result primarily from bridge, ford, and culvert installation and repair, and from stabilizing road embankments near new, improved, and reconstructed access roads. All road crossing improvements would occur along existing access roads in previously disturbed areas, and there would accordingly be no new permanent disturbances near these stream crossings. Culvert replacement and installation in fish-bearing streams would include fish-passable culverts that better pass high-stream flows and debris. Replacement and installation work would occur within

the applicable in-water work windows. If streamflow is present, the work area would be isolated and fish relocated to avoid harming aquatic life, and erosion and sediment control measures would be implemented to prevent sediment movement downstream. Most construction work would occur during the dry season which would reduce the potential for runoff and erosion. There would be little or no flowing water on road surfaces, and temporarily disturbed soils would be mulched and reseeded to minimize erosion. Drainage upgrades would occur in conjunction with new, improved, and reconstructed access roads. Access road embankment stabilization near streams would help prevent erosion and runoff. If construction extends into the wet season, traffic on gravel roads would likely deliver the largest loading of sediment to stream channels. Use of erosion and sediment control BMPs and mitigation measures (see Table 2-3) would minimize sediment runoff to streams.

The Proposed Action would include work within regulated stream buffers ranging from 25 feet to 250 feet in width based on the jurisdiction. Stream buffers in the Project area are generally degraded because of a lack of tree canopy and no large woody debris recruitment. Approximately 8 acres of permanent stream buffer impacts would result from structure landings and new, improved, and reconstructed access roads. Limited tree removal would occur for danger trees, but widespread tree clearing would not occur. Stream shade and large woody debris recruitment would not be impacted because tree removal would be limited. Impacts on stream buffers would result primarily from herbaceous and shrub vegetation removal and grading. Approximately 5 acres of permanent stream buffer impacts would affect fish-bearing streams (Type S and Type F), with approximately 0.2 acres of permanent stream buffer impacts affecting Type S streams. Approximately 3 acres of permanent stream buffer impacts would occur to non-fish-bearing (Type Np and Ns) streams. Approximately 29 acres of temporary stream buffer impacts associated with 191 streams (97 Type S or F fish-bearing streams and 94 non-fish-bearing streams) would occur from access road work for new, improved, and reconstructed roads and pulling and tensioning sites. Many of the work areas are at the outer edge of stream buffers and would not impact quality of the buffers. Disturbed buffers of non-fish-bearing streams would be stabilized and reseeded with an approved native seed mix. Where disturbance would impact the buffers of fish-bearing (Type S and F) streams, native shrubs and plants would be installed where feasible to provide shade for streams and encourage aquatic insects, a food source for fish, to drift downstream.

Of the five listed 303(d) streams in the Project area, access road work would occur within the outer stream buffer for three of the streams. Where these streams cross the transmission line ROW, buffers would consist primarily of herbaceous and shrub vegetation with minimal to no tree cover. Because of the distance between Project work areas and these streams, there would be no-to-low impact. Access road improvements would occur immediately adjacent to two streams on the 303(d) list: an unnamed tributary to McLane Creek and East Fork Lees Creek, both of which are listed for bacteria. Access road improvements near these streams are unlikely to exacerbate bacteria levels. Where needed, erosion and sediment control measures would be implemented and disturbed areas would be stabilized to prevent exacerbation of water quality issues near 303(d)-listed streams.

With the implementation of BMPs and mitigation measures such as installing erosion and sediment controls, reseeding and replanting stream buffers where appropriate, and other BMPs listed in Table 2-3, impacts on streams would be low to moderate and would not constitute a substantial impact on water resources. In addition, drainage improvements would benefit streams in the long term by improving flow, reducing streambed erosion, and minimizing sediment mobilization and downstream transport and deposition.

Floodplain Impacts

Where it crosses floodplains, the transmission line ROW is already cleared of tall-growing vegetation and undergoes periodic vegetation maintenance or consists of agricultural fields. Most proposed construction activities in floodplains would be associated with improving and reconstructing existing access roads and developing a proposed temporary 150-foot-radius helicopter landing zone located in the floodplain of the Skokomish River. Approximately 1 acre of 100-year FEMA floodplain would be permanently impacted in the Project area. Permanent impacts would include re-gravelling road surfaces or minor regrading of improved and reconstructed access roads, which would constitute 1-foot or less in depth of fill. The amount of fill that would be put in place would be minimal compared to the total floodplain area. Approximately 5 acres of 100-year FEMA floodplain would be temporarily impacted for improved and reconstructed access roads and a helicopter landing pad. Temporary impacts along improved and reconstructed access roads include crushing or clearing vegetation. Disturbed areas would be reseeded with an appropriate seed mix as needed. The proposed site for the helicopter landing pad is a routinely mowed agricultural field. Vegetation in that area is expected to be crushed but would regrow after construction activities are completed.

Because impacts would occur primarily along existing access roads or already cleared areas and would include a minor amount of fill or regrading, no floodplain functions would be altered, including flood flow conveyance, storage, and base flood elevation, resulting in low-to-moderate impacts to floodplains.

Groundwater Impacts

Soil compaction during structure and access road work could temporarily impact groundwater recharge by reducing infiltration capacity and increasing surface runoff to streams. However, these impacts are expected to occur in small construction areas spread over a wide geographic area. To a large extent, access road work would be conducted on existing roads, which would further minimize groundwater recharge impacts. During construction and over the long term, potential groundwater quality impacts could result from accidental release of hazardous chemicals used during construction (e.g., fuels, lubricants, solvents, etc.); removal of existing creosote or PCP-treated wood poles and creosote or PCP-contaminated soil excavated from existing structure holes; and leaching of PCP from new PCP-treated wood poles into groundwater. Landowners are required to mark wells on the ROW and are encouraged to mark wells within 50 meters of the ROW. Prior to the Project start, landowners would be notified of work occurring in their area and would be able to request BPA to protect their well heads. BPA would implement mitigation measures where well heads are marked in the field by landowners and those that BPA is notified of, which would help limit chemicals coming into proximity with well heads. Mitigation measures would be used to minimize the spread of PCPs and petroleum products. Such measures would include the proper handling and disposal of creosote or PCP-treated wood poles and creosote or PCP-contaminated soils; spill prevention, containment, and cleanup; and proper storage methods for wood-poles to minimize the risk to groundwater from the accidental release of hazardous chemicals. Any spills that occur would likely be small and localized. BPA would immediately contain and clean up spills and dispose of regulated materials in accordance with federal and state laws. Since groundwater recharge would not be affected and BMPs and mitigation measures (see Table 2-3) would be used to minimize the risk to groundwater quality from the accidental release of chemicals and petroleum products, impacts would be low.

Effects of Compensatory Wetland Mitigation on Water Resources

Off-site BPA-responsible wetland mitigation actions would likely affect water resources and floodplains as mitigation is constructed. Effects could include but are not limited to temporary disturbance to streams and floodplains from grading, excavating, stream bank stabilization, restoring stream channels, or reconnecting floodplains and hydrologic processes. Temporary disturbances could include increased runoff and turbidity,

decreased stream shading, and/or increased stream temperatures from riparian vegetation removal. Mitigation measures such as implementing erosion and sediment control measures, replanting disturbed areas, and other mitigation measures identified in Table 2-3 would be used as appropriate to minimize short-term temporary adverse effects on water resources at wetland mitigation sites. Depending on the nature of the mitigation action, the short-term temporary adverse effects on water resources at wetland mitigation sites could be moderate to high; however, these effects would be lessened to low to moderate with the implementation of mitigation measures. In the long-term, beneficial effects would result in improved or restored hydrologic processes and water resource functions.

3.3.2.2 No Action Alternative

Since there would be no planned construction under the No Action Alternative, BPA would continue to maintain the transmission line and access roads. Initially, impacts on water resources would be the same as existing conditions, with no or low impact. As existing structures and access roads further deteriorate and emergency structure repair and replacement are required, impacts, especially permanent and temporary impacts to streams and stream buffers, could occur. Overall, depending on the timing, location, and nature of the emergency repairs required, the No Action Alternative could result in low-to-moderate impacts on water resources.

3.4 Wetlands

3.4.1 Affected Environment

The Project area contains 530 wetlands totaling 330 acres (ESA 2023a). Table 3-3 summarizes wetlands identified by hydrogeomorphic (HGM) class and wetland rating category based on the Wetland Rating System for Western Washington (Hruby 2014). Wetland categories are "designed to differentiate wetlands based on their sensitivity to disturbance, rarity, the functions they provide, and whether they can be replaced or not." (Hruby 2014). Category I wetlands are generally unique, rare, or highly functional while Category IV wetlands have the lowest level of function and are typically degraded.

Depressional wetlands are the dominant HGM class, with 245 acres (74 percent) in and adjacent to the Project area. Most wetlands identified (246 acres, 74 percent of total wetlands) are Category III or IV wetlands. These lower quality wetlands are abundant in the ROW in part because of regular maintenance for the transmission line corridor, which reduces the structure and function of wetlands. Three Category I wetlands (36 acres, 11 percent of the total wetland acreage) and 11 Category II wetlands (48 acres, 15 percent of wetland acreage) were identified in the Project area. In general, the Category I and II wetlands identified are large wetland systems that extend beyond the ROW (ESA 2023a).

Wetland buffer widths range from 25 feet to 260 feet depending on the wetland category and jurisdiction. As with wetlands located within the ROW, most wetland buffers are highly disturbed and provide little screening, hydrologic function, habitat, or temperature control because of ongoing vegetation maintenance in the transmission line corridor.

Table 3-3: Summary of Wetlands Identified in the Project Area by HGM and Category

HGM Class	Category I Wetland Acreage	Category II Wetland Acreage	Category III Wetland Acreage	Category IV Wetland Acreage	Total
Depressional	35.86	35.57	109.23	64.79	**245.46 (74%)**
Riverine	0	12.74	16.81	0.19	**29.75 (9%)**

HGM Class	Category I Wetland Acreage	Category II Wetland Acreage	Category III Wetland Acreage	Category IV Wetland Acreage	Total
Slope	0	0	6.84	47.87	**54.72 (17%)**
Total[1]	**35.86 (11%)**	**48.31 (15%)**	**132.89 (40%)**	**112.85** (34%)	**329.92**

Note: [1.] Percentages may add to greater than 100 due to rounding.

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action

Under the Proposed Action, permanent impacts to wetlands and wetland buffers would result from new, improved, and reconstructed access roads, drainage upgrades, landings, and transmission structure construction or replacement. Temporary impacts to wetlands and wetland buffers would result from staging areas, helicopter landing pads, and temporary guard structures. Of the 530 wetlands identified in the Project area, 259 wetlands (approximately 50 percent) would be affected by the Proposed Action.

Permanent Wetland and Buffer Impacts

Over the 107-mile linear Project area, 2.7 acres of permanent wetland impact would occur within the existing ROW, across six major watersheds; most resulting from grading or excavation associated with improved and reconstructed access roads and landings. No new transmission structures would be placed in a wetland.

Most permanent wetland impacts (84 percent) would occur in Category III and IV wetlands. The majority of these wetlands have one vegetation class, with emergent or scrub-shrub communities dominating the vegetation types. Many of the affected wetlands lack special habitat features or diverse plant communities and are dominated by non-native, invasive vegetation such as reed canary grass and Himalayan blackberry. One Category I wetland would be impacted by road reconstruction and a landing at structure 16/1 on the Olympia-Shelton line. Eight Category II wetlands would be impacted (14 percent of permanent wetland impacts), primarily from access road improvements and landings. In general, permanent wetland impacts to Category I and II wetlands would be small relative to the total wetland size. The majority of Category I and II permanent wetland impacts would affect less than 1 percent of the total wetland area, and at most would impact less than 5 percent of the total wetland area. Furthermore, these impacts would occur in areas that have been previously disturbed. Therefore, wetland habitat, hydrologic, and water quality functions would not be significantly impacted. In compliance with CWA permit conditions, wetland mitigation conducted through an in-lieu fee program, wetland mitigation bank, and off-site wetland mitigation would be proposed to replace lost wetland functions. Permanent impacts to wetlands would thus be low to moderate and would not constitute a significant impact. A summary of permanent wetland impacts is provided in Table 3-4.

Table 3-4: Summary of Permanent Wetland Impacts in the Project Area by HGM Class and Category

HGM Class	Category I Wetland Acreage	Category II Wetland Acreage	Category III Wetland Acreage	Category IV Wetland Acreage	Total[1]
Depressional	0.06	0.36	0.66	0.94	**2.03 (75%)**
Riverine	0	0.02	0.02	0	**0.05 (2%)**
Slope	0	0	0.09	0.53	**0.62 (23%)**
Total[1]	**0.06 (2%)**	**0.38 (14%)**	**0.78 (29%)**	**1.47 (55%)**	**2.69**

Note: [1.] Individual table entries may not add to the reported total values due to rounding.

Over the Project area, 10 acres of permanent wetland buffer impacts would occur, most associated with improved and reconstructed access roads and landings. Most permanent wetland buffer impacts (93 percent) would occur in wetland buffers of Category III and IV wetlands. The wetland buffers of affected wetlands are generally degraded in the Project area due to lack of tree canopy in the transmission line ROW; ongoing vegetation maintenance; prevalence of invasive, non-native species such as Scotch broom, Himalayan blackberry, and reed canarygrass; and compacted soils from past disturbance. Most permanent wetland buffer impacts would result from grading and excavation for access road improvements and landings. Because wetland buffers are already degraded and impacts would occur near existing roadways and structures, wetland buffer functions would not be substantially impacted. During construction, BMPs such as erosion and sediment control would be put in place to protect adjacent wetland and wetland buffer areas. Additionally, wetland buffer mitigation would be conducted. With the implementation of wetland buffer mitigation and use of BMPs, permanent impacts to wetland buffers would be low to moderate and would not constitute a significant impact. A summary of wetland buffer impacts is provided in Table 3-5.

Table 3-5: Summary of Permanent Wetland Buffer Impacts in the Project Area by HGM Class and Category

HGM Class	Category I Wetland Buffer Acreage	Category II Wetland Buffer Acreage	Category III Wetland Buffer Acreage	Category IV Wetland Buffer Acreage	Total[1]
Depressional	0.09	0.52	4.26	1.91	**6.78 (67%)**
Riverine	0	0.06	0.34	0.02	**0.41 (4%)**
Slope	0	0	0.62	2.36	**2.98 (29%)**
Total[1]	**0.09 (1%)**	**0.58 (6%)**	**5.21 (51%)**	**4.29 (42%)**	**10.17**

Note: [1.] Individual table entries may not add to the reported total values due to rounding.

Temporary Wetland and Wetland Buffer Impacts

Wetland and buffer vegetation (both native and non-native) would be temporarily disturbed or removed (e.g., crushing or clearing vegetation) for helicopter landing pads, temporary guard structures, and pulling/tensioning sites. Due to the maintained nature of the ROW, wetlands and wetland buffers in the Project area have degraded structure and function. Although already degraded, water quality, hydrology, and habitat functions could be temporarily impacted by vegetation disturbance. Table 3-6 and Table 3-7 provide a summary of temporary wetland and wetland buffer impacts.

Table 3-6: Summary of Temporary Wetland Impacts in the Project Area by HGM Class and Category

HGM Class	Category I Wetland Acreage	Category II Wetland Acreage	Category III Wetland Acreage	Category IV Wetland Acreage	Total[1]
Depressional	0.09	0.84	3.98	3.43	**8.33 (75%)**
Riverine	0	0.14	0.14	0.01	**0.28 (3%)**
Slope	0	0	0.48	2.07	**2.55 (23%)**
Total[1]	**0.09 (1%)**	**0.97 (9%)**	**4.59 (41%)**	**5.51 (49%)**	**11.17**

Note: [1.] Individual table entries may not add to the reported total values due to rounding.

Table 3-7: Summary of Temporary Wetland Buffer Impacts in the Project Area by HGM Class and Category

HGM Class	Category I Wetland Acreage	Category II Wetland Acreage	Category III Wetland Acreage	Category IV Wetland Acreage	Total[1]
Depressional	0.66	1.92	20.57	7.97	**31.12 (73%)**
Riverine	0	0.35	1.33	0.06	**1.74 (4%)**
Slope	0	0	2.24	7.56	**9.79 (23%)**
Total[1]	**0.66 (2%)**	**2.28 (5%)**	**24.13 (57%)**	**15.59 (37%)**	**42.66**

Note: [1.] Individual table entries may not add to the reported total values due to rounding.

Erosion and sediment control measures would be implemented where appropriate to protect water quality and hydrologic functions. All temporarily disturbed wetland and wetland buffer areas would be reseeded or replanted as appropriate to stabilize and restore these areas. With the implementation of mitigation measures such as reseeding and replanting disturbed areas and BMPs such as erosion and sediment control measures (see Table 2-3), temporary impacts on wetlands and wetland buffers would be low to moderate and would not constitute a significant impact on wetland resources.

Ten danger trees would be removed within five Category IV wetlands near structures 16/5, 22/7, 40/1, 45/3, and 55/6 on the Shelton-Fairmount No. 1 transmission line. Trees would be felled with hand-held equipment. Single trees rather than groups of trees would be removed adjacent to the transmission line ROW, and trees would be allowed to regrow. Since other trees would remain adjacent to removed trees, there would be little reduction in shading or other functions such as water filtration or storage. These trees may provide perching or nesting habitat for wildlife species that use the wetlands and once felled, would be left in place so that they could provide habitat to wildlife. Removal could create small openings for sunlight in forested areas, which could make those areas more susceptible to invasion by undesirable plant species. Because relatively few trees would be removed compared to the size of the Project area, trees would be allowed to regrow, and felled trees left in wetlands would act as habitat features, impacts from danger tree removal would be low and would not constitute a significant impact on wetland resources.

Compensatory Wetland Mitigation

As with direct wetland impacts discussed above, wetland mitigation to offset permanent and temporary wetland buffer impacts would be conducted through the HCCC ILF Program, Chehalis Basin Wetland Mitigation Bank, and BPA-responsible off-site wetland mitigation. A watershed approach for compensatory mitigation would be used to the extent appropriate and practicable in accordance with the 2008 Federal Mitigation Rule, which emphasizes maintaining and improving aquatic resources within watersheds through strategic selection of compensatory mitigation sites. Using this approach, wetland mitigation actions would be matched to the greatest extent practicable with the affected watershed processes and wetland functions, including hydrologic, water quality, and habitat functions. Wetland mitigation actions would be located in a variety of wetlands in watersheds where wetland and buffer impacts occur, including Water Resource Inventory Areas (WRIA) 13 (Deschutes), 14 (Kennedy-Goldsborough), 16 (Skokomish-Dosewallips), 17 (Quilcene-Snow), 18 (Elwha-Dungeness), and 23 (Upper Chehalis). Mitigation in WRIAs 16 and 17 would occur through the HCCC ILF Program where feasible, and mitigation in WRIA 23 would occur through the Chehalis Basin Wetland Mitigation Bank. Off-site BPA-responsible mitigation sites would be identified in WRIAs 13, 14, 17, and 18. If a suitable wetland mitigation site is not found in a WRIA, mitigation actions would follow the 2008 Federal Mitigation Rule hierarchy and would be focused on identifying suitable sites in an adjacent watershed or identifying appropriate out-of-kind mitigation (e.g., stream and floodplain restoration as

mitigation instead of wetland mitigation), as approved by the regulatory agencies. Compensatory mitigation would follow CWA regulations and permit conditions to provide the required mitigation for the Project.

