Holcomb-Naselle Transmission Line Rebuild Project

Draft Environmental Assessment

August 2019

DOE/EA – 2091

This page deliberately left blank

Contents

Figures

Tables

1 Purpose of and Need for Action

The Bonneville Power Administration (BPA) is a Federal agency that owns and operates more than 15,000 circuit miles of high-voltage transmission lines. The transmission lines move most of the Northwest's high-voltage power from facilities that generate the power to users throughout the region.

One of these existing BPA-owned transmission lines is the Holcomb-Naselle transmission line, which runs generally south from Holcomb Substation located about 10 miles southeast of Raymond, Washington to Naselle Substation in Naselle, Washington (Figure 1-1). Portions of this 21-mile-long, 115-kilovolt (kV) transmission line are in poor condition due to normal deterioration and aging. In addition, some of the existing roads used to access the existing line are in poor condition. BPA is proposing the Holcomb-Naselle Rebuild Project (Proposed Action or project) to replace many of the aged wood H-frame transmission structures, replace or install other line components, and improve portions of the access roads used to access transmission line structures.

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

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

1.1 Need for Action

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)). BPA needs to ensure the integrity and reliability of the Holcomb-Naselle transmission line that serves BPA's utility customers and communities in southwest Washington. The transmission line consists of structures, insulators, conductors (electrical wires), and other equipment used to transmit power.

The Holcomb-Naselle transmission line was constructed in 1949. It is currently not operating at full capacity because during times of high electrical load, there is the potential for failure of the fittings that connect the conductor segments. The vintage of fittings used on the existing conductor have a limited life expectancy. Repeated thermal expansion and contraction from fluctuations in the operating temperature of the conductor combined with corrosion that develops in these fittings causes poor electrical conductivity between the conductor and fitting. This increases the temperature of the fitting which can cause melting of individual conductor strands and ultimately causing separation of the conductor segments.