Off-site BPA-responsible wetland mitigation actions would affect the wetlands used for mitigation during construction. Effects could include but are not limited to temporary construction impacts from grading, constructing habitat features, and restoring stream channels or hydrologic connectivity within or adjacent to wetlands. Temporary construction impacts could include vegetation removal and soil disturbance resulting from grading, excavating, or invasive species removal. Mitigation construction could also temporarily increase the potential for erosion or turbidity. Mitigation measures such as replanting disturbed areas and using BMPs such as erosion and sediment control measures would be implemented, and other mitigation measures identified in Table 2-3 Table 2-3would be used as appropriate to minimize short-term temporary adverse effects at wetland mitigation sites. Depending on the nature of the mitigation action, short-term temporary adverse effects to wetland mitigation sites could be moderate to high; however, these effects would be lessened to low to moderate with the implementation of mitigation measures. In the long-term, beneficial effects would result in wetland conditions that provide greater ecological structure, functions, and benefits within the watershed.

3.4.2.2 No Action Alternative

Under the No Action Alternative, existing structures and access roads would continue to deteriorate, requiring emergency structure replacement and road improvement. Emergency repairs in wetlands during the rainy season or at times of high runoff could cause vegetation and soil disturbance, as well as runoff that may allow sediments to enter adjacent wetlands. Under the No Action Alternative, compensatory wetland mitigation would occur only if emergency repairs impacted wetlands. Depending on the nature of the emergency repair and the extent of wetland impacts, mitigation could be required at a higher ratio because it would happen after the wetland impacts would occur, which could result in a temporal loss of those wetland functions; this type of action typically requires additional mitigation and increased mitigation ratios to account for the temporal loss. Overall, the No Action Alternative could result in low-to-moderate impacts depending on the timing, location, and nature of emergency repairs required.

3.5 Wildlife and Fish

3.5.1 Affected Environment

This section summarizes terrestrial wildlife, fish, and habitat conditions in the Project area. The analytical methodology included two main components: (1) a preliminary site evaluation of fish and wildlife species and habitats potentially occurring in the Project area based on federal, state, county, and non-governmental organization resources, and (2) surveys to verify wildlife conditions, note any observed wildlife or indications of wildlife presence (e.g., nests, feathers, prints, scat, etc.) along the length of the ROW, and assess each stream crossing to determine potential fish use. Except for northern spotted owl, no species-specific surveys were conducted for wildlife or fish.

3.5.1.1 General Wildlife Habitat and Species

Much of the Project area is dominated by an existing transmission line ROW and access road network subject to regular vegetation management (selective treatment), including removal of much of the tall-growing (woody) vegetation within, and immediately adjacent to, the ROW. Tsuga heterophylla Zone (Franklin et.al. 1988; as documented by ESA 2023b), which is the most extensive vegetation zone in western Washington and Oregon, dominates the Project area (outside of the ROW). Forested conditions predominate in areas

adjacent to the ROW, consisting primarily of industrial coniferous forest. In addition, much smaller patches of mixed/deciduous forest, grasslands, and impervious surface are scattered along the ROW.

Within the ROW, the predominant vegetation type is shrub habitat (greater than 75 percent), while the remainder of the ROW (less than 25 percent) is dominated by herbaceous species, including emergent plants and pasture grasses. Small amounts of impervious surface, such as roadways and small residential structures, are also present.

A diversity of wildlife species and habitats typical of the Olympic Peninsula occur in the Project area. Numerous invertebrates, amphibians, reptiles, birds, and mammals were observed in the field during surveys conducted in support of the Project (see Appendix F). Basic patterns of distribution appear closely tied to the extent of human disturbance. Near areas with the highest human disturbance, such as around towns and cities and where the Project area is flanked by human development, species and habitats adapted to human influence predominate, and species that are less compatible are largely absent.

Wildlife species accustomed to human presence that were documented in the Project area include amphibians such as bullfrog (*Lithobates catesbeianus*) and Pacific tree frog (*Pseudarcris regilla*); bird species such as American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*), chestnut-backed chickadee (*Poecile rufescens*), downy woodpecker (*Dryobates pubescens*), red-tailed hawk (*Buteo jamaicensis*), song sparrow (*Melospiza melodia*), and Steller's jay (*Cyanocitta stelleri*); and mammals, including black-tailed deer (*Odocoileus hemionus* ssp. *columbianus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*) (ESA 2023b).

Within the Project area, sites with little or infrequent human disturbance tend to be relatively unique natural ecological sites. These areas are typically shrub or forested wetlands, patches of upland forest with diverse age classes of trees, or edge habitats between relatively intact native-type habitat. These areas support a wider diversity of wildlife species that have less capacity to co-occur with humans than more disturbed sites. Wildlife documented in these areas include amphibians such as northern leopard frog (*Lithobates pipiens*) and tailed frog (*Ascaphus sp.*); birds such as American bittern (*Botaurus lentiginosus*), band-tailed pigeon (*Patagioenas fasciata*), black-headed grosbeak (*Pheucticus melanocephalus*), Hutton's vireo (*Vireo huttoni*), pileated woodpecker (*Dryocopus pileatus*), red crossbill (*Loxia curvirostra*), ruffed grouse (*Bonasa umbellus*), and sooty (blue) grouse (*Dendragapus fuliginosus*); and mammals including black bear (*Ursus americanus*), bobcat (*Lynx rufus*), and cougar (*Puma concolor*) (ESA 2023b).

3.5.1.2 General Fish Habitat and Species

Of the 310 stream crossings identified in the Project area, 92 had documented or presumed fish presence in the Statewide Washington Integrated Fish Distribution (SWIFD) Stream and Fish Use Database (NWIFC 2020), for a total of 285 occurrences of documented or presumed fish species in these 92 streams. Section 3.3 discusses these stream resources in greater detail. Stream crossings at new and replacement culverts were also surveyed to assess habitat conditions and potential for fish presence.

According to the SWIFD dataset, most fish in the Project area are resident coastal cutthroat trout (*Oncorhynchus clarkii clarkii*), coho salmon (*Oncorhynchus kisutch*), winter steelhead trout (*Oncorhynchus mykiss*), and fall chum salmon (*Oncorhynchus keta*). A few streams also support pink salmon (*O. gorbuscha*) and sockeye salmon (*O. nerka*). Several non-salmonid freshwater species exist in the Western Puget Sound region and may be present within the Project area, such as several species of sculpin (Sculpin spp.) and lamprey (E*ntosphenus* spp. and *Lampetra* spp.). Introduced species such as bass (*Micropterus* spp.), yellow perch (*Perca flavescens*), channel catfish (*Ictalurus punctatus*), and crappie (*Pomoxis spp*.) may also be present in a limited number of streams.

3.5.1.3 Federally Protected Fish and Wildlife Species and Habitats

Federally protected fish and wildlife and habitats considered in this EA include species listed or proposed for listing under the ESA as threatened or endangered, or critical habitat for listed species in the Project area. Three ESA-listed salmonid species managed by NMFS are documented as present in the Project area (NWIFC 2020) (see Table 3-8). BPA obtained a formal list of USFWS-managed ESA-species (see Appendix E) that identified eight protected wildlife species and three associated designated critical habitats that may occur in the Project area. Of the eight species identified on the USFWS list, five ESA-listed fish and wildlife species are potentially present in the Project area (see Table 3-8). Supportive habitat for these species was identified during field surveys. The remaining three species are unlikely to occur in the Project area due to a lack of supportive habitat features and/or because their current ranges do not overlap with the Project area. Designated critical habitat for these species either does not overlap the Project area or has not been spatially defined and primary constituent elements are largely absent. ESA-listed species and critical habitats with the potential to occur in the Project area are described further in Appendix H.

Bull trout (*Salvelinus confluentus*), federally listed as threatened, are native to the State of Washington and are documented in a number of the rivers and streams within the Project area. There are documented populations in the Elwha, Dungeness, and North Fork Skokomish Rivers, among others. Bull trout require very cold water for spawning and migrate further upstream than most other species. Seven stream crossings have documented presence of bull trout within or adjacent to the Project area, while two other crossings have presumed presence (ESA 2023a).

Hood Canal Summer-run chum (*Oncorhynchus keta*), federally listed as threatened, are found in several watersheds in the Project area (Correa 2002; NWIFC 2020). This Evolutionarily Significant Unit (ESU) includes naturally spawned summer-run chum salmon originating from Hood Canal and its tributaries as well as from Olympic Peninsula rivers between Hood Canal and Dungeness Bay. Typically, chum begin their upstream migrations between mid- to late-August through mid-October with emergence occurring toward the end of March through the end of April, depending on water temperatures (Correa 2002). Juvenile chum immediately migrate seaward after incubation and subsequent emergence (Williams et al. 1975). Six stream crossings in the Project area have documented presence of summer chum salmon, consisting of four rivers and two larger streams (ESA 2023a).

Table 3-8: Federally Protected Fish and Wildlife Species Potentially Occurring in the Project Area

Common Name (*Species*)	Federal Listing, Critical Habitat and Resource Agency	Potential of Occurrence (Justification)
Fish		
Bull trout/Dolly Varden (*Salvelinus confluentus*)	Threatened, Critical Habitat, USFWS	**Documented Presence**
Hood Canal Summer Chum Salmon (*Oncorhynchus keta*)	Threatened, Critical Habitat, NMFS	**Documented Presence**
Puget Sound Steelhead (*O. mykiss*)	Threatened, Critical Habitat, NMFS	**Documented Presence**
Puget Sound Chinook Salmon (*O. tshawytscha*)	Threatened, Critical Habitat, NMFS	**Documented Presence**
Amphibians		

Common Name (*Species*)	Federal Listing, Critical Habitat and Resource Agency	Potential of Occurrence (Justification)
Oregon Spotted Frog (*Rana pretiosa*)	Threatened, Critical Habitat, USFWS	**Potentially** (Suitable habitat present, Critical Habitat present)
Birds		
Marbled Murrelet (*Brachyramphus marmoratus*)	Threatened, Critical Habitat, USFWS	**Documented Presence** (Suitable habitat present, Critical Habitat present)
Northern Spotted Owl (*Strix occidentalis*)	Threatened, Critical Habitat, USFWS	**Potentially** (Suitable habitat present, Critical Habitat present)
Streaked horned lark (*Eremophila alpesteris strigata*)	Threatened, Critical Habitat, USFWS	**Not present** (Nearest Suitable/Critical Habitat is at the Olympia Airport)
Yellow-billed cuckoo (*Coccyzus americanus*)	Threatened, Critical Habitat, USFWS	**Not present** (Extirpated from WA, Critical Habitat absent)
Insects		
Taylor's checkerspot (*Euphydryus editha taylori*)	Endangered, Critical Habitat, USFWS	**Not present** (No suitable habitat, Critical Habitat absent)
Mammals		
Olympia Pocket Gopher (*Thomomys mazama pugetensis*)	Threatened, Critical Habitat, USFWS	**Potentially** (Suitable habitat present, Critical Habitat absent)

Source: USFWS 2022; NWIFC 2020; NMFS 2022

The Puget Sound steelhead trout (*Oncorhynchus mykiss*) is a federally listed threatened species. This Distinct Population Segment (DPS) includes naturally spawned anadromous *O. mykiss* (steelhead) originating below natural and manmade impassable barriers from rivers flowing into Puget Sound from the Elwha River (inclusive) eastward, including rivers in Hood Canal and South Sound. Winter steelhead spawn from winter to spring with emergence occurring from April to June. They then spend 1 to 2 years in the stream rearing before migrating to the sea in the spring (Correa 2002). It is anticipated that rearing juveniles will be present year-round within streams in the Project area. Twenty-seven stream crossings in the Project area have documented presence of summer or winter steelhead, while eight additional crossings have presumed presence (ESA 2023a).

The Puget Sound ESU of Chinook salmon (*Oncorhynchus tshawytscha*) is federally listed as threatened. This includes naturally spawned Chinook salmon originating from rivers flowing into Puget Sound from the Elwha River (inclusive) eastward, including rivers in Hood Canal, South Sound, North Sound, and the Strait of Georgia. This ESU also includes Chinook salmon from Kendall Creek Hatchery Program, Marblemount Hatchery Program (summer and spring run), Issaquah Creek Hatchery Program, and various other programs dedicated for artificial propagation (NOAA Fisheries 2021). Most Chinook spawn in large rivers, although they also use smaller streams with sufficient water flow. Fourteen stream crossings in the Project area have documented presence of fall or spring Chinook salmon, and one crossing has presumed presence (ESA 2023a).

Oregon spotted frog (*Rana pretiosa*), a federally listed threatened species, is almost always found in or near a perennial body of water, such as a spring, pond, lake, slow-moving stream, irrigation canal, or roadside ditch. Oregon spotted frogs breed in shallow wetland systems that are near flowing water or seasonally connected to a perennial stream. Only six watersheds in Washington are currently known to be occupied by Oregon

spotted frogs (WDFW 2022) and none occur in the Project area. Suitable Oregon spotted frog habitat is present in portions of the Olympia-Shelton transmission line (from Structures 1/1 to 2/7) where there is wetland and stream habitat; however, the majority of these features are not perennial. The nearest critical habitat has been mapped south of the Olympia Substation but is restricted to a portion of Fish Creek, a small tributary draining into Black Lake, south of Olympia. No Oregon spotted frog populations have been documented in the transmission line ROW nor were any Oregon spotted frog egg masses observed during March 2023 field surveys conducted in support of the Project (ESA and Hamer 2023).

Northern spotted owl (*Strix occidentalis*) and marbled murrelet (*Brachyramphus marmoratus*), both federally listed threatened species, were not observed during the general wildlife and wildlife habitat surveys; however, detecting these species requires a targeted effort to assess the likelihood of their presence. A desktop exercise and field assessment were conducted by wildlife biologists to verify all northern spotted owl and marbled murrelet detections and suitable habitat within 1 mile of the Project area. The best, although degraded, habitat for these species within the Project area occurs in the northern portion of the Shelton-Fairmount No. 1 transmission line (south of Quilcene) and the Fairmount-Port Angeles No. 1 transmission line (south of Blyn). Historic observations of marbled murrelet have been reported and suitable habitat features occur for marbled murrelet and northern spotted owl in these areas as determined by the WDNR, the USFS, and Project habitat surveys. Despite the presence of suitable habitat in the Project area, both marbled murrelet and northern spotted owl populations have been in steep decline on the Olympic Peninsula in recent years (ESA and Hamer 2023). The last recorded observation of marbled murrelet near the Project area was from 2013, where the species was reported approximately 1 mile from the transmission line corridor. The last recorded observation of northern spotted owl in the vicinity was from 2003. These species have not been recorded as occurring in or around the Project area since these reports were made.

The Olympia (*Thomomys mazama pugetensis*) pocket gopher, a threatened subspecies of the Mazama pocket gopher, are known to occur in and around Olympia (WDFW 2022). The closest known population of this subspecies and Critical Habitat are located at the Olympia Airport approximately 2.5 miles southeast of the Project area. Suitable soils for pocket gophers are mapped in the Project area, indicating there is potential for this subspecies to be present (ESA and Hamer 2023).

3.5.1.4 State Protected and USFS Fish and Wildlife Species

The Washington Fish and Wildlife Commission has classified state-listed species for Washington, some of which may occur within the Project area. The most recent list of state endangered species (revised June 2019) identifies several taxa within the region, with four species having the potential to occur in the Project area. These species include fisher (*Pekania pennanti*) (also a candidate for federal ESA listing as threatened), marbled murrelet, northern spotted owl, and Oregon spotted frog. The fisher is the only species listed by the state that does not currently have federal ESA protections. Fishers were reintroduced in Olympic National Park from 2008 through 2010, and have dispersed widely throughout the Olympic Peninsula, into both managed and natural forests, including within Port Angeles (NPS 2018). Although their population is currently small, habitat that would support the fisher occurs in the Project area.

There are no state endangered or threatened fish species in the Project area. Pygmy whitefish (*Prosopium coulterii*), margined sculpin (*Cottus marginatus*), and Olympic mudminnow (*Novumbra hubbsi*) are state listed as sensitive species, but none are distributed in the Project area. State candidate species include a number of salmonids, including Puget Sound Chinook, Hood Canal Chum, and bull trout, which are discussed in Section 3.5.1.3 as federally-listed species.

North of Brinnon, Washington, the Project area traverses approximately 1.5 miles of the Olympic National Forest, managed by the USFS. The Threatened, Endangered, & Sensitive (TES) Species Program is the USFS's initiative to conserve and recover plant and animal species that need special management attention and to restore National Forest and Grassland ecosystems and habitats. This program has developed regional lists of species determined to require protections. A final Region 6 Regional Forester and Oregon/Washington State Director Special Status Species List, published June 21, 2021, identifies 76 species for the Project area region. Nine of these identified wildlife species have the potential to occur in the Olympic National Forest within the Project area. TES species potentially present includes five birds: Northern Goshawk (*Accipiter gentilis*), common loon (*Gavia immer*), bald eagle (*Haliaeetus leucocephalus*), mountain quail (*Oreortyx pictus*), and harlequin duck (*Histrionicus histrionicus*); two bats: little brown bat (*Myotis lucifugus*) and Keen's bat (*Myotis keenii*); one mammal: fisher; and one amphibian: Olympic torrent salamander (*Rhyacotriton olympicus*). All of these species could be present in the Project area, although some may be absent or rare. Habitat for these species, generally mature forest or large open-water areas, is absent in the ROW.

The Region 6 Regional Forester and Oregon/Washington State Director Special Status Species List shows only a single fish species, Olympic mudminnow, as documented or suspected as occurring in the Olympic National Forest. However, this species is only distributed in the southwestern portions of the Olympic Peninsula and its distribution does not overlap with the Project area; therefore, the Project would not affect this species.