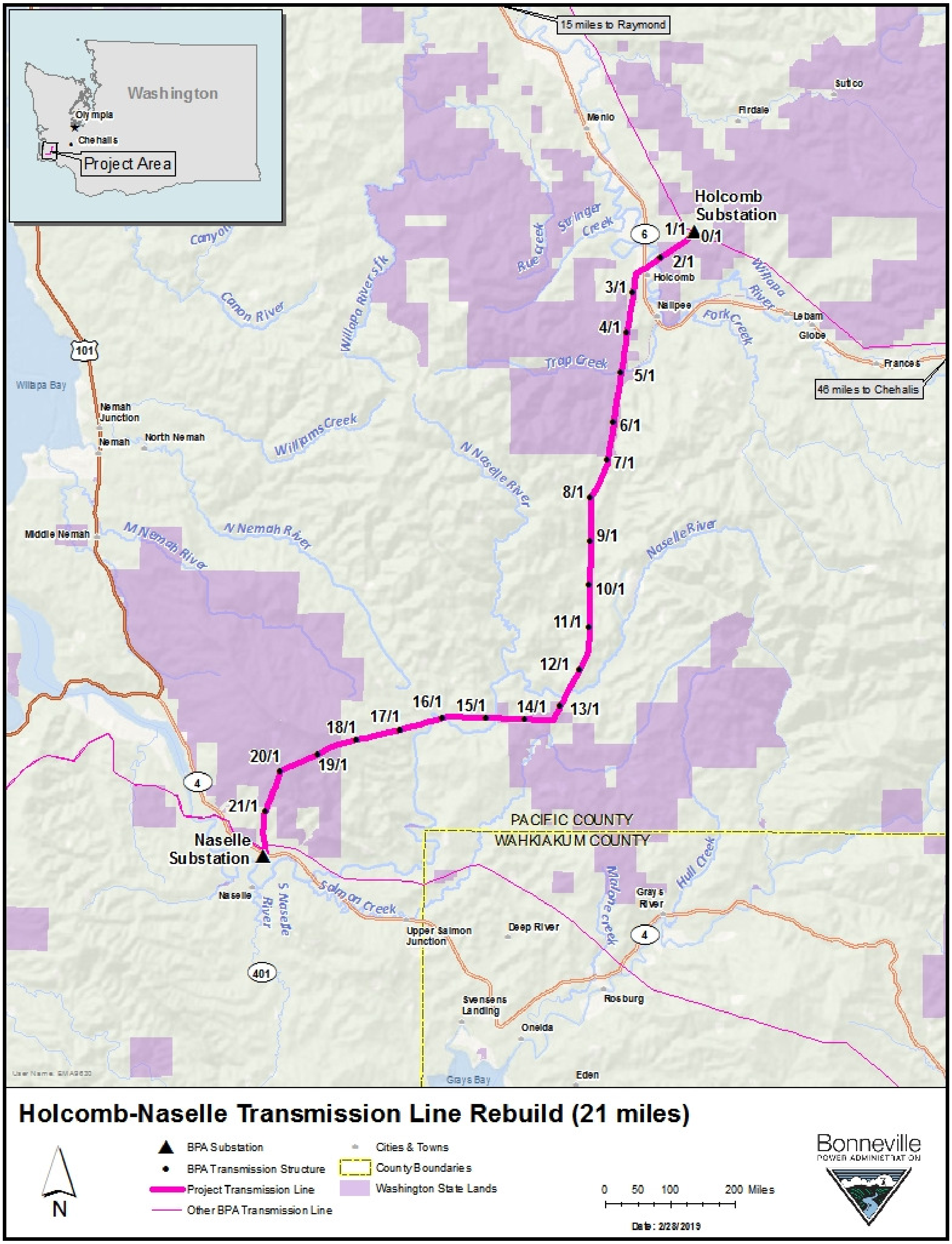


Figure 1-1. Project Vicinity Map

Additionally, the wood pole structures that support the conductor have a typical service life of 55 to 60 years. About half of the individual poles that make up the structures on this line have been replaced over time due to normal deterioration. The remaining original poles are well past their expected service life and showing signs of deterioration. Conductors, insulators and hardware along portions of the transmission line have also reached the end of their service life.

Due to these conditions, portions of the line have begun to fail in recent months, causing outages and requiring emergency repairs. The age, continuing deterioration, and overall poor condition of the line create the risk of additional outages that would adversely affect power deliveries to BPA's customers in the Pacific County area of Washington. The need for emergency maintenance poses safety risks for BPA transmission line workers.

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

1.2 Purposes

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.
- Demonstrate cost-effectiveness by rebuilding the transmission line instead of performing repairs on an as-needed basis.

1.3 Public Involvement

To help determine the issues to be addressed in the EA, BPA conducted public scoping outreach. The public comment period began on February 20, 2018, and BPA accepted public comments on the project until March 26, 2018. On February 20, 2018, BPA mailed letters to potentially interested and affected persons, agencies, Tribes, and organizations. The public letter provided information about the project and EA scoping period, requested comments on issues to be addressed in the EA, and described how to comment (mail, fax, telephone, and the BPA project website). The public letter was also posted on the project website to provide information about the Proposed Action and the EA process: www.bpa.gov/goto/HolcombNaselleRebuild.

BPA determined that four American Indian tribes (Tribes) have a potential interest in this project—Confederated Tribes of the Chehalis Reservation, the Chinook Indian Tribe, the Cowlitz Indian Tribe, and the Quinault Indian Nation. BPA requested comments on the Proposed Action from the Tribes, as well as on potential cultural resources to help shape the field investigations.

BPA received five written comments during the scoping period and posted them on the project website (www.bpa.gov/goto/HolcombNaselleRebuild). Comments were focused on the following:

- Request to include installation of fiber on the transmission line as part of this project
- Expressing project support from local customers
- Disturbance to residents from the use of helicopters during construction
- Placing the transmission line underground
- Increasing the potential spread of noxious weeds from construction activities
- Request for information on generation interconnection from wind turbines on private lands
- Request that BPA engage in consultation with U.S. Fish and Wildlife Service (USFWS) regarding marbled murrelet habitat on Washington Department of Natural Resources (WDNR)-managed state trust lands
- Request that the project be consistent with WDNR's State Trust Lands Habitat Conservation Plan (HCP) on WDNR-managed state trust lands
- Request for review by WDNR of the cultural resources report for portions of the project located on WDNR-managed state trust lands
- Request for information on the identification of trees proposed for removal on WDNR-managed state trust lands

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

2 Proposed Action and Alternative

This section describes the existing transmission line, the Proposed Action, 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 alternatives. Figure 1-1 in Section 1 shows the location of the Holcomb – Naselle transmission line.

2.1 Existing Transmission Line

The existing 21-mile, 115-kV Holcomb-Naselle transmission line extends south from BPA's Holcomb Substation about 13 miles before turning west for about 7 miles and then south to BPA's Naselle Substation (Figure 1-1). Substations are the fenced sites that contain the terminal switching and transformation equipment needed at the ends of a transmission line. The transmission line and access roads cross through Pacific and Wahkiakum counties, generally between the communities of Holcomb and Naselle. Just south of Holcomb Substation, the transmission line crosses State Highway 6. Next to the Naselle Substation, the transmission line crosses State Highway 4.

The transmission line is located in a 100-foot wide right-of-way that crosses about nine miles of WDNR land with the remainder of the line located on private property. BPA has easements (authorization to use land owned by another) or other authorizations with underlying landowners for all of the transmission line right-of-way and access roads. About 59 miles of public and private roads are used to access the transmission line (about 3.8 miles are located in Wahkiakum County with the remainder in Pacific County). Most of the line crosses hilly terrain through private and state forested areas.

The existing transmission line is made up of 159 structures— mostly two- and three-pole wood H-frame structures. Many of the wood-pole structures have guy wires used to increase structure stability. Photos of the existing transmission line structures are shown in Figures 2-1 and 2-2.

The line has three conductors (electrical wires) and stretches of overhead ground wire (protective wire strung above the conductors to shield them from lightning). Structures within 0.5 miles of Naselle Substation have overhead ground wire; structures near Holcomb Substation do not have overhead ground wire. The overhead ground wire also protects substation equipment from lightning strikes.

Figure 2-1. Existing Two-Pole Wood Structure

Figure 2-2. Existing Three-Pole Wood Structure

Ongoing Maintenance and Vegetation Management

BPA conducts routine periodic inspections, maintenance, and vegetation management of 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 has operated and maintained the Holcomb-Naselle transmission line since the line was built in 1949. This ongoing operation and maintenance will continue whether or not the Proposed Action is implemented. However, because the Proposed Action is essentially a major maintenance project and includes the replacement of worn parts of the existing transmission line and improvements to the access roads, the need for future maintenance and repairs would be expected to be less frequent and on a smaller scale than currently required.

BPA conducts vegetation management along the Holcomb-Naselle transmission line right-of-way every three to five years to keep vegetation a safe distance from the conductor, maintain access to structures, and to 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, a number of different vegetation management methods could be used: manual (e.g., hand-pulling, clippers, chainsaws); mechanical (e.g., roller-choppers, brush-hog); or chemical (e.g., herbicides).

Vegetation in the transmission line right-of-way is managed to ensure that tall growing species do not grow into or near conductors, and to remove select "danger trees" adjacent to the right-of-way that have the potential to grow or fall into the line. Identifying danger trees includes determining tree height and growth potential, how the tree leans, 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 Holcomb-Naselle right-of-way to prevent establishment of tall-growing woody vegetation. Shrubs that are less than about 20 feet tall are allowed to grow, along with herbaceous species. Vegetation management was most recently conducted in 2018.

2.2 Proposed Action

Under the Proposed Action, BPA would replace the conductors and hardware, replace many of the wood-pole structures that support the Holcomb-Naselle transmission line, replace various other line components, and upgrade the access road system that allows BPA access to the line. The line would still be operated at 115-kV. The project corridor includes the existing transmission line and right-of-way, access roads, substations, and other temporary construction areas.

The Proposed Action would include the following:

- Replace many of the wood-pole transmission line structures in kind and in the same location (except for two structures)
- Replace cross arms, insulators, hardware, and guy wire with anchors
- Install dampers
- Replace conductors and replace or install overhead ground wire and counterpoise
- Install fiber optic cable

- Replace and upgrade of substation equipment
- Establish temporary construction areas including staging areas, helicopter landing zones, and conductor pulling/tensioning sites
- Remove danger trees and other vegetation
- Upgrade the access road system

Table 2-1 summarizes the 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
Transmission Structure Replacement[1]	
Replace one-pole wood structures	2
Replace two- pole wood structures	97
Replace three-pole wood structures	12
Access Road Activities[2]	
Reconstruction	90 feet
Improvement	11 miles
Gates (replacements and new)	3
New cross drain culverts[3]	24
Replace cross drain culverts[3]	3
New stream culverts	3
Replace stream culverts	12
Vegetation Removal	
Removal or disturbance of low-growing vegetation in the transmission line right-of-way for structure work and landings	0.8 acres (permanent landings) 80 acres (temporary structure work)
Removal of trees along access roads	8 trees
Removal of danger trees adjacent to the transmission line right-of-way	415 trees
Removal of trees in pulling/tensioning sites located off right-of-way[4]	21 trees

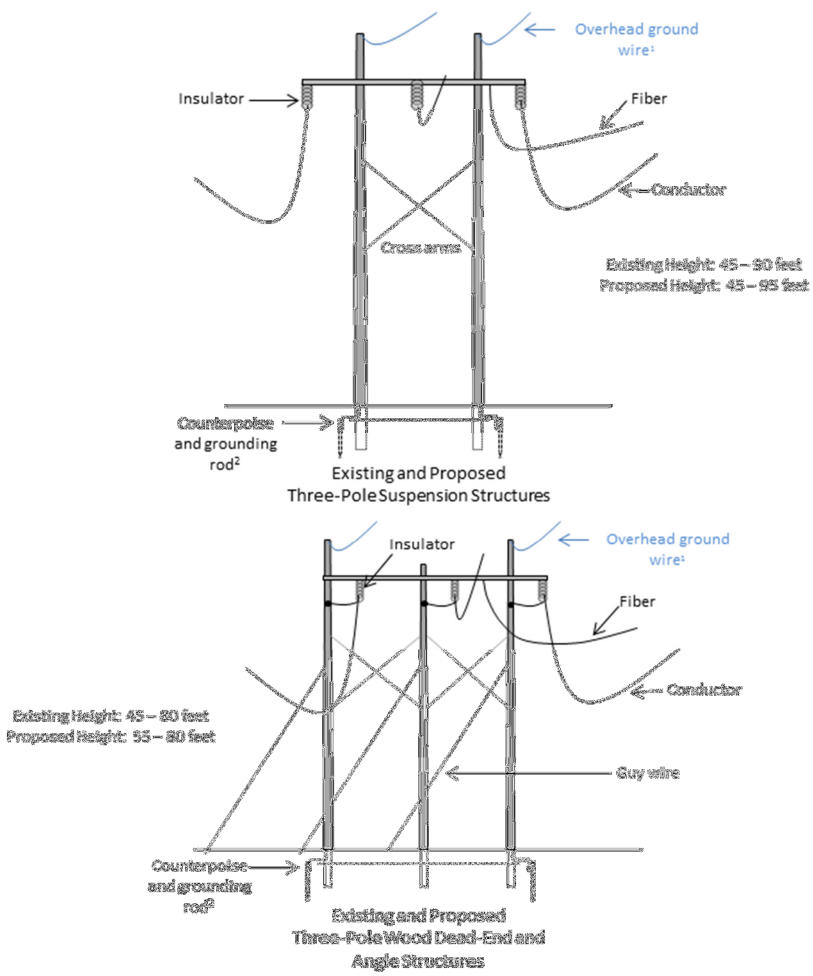
Notes:
[1]There are 159 transmission structures on the Holcomb-Naselle transmission line.
[2]Direction of travel roads, existing roads that would be used in their current condition without any upgrades, are not included in this table.
[3]Cross drain culverts provide surface water runoff management on access roads and are not located in streams.
[4]Of the 12 pulling/tensioning sites needed, four would be located partially off right-of-way with one (at structure 1/2) requiring tree removal.