3.5.1.5 Migratory Birds

The USFWS lists a number of bird species potentially occurring within the Project area as birds of conservation concern, many of which have the potential to nest and rear their chicks in the Project area. The breeding season for most bird species is recognized by USFWS as March 15 to August 31 (USFWS 2021). Some observed species nest in or on the existing transmission line structures (i.e., many raptors, corvids, woodpeckers, some passerines), while others nest in the surrounding vegetation.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

General Wildlife

Temporary noise and disturbance during construction would contribute the most to effects on wildlife in and near the Project area. During construction, work crews would operate heavy construction equipment, including helicopters, for clearing, grading, and line stringing. In active construction areas wildlife would likely be temporarily displaced due to disturbance. Although much of the Project area receives some human disturbance under existing conditions, construction activities would exceed existing levels and any habituation by species would not be sustained during intensive construction activity. Because some areas currently receive less human disturbance than others and, therefore, are generally the sites that host the most infrequently occurring species (i.e., the rarest within the Project area), these species would likely be the most impacted by construction activities. Disturbance and physical changes made by construction would likely favor the most human disturbance-adapted species, such as American crow and European starling, potentially expanding their range. A very small amount of incidental mortality could result from clearing and grading activities or dewatering (e.g., amphibians or small mammals). There is also a risk of bird strikes on the fiber optic and transmission lines, but this risk is already present. To mitigate the risk of bird strikes, BPA worked with USFWS and WDNR to determine appropriate locations to install bird flight diverters on the transmission and fiber optic lines where they intersect known murrelet and spotted owl flyways and waterfowl concentration areas.

Habitat that currently supports wildlife would be disturbed and/or removed during construction but is anticipated to return to pre-existing conditions once construction is complete and enough recovery time has elapsed. Permanent and temporary impacts to wildlife from loss of habitat—mostly in the form of vegetation removal associated with new, improved, and reconstructed access roads, drainage upgrades, crane pads, danger tree removal, and transmission structure construction or replacement—would vary. Vegetation removal would include crushing, clearing, or cutting, depending on the type of work conducted (see Section 3.2.2 for a discussion of vegetation impacts). Vegetation removal that results in the loss of native habitat would generally have a larger impact on wildlife than the loss of habitat composed primarily of exotic species. The extent of impact on wildlife would depend on the specific impact sites and the habitat currently present (fairly uniform shrub: greater than 75 percent and herbaceous: less than 25 percent vegetation which undergoes regular vegetation management). Most clearing and grading impacts are associated with landings adjacent to the structures and with the edges of existing BPA access roads.

The Project area includes a short segment on WDFW-managed wildlife lands on the Skokomish Wildlife Unit (on north side of Skokomish River). There would be no clearing and grading on this land and, therefore, there would be no impacts to wildlife and habitat except temporary noise impacts from helicopter fly-over.

Overall, direct impacts on common wildlife species would be low because most of the species are mobile and would avoid temporary construction disturbance from construction activities, including helicopter use and heavy equipment. Any incidental mortality would be minor and would not have the potential to affect regional population levels. Furthermore, permanent habitat changes would be minimal relative to current habitat conditions, which are already heavily altered and disturbed within the transmission line ROW and access roads. The installation of bird flight diverters would reduce the risk of bird collision with conductors. No significant impacts to wildlife resources are anticipated from the Project.

General Fish

Culvert replacements in fish-bearing streams would maintain or improve fish passage and fish access to upstream aquatic habitats. Because tree removal would be extremely limited, only minor temporary increases in stream water temperatures (if any) would result from the removal of shrubby vegetation within the Project area, including within culvert footprints. In-water work for construction or replacement of non-fish-bearing stream culverts, drain dips, or water bars could increase sedimentation to these features; however, the implementation of appropriate water quality BMPs would likely reduce or eliminate this risk. Even if sediments were to reach fish habitat, sediment inputs would be small and temporary in duration. Conducting work during regulatory in-water work windows and conducting fish removal according to NMFS and USFWS protocols would limit impacts on fish, although a few individual fish may be harmed or disturbed during fish relocation efforts. Site isolation to minimize the downstream transport of turbid water would be required if flowing water is present during construction.

Aquatic noise and vibration disturbance is not expected to be an issue, as no pile driving would occur and exceedances of background ambient underwater noise levels are also not anticipated. If fish are temporarily displaced from waters near construction work areas due to noise and activity, they would be relocated and expected to return once the work in that area ceases. The Project would slightly improve fish passage conditions in the Project area and would protect, or slightly improve, overall water quality. Although a few individual fish may be disturbed or harmed, the Project would have only minor and temporary direct and indirect effects on fish and aquatic resources.

Federally Protected Fish and Wildlife

The Project complies with the ESA and with Section 7 consultation underway with the NMFS and USFWS on the effect of the Project on ESA-listed species. This consultation includes consideration of Project avoidance, minimization, and conservation measures to reduce potential impacts on these species.

Project impacts on ESA-listed fish are similar to those discussed with respect to general fish species. However, construction work will only occur within and adjacent to a handful of streams that support ESA-listed fish. In most cases, construction work would consist of minor clearing of the shrub-dominated riparian buffer at the outer edge of the buffer. The location and minor extent of this clearing would not significantly degrade any riparian functions, such as larger wood recruitment, stream shading, bank stability, and sediment filtration. As with other fish resources, Project effects on ESA-listed fish species would be minor and limited in scope and scale, with no potential significant impacts.

If construction activities were to occur during the marbled murrelet or northern spotted owl breeding seasons adjacent to species habitat, individuals could be disturbed and displaced. Activities near active nests may additionally cause parents to abandon nests, likely resulting in chick or egg mortality. However, all Project work in occupied murrelet habitat would occur outside the marbled murrelet breeding season. Construction work next to suitable murrelet habitat would occur during the breeding season, but daily timing restrictions would be implemented. With these timing restrictions, Project construction, including helicopter and heavy equipment use and felling of danger trees outside of the ROW (168 of which are potential suitable nesting trees), would not likely cause injury, mortality, or nest abandonment; rather, these activities may stress and/or displace any individuals present in forest stands adjacent to the ROW. Furthermore, important murrelet habitat features (such as old-growth trees) would not be removed in meaningful numbers. Along the ROW, occupied murrelet habitat is limited to a few miles in length and the vast majority of habitat adjacent to the ROW is not suitable murrelet habitat. To mitigate the risk of marbled murrelet striking transmission and fiber lines, BPA worked with USFWS and WDNR to determine appropriate locations to install bird flight diverters on the conductor and fiber lines where they intersect known murrelet flyways and waterfowl concentration areas. At most, impacts to marbled murrelet would be minor and temporary and limited to disturbance of a few individuals.

There is no northern spotted owl occupied habitat in the Project area. Surveys for owl presence in the limited areas of suitable habitat along the Project area were conducted in 2021 (with no detections) and will be conducted again in the year prior to construction of a given scheduled section of the Project. Furthermore, the Project would adhere to seasonal timing restrictions during the early breeding season (March 1 to July 15) within suitable owl habitat that has not been surveyed and would remove danger trees in such habitat outside the breeding season. Important spotted owl habitat features (such as old-growth trees) would not be removed in meaningful numbers. Based on declining populations of owls state-wide and on the Olympic Peninsula and the application of mitigation measures, no significant impact on owls is expected to result from noise or disturbance associated with the Project.

Ground alterations may disturb Olympia pocket gophers that may be present during construction; however, because soils within the Project area are already disturbed and degraded, this species is already unlikely to occur in the Project area, and at most, only small numbers, if any, would be affected. If this species were to occur, it would likely be in a short section of the Olympia-Shelton transmission line. To reduce impacts to pocket gophers, construction activities in potentially suitable habitat would minimize the amount of soil excavated and, to the extent feasible, minimize soil compaction. Additionally, protocol-level pocket gopher surveys are proposed near the Olympia Substation in the year prior to site activity to clear the area for construction. Due to the limited amount of excavation proposed in suitable pocket-gopher soils and the presence of roads, forests, and other development adjacent to the substation, no pocket gophers are

anticipated to be found. Project impacts on pocket gophers, if any, would be limited to minimal disturbance or habitat alteration and would not be considered significant.

Construction of landings and road improvements may impact a small amount of Oregon-spotted-frog-suitable habitat in the form of wetlands associated with streams between miles one and two of the Olympia-Shelton transmission line. Project activities would not fill wetlands but may disturb and displace frogs in the area. If this species were to occur, it would likely be in a short section of the Olympia-Shelton transmission line. Erosion and sediment control BMPs would be installed in this area prior to construction to reduce the potential for impacts on Oregon spotted frog. Project impacts on Oregon spotted frog, if any, would be limited to minimal disturbance or habitat alteration and would not be considered significant.

State Protected and USFS Fish and Wildlife Species

The Proposed Action may impact some state-listed species over the Project area, as well as certain USFS-sensitive species on the 1.5-mile segment of USFS lands. Although most of these species are not common in the Project area and would be relatively rare in the cleared ROW, there is the potential for some birds or mammals of concern to be located within or adjacent to the Project area during construction. This may result in limited temporary disturbance and/or displacement during construction, though physical harm would be unlikely. Other taxa (amphibians) with less mobility may experience individual mortality during construction, but such losses would be minor and would not affect regional populations. Any habitat alterations would be minor in extent relative to the total habitat in the ROW. Construction in the Olympic National Forest would last days to a few weeks; therefore, any impacts to these species would be temporary and minor and would be considered non-significant. The Project would have minor effects at most, on both state-listed/sensitive species and USFS-sensitive species.

Migratory Birds

Construction activities during the spring/summer breeding season adjacent to nesting habitat features (e.g., shrubs, trees, grass tufts, cavities, stumps, etc.) may disturb and displace individuals. Construction near active nests may cause them to be abandoned, and young would likely suffer mortality as a result. Construction disturbance from noise and human activities may extend beyond the Project area and impact individuals in adjacent forest stands if present. This disturbance, however, would likely lead to only temporary displacement of individuals. Scheduling tree removal (and other vegetation removal) between September 15 and March 1 in areas with supporting habitat features, when possible, would minimize impacts to migratory birds. If tree clearing is needed outside of that time, a pre-construction nesting bird survey would be conducted prior to the tree removal. If active nests are found, trees would not be removed until the young have fledged (see Table 2-3).

Permanent impacts on migratory birds would likely be minimal, as important habitat features such as native habitat would be minimally altered. Further, vegetation alterations would largely be similar to ongoing vegetation management activities. The Project would add fiber optic and guy wires in locations where they do not presently exist and would change the height of transmission structures and conductors, which may increase the potential for bird collisions. However, the proposed installation of bird flight diverters should mitigate this risk and reduce impacts to low.

Effects of Compensatory Mitigation to Wildlife and Fish Habitat and Species

Project construction would entail some unavoidable adverse impacts on wetland and stream habitat. To offset these impacts, mitigation would be proposed in compliance with federal and state regulatory requirements. Generally, proposed mitigation actions would aim to increase available habitat for wildlife and

fish by restoring off-site degraded habitat. Mitigation typically requires that more habitat be preserved, restored, or enhanced than the habitat that is impacted by the Project. While there would be short-term temporary impacts resulting from mitigation site construction (turbidity, sedimentation) these effects would be managed by the use of BMPs. Furthermore, construction noise, temporary habitat disturbance, and any required fish salvage associated with mitigation activities would be short-term, localized and would follow the mitigation measures identified in Table 2-3, Corps Clean Water Act (CWA) permits, and Section 7 consultation with USFWS or NMFS to minimize potential adverse impacts to federally listed species. WDFW protocols would be followed for state-managed species. Any CWA or ESA Section 7 consultations would occur after specific mitigation actions are identified. In the long term, mitigation sites are anticipated to increase the net quality and quantity of habitat available to wildlife and fish, including salmonids, in the Project area.

3.5.2.2 No Action Alternative

Under the No Action Alternative, existing structures and access roads would continue to deteriorate, requiring emergency structure replacements and road improvements. Emergency repairs could occur at any time of the year, including during the respective breeding seasons of various wildlife species in the area. However, repairs would likely be smaller in scope than a full rebuilding of the transmission line, restricting any impacts to confined areas. Undersized and/or damaged culverts would remain as-is, possibly impeding fish passage. Emergency repairs during precipitation events and times of high runoff could cause erosion that may allow sediments to enter adjacent waterbodies and cause increased disruption to fish. Overall, depending on the nature of emergency repairs required, the No Action Alternative could result in low-to-moderate impacts as determined by the timing, extent, and location, but would likely be restricted to discrete areas.

3.6 Cultural Resources

3.6.1 Affected Environment

A cultural resources inventory, consisting of background research and archaeological and built environment surveys (field surveys), was conducted within the transmission line ROW, access roads, and all other areas of the Project area (AECOM 2022x, in prep). Based on the results of background research, 13 cultural resources were previously documented within the Project area, including four previously-recorded archaeological sites, one previously-recorded isolated find, and eight previously-recorded built environment resources. The field surveys resulted in the identification of 36 cultural resources. These include four previously-recorded archaeological sites; three newly-recorded archaeological sites; one previously-recorded isolated find; six previously-recorded built resources; and 22 newly-recorded built resources. Two previously-recorded built resources were not relocated during the survey. The following are the results of the archaeological field survey:

- Site 45TN80, the previously-recorded multicomponent Black Lake Portage Site, may be eligible for listing in the National Register of Historic Places (National Register) (Lindeman, 1980). The archaeological site is located on private property and has not been formally evaluated for inclusion in the National Register.
- Site 45OL15 is a previously-recorded historic log cabin located along a proposed access road within the Olympic National Forest. The archaeological site was determined not eligible for listing in the National Register in 1981 (Stilson 2000).
- Site 45OL74 consists of a previously-recorded historic bridge located along a proposed access road within the Olympic National Forest. The archaeological site is unevaluated and considered potentially eligible for listing in the National Register.

- Site 45JE29 is a previously-recorded historic logging railroad incline that intersects the Shelton-Fairmount No. 1 ROW within the Olympic National Forest. The archaeological site is unevaluated and considered potentially eligible for listing in the National Register.
- Isolated Find 45CA768 consists of a single precontact lithic flake located on private property. The previously-recorded precontact isolate was determined not eligible for listing in the National Register in 2017.
- Site RS-04112022-S01 consists of newly-recorded historic debris scatter located on private property. The archaeological site is unevaluated and potentially eligible for listing in the National Register.
- Site RS-05052022-S01 consists of abandoned logging railroad grades on DNR lands, within and adjacent to the Shelton-Fairmount No. 1 ROW. Post-abandonment, the grades were converted into access roads. The archaeological site is unevaluated and considered potentially eligible for listing in the National Register.
- Site RS-05102022-S01 consists of an historic concrete foundation and the remnants of two wood structures located on private property. The newly-recorded archaeological site has not been formally evaluated and is considered potentially eligible for listing in the National Register.

The survey also identified hundreds of old-growth cedar and spruce tree stumps, many with evidence of springboard cuts typical of late-nineteenth century and early-twentieth century logging techniques. Because old-growth tree stumps with springboard scars are ubiquitous resources and have negligible data potential relating to initial timber harvest entry and technologies, they were not formally documented.

The cultural resources inventory also included the National Register eligibility evaluation of the Shelton-Fairmount No. 1 transmission line, the reevaluation of BPA's historic-age substations that were evaluated for National Register eligibility in 2018, and the reconnaissance-level survey of other historic transmission lines and substations in the Project area. A reconnaissance-level survey of the Walter Austin House property was also included. Built environment inventory results include:

- The newly recorded Shelton-Fairmount No. 1 transmission line is recommended as eligible to the National Register for its association with rural electrification and the timber industry and as a representative example of BPA's post World War II system expansion development.
- Eight substations in the Project area, including BPA Port Angeles substation and BPA Potlatch substation, are eligible for the National Register. The Port Angeles and Potlatch substations are eligible as a historic district under National Register Criterion A for their association with the design, construction, and operation of the BPA Transmission System in the Pacific Northwest during BPA's Post-World War II system expansion period (AECOM 2018a; AECOM 2018b).
- The Fairmount, Olympia, and Shelton substations do not retain historic integrity as significant elements of the BPA Transmission Network and are not eligible for the National Register (AECOM 2018c; AECOM 2018d, AECOM 2018e).
- The BPA Happy Valley substation, Mason County No. 1 t3ba'das (pronounced Tah-bah-das) Substation, Mason County PUD No. 3 Mountain View substation, and Jefferson PUD Quilcene substation do not meet age requirements for the National Register.
- The Mason County No. 1 Duckabush substation is recommended as eligible for the National Register under Criterion A for its association with rural electrification in Jefferson County.
- Sixteen additional BPA transmission lines are in the Project area, including 11 that date to BPA's

period of significance (1938 to 1974) and are presumably eligible for the National Register as contributing historic resources within BPA's transmission system (Kramer 2012). These include Fairmount-Port Angeles No. 1 and No. 2; Olympia-Satsop No. 2; Olympia-Shelton No. 1, No. 2, No. 3, No. 4; Olympia-South Elma No. 1; Shelton-Fairmount No. 3 and No. 4; and Shelton-Kitsap No. 3.

- The Walter Austin House was surveyed in 1985 but remains unevaluated (Stevenson S. and Tom C. 1985). This resource is treated as potentially eligible for listing in the National Register.

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

The Proposed Action would not adversely impact cultural resources. Rebuilding the wood-pole transmission lines with in-kind materials and upgrading the fiber optic system would not adversely affect characteristics that make transmission lines eligible for listing in the National Register. Additionally, the replacement structures would be the same material, design, and height as the existing structures and the transmission lines would retain its current alignment, function, and setting. The fiber optic system upgrade would be consistent with its existing appearance, which would not change with the addition of support bracing. The transmission line's visual uniformity and overall historic integrity would accordingly remain intact, resulting in no adverse impact.

The Proposed Action's associated substation activities would not diminish the aspects of integrity that convey the historic significance of those resources.

The Proposed Action associated with the Walter Austin House would not diminish aspects of the property's historic integrity that would support potential eligibility for the National Register.

The Proposed Action's roadwork and associated activities would not adversely affect built environment cultural resources.

Site 45TN80 is located along Black Lake Boulevard NW between Olympia-Shelton transmission line structures 1/7 and 2/1. Previous development left no traces of the historic portage trail in the ROW. Impacts to the archaeological site would be none to low.

Sites 45OL15 and 45OL74 are adjacent to existing gravel-surfaced access roads in the Olympic National Forest. Site 45OL15 has been determined not eligible for listing in the National Register; and therefore, there would be no impact on the archaeological site. Site 45OL74 is unevaluated for the National Register; however, because the Proposed Action would be confined to the road prism, the site boundary would be avoided and impacts to the archaeological site would be none to low.

Site 45JE29 extends across the Shelton-Fairmount No. 1 transmission line ROW between structures 41/5 and 41/6 in the Olympic National Forest. To prevent temporary disturbance to the site by the Proposed Action, the site boundary would be marked for avoidance prior to construction, and all vehicles and equipment would be parked outside the site boundary. Impacts to the site would be none-to-low with cultural monitoring during construction to ensure implementation of avoidance measures.

Site RS-04112022-S01 is located 95 feet from Olympia Substation on the south side of 54th Ave SW and 150 feet northwest of Paul-Olympia No. 1 Structure 21/4 in an area where no construction activities would occur. To prevent temporary disturbance to the site by the Proposed Action, all vehicles and equipment would be parked outside the site boundary. The site boundary would be marked for avoidance prior to construction. Impacts to the site would be none to low.