Replacement of transmission structures

The transmission line structures are individually numbered by line mile and structure in the line mile (e.g., structure 3/4 is the fourth structure in the third mile of the transmission line). Structure 1/1 is at the Holcomb Substation and structure 21/11 is at Naselle Substation. The distance between structures is called a span. Spans between individual structures range from 30 to 1,590 feet, with about 7 to 10 structures in each line mile.

The Proposed Action would replace approximately 111 of the existing wood-pole structures on this line with new wood-pole structures. This includes all poles for structures within 0.5 miles of Holcomb and Naselle substations. Poles to be replaced, based on condition and age and new ground clearance or loading requirements, would be installed in the same location or within 5 to 10 feet of the existing location (except for structures 10/1 (moved 90 feet north) and 17/4 (moved 20 feet west). The existing holes would be cleaned-out and re-augered to a total depth of 7 to 12 feet. Additional soil removed by the auger would be placed within 5 feet of pole bases or removed from the site. If the existing hole could not be reused, the structure would be located as close to the existing hole as possible, while avoiding sensitive resources (e.g., wetlands) if practicable. No blasting is anticipated.

Two-pole wood suspension structures are used where the structures are in a straight alignment or where the structure makes a slight turn (turning angles less than 3 degrees). They are the lightest structures because they do not have to withstand the stresses created by angles in the conductors (Figures 2-1 and 2-3). The three-pole wood dead-end structures are stronger because they use guy wires and are placed at intervals along the line to independently hold the weight and tension of the conductors. They are also used at turning angles greater than 3 degrees or on longer spans (Figures 2-2 and 2-3).



Notes:
1. Proposed overhead ground wire would extend only 0.5 mile from the Holcomb and Naselle substations.
2. Counterpoise would be installed at all structures supporting overhead ground wire and structures where all poles would be replaced.

Figure 2-3. Existing and Replacement Wood Pole Structures

Structure replacement would include installing steel cross arms and braces, dampers, insulators, guy wires and anchors (Figure 2-3). Cross arms hold up the conductors; cross braces form an "X" between wood poles for stability; and dampers minimize vibration of conductors. Wood cross arms and cross braces also would be replaced with steel cross arms and braces on structures not replaced. Insulators are strings of bell-shaped devices that prevent electricity from moving from the conductors to the structures and traveling to the ground. The existing ceramic 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 ten guy wires depending on the structure type. Guy wires attach at various points along the structure and are anchored at the ground (by plate anchors) to lend stability to structures (Figure 2-3). 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 3 to 10 feet away from replaced structures. Holes for plate anchors would be about 10 feet deep by 4 feet square (about 16 square feet of disturbance per anchor). A trench about 6 to 12 inches wide by 2 to 3 feet deep would be dug so the anchor rod can be connected 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, minimize the disturbance area and generate no spoils.

The height of the replaced wood-pole structures would be similar to the 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 (Figure 2-3). Proposed wood-pole structure heights in some locations would be increased by about 5 to 35 feet to provide increased clearance from the conductor to the ground.

Transmission structure replacement activities would temporarily disturb about 0.5 acre; 100 feet ahead on line (towards Naselle Substation) and 100 feet back on line (towards Holcomb Substation) from the structures in the 100 foot width of the right-of-way (200 feet long by 100 feet wide right-of-way = 0.5 acre). The permanent disturbance area around each structure would be an average area of 15 by 15 feet occupied by structures without guy wires and about 30 by 50 feet for structures with guy wires.

Permanent structure landings, used to provide space for equipment and vehicles during construction and maintenance, would be constructed at 18 structures located in steep terrain. These landings would add about 0.05 acre to the permanent disturbance area described above for these 18 structures. For structures located in gentler terrain, the existing area around the structures would be used as permanent landings.

Like most wood poles used for utility or telephone lines, the replacement wood poles would be treated with a preservative called pentachlorophenol (PCP) to lessen wood rot and extend the life of the poles. To prevent leaching of PCP into waterbodies from the treated poles, pole wraps would be installed for wood poles located within 50 feet of wetlands or streams or in floodplains.

Replacement of Conductors, Overhead Ground Wire, and Counterpoise

Conductors are the wires on the structures that carry the electrical current (Figure 2-3). The transmission line supports three conductors. The new conductors would be installed with new hardware and insulators. New non-reflective conductors would be 0.84 inches in diameter and would be installed after the replacement structures are erected.

The NESC and BPA specify the minimum conductor heights above the ground surface and other features (e.g., street lights, electrical distribution lines, etc.). The minimum height for a 115-kV line is 24 feet. Additional conductor to ground clearance would be provided over roadway and river crossings.