Site RS-05052022-S01 is located within the ROW between Shelton-Fairmount No. 1 transmission line structures 21/4 and 22/4 and within adjacent access roads. The site consists of historic railroad grades that were converted into access roads following abandonment. The Proposed Action would improve and rebuild portions of the access roads within the site. Because previous BPA construction and maintenance activities have impacted the grades, impacts to the site would be none to low with cultural monitoring during construction to ensure identification of any artifacts and/or intact features related to the logging railroads.

Site RS-05102022-S01 is located along the edge of the ROW between Fairmount-Port Angeles No. 1 structures 18/8 and 18/9 where no construction activities would occur. To prevent temporary disturbance to the site, all vehicles and equipment would be parked outside the site boundary and the site boundary would be marked for avoidance prior to construction. Impacts to this site would be none to low with cultural monitoring during construction to ensure implementation of avoidance measures.

Isolated Find 45CA768 has been determined not eligible for listing in the National Register. Because the isolated find is ineligible, the Proposed Action would have no impact on the resource.

Potential compensatory wetland mitigation activities would be surveyed for cultural resources during planning and eligible sites would be avoided as possible. Any future wetland mitigation activities would be reviewed and consulted upon under Section 106 of the National Historic Preservation Act (NHPA).

Construction activities and potential compensatory wetland mitigation activities could result in disturbance to unknown cultural resources through accidental discovery depending on their extent and proximity to structures, access roads, and compensatory wetland mitigation sites. Use of BMPs and mitigation measures (see Table 2-3) would provide that any previously undiscovered resources found would be managed properly, thereby minimizing any inadvertent disturbance or destruction of cultural resources as a result of the Proposed Action.

3.6.2.2 No Action Alternative

Under the No Action Alternative, impacts from ongoing maintenance and emergency repairs could potentially include ground disturbance of archaeological sites. Activities would be similar to existing practices, although the frequency and scope of maintenance activities would likely increase as existing structures deteriorate and more structural repairs and replacements are required. Impacts from continued routine maintenance of the existing line and/or emergency repairs could range from none to low, depending on the level and amount of disturbance, the location of the disturbance, and the eligibility of the cultural resource for listing in the National Register.

3.7 Noise, Public Health, and Safety

3.7.1 Affected Environment

3.7.1.1 Noise

Noise is defined as unwanted or objectionable sound. Sound is usually considered unwanted when it interferes with normal activities, causes physical harm, and/or has adverse health effects. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in extreme cases, hearing impairment. Audible noise is usually measured in decibels (dB) on the A-weighted decibel scale (dBA). This scale models sound as it corresponds to human perception. Table 3-9 shows typical

noise levels for common sources expressed in dBA. Noise exposure depends on how much time an individual spends in different locations.

Table 3-9: Decibel Level Chart

Environmental Noise	dBA
Jet engine (at 100 feet)	140
Chain saw (at 3 feet)	110
Power mower	107
Subway train (at 200 feet)	95
City traffic	85
Chamber music (in a small auditorium)	75-85
Vacuum cleaner	75
Normal conversation	60-70
Business office	60-65
Household refrigerator	55
Whisper	25
Quiet natural area with no wind	20

Source: Yale University 2022

Ambient Noise Environment

The noise environment within the Project area is typical of remote forestland and rural settings, with generally very low ambient noise levels except at locations more directly affected by agricultural or transportation noise sources, including motor vehicles traveling on U.S. Highway 101 and other arterial roadways and occasional aircraft overflights. Intermittent noise from outdoor activities at the surrounding residences (e.g., people talking, operation of agricultural equipment, car doors slamming, and dogs barking), although minor, also influences the ambient noise environment. Ambient daytime noise levels in low-density rural areas, such as those in the Project area, range from 35 to 45 dBA (EPA 1978, FTA 2006).

The existing noise environment also includes a "corona," an electric field generated in the air surrounding high-voltage transmission line conductors. Corona-generated noise can be characterized as a hissing, crackling sound that is accompanied by a 120-Hertz hum under certain conditions. Corona noise from transmission lines generally occurs during foul or wet weather. Typically, audible noise from 115-kV lines is so low as to be not noticeable (due to the low amount of corona activity generated at this voltage level) and is usually well below other ambient noise levels in the area. BPA designed 115-kV transmission lines to meet applicable state and federal noise regulations. Historically, public complaints/inquiries of transmission line audible noise at this voltage level are extremely rare. BPA has established a design criterion for corona-generated audible noise from transmission lines of 50 dBA for sound levels exceeded 50 percent of the time (L_{50}; during rainy season for wet conductors) at the edge of the ROW.

Noise Sensitive Areas

Noise Sensitive Areas near the Project area include scattered residences, schools, churches, and recreational areas, including several public recreation sites (e.g., Dosewallips State Park). Additional Noise Sensitive Areas within the range of Project-related noise and/or vibration, including from helicopters or construction equipment, include residences located within 0.25 mile of the transmission line ROW, including in the cities of Shelton, Quilcene, and Port Angeles, and in rural unincorporated communities.

3.7.1.2 Public Health and Safety

Hazardous Materials and Hazardous Waste

No hazardous materials are known to be present, and the Project is not expected to create hazardous conditions. There are four toxic cleanup sites in or near the Project area based on the Washington Department of Ecology toxic cleanup site database (Washington Department of Ecology, 2022), two of which are awaiting cleanup, one of which is undergoing cleanup, and another of which requires no further action. These sites are all located along the Olympia-Shelton section of the Project. Wood poles treated with chemical preservative, commonly creosote or PCP depending on the pole's age and manufacturer, are used throughout the existing transmission line ROW.

Fire Protection

The Project is predominately located within forested areas, resulting in wildfire hazards. The primary providers of fire suppression, emergency medical care, disaster preparedness coordination, hazard mitigation, and fire prevention services within the Project area include the Clallam County Fire Districts 2 and 3; Jefferson County Fire Districts 2, 4, and 5; Mason County Fire Districts 4, 11, 16, 17, and 18; and the Olympic National Forest.

Public Safety

The Project area is predominately located within forested areas, with wildfire representing the predominant public safety hazard. Additional hazards to public health in the Project area include motor vehicle operation, motor vehicle collision, rockslides, and agricultural equipment operation. Law enforcement is provided by local police departments, county sheriff's offices, and Washington State Patrol.

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

3.7.2.1.1 Noise

Noise impacts resulting from the Project would be similar to other BPA transmission line rebuild projects of similar length (BPA 2016). Noise disturbance from construction equipment, vehicles, and helicopters would be of a short duration, would occur primarily during daylight hours, and would be limited to general construction equipment activities. A helicopter would be used to string sock line through structures and deliver equipment, materials, and possibly workers to transmission line segments that are not ground accessible, creating an additional temporary source of noise. Blasting would be required to install some structures where bedrock prevents the use of augers but would be of relatively short duration compared to other rock-removal methods such as using drill rigs or jackhammers.

Inhabitants of the more populous areas in the vicinity of the Project area, including Shelton, Quilcene, Happy Valley, and Port Angeles, would be affected by construction noise from multiple sources, which may result in higher sound levels unless the sources are similar in level, in which case the change would be barely perceptible. Sound levels would be higher in areas where a helicopter is in use and close to other noise-generating machinery. As work progresses and noise sources shift varying distances from noise sensitive users, these impacts would be lessened.

Noise levels may briefly exceed 100 dBA during helicopter use, as helicopter noise levels are approximately 106 dBA when operating at 50 feet above the ground. Helicopter noise would be temporary and intermittent during material delivery or stringing of sock line requiring brief periods of time at each structure location.

During construction, helicopter work would generally be completed in less than an 8-hour workday and would operate only when required.

Construction activities at each structure location would be temporary and intermittent, requiring up to 2 days total per structure and 1 to 3 days per mile of access road improvements. The extent and duration of noise related to wetland and stream mitigation activities could vary based on the type of activities needed to construct those sites. Activities such as grading, excavation, moving or building habitat structures, and mowing or clearing invasive species would have the most potential for generating noise; however, these construction activities would also be temporary and intermittent. Other activities such as installing native plants would not exceed ambient noise levels.

Implementation of mitigation measures such as sound-control devices on motorized construction equipment, time restrictions on construction noise, and limiting equipment idling would reduce noise impacts. Only low amounts of noise are anticipated as a result of truck traffic and increased worker trips given the temporary duration of Project work over a large regional area. Mitigation measures, such as speed limits and reducing driving distances between staging areas and construction sites by situating them close to each other, would minimize these effects.

Rural and forested portions of the Project area would experience low noise impacts because these areas are located away from noise-sensitive users and typically include machinery noise from forestry activities; there accordingly would be no perceived change in overall noise levels. Similarly, portions of the Project area adjacent to noise-sensitive land uses would have low-to-moderate impacts because residents and recreational users are present in these areas and noise levels during construction would likely exceed ambient noise levels. Construction disturbances near these noise-sensitive land uses, however, would be temporary and of short duration (averaging up to 2 days total per structure replacement and 1 to 3 days per mile of access road work).

No impacts due to corona effects are anticipated since this effect is normally generated by transmission lines with voltages higher than the 115 kV Shelton-Fairmount No. 1 transmission line.

3.7.2.1.2 Public Health and Safety

Potential public health and safety impacts resulting from Project construction include wildfire ignition; transportation safety incidents involving workers commuting to/from the work site; incidents involving heavy equipment operation by workers; aircraft hazards; worker exposure to hazardous materials or waste; worker proximity to high voltage lines; and rockslide dangers during upslope activities. Additionally, the midnight power outages could adversely affect Mason PUD #1 and Mason PUD #3 residential and commercial customers by temporarily eliminating power for lighting, cooking, water, security alarms, and home medical devices. Power outages are anticipated to last about 12 hours and occur overnight when BPA anticipates the least amount of disruption to power users. While the severity of these risks is potentially very high, their likelihood of occurring would be low due to implementation of BMPs (e.g., Public Safety Plan which would include public notification procedures; see Section 2.6), the short duration, and following standard industry safety practices. Therefore, potential effects to public health and safety risks are low to moderate.

3.7.2.2 No Action Alternative

Under the No Action Alternative, BPA would not rebuild the transmission line, replace the fiber optic system, or improve the access roads, instead continuing operation and maintenance activities similar to those currently occurring along the transmission line. Initially, noise impacts would remain similar to existing conditions, with low-to-moderate noise impacts depending on location and type of activities.

Under the No Action Alternative, continued operation and maintenance of the aging transmission line would likely result in increased equipment operation and vehicle transport on access roads during emergency repair and maintenance activities. Emergency repairs could expose Noise Sensitive Areas to noise from work required to put the transmission line back in service at times outside normal work periods. Noise impacts resulting from emergency repair and maintenance activities for the No Action Alternative are expected to typically be low due to the temporary and localized nature of activity, but the temporary noise effect may range up to high, depending on the nature and location of the emergency activity.

Under the No Action Alternative, public health and safety impacts during construction activities would not occur, and worker/public risk of exposure to hazards and/or hazardous materials would be avoided. BPA would continue operations and maintenance activities similar to those currently performed on the transmission line. Initially, impacts on public health and safety would remain largely the same as the existing condition, ranging from none to low. Continued operation of the aging transmission line would result in potential public safety hazards due to the operation of older, less reliable structures and associated equipment. Further, depending on the location of and magnitude of the need for emergency repair, power to surrounding communities could be interrupted, resulting in localized power outages. Depending on the duration of the power loss, impacts on public health and safety from the No Action Alternative could range from low if no emergency outages are realized to high if a prolonged emergency outage were to occur.

3.8 Environmental Justice

3.8.1 Affected Environment

Executive Order 12898 ("Federal Action to Address Environmental Justice in Minority populations and Low-Income Populations") directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on the health or environment of minority populations and low-income populations (collectively, the environmental justice populations) to the greatest extent practicable and permitted by law. For purposes of identifying environmental justice populations near the Project, low-income households are defined as those with household income less than or equal to twice the federal poverty threshold defined by the U.S. Census. Minority or persons of color are defined as those that identify as a race other than white alone and/or list their ethnicity as Hispanic or Latino.

Much of the Project area is uninhabited. However, there are some environmental justice populations in the Project's surrounding communities including Skokomish, Washington, home of the Skokomish Indian Tribe (75 percent of residents are people of color and 50 percent are low income), and Kamilche, Washington, home of the Squaxin Island Tribe (46 percent of residents are people of color and 54 percent are low income) (EPA 2022b). The Project also passes near some areas that have a high percentage of low-income residents relative to Washington State, and therefore may be considered environmental justice populations. These communities include Shelton, Washington and some areas between Port Angeles and Sequim (EPA 2022b).

3.8.2 Environmental Consequences

3.8.2.1 Proposed Action

The Project ROW follows the outer boundary of Skokomish in an undeveloped area and construction would not result in substantial impacts to Skokomish residents because the ROW and work areas would be situated at least 1 mile away from this community. In Kamilche, the Project area passes directly adjacent to the Squaxin Island Tribe's Salish Cliffs Golf Club, Little Creek Casino Resort, and RV Park. Construction crews would work in this area three separate times over the course of 4 months to complete structure

reinforcement and fiber optic cable installation and removal. Each of these activities would involve 1 to 2 weeks of work in the vicinity of the Squaxin Island Tribe's businesses, for a total of up to 6 weeks of construction. Impacts to these businesses would result from construction noise and traffic. The 1 to 2 weeks of fiber optic cable installation would also involve intermittent noise from helicopter use. The Project ROW crosses the entrance to the Salish Cliffs Golf Club and crosses golf course paths that connect hole #1, east of the ROW, to the rest of the golf course west of the ROW. Travelers on the golf course entrance road may be briefly delayed to maintain safety during construction while heavy equipment enters and exits work areas in the ROW. Impacts to the Squaxin Island Tribe's businesses would be short term and would be mitigated by coordination with the Tribe regarding the timing of work near their facilities. Safety measures would be implemented in accordance with a Public Safety Plan to reduce the risk of harm to the public. Traffic impacts would be mitigated with the use of traffic safety signs and flaggers to inform motorists and manage traffic during construction on affected roads. Temporary guard structures or bucket trucks with side arms would be used where the ROW crosses roads and golf course paths to maintain normal travel routes during fiber optic cable installation and removal. Therefore, temporary construction impacts would not have significant economic effects on the businesses and the Proposed Action would not have disproportionately high and adverse impacts on the Squaxin Island Tribe.

The Project would have similar impacts on surrounding low-income populations as it would have on other communities as described in this EA. The Project would provide long-term benefits to surrounding communities by improving the reliability of electrical transmission. Construction would be short-term, with temporary inconveniences to the residences and businesses located adjacent to the Shelton-Fairmount No. 1 and Fairmount-Port Angeles transmission line ROWs. Access to residences and businesses near the transmission line would be maintained during construction and traffic control measures would be in place. Low-income populations may be more sensitive to the effects of power outages. Affected communities would be notified of upcoming construction activities and potential disruptions associated with the Proposed Action and a Public Safety Plan would be implemented to mitigate impacts associated with power outages. Therefore, temporary construction impacts would not significantly affect low-income populations, and the Project would not result in disproportionately high and adverse human health or environmental effects on low-income populations.

3.8.2.2 No Action

Under the No Action Alternative, operation and maintenance activities would continue to occur along the transmission line. These activities would result in intermittent noise and traffic impacts to nearby communities, including environmental justice populations. Environmental justice populations in surrounding communities would not benefit from the improved reliability of electrical transmission. Fiber optic replacement would not occur under the No Action Alternative; therefore, construction would not occur in the vicinity of the Squaxin Island Tribe's businesses.

3.9 Cumulative Effects

Cumulative effects are environmental impacts collectively encompassing the incremental impact of an action in addition to those of other past, present, and reasonably foreseeable future actions regardless of the agency (federal or non-federal), organization, or person undertaking them (CEQ 1997b). These impacts can result from individually minor, but collectively significant actions occurring over a period of time. For each resource, the affected environment baseline is formed by effects of past actions. Past actions that have affected the natural, physical, and human environment in the Project area include construction and maintenance of the existing transmission system and access roads, silvicultural and agricultural activities, highway maintenance and construction, and rural residential development. This section presents the

cumulative impacts for the Proposed Action combined with past, present, and reasonably foreseeable future actions.

3.9.1 Reasonably Foreseeable Projects

Identifying reasonably foreseeable projects to consider in the cumulative effects assessment requires review of planned work by BPA, USFS, WSDOT, WDNR, and WDFW along with county planning and public works documents available to the public on planning information sources. Reasonably foreseeable projects are those where some form of planning (environmental or engineering) has been initiated or a planning document (e.g., transportation plan; forest management plan) exists that describes specific potential projects.

The following reasonably foreseeable projects are anticipated to occur along the Project area:

- BPA would continue to operate and maintain other transmission lines near the Shelton-Fairmount No. 1 transmission line and fiber optic system. Routine work may include hardware replacement, vegetation management, danger tree removal, and access road maintenance.
- USFS's Canyon Forest Restoration Project would improve wildlife habitat by thinning 2,300 acres of forest stands with commercial timber sales or hand felling, hauling logs on forest roads, developing rock pits, planting native species, and replacing two fish culvert barriers. This project is located 3 miles southwest of the Olympia to Port Angeles transmission line along the fiber optic system. The project is currently undergoing permitting with a decision anticipated May 1, 2023, and timber sales planned from 2024 through 2028.
- WDNR would undertake the following projects and ongoing land management operations:
    - Pennywise timber sale on adjacent Washington State lands which would include timber harvest and access road construction on approximately 131 acres and the use of seven trees as tailholds to facilitate cable yarding systems for harvest of the timber (Pennywise Tailhold Permit) on USFS land. This timber sale is located 2 miles east of Quilcene near the Project and will occur over multiple years to allow for operational flexibility.
    - Forestry activities would continue within WDNR and private lands, including road construction, timber harvest, planting, thinning, and other management activities.
    - Dispersed recreational use would continue to occur on WDNR lands.
    - WDNR would continue to manage state trust lands in the Project area and adjacent areas for marbled murrelet and their habitat in compliance with WDNR's 1997 State Trust Lands Habitat Conservation Plan (HCP) and Final EIS (FEIS) (WDNR 1997).
- Farming activities would continue in and adjacent to the ROW.
- Residential development may continue in the vicinity of cities and towns along the Project area (i.e., Olympia, Shelton, Quilcene, and Port Angeles, Washington).

3.9.2 Cumulative Effects by Resource

The Proposed Action—in combination with past, present, and reasonably foreseeable future actions—may result in cumulative effects on the natural, physical, and human environment described in Sections 3.1 through 3.7. The impacts that would persist even after the application of BMPs and mitigation measures collectively comprise cumulative effects. The following analysis describes these potential cumulative effects from the remaining impacts of the Proposed Action, organized by resource topic.