In addition, dampers may be added on the conductors. Dampers suppress wind-induced vibrations on taut conductors for better protection against storms. If needed, dampers would be located within 15 feet of the insulators and would help protect the 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 every 30 feet on the conductor on spans where an increased risk of bird strikes exists (e.g., wetlands, rivers, and marbled murrelet habitat). Diverters are spiral-shaped devices that help birds see power lines and avoid potential collisions.

Existing overhead ground wire that protects substation equipment from lightning strikes would be replaced in the first 0.5 mile out from Naselle Substation and new overhead ground wire would be installed in the first 0.5 miles out from Holcomb Substation (Figure 2-3). A series of wires, grounding rods, or both (called counterpoise) used to establish a low resistance path from the overhead groundwire to earth for lightning protection of the substations, was originally installed at each structure with overhead groundwire near Naselle Substation. This existing counterpoise would either continue to provide protection or would be replaced. New counterpoise would be installed at structures in the first 0.5 miles from Holcomb Substation. Counterpoise also would be installed at structures where all poles are replaced. Counterpoise would not be installed at structures where one pole of a two-pole structure is replaced or two poles of a three-pole structure are replaced.

New and replacement counterpoise would be buried between the poles and connected to grounding rods (Figure 2-3). The disturbance area for installing counterpoise would be within the permanent structure disturbance area.

The existing conductors, as well as the overhead ground wire, would be removed by reeling the wires on to 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.

Installation of Fiber Optic Cable

A fiber optic cable would be strung on the transmission structures from Naselle Substation to Holcomb Substation. The 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 allows voice communications between power dispatchers and line maintenance crews and provides instantaneous commands that control power system operation.

The fiber optic cable would be less than 1 inch in diameter and would be mounted above the conductors. Every 3 to 5 miles there would be a cable 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 the structures. Fiber optic cable vaults, 4 feet by 4 feet by 4 feet concrete boxes placed on the ground or partially buried in the ground, would be located just outside the fence of both Naselle and Holcomb substations. There would be three new fiber optic wood poles: one near the vault at Holcomb Substation to help transition the fiber cable from overhead to the vaults; and two installed within 10 to 15 feet of structures 2/4 and 2/5 to route the fiber around these switch structures.

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

Temporary staging areas, usually placed outside of the transmission line right-of-way, would be used to store and stockpile wood poles and materials, trucks, and other equipment during construction. One staging area located near Holcomb Substation would be located in an agricultural field and the second would be located east of Naselle Substation in an existing quarry (both would be about 10 miles from the transmission line). Each staging area would occupy approximately 5 acres, based on the area needed to accommodate wood poles and other materials.

About five helicopter landing zones would be identified along the line in previously cleared areas. Helicopters would be used to transport equipment and during stringing of conductor, fiber, and overhead groundwire. 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 right-of-way when in close proximity to the project corridor. An FAA congested area plan including the use of flaggers would be required where the line crosses Highway 6 near Holcomb Substation and Highway 4 adjacent to Naselle Substation. Near Naselle Substation, work would be scheduled during the weekends or in the summer months when school is not in session.

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 overhead ground wire cables to the correct tension once they are mounted on the transmission line structures. Sites selected can accommodate pulling and tensioning equipment but may need to be cleared of interfering vegetation (using a chainsaw, mowers, brushing machines, heavy equipment, or hand tools) to position pulling and tensioning equipment. These sites would be located in the right-of-way where possible; of the 12 sites needed, four would be partially located outside of the right-of-way where the transmission line makes a sharp turn or angle. Most of the pulling and tensioning sites would use an area about 250 feet long by 100 feet wide (right-of-way width) ahead or back on line of a structure (about 0.6 acre or up to 1.2 acre if both sides are used). One site would require a larger area for the pulling/tensioning site (about 340 feet long by 100 feet wide on one side of the structure = 0.8 acre). Ground disturbance would occur from leveling and grading of the 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 (Figure 2-4). 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 strung using a helicopter or by workers on the ground. The sock line would be connected to a hard line (typically a small stranded steel wire), which would be connected to the new conductor 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 of the structures.

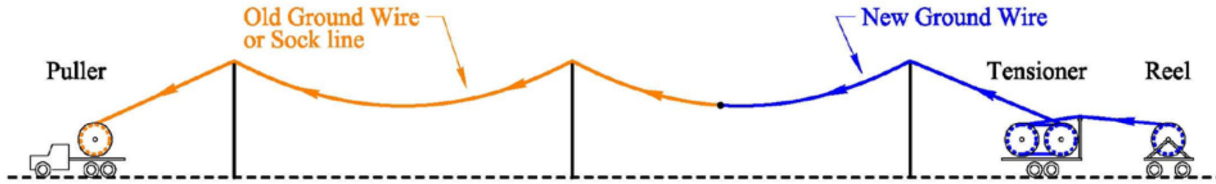


Figure 2-4. Typical Stringing Operation

Guard structures are temporary wood-pole structures with cross arms placed on either side of a facility (distribution lines, roads, railroad crossings, navigable rivers) to catch conductors, groundwire, or fiber optic cable in the unlikely event that the conductors/wires fall while being removed or installed. Guard structures installed where the conductors cross highways 6 and 4 would be removed after the conductor or other wires were strung.