3.9.2.1 Soils and Geologic Hazards

Past actions that have adversely affected soils and geologic hazards in the Project area include construction and maintenance of the existing transmission system and access roads, silvicultural and agricultural activities, highway maintenance and construction, and rural residential development. These actions have included soil clearing and grading, soil piling, and compaction from heavy equipment, resulting in the potential for increased erosion and sedimentation and decreased soil productivity.

Similar present and reasonably foreseeable future actions, including ongoing operations and maintenance activities, agriculture and timber land uses, highway maintenance, and residential development, have a similarly substantial potential as the aforementioned past actions to affect soils and geologic hazards in the Project area. The Proposed Action would contribute to cumulative effects on soils from disturbance due to ground clearing, soil piling, and compaction from heavy equipment for road reconstruction, improvements, and new roads. Disturbance to soils would result in the potential for increased erosion and sedimentation. Farmland soils would be similarly impacted, and agricultural crops may be damaged or removed during the growing season for access to work sites. Impacts resulting from danger tree removal would also result in cumulative impacts to soils including potential soil erosion.

BMPs and mitigation measures described in Section 3.1.2 and Table 2-3, including use of existing roads, reduction of ground disturbance and vegetation removal, stabilization of soils, and revegetation of temporarily disturbed soils, would reduce potential Project-related contributions to cumulative soil impacts. In farmlands, restoration of compacted soils, limiting spread of noxious weeds, separating topsoil in croplands, and reducing disturbance to agricultural activities would further reduce potential Project-related contributions to cumulative soil impacts. With the implementation of BMPs and mitigation measures, cumulative effects due to the Proposed Action when considered in addition to past, present, and other reasonably foreseeable projects would be low to moderate.

3.9.2.2 Vegetation

Past actions that have adversely affected vegetation in the Project area are similar to those described in Section 3.9.2.1, including construction and maintenance of the existing transmission system and access roads, agricultural and forestry activities, highway maintenance and construction, and residential development. These activities have reduced vegetation composition through vegetation management, danger tree removal, forest management, conversion of native habitat to cropped monocultures, and introduction and proliferation of non-native vegetation and noxious weeds.

Similar present and future actions, including ongoing maintenance, construction, and vegetation management, have a similarly substantial potential as the aforementioned past actions to affect vegetation in the Project area. The Pennywise Timber Sale located 2 miles east of the Project and the USFS's Canyon Forest Restoration Project, located 3 miles southwest of the Project, would also impact vegetation by removing trees near the Project area over a multiple year period that may overlap with replacement of the fiber optic system. Permanent disturbance from the Project would result in vegetation loss and potential for infestation by non-native plants and noxious weeds despite implementation of BMPs and mitigation measures. Restoration in temporary disturbance areas, including re-seeding with native grasses and forbs, and implementing BMPs and mitigation measures described in Section 3.2 and Table 2-3, would likely reduce these potential long-term effects on vegetation that would contribute to cumulative effects. Further, danger tree clearing would occur sporadically along the length of the Project area and would not be concentrated in areas near other timber clearing and thinning activities. The Proposed Action when considered in addition to past, present, and other reasonably foreseeable projects, could contribute to low-to-moderate cumulative effects on vegetation resulting from construction activities and the potential spread of invasive plants.

3.9.2.3 Water Resources and Floodplains

Past and ongoing silviculture, agriculture, transmission line construction and maintenance, and road construction across stream crossings and riparian corridors in the Project area have impacted streams and floodplains by removing native vegetation, increasing erosion and sedimentation, decreasing floodplain storage, and altering stream flows and hydraulic conditions. Future forest management activities, including the Pennywise Timber Sale and Canyon Forest Restoration Project, road maintenance and construction, and transmission line and access road maintenance are expected to sustain these impacts.

The Proposed Action would temporarily disturb streams and reduce water quality by increasing erosion and sedimentation due to new, improved, and reconstructed access roads, drainage upgrades, including culvert installation, and crane pads. Vegetation removal would temporarily impact stream buffers. Floodplains within the transmission line ROW are already clear of vegetation and undergo periodic vegetation maintenance or consist of agricultural fields. The Proposed Action would improve and reconstruct access roads that are primarily in previously cleared areas, requiring minor fill or regrading. Access road improvement and reconstruction are not anticipated to have high impacts on floodplain functions, including conveyance and storage. Application of BMPs and mitigation measures (see Table 2-3), including working during the dry season and mulching and reseeding to reduce potential erosional impacts from runoff, would reduce cumulative impacts on water resources such as streams and floodplains from the Proposed Action when combined with past, present, and other reasonably foreseeable projects and ensure that such effects would be low to moderate.

3.9.2.4 Wetlands

Wetlands in the Project area are degraded due to ongoing vegetation maintenance and the prevalence of invasive, non-native species in the existing transmission line ROW. Clearing and filling activities undertaken in the course of past and ongoing forest management, agriculture, and road and transmission line construction have impacted wetlands, and future forest management and access road maintenance activities as described in Section 3.9 may similarly contribute to additional wetland disturbance.

The Proposed Action would impact wetlands by causing temporary disturbance to, or removal (e.g., crushing or clearing) of vegetation for staging or construction of helicopter landing pads or temporary guard structures. Permanent impacts would result from reconstruction of access roads and clearing for crane pads. With the implementation of BMPs and mitigation measures (see Table 2-3), including compensatory mitigation that would result in no net loss of wetland function, the Proposed Action would have low-to-moderate impacts on wetlands and when combined with past, present, and future projects would result in low cumulative impacts on wetlands.

3.9.2.5 Wildlife and Fish

Past and ongoing activities in the Project area including forest management; access road use and construction; transmission line construction, operation, and maintenance; and vegetation management have historically impacted area wildlife, including marbled murrelets, northern spotted owls, and associated habitats. Such impacts, including loss of wildlife habitat, have stemmed from clearing operations and subsequent conversion of land to aid forest management, utility infrastructure construction and operation (e.g., the existing transmission line and public and private roads), and agricultural uses. Future activities, as described in Section 3.9.1, could result in further loss of wildlife and habitat through forest vegetation clearing and noise disturbances. Marbled murrelets, in particular, may experience various impacts, including behavioral disruptions or injury, if such activities were to occur during their nesting period. Past and ongoing actions have diminished fish habitat through increased water temperatures from the removal of native

vegetation and floodplain trees and shrubs, increased erosion and sedimentation entering waterbodies, and the alteration of stream flows and hydraulic conditions. Reasonably foreseeable future actions are anticipated to have similar impacts to fish habitat.

The Project's wildlife impacts may include displacement as a result of human- and construction-caused noise, but such impacts would mostly be temporary and limited to the duration of construction. Although some construction-induced habitat loss may occur (either permanently or temporarily), such disturbances would be confined to a previously disturbed transmission line corridor where habitat for some species would be marginal, and temporary impacts would subside upon restoration. Pre-construction wildlife surveys and adherence to seasonal and spatial restrictions during construction would minimize wildlife impacts, including to fish and birds, during sensitive reproductive periods. Habitat loss for marbled murrelets and northern spotted owls would be minimal because important features of those species' respective habitats (such as old-growth trees) would likely remain intact, as would the marginal quality of the habitats overall. Additionally, installation of bird flight diverters on sections of the transmission line conductor and fiber optic system where birds are present would reduce bird strikes on the transmission line. Fish and aquatic species habitat could be temporarily degraded by sedimentation introduced during instream work and disturbance near waterbodies. Fish and aquatic species (e.g., amphibians) could be harmed when handled during capture and removal activities in isolated instream work areas. Installation of fish passage culverts would benefit fish and aquatic species in the Project area, allowing improved access to upstream habitat.

Project-related impacts to fish and wildlife would be reduced through the implementation of BMPs and mitigation measures (see Table 2-3), such as erosion control measures, work timing, and disturbance area minimization. With the implementation of these measures, the Proposed Action would have low-to-moderate impacts on wildlife and fish resources and, when combined with past, present, and future projects, would result in low cumulative impacts on wildlife and fish.

3.9.2.6 Cultural Resources

Past and ongoing actions with impacts to cultural resources include forest management, access road and transmission line construction, residential development, and agricultural practices.

Like the Proposed Action, reasonably foreseeable future projects in the Project area include forest management and timber harvest activities, agricultural uses, and transmission line maintenance activities, which may disturb previously undiscovered cultural resources. Cumulative impacts from the Project on cultural resources would likely be low based on anticipated application of BMPs and mitigation measures (see Table 2-3) and also because the Proposed Action occurs in previously disturbed transmission line ROW and access roads.

3.9.2.7 Noise, Public Health, and Safety

Past, ongoing, and future activities in the Project area with noise, public health, and safety impacts include agriculture, ongoing transmission line operation and maintenance (e.g., hardware replacement, danger tree removal, and access road work), forestry activities (e.g., road construction, timber harvesting, planting, and thinning), and agricultural activities. Noise impacts located in proximity to construction activities would be short term and temporary, returning to existing levels after construction. As such, cumulative noise impacts resulting from the Project are expected to be low. Cumulative hazards and public health and safety risks could arise during construction of the Proposed Action or during other reasonably foreseeable future activities in the Project area, including operations and maintenance. Land use and associated hazards and risks of such activities would be similar to those of the Proposed Action and would be subject to mitigation measures designed to avoid and minimize public health and safety impacts, such as the ones listed for the Project.

After implementation of BMPs and mitigation measures (see Table 2-3), the Proposed Action would have low-to-moderate impacts on noise, public health, and safety and, when combined with past, present, and future projects, would result in low cumulative impacts.

3.9.2.8 Environmental Justice

The reasonably foreseeable future forestry, agriculture, and transmission projects described in Section 3.9.1 are expected to have low adverse impacts to the environmental justice populations identified in this EA due to the project locations and the implementation of mitigation measures addressing noise, public health, and safety. Ongoing residential development in cities and towns near the Project may impact low-income populations by increasing the housing supply. In combination with past, present, and future projects, the Proposed Action would not significantly contribute to cumulative disproportionate impacts to environmental justice populations.

4.0 Environmental Consultation, Review, and Permit Requirements

Several federal and state statutes, implementing regulations, Executive Orders, other consultation, review, and permit requirements are potentially applicable to the Project (see Table 4-1). In Table 4-1, similar resources (e.g., vegetation and wildlife) have been combined when statutes or regulations overlap multiple resource areas.

Table 4-1: Potential Applicable Statutory, Regulatory, and Other Requirements

Category	Potentially Applicable Requirement	Relevant Project Information
All Resources	NEPA of 1969 42 U.S.C. § 4321 *et seq.*	BPA has prepared this EA pursuant to regulations implementing NEPA, which requires federal agencies to assess, consider, and disclose the impacts that any major federal actions may have on the environment.
All Resources	CEQ Guidance for Federal Departments and Agencies on Indigenous Knowledge (November 30, 2022)	Consistent with CEQ regulations and related guidance including CEQ's November 30, 2022, Guidance for Federal Departments and Agencies on Indigenous Knowledge, BPA has engaged affected communities, Tribes, and Indigenous Peoples including the Jamestown S'Klallam Tribe, Lower Elwha Klallam Tribe, Skokomish Tribal Nation, Squaxin Island Tribe, and Port Gamble S'Klallam Tribe to inform them of the environmental assessment.
Land Use and Recreation	Olympic National Forest Land and Resource Management Plan 1990	The Land and Resource Management Plan (LRMP), as amended, guides all natural resource management activities and establishes management Standards and Guidelines for the Olympic National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management. Through extensive coordination with BPA, Olympic National Forest has determined the Project is consistent with the

Category	Potentially Applicable Requirement	Relevant Project Information
		LRMP. Olympic National Forest focused specific attention on how the Project might affect the visual quality from the Highway 101 scenic corridor. However, it was determined that the Project would not be visible from the highway due to the topography and dense forested vegetation along the highway.
Vegetation, Wildlife, and Fish	ESA of 1973 16 U.S.C. § 1531 *et seq*. WDNR State Trust Lands HCP	BPA will submit a biological assessment (BA) to the USFWS in support of formal consultation to address potential adverse impacts on the marbled murrelet and designated critical habitat. Informal consultation is requested for northern spotted owl, Oregon spotted frog, Olympia pocket gopher, and associated critical habitats. A no effect determination has been made for bull trout, streaked horned lark, yellow-billed cuckoo, golden paintbrush, and Taylor's checkerspot. It is anticipated that USFWS will issue a biological opinion regarding potential impacts on the marbled murrelet and critical habitat. USFWS is also expected to provide concurrence on a "not likely to adversely affect" determination for northern spotted owl and critical habitat, Oregon spotted frog, and Olympia pocket gopher. The Project would not affect critical habitat of the Oregon spotted frog or Olympia pocket gopher. BPA plans to use National Oceanic Atmospheric Administration (NOAA) NMFS's Programmatic Biological Opinion (PBO) (WCR-2014-1600) that BPA has in place with NMFS for ESA-listed fish under their administration to address effects on listed salmon (Puget Sound Chinook ESU, Hood Canal summer chum ESU, and Puget Sound steelhead DPS). The BPA PBO provides take coverage for most BPA maintenance activities, including transmission line rebuild projects. The WDNR has a Marbled Murrelet Long-Term Conservation Strategy that is an amendment to the 1997 State Land HCP. Under this long-term strategy there are restrictions on what activities can take place within or in proximity to marbled murrelet occupied sites and occupied site buffers. BPA has coordinated with WDNR to incorporate BMPs such as implementing seasonal timing restrictions within suitable and occupied habitat to avoid and minimize effects to marbled murrelet.
Vegetation, Wildlife, and Fish	Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) of 1976 16 U.S.C. 1801 *et seq*.	Pacific salmon Essential Fish Habitat (EFH) is administered under the amended Magnuson-Stevens Act; EFH for coho and Chinook salmon are found in streams in the Project area. BPA consulted with NMFS on effects to EFH pursuant to the Magnuson-Stevens Act as part of the Programmatic ESA consultation. BPA's

Category	Potentially Applicable Requirement	Relevant Project Information
		PBO contains the analysis of the action's effects on EFH and the Project would be consistent with that analysis.
Vegetation, Wildlife, and Fish	Bald Eagle and Golden Eagle Protection Act (BGEPA) of 194016 U.S.C. § 668-668d	Bald eagles were observed during a survey of the Project area, and it is possible bald eagles could nest within or near the Project area. If a nest is identified, BPA would comply with the BGEPA by avoiding construction activities within 660 feet of an active bald eagle nest during the breeding season and avoiding snag and large tree removal to the extent possible (see Table 2-3). No golden eagles were observed during a survey of the Project area.
Vegetation, Wildlife, and Fish	Migratory Bird Treaty Act (MBTA) of1918 16 U.S.C. § 703-712 Responsibilities to Federal Agencies to Protect Migratory Birds Executive Order 13186	Many bird species protected under the MBTA are present in the Project area and some may nest in the general vicinity. Potential impacts on nesting birds are described in Section 3.5. BPA would meet its responsibilities under the MBTA with mitigation measures, such as scheduling tree removal and other vegetation removal as much as possible between September 15 and March 1, to minimize impacts on migratory birds. If tree clearing is needed outside of that time, BPA would conduct a pre-construction nesting bird survey prior to tree removal. If active nests are found, trees would not be removed until the young have fledged. BPA would also avoid removal of snags and large trees to the extent possible (see Table 2-3). Bird diverters would also be installed on conductors and/or fiber optic cable in high bird-use areas.
Vegetation, Wildlife, and Fish	Fish and Wildlife Conservation Act16 U.S.C. § 2901 *et seq*. Fish and Wildlife Coordination Act16 U.S.C. § 661 *et seq*.	BPA has consulted with the USFWS and WDFW and plans to incorporate BMPs to avoid and/or minimize potential impacts on fish and wildlife resources (see Table 2-3). Impacts on fish and wildlife are described in Section 3.5.
Waters, Wetlands, and Floodplain Protection	CWA 33 U.S.C. § 1251 *et seq*. Floodplain/Wetlands EnvironmentalReview Requirements 10 Code of Federal Regulations (CFR) 1022.12 Floodplain Management Executive Order 11988	BPA would obtain any necessary permits for the Project under CWA Sections 401, 402, and 404. Potential impacts on floodplains and wetlands from the Proposed Action and mitigation for these impacts are described in Section 3.3 and 3.4. Applicants receiving a Section 404 permit from the Corps are required to obtain a Section 401 water quality certification from Ecology through a joint application process. BPA anticipates submitting the joint permit application the winter before the first construction season, if needed. For construction that disturbs soils at federal facilities in Washington, the EPA would issue a National Pollutant

Category	Potentially Applicable Requirement	Relevant Project Information
	Protection of Wetlands Executive Order 11990	Discharge Elimination System (NPDES) permit. This permit authorizes BPA or BPA's contractor to construct, install, modify, or operate erosion and sediment control measures and stormwater treatment and control facilities, and to discharge stormwater to public waters in conformance with all the requirements, limitations, and conditions set forth in the NPDES permit.
Waters, Wetlands, and Floodplain Protection	Coastal Zone Management Act (CZMA) 16 U.S.C. § 1451 *et seq*.	The State of Washington has an approved Coastal Zone Management Program, which is implemented by the Washington State Department of Ecology. Because the Project is in Washington's Coastal Zone, which includes Mason, Jefferson, Thurston, and Clallam counties, BPA is subject to the coordination and consistency requirements of the Act. The CZMA requires that "each federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs" (16 U.S.C. 1456c(1)(A)). BPA believes that the Project is consistent with Washington's Coastal Zone Management Program. BPA will submit a consistency statement to Department of Ecology in winter 2022 to 2023, including a detailed Project description, and request its concurrence.
Air Quality and Greenhouse Gases	The Clean Air Act, as revised in 1990 42 U.S.C. § 4701	Air quality impacts of the Proposed Action would be low, localized, and temporary, as described in Table 3-1.
Air Quality and Greenhouse Gases	Final Mandatory Reporting ofGreenhouse Gases Rule 40 CFR 98 Federal Leadership in Environmental,Energy, and Economic Performance Executive Order 13514	Greenhouse gas emissions would be low, localized, and temporary, as described in Table 3-1.
Cultural and Historic Resources	Antiquities Act of 190616 U.S.C. § 431-433 Historic Sites Act of 1935 16 U.S.C. § 461-467 NHPA, as amended, inclusive of Section 106 54 U.S.C. § 306108 *et seq.*	BPA identified and documented cultural resources in the Project area and evaluated them for eligibility for listing in the National Register. BPA requested comments on the Proposed Action from DAHP and the five Tribes determined to have potential interest in the Project in the form of an initiation letter dated July 19, 2021, and a public scoping letter sent March 23, 2022. BPA also consulted the Tribes on potential cultural resources to help shape field investigations. BPA's compliance with these regulations is described in Section 3.6. If