Upgrading the Access Road System

The system of roads that provide access to the transmission line would be upgraded to help provide safe access while rebuilding the transmission line, and during ongoing operation and maintenance activities. BPA uses this system of access roads through a mix of permits or access road easements across WDNR and private land. Access roads are located in the transmission line right-of-way as much as possible but some are located outside the right-of-way.

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 about 20 feet. One road in line mile 9 would be widened to allow trucks with long trailers and construction equipment to navigate a sharp u-shaped turn. BPA's road standards include water bars, drain dips, and cross drain culverts to manage surface water runoff. For joint-use roads located on state trust lands, BPA is consulting with WDNR regarding road standards.

There would be a total of about 59 miles of access roads used for the project—about 11 miles of access roads would need work (either reconstruction or improvement) and 48 miles of roads that would not require any work (e.g., Green Creek Road, Salmon Creek Road and Deep River Road). Access road work falls into the following categories (Table 2-1):

- Access road reconstruction – About 90 feet of an existing access road in line mile 6 that has deteriorated to the point of being unusable by construction equipment would be reconstructed (located on WDNR land). This includes vegetation removal, road prism reconstruction, grading, widening, gravelling, and installing drainage features or culverts. As mentioned above, work at an access road's u-shaped turn in line mile 9 would include construction of cut and fill slopes around the outside of the turn to widen the road. About 1 acre would be permanently disturbed from the widening with about 1 acre temporarily disturbed around the perimeter of the road work.
- Access road improvements – About 11 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. Approximately 4 miles of improvement would occur on WDNR land with about 6.5 miles improved on private lands.

About 42 culverts would be replaced or installed (3 new in streams, 12 replaced in streams, 27 cross drains to provide drainage across roads). Other access road work would include installing two new gates and repairing one existing gate at the entrances to access roads to prevent public access to private lands and to the transmission line right-of-way. Gate locks would be coordinated with appropriate landowners to ensure that both BPA and the landowner can unlock them.

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 the line. Approximately 90 acres (including about 10 acres at staging areas) of vegetation in these areas would be crushed, removed, or cut for rebuild activities. Along access roads, trees identified for removal would be directionally felled away from the roads. Removal of trees as described in this EA represents tree cutting or topping; trees may or may not be removed depending on landowner preferences.

Trees identified for removal outside the right-of-way are called “danger trees” because they have the potential to fall or grow into or grow too close to the conductor and cause flashovers or line outages. About 415 danger trees would require removal adjacent to the transmission line right-of-way with about 198 of these trees located on WDNR lands. The majority of danger trees identified for removal are Douglas-fir, western hemlock, red alder, or Sitka spruce trees ranging from 8 to 38 inches in diameter. About 21 trees (4-inch diameter red alders with one 26-inch red alder) would be removed in the pulling and tensioning site at structure 1/2. Approximately 8 trees (seven 4 to 13-inch diameter Douglas-fir and one 10-inch diameter Sitka spruce) in line mile 5 would be removed along an access road. These trees would be removed so that long construction vehicles, such as trucks with trailers carrying the structures, could navigate turns along the road. Some of the trees are considered merchantable trees – that is, large enough to be of commercial value.

All areas disturbed by tree clearing along the edges of the transmission line right-of-way 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 right-of-way). If available, BPA would use a seed mix with a diversity of native species from a source close to project corridor. WDNR would provide a seed source or list for revegetating disturbed areas on state land.

Replacement of Substation Equipment

Some work would need to be conducted at the Holcomb Substation: replace structure 0/1 inside the substation fence, install three 115-kV disconnect switches, install three 115-kV surge arresters on the new structure, replace three disconnect switches, and replace rod gaps. Rod gaps were used in the past to protect equipment from overvoltage - a circuit or part of it is raised above its upper design limit. Instead of rod gaps, surge arresters are now used for to protect against overvoltage and for lightning protection.

At Naselle Substation, three rod gaps would be replaced with new surge arresters. The arresters would be installed on new pedestals underneath a structure inside the substation fence. An existing spare footing would need to be removed to make space for the arresters. Existing bus risers in the substation would need to be replaced to meet current seismic standards and to make an available connection for the arresters.

Construction Activities

A BPA transmission line maintenance crew would rebuild the transmission line. Prior to and concurrent with the transmission line structure work, access road work and landing construction would occur. The BPA crew would reconstruct or improve some access roads and landings with a contractor completing the remainder of access road work and landing construction. The BPA crew would consist of 8 to 20 people, including transmission line and access road construction workers, inspectors, administrative personnel, surveyors, and other support personnel.

The existing transmission line would be taken out of service (power outage) temporarily by line section, and existing conductors, insulators, and attachment hardware would be removed. The line sections where the outage would occur would be dictated by the need to keep power on to local customers (customers would not be affected by temporary outages of the transmission line). Each line section would have many smaller line segments where construction would be concentrated. These smaller line segments would equate to the distance between pulling/tensioning sites (there would be about 12 segments).

Construction vehicles required for structure replacement could include a bucket truck, a dump truck, an excavator, cranes, a digger derrick (a specialized type of equipment equipped with augers to drill holes for the poles and a hydraulic boom to lift the poles and set them in the holes), and helicopter. Fiber optic cable would be installed on the transmission line once structure replacement work is completed. Equipment used for access road work would include dump trucks, rollers, graders, bulldozers, and excavators.