Category	Potentially Applicable Requirement	Relevant Project Information
	Archaeological Data Preservation Actof 1974 16 U.S.C. § 469 – 469-1 Archaeological Resources ProtectionAct of 1979, as amended 16 U.S.C. § 469 a-c Native American Graves Protectionand Repatriation Act 25 U.S.C. § 3001 *et seq.* Indian Sacred Sites Executive Order 13007 American Indian Religious FreedomAct of 1978 42 U.S.C. § 1996	previously unidentified cultural resources that would be adversely affected by the Proposed Action are found during construction, BPA would follow the procedures set out in Table 2-3 and in compliance with applicable regulations.
Noise, Public Health, and Safety	Noise Control Act of 1972 42 U.S.C. § 4901 *et seq*.	Noise disturbance would be short in duration and would occur during daylight hours as described in Table 3-1.
Noise, Public Health, and Safety	Spill Prevention Control and Countermeasures (SPCC) Rule 40 CFR 112 Comprehensive Environmental Response, Compensation, and Liability Act 42 U.S.C. § 9601 *et seq*. Resource Conservation and Recovery Act 42 U.S.C. § 6901 *et seq*.	BPA's construction specifications contain Spill Prevention and Response Procedures that stipulate the methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.
Noise, Public Health, and Safety	The Toxic Substances Control Act 15 U.S.C. 2601 *et seq*.	BPA adopted guidelines to prevent the introduction of polychlorinated biphenyls (PCBs) into the environment. Equipment used for the Proposed Action would not contain PCBs. Any equipment removed that may have PCBs would be handled according to the disposal provisions of the Toxic Substances Control Act. Pole wraps and implementation of an SPCC Plan would mitigate these substances.
Noise, Public Health, and Safety	Federal Communications Commission	There would be no interference with radio, television, or other reception as a result of the Proposed Action. BPA would comply with Federal Communication Commission (FCC) requirements relating to radio and television

Category	Potentially Applicable Requirement	Relevant Project Information
		interference from the Proposed Action if any such interference occurs.
Environmental Justice	Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations Executive Order 12898 Revitalizing Our Nation's Commitment to Environmental Justice for All Executive Order 140008	The Proposed Action would not cause disproportionately high and/or adverse impacts on minority and low-income populations.
State, County, and Local Plan Consistency	Washington Department of Natural Resources State Trust Lands HCP	WDNR and the USFWS prepared a Revised Draft EIS (RDEIS) to amend WDNR's 1997 State Trust Lands HCP. The notice of availability of the Record of Decision for the FEIS and Incidental Take Permit (ITP) was issued November 29, 2019. The 1997 HCP, a 70-year agreement between the USFWS and WDNR, describes a set of management strategies that are employed to offset any incidental take caused to individual listed species and to promote conservation of the species as a whole. The amendment replaced the interim conservation strategy for the marbled murrelet with a long-term conservation strategy on WDNR's west-side forested state trust lands (the amendment is limited to marbled murrelet and does not change other conservation strategies of the 1997 HCP).The long-term conservation strategy would achieve the following objectives on west-side state trust lands: generate revenue; provide forest conditions that minimize and mitigate incidental take of marbled murrelets from WDNR's forest management activities; promote active, innovative, and sustainable forest management; provide operational flexibility; and adopt feasible, practical, and cost-effective actions that are likely to be successful and can be sustained throughout the life of the 1997 HCP. Conservation measures were added to the 1997 HCP to minimize impacts from new or expanded forest management and land use activities in marbled murrelet habitat. These measures include protection of 59,000 acres of murrelet-occupied sites and special habitat areas and the harvest delay of 5,000 adjusted acres to achieve "no net loss" of adjusted acres of habitat. The amendment also applies 328-foot (100-meter) buffers around all known murrelet-occupied sites and releases approximately 33,030 acres of low-quality marbled murrelet habitat and 5,017 acres of high-quality marbled murrelet habitat for harvest. The amendment limits

Category	Potentially Applicable Requirement	Relevant Project Information
		harvest in long-term forest cover, thinning activities in and near habitat, and development of new or expanded recreational facilities in marbled murrelet conservation areas. The measures also prohibit or limit road construction in marbled murrelet conservation areas, require application of daily timing restrictions to potentially disturbing management activities such as road construction or aerial operations during nesting season, and minimize the impacts of other non-timber harvest activities. BPA's existing transmission line ROW and access road easements would be subject to the conditions of the 1997 HCP and amendment. BPA has consulted with WDNR and USFWS to comply with conservation measures in the amended HCP.
State, County, and Local Plan Consistency	Hydraulic Project Approval (HPA) (RCW 77.55) issued by WDFW	Requires any person, organization, or non-federal government agency wishing to conduct a construction activity using, diverting, obstructing, or changing the bed or flow of state waters (including wetlands) to do so under the terms of an HPA permit issued by WDFW. As a federal entity, BPA is not required to obtain an HPA. However, by implementing BMPs such as observing WDFW in-water work windows and installing fish passable culverts, BPA would conduct instream construction activities in a manner consistent with HPA terms and conditions.
State, County, and Local Plan Consistency	Washington counties Critical Areas Ordinance as guided by the Washington State Growth Management Act	BPA strives to meet or exceed the substantive standards and policies of state and local plans and programs to the maximum extent practical. The Washington State Growth Management Act requires local governments to protect five types of critical areas: important fish and wildlife habitat areas, wetlands, critical aquifer recharge areas, frequently flooded areas, and geologically hazardous areas (such as bluffs). Thurston County's critical areas regulations are a response to that law—they regulate how development and redevelopment can safely occur on lands that contain critical areas. The resources analyzed in this EA are consistent with each county's critical areas. Appropriate BMPs and mitigation measures would be implemented in critical areas (e.g., wetlands, floodplains) as appropriate. The Project would occur primarily within an existing transmission line corridor and critical area impacts are anticipated to be low.

Appendix A: Persons and Agencies Consulted

The Project mailing list contains contacts for Tribes; local, state, regional, and federal agencies; public officials; interest groups and businesses; and potentially interested or affected landowners. These stakeholders have directly received or have been given instructions on how to receive all Project information currently available and they will have an opportunity to review the Draft EA. Specific entities (other than private persons) receiving the scoping notifications and this Draft EA are listed below by category.

Federal Agencies and Officials

- National Ocean and Atmospheric Administration, National Marine Fisheries Service
- U.S. Environmental Protection Agency, Region 10
- U.S. Army Corps of Engineers, Seattle District
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- Olympic National Park Environmental Planner, Christina Miller
- U.S. Senator, Patty Murray
- U.S. Senator, Maria Cantwell
- U.S. Representative, Derek Kilmer
- U.S. Representative, Marilyn Strickland

Tribes and Tribal Groups

- Jamestown S'Klallam Tribe
- Lower Elwha Klallam Tribe
- Skokomish Tribal Nation
- Squaxin Island Tribe
- Port Gamble S'Klallam Tribe

State Agencies and Officials

- Washington Department of Archaeology and Historic Preservation
- Washington Department of Ecology
- Washington Department of Fish and Wildlife
- Washington Energy Facility Site Evaluation Council
- Washington State Department of Natural Resources
- Washington Department of Transportation
- Washington State Parks Assistant Director, Parks Development, Peter Herzog
- Washington State Representative, Laurie Dolan
- Washington State Representative, Jessica Bateman
- Washington State Representative, Dan Griffey
- Washington State Representative, Drew MacEwen
- Washington State Representative, Mike Chapman
- Washington State Representative, Steve Tharinger
- Washington State Senator, Sam Hunt
- Washington State Senator, Tim Sheldon
- Washington State Senator, Kevin Van De Wege

Local Government and Utilities

- Shelton City Council
- Shelton City Councilmember, James Boad
- Shelton City Councilmember, Kathy McDowell
- Shelton City Councilmember, Eric Onisko
- Shelton City Councilmember, Joe Schmit
- Shelton City Councilmember, Megan Fiess
- Shelton City Mayor, Kevin Dorcy
- Shelton City Deputy Mayor, Deidre Peterson
- Mason County Board of County Commissioners
- Mason County Commissioner, Randy Neatherlin
- Mason County Commissioner, Kevin Shutty
- Mason County Commissioner, Sharon Trask
- Jefferson County Board of County Commissioners
- Jefferson County Chair, Kate Dean
- Jefferson County Commissioner, Heidi Eisenhour
- Jefferson County Commissioner, Greg Brotherton
- Jefferson County Administrator (Interim), Mark McCauley
- Sequim City Council
- Sequim City Councilmember, William Armacost
- Sequim City Councilmember, Rachel Anderson
- Sequim City Councilmember, Kathy Downer
- Sequim City Councilmember, Lowell Rathburn
- Sequim City Councilmember, Vicki Lowe
- Sequim City Mayor, Tom Ferrell
- Sequim City Deputy Mayor, Brandon Janisse
- Port Angeles City Council
- Port Angeles City Clerk, Kari Martinez-Bailey
- Port Angeles City Administrative Assistant, Sherry Curran
- Port Angeles City Councilmember, Mike French
- Port Angeles City Councilmember, Charlie McCaughan
- Port Angeles City Councilmember, Lindsey Schromen-Wawrin
- Port Angeles City Councilmember, LaTrisha Suggs
- Port Angeles City Councilmember, Brendan Meyer
- Port Angeles City Mayor, Kate Dexter
- Port Angeles City Deputy Mayor, Navarra Carr
- Clallam County Board of County Commissioners

- Clallam County Commissioner, Mark Ozias
- Clallam County Commissioner, Randy Johnson
- Clallam County Commissioner, Bill Peach
- Thurston County Commissioner, Carolina Mejia
- Thurston County Commissioner, Gary Edwards
- Thurston County Commissioner, Tye Menser
- Thurston County Manager, Ramiro Chavez
- Thurston County Public Works Director, Jennifer Walker

Libraries

- Washington State Library

Other Interested Parties

- Hood Canal Salmon Enhancement Group
- Olympic Forest Coalition
- Conservation Northwest
- Hood Canal Environmental Council
- North Olympic Land Trust

Appendix B: References

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Appendix C: Glossary and Acronyms

List of Acronyms

Abbreviation	Term/Phrase/Name
ARU	Autonomous Recording Unit
BA	Biological Assessment
BGEPA	Bald Eagle and Golden Eagle Protection Act
BMP	Best Management Practice
BPA	Bonneville Power Administration
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DAHP	Department of Archaeology and Historic Preservation
dB	decibel
dBA	A-weighted decibels
DCOI	4,5-Dichloro-2-n-Octyl-4-Isothiazolin-3-One
DPS	Distinct Population Segment
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit

Abbreviation	Term/Phrase/Name
FAA	Federal Aviation Administration
FCC	Federal Communication Commission
FEIS	Final EIS
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FOWP	Fiber Only Wood Pole
Fiber Optic System	Olympia-Port Angeles Fiber Optic Communication System
HCCC	Hood Canal Coordinating Council
HCP	Habitat Conservation Plan
HGM	hydrogeomorphic
HPA	Hydraulic Project Approval
ILF	In-Lieu Fee
ITP	Incidental Take Permit
kV	kilovolt
L_{50}	A-weighted sound level that is exceeded 50 percent of time
LRMP	Land and Resource Management Plan
MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement
NAP	Natural Area Preserve
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation

Abbreviation	Term/Phrase/Name
NESC	National Electric Safety Code
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCA	Natural Resource Conservation Area
NRF	Nesting, Roosting, and Foraging
PBO	Programmatic Biological Opinion
PCBs	polychlorinated biphenyls
PCP	pentachlorophenol
Project or Proposed Action	Shelton – Fairmount Transmission Line Rebuild and Fiber Optic System Replacement
PUD	Public Utility Districts
RDEIS	Revised Draft EIS
ROW	right-of-way
SCADA	Supervisory control and data acquisition
SEPA	State Environmental Policy Act
SPCC	Spill Prevention Control and Countermeasures
State Parks and Recreation	State Parks and Recreation Commission
SWIFD	Statewide Washington Integrated Fish Distribution
SWPPP	Storm Water Pollution Prevention Plan
TES	Threatened, Endangered, & Sensitive
TMDL	total maximum daily load

Abbreviation	Term/Phrase/Name
Tribes	American Indian tribes
U.S.C.	U.S. Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation

Glossary

Term	Definition
A-weighted decibel (dBA)	A logarithmic measurement of sound based on the decibel but weighted to approximate the human perception of sound. Commonly used for measuring environmental and industrial noise levels.
Access road	Part of a system of roads that provides access to transmission lines and structures.
Anchor	A device that stabilizes a transmission structure with respect to the ground.
Best management practices (BMPs)	Methods that have been determined to be effective and practical means of preventing or reducing impacts to the environment.
Bird diverter	Device placed on a transmission line to help birds see power lines and avoid potentially fatal collisions.
Bus	A conductor or a group of conductors used for collecting electric power from incoming feeders and distributing to outgoing feeders
Bus Risers	Conductor used to connect substation equipment to transmission line.
Conductor	The wire cable strung between transmission structures through which electric current flows.
Corona	An electrical field around the surface of a conductor, insulator, or hardware caused by ionization of the surrounding air.
Counterpoise	A type of electrical ground that is not connected to the earth. It is used when a normal earth ground cannot be used because of high soil resistance. It consists of a network of wires or cables (or a metal screen) parallel to the ground, suspended from a few centimeters to several meters above the ground. The counterpoise functions as one plate of a large capacitor, with the conductive layers of the earth acting as the other.
Critical habitat	Habitat essential to the conservation of an endangered or threatened species listed under the ESA that has been designated by the USFWS or the NMFS.
Cross arm	A high-quality piece of wood mounted on a utility pole used to hold up power lines or other equipment.
Cross brace	A structural member that forms an “X” between two wood poles to strengthen the transmission line structure and provide stability.
Damper	A device attached to insulators in order to minimize vibration of the conductors in windy conditions.

Term	Definition
Danger Tree	Trees (or high-growing brush) growing alongside the transmission line ROW that are hazardous to transmission lines. They are identified by special crews and must be removed to prevent tree-fall into the line or other interference with conductors. BPA's Construction Clearing Policy requires that trees be removed that meet either one of two technical categories. Category A is any tree that within 15 years would grow to within about 18 feet of conductors when the conductor is at maximum sag (212°F) and swung by 6 pounds per square feet of wind (58 miles per hour). Category B is any tree or high-growing brush that after a year of growth would fall within about 8 feet of the conductor at maximum sag (176°F) and in a static position.
Demographic index	An index based on the average of two demographic indicators; low-income and people of color.
Direction of Travel Road	An existing road that provides a path of access to the transmission line and can be used in its current condition without any improvements or upgrades. Direction of travel maybe include public roads, publicly available state and federal roads, and access roads where BPA owns the ROW or has easements where no improvements will be made to existing roads or fields. Direction of travel roads connect all separated road construction activities and create a continuous transportation plan from every structure to a county road or state highway.
Disconnect switch	A mechanical device that conducts electrical current and provides an open point in a circuit for isolation of circuit breakers, circuit switchers, power transformers, capacitor banks, reactors, or any other substation equipment. Disconnect switches are normally used to provide a point of visual isolation of the substation equipment for maintenance.
Distinct Population Segment (DPS)	Under the ESA, a distinct population segment—or DPS—is a vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The ESA provides for listing species, subspecies, or distinct population segments of vertebrate species.
Easement	The property interest obtained by BPA to use land owned by another entity, for example, to construct, maintain, and operate a transmission line.
Endangered species	Plants or animals that are in danger of extinction through all or a significant portion of their ranges and that have been listed as endangered by the USFWS or the NMFS.
Environmental Assessment (EA)	A document that evaluates the possible environmental effects of a federal agency's proposed action and provides sufficient evidence to determine whether an EIS or a Finding of No Significant Impact (FONSI) is warranted. An EA is one means of compliance with NEPA.
Evolutionarily Significant Unit (ESU)	A population that is substantially reproductively isolated from cospecific populations and represents an important component in the evolutionary legacy of the species. They are defined by NOAA Fisheries under their ESA status reviews.

Term	Definition
Floodplain	An area of low-lying ground adjacent to a river, formed mainly of river sediments and subject to flooding.
Ford	Low water vehicle crossings installed in stream channels at locations where it is not feasible to install a bridge or culvert.
Ground wire	A protective wire strung above the conductors on a transmission line to shield the conductors from lightning; also called shield wire or overhead ground wire.
Guard structures	Temporary wood-pole structures with cross arms placed on either side of a facility (e.g., distribution lines, roads, railroad crossings) to catch conductors, ground wire, or fiber optic cable in the unlikely event that they fall while being removed or installed.
Guy wire	Steel wire used to support or strengthen a structure.
hyporheic	The exchange of water between a stream and groundwater, important for surface water/groundwater interactions.
Insulator	A bell-shaped device, made of ceramic, glass, or other non-conducting material, used to prevent electricity from arcing from the conductors to the structures and traveling to the ground.
Line mile	A particular mile of transmission line from the originating substation.
Mitigation Measures	Steps or measures taken to lessen the potential impacts predicted for a resource. They may include reducing the impact, avoiding it completely, or compensating for the impact. Some mitigation, such as adjusting the location of a structure to avoid a special resource, is taken during the design and location process. Other mitigation may be done during construction, such as measures to reduce noise, or after construction, such as reseeding access roads with desirable grasses to help prevent the proliferation of weeds.
Optical ground wire	Wire placed in the secure topmost position of the transmission line where it “shields” the conductors from lightning while providing a telecommunications path. Optical Ground Wire is a dual functioning cable, meaning it is designed to replace traditional static/shield wires on overhead transmission lines with the added benefit of containing optical fibers which can be used for telecommunications purposes.
Outage	Event caused by a disturbance on the electrical system that requires BPA to remove a piece of equipment or a portion or all of a transmission line from service. The disturbances can be either natural or human caused.

Term	Definition
Project/Proposed Action	Replace aged wood pole transmission structures, conductors, overhead ground-wire, all associated hardware, disconnect switching facilities, and upgrade or repair portions of the access roads used to access transmission line structures. Fiber optic cable and some existing structures would also be replaced on three existing BPA transmission lines for a total of 107 miles of fiber optic cable replacement. Access roads would be upgraded or repaired to accommodate fiber optic cable replacement activities.
Project area	The existing 100-foot-wide ROW for the Olympia-Shelton, Fairmount-Port Angeles No. 1, and Shelton-Fairmount No. 1 transmission lines (including access roads in the ROW), pulling and tensioning sites, danger tree removal areas adjacent to the ROW, substations, staging areas and helicopter landing zones, and the area within 15 feet of the centerline (for a total width of 30 feet) of access roads that extend outside the ROW
Rod gaps	Protective devices that allow for transient overvoltage's to arc across the gap to ground rather than the transient overvoltage to pass through equipment (typically insulators).
Sensitive plant species	Plant species listed under the federal ESA as threatened, endangered, or species proposed for listing; species that are candidates for listing; state threatened and endangered species; and USFS sensitive species.
Span	The distance between individual structures.
Stream buffer	Natural areas adjacent to streams and waterways that remain free of development, construction, or other alterations and play an important role in maintaining predevelopment water quality.
Stream crossing	A section of a stream where it crosses the Project area.
Stream type	Washington Administration Code 22-16-030 requirements classify streams as either: shorelines (Type “S”), fish-bearing streams and waterbodies (Type “F”), non-fish perennial streams (Type “Np”), or non-fish seasonal streams (Type “Ns”).
Substation	The fenced site that contains the terminal switching and transformation equipment needed at the end of a transmission line so that energy can be supplied to customers.
Supervisory control and data acquisition (SCADA)	A control system architecture comprising computers, networked data communications, and graphical user interfaces for high-level supervision of machines and processes. It also covers sensors and other devices, such as programmable logic controllers, which interface with substation equipment.
Surge arrestor	A basic protective device, protecting against system or induced transient over-voltages which could cause damage to equipment, or flashovers.

Term	Definition
Tailhold	A strong tree or stump that will hold steady under the weight of the cable and the logs it carries.
Tensioner	A large piece of equipment with drums that the new conductor is fed through to set the proper tension.
Tensioning site	Sites used for pulling and tightening conductor and fiber optic cable to the correct tension once they are mounted on a transmission structure. Tensioning sites are located within the ROW where possible or just outside of the ROW where the transmission line makes a turn or angle.
Threatened, Endangered, & Sensitive (TES) Species Program	The USFS's initiative to conserve and recover plant and animal species that need special management attention and to restore National Forest and Grassland ecosystems and habitats.
Transmission Line	The structures, insulators, conductors, and other equipment used to transmit electrical power from one point to another.
Undergrounding	Installing electrical or telecommunications cables beneath the ground.
Undesirable plant species	Non-native/invasive plants, typically classified as noxious weeds. They are ranked by the State as Class A, B, or C. Eradicating Class A weeds is required by law. Class B weeds may be regionally abundant but are not yet widespread. Preventing new infestations and containing existing Class B weed infestations are high priorities at the local level. Class C weeds are widespread and a lower priority for control.
Wellhead protection areas	The surface and subsurface areas surrounding a well or well field that contaminants could pass through and eventually reach water supplies.
Wetland	Area that, for the purposes of the Clean Water Act, meets three-parameter criteria that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils subject to saturation/inundation). All three parameters must be present, under normal circumstances, and the wetland must be connected to or have a significant nexus with "waters of the United States" for an area to be designated as a jurisdictional wetland under the Clean Water Act.
Wetland buffer	Areas that surround a wetland and reduce impacts to wetland functions and values from adjacent development.

Appendix D: Figures

Figure D-2: Existing Two-Pole Wood Structure

Figure D-3: Existing Three-Pole Wood Structure

Figure D-4: Fiber Optic Wood Pole Diagram

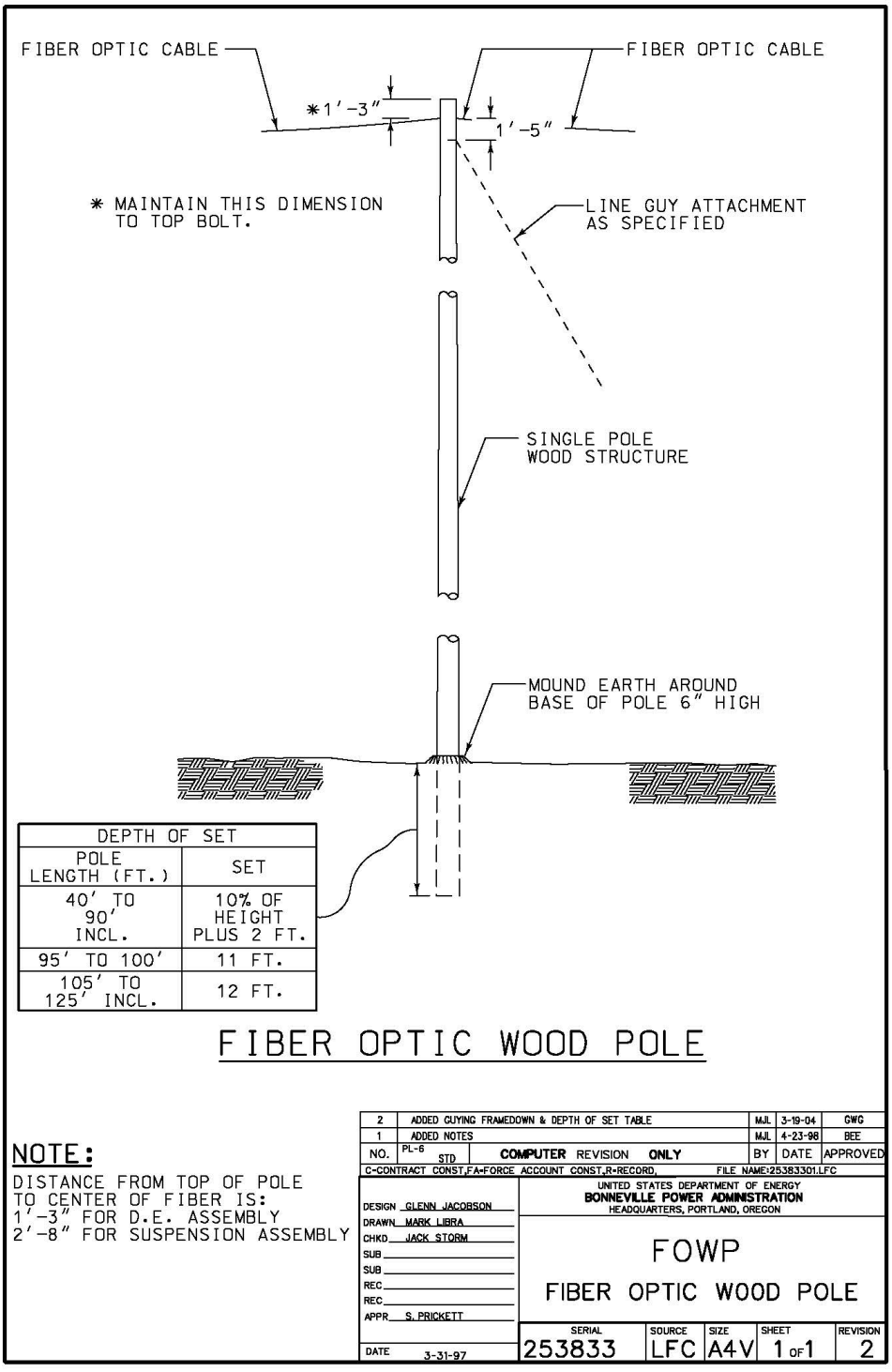
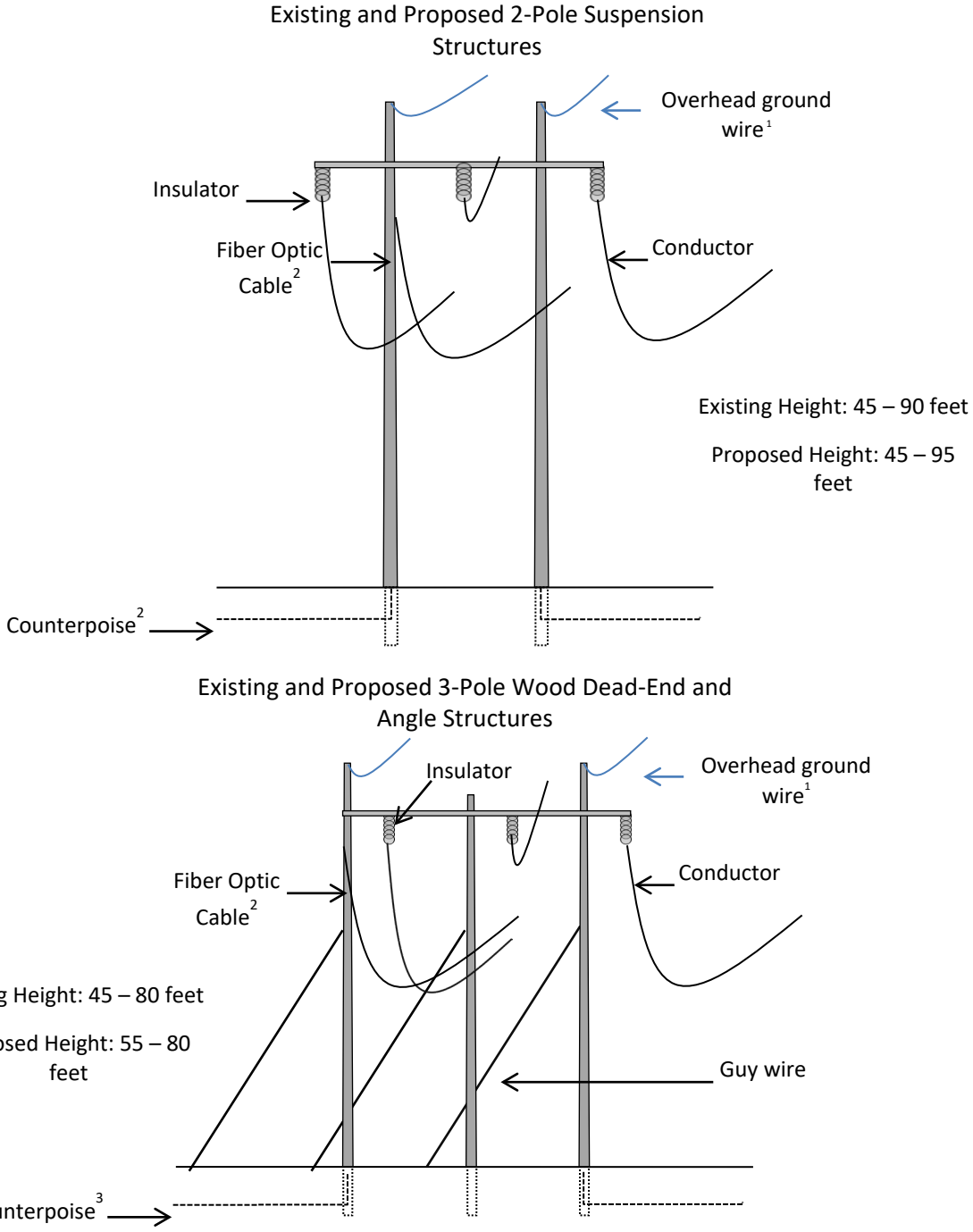


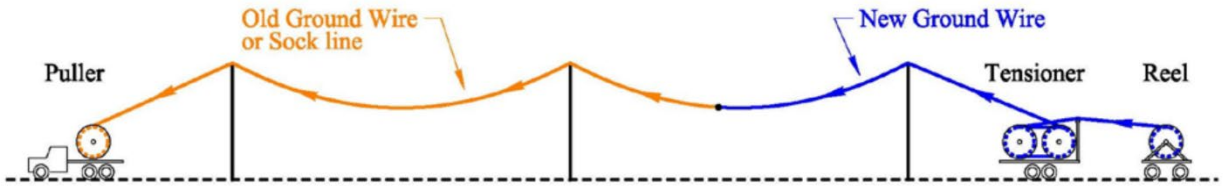
Figure D-5: Existing and Replacement Wood Pole Structures



Notes:

1. Proposed overhead ground wire would only be installed on Shelton-Fairmont No. 1.
2. Fiber optic cable would only be installed on the Olympia-Shelton and Fairmont-Port Angeles No. 1 sections of the Project.
3. Counterpoise would be installed at all structures supporting overhead ground wire along Shelton-Fairmont No. 1.

Figure D-6: Typical Stringing Operation



Appendix E: State, Federal, and USFS List of Sensitive Plant Species

Common Name	Scientific Name	Current Overlap with Project Corridor	Federal Status[1]	State Status (Rank)[2]	USFS Status[3]	Bloom Period	Habitat Requirements (WNHP 2021)
Adder's-tongue	*Ophioglossum pusillum*	Mason	--	S(S1S2)	X	Jun–Sept	Seasonally wet areas, ditches, bogs, fens, wet meadows, floodplains, moist woods, dry hillsides and seasonally wet acidic wetlands; 40–3,200 feet.
Black bog (several flowered) sedge	*Carex pluriflora*	Clallam	--	S(S2)	--	May–Jul	Wetlands, boggy lake edges, prairies, streambanks; 160–3,160 feet.
Blunt-leaf pondweed	***Potamogeton obtusifolius***	Mason, Jefferson, Thurston	--	S(S2)	--	Aug	Submerged on the banks of lakes, sloughs, and slow-flowing streams; 100–513 feet.
Bog clubmoss	*Lycopodiella inundata*	Mason (present), Thurston (historical)	--	S(S2)	X	NA	Sphagnum bogs, wet sandy places, and wetlands adjacent to lakes, marshes, and swampy grounds; 0–6,500 feet.
Common bluecup	***Githopsis specularioides***	Mason, Thurston	--	S(S2S3)	--	Apr–Jun	Dry, open places; bedrock outcrops, grassy balds, talus slopes, and gravelly prairies; 200–2,500 feet.
Few-flowered sedge	***Carex pauciflora***	Mason, Jefferson, Clallam	--	S(S2)	X	May–Sep	Wet acidic areas, sphagnum bogs and peat; usually on open mats, but partial shade; 250–4,550 feet.
Giant chain fern	***Woodwardia fimbriata***	Mason, Jefferson, Thurston	--	S(S2)	--	NA	Streambanks, shaded wet road banks, mixed conifer-hardwood forests, near saltwater; 3–100 feet.
Golden chinquapin	***Chrysolepis chrysophylla***	Mason	--	S(S2)	X	NA	Large evergreen shrub/small tree that prefers dry, open sites to fairly thick woodlands, 50–3,600 feet.

Common Name	Scientific Name	Current Overlap with Project Corridor	Federal Status[1]	State Status (Rank)[2]	USFS Status[3]	Bloom Period	Habitat Requirements (WNHP 2021)
Golden paintbrush	*Castilleja levisecta*	Clallam (Introduced), Jefferson (historical), Thurston	T	T(S2)	--	Apr–Jul	Open grasslands in the Puget trough lowlands; 10–300 feet. Rare regional endemic.
Greater Canadian St. John's-wort	*Hypericum majus*	Kitsap (near Mason), Thurston	--	S(S2)	--	Jul–Sep	Along ponds and lakeshores, riparian areas; 50–2,340 feet.
Humped bladderwort	*Utricularia gibba*	Mason, Thurston	--	State Rev. Group 1	--	Jun–Aug	Obligate wetland herb found in lakes, lake edges, and muddy disturbed sites; 10–500 feet.
Mountain lady's slipper	*Cypripedium montanum*	Jefferson, Clallam, Thurston	--	--	S/M	Feb–Sept	Mesic to dry forests, openings, and thickets, around shrubs on open slopes; 0–7,200 feet.
Northern grass-of-Parnassus	*Parnassia palustris var. neogaea* (syn. *tenuis)*	Jefferson, Mason	--	S(S2)	X	Jul–Aug	Stream channels, moist meadows, bogs, and seeps; 360–3,300 feet. Saxifrage family, hairless, leaves all basal; blades triangular.
Oregon goldenaster	***Heterotheca oregona***	Mason, Thurston	--	S(S2)	X	Jun–Sept	On sand and gravel bars along rivers and streams. Seasonally flooded areas; 0–2,600 feet.
Salmon Jacob's-ladder	*Polemonium carneum*	Clallam, Thurston	--	T(S1S2)	--	May–Aug	Woody thickets, moist open forests, meadows, prairies, roadsides, fence rows; 150–2,000 feet.
Spleenwort-leaved goldthread	*Coptis aspleniifolia*	Clallam	--	--	X, S/M	Late Apr–May	Moist, cool, mossy sites, in mature forests with a well-developed litter layer; below 2,800 feet.
Tall bugbane	*Actea elata* var. *elata (Cimicifuga elata)*	Clallam, Thurston	SOC	S(S3)	--	May–Aug	Tall understory plant of lowland forests; along margins of mixed, mature, or old-growth forests.

Common Name	Scientific Name	Current Overlap with Project Corridor	Federal Status[1]	State Status (Rank)[2]	USFS Status[3]	Bloom Period	Habitat Requirements (WNHP 2021)
Water howellia	*Howelia aquatilis*	Mason (historical), Thurston	T	T(S2)	--	May–Jun	Low elevation wetlands, with *Carex vesicaria, Sium suave, Callitriche* spp.*, Ranunculus aquatilis, R. flammula, Equisetum fluviatile,* and *Sparganium.*
Water lobelia	*Lobelia dortmanna*	Clallam, Mason	--	S(S2)	--	Jun–Aug	Shallow water at the margins of lakes and ponds; 5–1,000 feet.
Western yellow oxalis	*Oxalis suksdorfii*	Clallam	--	T(S1)	--	Apr–Aug	In meadows, moist forests; sometimes dry slopes or shrubby areas. With *Viola adunca, Ranunculus repens, and Calystegia soldanella.*
Yerba de selva	***Whipplea modesta***	Clallam, Thurston	--	T(S1)	--	Apr–Jun	Found in open or shady places including coniferous forests and balds; < 1,500 feet.

Species in **Bold** are documented as occurring within 10 miles of the Project area (WNHP 2020).

[1]SOC=Species of Concern (a species that might be in need of conservation action); T=Threatened (likely to become Endangered in the foreseeable future).

[2]Status: S=Sensitive; T=Threatened; E=Endangered. Rank: (S1)=Critically imperiled in the state because of extreme rarity or other factors making it especially vulnerable to extirpation from the state; (S2)=Imperiled in the state because of rarity or other factors making it very vulnerable to extirpation from the state; (S3)=Rare or uncommon in the state.

[3]X=USFS Sensitive species; S/M = Survey and Manage.