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 as a result of BPA's construction activities, BPA would compensate landowners for the damage as appropriate.

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 right-of-way segment. One construction season would be needed to complete the Proposed Action. The current schedule calls for access road work and danger tree removal July through October 2020 and transmission line from July 2020 through May 2021 with the majority of work taking place during dry, summer months.

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

- In-water work: 15 streams - In-water work allowed August 1 to September 30
- Marbled Murrelet: Suitable habitat is located at or between structures 4/1, 5/1 to 5/3, 6/3 to 6/5, and 14/4 to 14/6 and occupied habitat is located between structures 13/2 to 13/6. 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 two hours after sunrise and end two hours before sunset within the nesting period. No helicopter use would be allowed within 50 yards of suitable and 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: Tree removal would not occur between April 1 and September 23 to avoid displacement of nesting birds.

2.3 No Action Alternative

Under the No Action Alternative, BPA would not rebuild the transmission line 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 existing transmission line in its current condition, replacing failed conductor fittings, 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 transmission line, the No Action Alternative would likely cause more frequent and more disruptive maintenance activities than has been required in the past. It might be possible to plan some repairs, but many would likely occur on an emergency basis as the transmission line continues to deteriorate.

The overall scale and scope of the repairs that would be done under the No Action Alternative would be smaller than what is planned under the Proposed Action. The maintenance program addresses immediate needs to keep the transmission line functioning, and would likely not include more comprehensive improvements such as access road work to improve water runoff, fish-passable culvert replacements, conductor replacement, or installation of fiber optic cable. Access road work under the No Action Alternative would be limited to enhancements necessary to allow access to specific structures for as-needed repairs and maintenance.

2.4 Alternatives Dismissed from Further Consideration

An alternative that BPA considered but determined infeasible and eliminated from detailed analysis is described below.

Undergrounding. During public scoping, a commenter requested that the transmission line be removed above ground and replaced underground. In general, because of the costs of 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 Holcomb-Naselle transmission line, placing the existing line underground would have substantially greater costs and environmental impacts than replacing the existing overhead structures. Some of the costs and impacts of undergrounding the transmission line would include the following (based on Xcel Energy 2014):

- During outages, the failed equipment that caused the outage is more difficult to locate and repair, which can 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 removed, it could lead to failure).
- Construction impacts would be much greater to underground the line because the entire length of the right-of-way would be trenched—through agricultural fields, wetlands and waterways, and up and down steep terrain. (The existing overhead line spans many sensitive areas that can be left undisturbed.)
- Concrete vaults and manholes would be needed at regular intervals along the line for access.
- Transition stations would be required on either end of the line to terminate the underground cables and connect to the overhead transmission system. These stations would be in addition to the existing substations.
- 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 4 and 15 times more than keeping the line overhead.

Because of the higher construction and maintenance costs, environmental impacts, and shorter life expectancy, replacing the existing line with an underground cable was not considered a reasonable alternative for ensuring the integrity and reliability of the existing Holcomb-Naselle transmission line. For these reasons, this alternative was 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 for soils and geologic hazards, vegetation, water resources, floodplains and fish, wetlands, wildlife, and cultural resources are summarized in Table 2-2. The remaining resources were determined to not be applicable to the proposed project or there would be either no or only an extremely small, insignificant impact on the resource from the project as described in Table 3-1. Because there would be no or negligible impacts expected to those resources from the proposed project, they have not been evaluated further.

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

Alternative	Potential Direct and Indirect Impacts
Soils and Geologic Hazards	
Proposed Action	Impacts would be **low-to-moderate** during transmission structure work including 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. About 80 acres would be temporarily disturbed during structure work with about 2.5 acres permanently impacted adjacent to structures and at their landings.
No Action Alternative	Impacts would be similar to the Proposed Action (**low-to-moderate**) but spread out over time as emergency repairs are needed. Emergency repairs during wet seasons could increase risk of erosion and soil compaction.
Vegetation	
Proposed Action	Impacts would be **low-to-moderate** during construction that requires clearing and crushing of vegetation. About 80 acres of vegetation could be impacted at structure sites. Access road reconstruction would remove vegetation within a width of 20 feet (about 0.14 acres of vegetation removed). About 415 danger trees would be removed along the right-of-way. There is a low potential for special-status plants to be impacted because either suitable habitat is lacking or identified populations would be avoided. Construction activities would increase the potential for the spread of invasive plants.
No Action Alternative	Impacts would be similar to the Proposed Action (**low-to-moderate**) 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, Floodplains, and Fish	
Proposed Action	Impacts would be **none-to-low** during construction; temporary disturbance of vegetation and soils would occur during the dry season. Twelve structure work areas would be located within 100 feet of streams (the closest is 50 feet). All structures (except 10/1 and 17/4) would be replaced in the same general location in already disturbed areas. Access road improvement including replacement or installation of 15 culverts would occur in already disturbed areas. All are in intermittent, non-fish bearing streams except for two located in fish-bearing streams.