Appendix F: Wildlife Observed in Project Area

Taxa	Common Name (Scientific Name)	Documented in Clallam County	Documented in Jefferson County	Documented in Mason County	Documented in Thurston County
Invertebrates	Snail sp.			X	
Invertebrates	Water beetle sp.			X	
Invertebrates	Water skimmer sp.			X	
Amphibians	Bullfrog (*Rana catesbeiana*)			X	
Amphibians	Cascades Frog (*Rana cascadae*)			X	
Amphibians	Northern Leopard Frog (*Rana pipiens*)	X			
Amphibians	Pacific Tree Frog (*Pseudacris regilla*)	X	X	X	X
Amphibians	Red-legged Frog (*Rana aurora*)		X		
Amphibians	Rough-skinned Newt (*Taricha granulosa*)	X	X	X	
Amphibians	Tailed Frog (*Ascaphus truei*)			X	
Amphibians	Amphibian sp.	X		X	
Amphibians	Frog sp.			X	
Reptiles	Common Garter Snake (*Thamnophis sirtalis*)			X	
Reptiles	Northwestern Garter Snake (*Thamnophis ordinoides*)				X
Birds	American Bittern (*Botaurus lentiginosus*)			X	
Birds	American Crow (*Corvus brachyrhynchos*)			X	
Birds	American Goldfinch (*Carduelis tristis*)		X		
Birds	American Kestrel (*Falco sparverius*)			X	X
Birds	American Robin (*Turdus migratorius*)		X	X	

Taxa	Common Name (Scientific Name)	Documented in Clallam County	Documented in Jefferson County	Documented in Mason County	Documented in Thurston County
Birds	Anna's Hummingbird (*Calypte anna*)			X	
Birds	Bald Eagle (*Haliaeetus leucocephalus*)	X	X	X	X
Birds	Band-tailed Pigeon (*Patagioenas fasciata*)		X		
Birds	Barn Swallow (*Hirundo rustica*)		X		
Birds	Barred Owl (*Strix varia*)	X			X
Birds	Belted Kingfisher (Ceryle alcyon)			X	
Birds	Bewick's Wren (*Thryomanes bewickii*)		X	X	
Birds	Black-capped Chickadee (*Poecile atricapillus*)			X	
Birds	Black-headed Grosbeak (*Pheucticus melanocephalus*)	X	X		
Birds	Bushtit (*Psaltriparus minimus*)			X	
Birds	California Quail (*Callipepla californica*)	X			
Birds	Canada Goose (*Branta canadensis*)			X	
Birds	Canada Jay *(Perisoreus canadensis obscurus)*			X	
Birds	Cassin's Vireo (*Vireo cassinii*)		X		
Birds	Cedar Waxwing (*Bombycilla cedrorum*)	X			
Birds	Chestnut-backed Chickadee (*Poecile rufescens*)	X	X	X	
Birds	Common Raven *(Corvus corax)*	X		X	X
Birds	Common Snipe *(Gallinago gallinago)*			X	
Birds	Common Yellowthroat *(Geothlypis trichas)*	X	X		
Birds	Cooper's Hawk *(Accipiter cooperii)*		X		
Birds	Dark-eyed Junco *(Junco hyemalis)*			X	

Taxa	Common Name (Scientific Name)	Documented in Clallam County	Documented in Jefferson County	Documented in Mason County	Documented in Thurston County
Birds	Downy Woodpecker *(Picoides pubescens)*	X		X	X
Birds	European Starling *(Sturnus vulgaris)*			X	
Birds	Evening Grosbeak (*Coccothraustes vespertinus*)	X			
Birds	Great Horned Owl *(Bubo virginianus)*			X	
Birds	Hairy Woodpecker *(Picoides villosus)*	X			
Birds	Hermit Warbler *(Dendroica occidentalis)*		X		
Birds	House Finch *(Haemorhous mexicanus)*			X	
Birds	House Wren *(Troglodytes aedon)*			X	
Birds	Hutton's Vireo *(Vireo huttoni)*			X	
Birds	Killdeer *(Charadrius vociferus)*			X	
Birds	Marsh Wren *(Cistothorus palustris)*		X	X	
Birds	Mourning Dove *(Zenaida macroura)*			X	
Birds	Northern Flicker *(Colaptes auratus)*	X		X	
Birds	Northern Harrier *(Circus cyaneus)*		X	X	
Birds	Northwestern Crow *(Corvus caurinus)*			X	
Birds	Olive-sided Flycatcher *(Contopus cooperi)*		X		
Birds	Orange-crowned Warbler *(Vermivora celata)*	X	X		
Birds	Osprey *(Pandion haliaetus)*	X			
Birds	Pacific (Winter) Wren *(Troglodytes pacificus)*			X	X
Birds	Pileated Woodpecker *(Dryocopus pileatus)*	X	X	X	
Birds	Red Crossbill *(Loxia curvirostra)*			X	

Taxa	Common Name (Scientific Name)	Documented in Clallam County	Documented in Jefferson County	Documented in Mason County	Documented in Thurston County
Birds	Red-breasted Nuthatch *(Sitta canadensis)*	X		X	
Birds	Red-breasted Sapsucker *(Sphyrapicus ruber)*	X	X	X	X
Birds	Red-tailed Hawk *(Buteo jamaicensis)*	X	X	X	X
Birds	Red-winged Blackbird *(Agelaius phoeniceus)*	X	X	X	
Birds	Ruby-crowned Kinglet (*Regulus calendula*)	X			
Birds	Ruffed Grouse *(Bonasa umbellus castanea)*			X	
Birds	Rufous Hummingbird *(Selasphorus rufus)*	X		X	
Birds	Savannah Sparrow (*Passerculus sandwichensis*)	X			
Birds	Scrub Jay *(Aphelocoma californica)*			X	
Birds	Song Sparrow *(Melospiza melodia)*		X	X	
Birds	Sooty (Blue) Grouse *(Dendragapus obscurus)*		X	X	
Birds	Sora *(Porzana carolina)*			X	
Birds	Spotted Towhee *(Pipilo maculatus)*			X	X
Birds	Steller's Jay *(Cyanocitta stelleri)*			X	X
Birds	*S*wainson's Thrush *(Catharus ustulatus)*	X			
Birds	Townsend's Solitaire (*Myadestes townsendi*)	X			
Birds	Turkey Vulture *(Cathartes aura)*	X	X	X	X
Birds	Varied Thrush *(Ixoreus naevius)*	X		X	
Birds	Violet-green Swallow *(Tachycineta thalassina)*			X	
Birds	Western Bluebird *(Sialia mexicana)*			X	
Birds	Western Tanager *(Piranga ludoviciana)*		X		

Taxa	Common Name (Scientific Name)	Documented in Clallam County	Documented in Jefferson County	Documented in Mason County	Documented in Thurston County
Birds	White-crowned Sparrow *(Zonotrichia leucophrys)*	X	X	X	X
Birds	Wilson's Warbler *(Wilsonia pusilla)*		X		
Birds	Woodpecker sp.			X	
Birds	Yellow-breasted Chat *(Icteria virens)*				X
Mammals	American Beaver *(Castor canadensis)*			X	X
Mammals	Black Bear *(Ursus americanus)*	X	X	X	
Mammals	Black-tailed Deer *(Odocoileus hemionus columbianus)*	X	X	X	X
Mammals	Bobcat *(Lynx rufus rufus)*		X	X	X
Mammals	Cougar *(Puma concolor oregonensis)*	X	X	X	X
Mammals	Coyote *(Canis latrans)*	X	X	X	X
Mammals	Douglas Squirrel *(Tamiasciurus douglasii)*			X	
Mammals	Mountain Beaver, Sewellel *(Aplodontia rufa)*			X	X
Mammals	Raccoon *(Procyon lotor)*		X	X	
Mammals	Roosevelt Elk *(Cervus elaphus roosevelti)*	X	X	X	X
Mammals	Spotted Skunk (Spilogale putorius)		X		
Mammals	Striped Skunk *(Mephitis mephitis)*			X	
Mammals	Townsend's Mole *(Scapanus townsendii)*		X		
Mammals	Vole sp.	X		X	
Mammals	Rodent sp.			X	

Appendix G: USFWS List of Threatened and Endangered Species that May Occur in Project Area

Scientific Name	Common Name	Critical Habitat	Listing Status
Mammals			
Thomomys mazama prgetensis	Olympia Pocket Gopher	Final	Threatened
Birds			
Brachyramphus marmoratus	Marbled Murrelet	Final	Threatened
Strix occidentalis caurina	Northern Spotted Owl	Final	Threatened
Phoebastria (=Diomedea) albatrus	Short-tailed Albatross	None	Endangered
Eremophila alpestris strigata	Streaked Horned Lark	Final	Threatened
Coccysus americanus	Yellow-billed Cuckoo	Final	Threatened
Amphibians			
Rana pretiosa	Oregon Spotted Frog	Final	Threatened
Fishes			
Salvelinus confluentus	Bull Trout	Final	Threatened
Salvelinus malma	Dolly Varden	None	Threatened
Insects			
Danaus plexippus	Monarch Butterfly	None	Candidate
Euphydryas Editha taylori	Taylor's (=whulge) Checkerspot	Final	Endangered
Flowering Plants			
Castilleja levisecta	Golden Paintbrush	None	Threatened
Critical Habitat[1]			
Salvelinus confluentus	Bull Trout	X	--
Brachyramphus marmoratus	Marbled Murrelet	X	--
Strix occidentalis caurina	Northern Spotted Owl	X	--
Rana pretiosa	Oregon Spotted Frog	X	--

[1]There are four critical habitats wholly or partially within the Project area

Note: Information obtained from the U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC)

Appendix H: Descriptions of Federally Listed Species and Critical Habitats with the Potential to Occur in the Project Area

Endangered and threatened species and critical habitats with potential to occur in the Project area are described below.

Oregon Spotted Frog

The Oregon spotted frog (*Rana pretiosa*) (Section 7-listed as threatened with critical habitat) is highly aquatic and generally avoids dry uplands. It is rarely found far from permanent, quiet water and typically occurs in vegetated shallows or among grasses or sedges along the margins of streams, lakes, ponds (including those behind beaver dams), oxbows, springs, and marshes (Hodge 1976; Licht 1986; Watson et al. 2003; Chelgren et al. 2008). Individuals move among seasonal habitats, often along flooded or saturated corridors (Watson et al. 2003). In Washington, overland movements are very rare (Watson et al. 2003). Breeding occurs in shallow water in pools, ponds, or other quiet waters, among moderate or dense herbaceous vegetation, and often close to shore but sometimes far away from the edge (Pearl et al. 2009). Oviposition sites may be devoid of water later in the year. In Washington, frogs have been observed using deeper permanent pools in the dry season, and in the coldest periods, they bury themselves at the base of dense vegetation in shallow water under ice (Watson et al. 2003). Wintering sites are in springs, slow-flowing channels, or deep open water (Hallock and Pearson 2001; Chelgren et al. 2008).

Oregon spotted frogs are generally associated with wetland complexes greater than 4 hectares in size with extensive emergent marsh coverage that warms substantially during seasons when the frogs are active at the surface (Pearl and Hayes 2004). The expanse of inundation in wetlands often varies greatly between spring and fall, but sites always include some permanent water adjacent to seasonally inundated habitat. Individuals regularly move from short to long distances between breeding and nonbreeding habitats. In Washington, frogs were recorded to move a distance of 2.4 kilometers along a creek (McAllister and Walker 2003).

Marbled Murrelet and Northern Spotted Owl

The northern spotted owl (*Strix occidentalis*) and marbled murrelet (*Brachyramphus marmoratus*) are both ESA-listed as threatened with designated critical habitat.

Shared habitat characteristics of both species include moderate to high canopy closure; a multilayered, multispecies canopy dominated by large overstory trees; a high incidence of large trees with large cavities, broken tops, and other indications of decay; numerous large snags; heavy accumulations of logs and other woody debris on the forest floor; and considerable open space within and beneath the canopy (Thomas et al. 1990). Generally, these conditions are found in old growth forests (at least 150 to 200 years old), but sometimes they occur in younger forests that include patches of older growth.

In Washington and Oregon, conifer forests begin to develop conditions suitable for northern spotted owls (and marbled murrelets) about 80 to 120 years after clearcutting (NatureServe 2022). Prey base is important to determining habitat potential for northern spotted owls. In the Olympic Peninsula, primary prey species include squirrels, woodrats, and rabbits/hares (Carey et al. 1992).

Marbled murrelets require similar forested characteristics as northern spotted owls during the breeding season (late March through late September) (NatureServe 2022); however, they spend the remainder of their life in marine waters. Nests are often placed in mature/old-growth coniferous forest near the coast, and on a large mossy horizontal branch, mistletoe infection, witches' broom, or other structure providing a platform high in mature conifers (e.g., Douglas-fir, mountain hemlock) (NatureServe 2022). Most nesting occurs in large stands of old growth. Good overhead protection is a common feature of nest sites (NatureServe 2022).

Most designated critical habitat found within the Project area is designated for marbled murrelet and northern spotted owl. In general, critical habitat for these two species substantially overlaps because of the reliance that both have on mature conifer forests with diverse structure and species composition. The extensive history of logging on the Olympic Peninsula, including within the Project area, has resulted in most of the forested area having been cut in the recent past and replanted in even-aged, Douglas fir-dominated stands (National Park Service 2009).

Olympia Pocket Gopher

Olympia pocket gopher (*Thomomys mazama pugetensis*) (ESA listed as threatened with designated critical habitat) is highly fossorial, spending most of its life underground. Their burrows include foraging tunnels and chambers for nesting and caching of food (WDFW 2022). Although the gophers are territorial, burrow systems are often aggregated in favorable habitat (WDFW 2022). Pocket gophers are ecologically important as prey items and in influencing soils and plant species diversity, and their burrows are a retreat for amphibians, reptiles, and many invertebrates (WDFW 2022). Pocket gopher predators include owls and mammalian mesopredators.

Chinook Salmon

Chinook salmon in Hood Canal are included in the Puget Sound Chinook ESU, a population currently listed as threatened under the ESA in Washington State. The life history and habitat requirements of Puget Sound Chinook salmon are described by Myers et al. (1998) and are briefly summarized herein. Chinook salmon have a historic range from the Ventura River in California to Point Hope, Alaska in North America; and from Hokkaido, Japan to Anadyr River in Russia. Chinook require varied habitats during different phases of their life. Peak spawning occurs within the streams between mid-October and mid-November (Haring, 2000). Spawning habitat typically consists of lower mainstem areas with large quantities of gravel and greater flows (Haring, 2000). Upstream migration of adult fall Chinook salmon in south Puget Sound's lowland streams typically extends from mid-September to mid-November. After spending 3 to 4 months rearing in the lowland streams, fry enter the estuaries around May or early June, depending on the spring flows (Haring, 2000). Chinook generally migrate to salt water in the spring and summer. Most Chinook spend from 2 to 4 years feeding in the North Pacific before returning to spawn. Chinook salmon die after spawning.

Steelhead

The Puget Sound DPS distribution extends from the United States/Canada border and includes all naturally spawned anadromous winter-run and summer-run populations in streams and river basins of the Strait of Juan de Fuca (east of and including the Elwha River), Puget Sound (north to include the Nooksack River), and Hood Canal. Steelhead exhibit one of the most complex suite of life history traits of any salmonid species. Steelhead may be anadromous or freshwater residents (which are usually referred to as rainbow or redband trout). Biologically, steelhead can be divided into two reproductive ecotypes: "stream maturing" and "ocean maturing." Stream maturing, or summer run steelhead enter fresh water in a sexually immature condition and require several months to mature and spawn. Ocean maturing, or winter run steelhead enter fresh water with well-developed gonads and spawn shortly after river entry. Steelhead adults typically spawn between December and June. Depending on water temperature, steelhead eggs may incubate in redds for 1.5 to 4 months before hatching. Puget Sound DPS steelhead typically smolt after 2 years, though they may spend 1 to 4 years in fresh water. They then reside in marine waters for typically 2 or 3 years prior to returning to their natal stream to spawn. Steelhead are iteroparous, but rarely spawn more than twice before dying; most that do so are females.

Bull Trout

Bull trout have a complex life history that includes a resident form and a migratory form. The individuals of the migratory form may be stream dwelling (fluvial), lake dwelling (adfluvial), or ocean/estuarine dwelling (anadromous) (USFWS, 1998). Resident bull trout spend their entire life cycle within their natal or nearby streams. Fluvial populations spawn in tributary streams where the young rear from 2 to 3 years before migrating to a river where they grow to maturity (Knowles and Gumtow, 1999). Adfluvial forms spawn and rear in headwater streams like fluvial fish, but migrate to lakes and reservoirs to mature (KCDNR, 2000). Anadromous bull trout spawn in tributary streams, with major growth and maturation occurring in the marine or estuarine environment (Sims, 2000). Individuals of each form may be represented in a single population; however, migratory populations may dominate where migration corridors and subadult rearing habitats are in good condition (USFWS, 1998).

Like many other salmonids, bull trout migrate to freshwater streams to spawn. Spawning begins in late August, peaking in September and October, and ending in November (WDFW, 2000). Bull trout spawn in streams with clean gravel substrates and cold-water temperatures (less than 9°C/48°F) (USFWS, 1998). Redds are dug by females in water 8 to 24 inches deep, in substrate gravels 0.2 to 2 inches in diameter (Wydoski and Whitney, 1979). Fecundity for bull trout can reach up to 5,000 eggs. Emergence from the streambed typically occurs in late winter and early spring (KCDNR, 2000). Among migratory forms (fluvial, adfluvial, and anadromous), outmigration to larger rivers, lakes, and the ocean most commonly occurs at age two, but has been observed for ages of one to three years (FERC, 1999).

Bull trout are opportunistic feeders, consuming fish in the water column and insects on the bottom (WDW, 1991). Low stream temperatures and clean substrates are key features of bull trout habitat. This species is most commonly associated with pristine or only slightly disturbed basins (USFWS, 1998).

The Coastal-Puget Sound DPS of bull trout is unique because it is thought to contain the only anadromous forms of bull trout within the continental U.S. (USFWS, 1998a). The status of the migratory (fluvial, adfluvial, and anadromous) forms is of greatest concern throughout most of their range. The majority of the remaining populations in some areas may be largely composed of resident bull trout (Leary et al., 1991; Williams and Mullan, 1992).

Hood Canal Summer-Run Chum Salmon

Hood Canal Summer-run chum populations are one of three genetically distinct lineages of chum salmon in the Pacific Northwest region (Ames et al. 2000). Hood Canal Summer-run chum salmon occurring in and near Port Hadlock are part of the Hood Canal Summer-run ESU population, which was listed as a threatened fish stock by NOAA Fisheries on March 25, 1999. The life history and habitat requirements of Hood Canal Summer-run chum salmon are described by Ames et al. (2000) and are included by reference and briefly summarized herein. Hood Canal Summer-run chum salmon are genetically distinct from other chum salmon stocks and have a distinctive life history (Ames et al. 2000). Summer chum enter freshwater spawning areas from late August through late October, during times when interaction with other Pacific salmon species and races is minimized (Ames et al. 2000). Fry emerge between February and the last week of May. Fry immediately migrate downstream to estuarine areas where they inhabit nearshore areas. Upon their arrival in tidal waters, chum fry inhabit shallow estuarine habitats, then migrate along marine shorelines (Nightingale and Simenstad 2001). Once juvenile chum reach a size of 1.7 to 2 inches (45 to 50 mm), they move to deeper off-shore areas (Ames et al. 2000).

Summer chum of the Hood Canal and Strait of Juan de Fuca region are defined as those fish that have an average peak of spawning before November 1. One distinguishing characteristic of this group of summer chum is an early nearshore marine area, adult run timing (early August into October). This early timing creates a temporal separation from the more abundant indigenous fall chum stocks, which spawn in the

same area, allowing for reproductive isolation between summer and fall chum stocks in the region.

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