No Action Alternative	Impacts would be **low-to-moderate** depending on timing and location. As existing structures and access roads continue to deteriorate, and emergency structure repair and replacement or road work in streams is required, impacts could occur.
Wetlands	
Proposed Action	Impacts would be **low** during construction; two structures located in wetlands would be replaced and seven others within 100 feet of wetlands would be replaced. Native and non-native wetland vegetation would be temporarily disturbed. Road improvement would occur along roads adjacent to wetlands. One new culvert would be placed in a wetland in line mile 1 to provide drainage under an existing road. One pulling and tensioning site would be partially located within a wetland at one structure.
No Action Alternative	Impacts would be similar to the Proposed Action (**low**) because even with deterioration of the structures and roads, only three structures and portions of six access roads are located in wetlands.
Wildlife	
Proposed Action	Impacts would be **low-to-moderate** during construction. Danger tree removal could affect common wildlife species and marbled murrelet. While a small number of danger trees would be removed along the edge of marbled murrelet habitat, habitat would not be converted from forested to nonforested. Marbled murrelet, assumed present in occupied habitat (line mile 13) and likely present in suitable habitat (line miles 4, 5, 6, and 14) could be disturbed during the nesting season (April 1 through September 23). Because construction is expected to move through any one potential habitat area at a moderate pace, disturbance is expected to be temporary. Bird collisions could occur along certain spans of the line near waterbodies or marbled murrelet habitat.
No Action Alternative	Impacts would be similar to the Proposed Action (**low-to-moderate**) depending on the timing of normal or emergency activities. Vegetation removal or heavy equipment use could result in disturbance to nesting birds especially during marbled murrelet critical nesting/breeding periods.
Cultural Resources	
Proposed Action	Impacts would be **none-to-low** during construction. Replacement structures would be the same type and the transmission line would retain its current alignment; the line's visual uniformity would remain and its integrity would remain intact. Site 45PC247 is located in an area previously disturbed during construction and maintenance of the line. Unknown cultural resources could be inadvertently discovered.
No Action Alternative	Impacts would be similar to the Proposed Action (**none-to-low**) from ongoing maintenance and emergency repairs.

2.6 Best Management Practices and Mitigation Measures

Best management practices (BMP) and mitigation measures have been identified for the Proposed Action (Table 2-3). Some of these measures are design features that have been incorporated into the original design of the proposed project, as well as BMPs that are typically used by BPA. Other measures were identified as a result of 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 for the Proposed Action

Soils and Geologic Hazards
• Stabilize permanent disturbance areas by applying a weed-free gravel (if available) top layer to the roadways. • Place new structures in existing structure holes to the maximum extent practicable to reduce ground 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. • 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 from water trucks 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. • Inspect and maintain access roads and cross-drains to ensure proper function and nominal erosion levels after construction.
Vegetation
• Use the existing road system to access structure locations. • Minimize the construction area and disturbance to vegetation to the extent practicable, especially in Marbled Murrelet habitat, wetlands, and waterbody crossings. • Flag rare plant populations in line mile 13 for avoidance during access road work. • Locate materials storage and staging areas in previously disturbed areas. • Conduct as much work as possible, including tree removal during the dry season to minimize erosion and soil compaction. • Conduct tree removal in a manner that minimizes disruption to remaining trees and shrubs. • Cut trees and leave existing root systems intact to help prevent erosion. • 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 grasses, forbs, or shrubs to ensure appropriate vegetation coverage and soil stabilization prior to rainy season (November 1). • Keep pulling/tensioning equipment inside the transmission line right-of-way for pulling/tensioning sites located on right-of-way. • Conduct post-construction site restoration monitoring once a month until site stabilization is achieved. • Prior to construction, identify noxious weed infestation areas for avoidance (as practicable). • Implement measures to minimize noxious weed spread–inspect vehicles before entering construction areas, install and use weed wash stations and wash before entering or leaving work areas, or use other appropriate equipment cleaning measures.
Water Resources, Floodplains, and Fish
• Conduct soil-disturbing activities during the dry season and culvert work when streams are dry, where possible. • Comply with applicable Clean Water Act permits for work in streams. • Divert stream flow around the work area and maintain downstream flow if construction occurs during times when streams are flowing.

Table 2-3. Best Management Practices and Mitigation Measures for the Proposed Action

• 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: mulch, seed, and plant as per plans and specifications. • Restrict construction vehicles and equipment to access roads and designated work areas. • Store, fuel, and maintain all vehicles and other heavy equipment (when not in use) in a designated upland staging area located a minimum of 150 feet away from any stream, waterbody, or wetland or where any spilled material cannot enter natural or manmade drainage conveyances. • 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. • Develop and implement a spill prevention and spill response plan. • Confirm equipment is clean (e.g., power-washed) and that it does not have fluid leaks prior to contractor mobilization of heavy equipment to 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 each ford or culvert replacement site at all times and ready for immediate deployment. • Install cross-drains per BPA access road design specifications. • Revegetate disturbed areas using a slow-release fertilizer. • Locate water drafting sites (locations where contractor may fill water trucks) to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows. • Conduct in-water work between August 1 and September 30. • Install culverts in accordance with WDFW fish passage requirements. • 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. • Use pole wraps and culverts on structures located within 50 feet of a stream or floodplain.
Wetlands
• Use temporary equipment mats when working in wetlands and only drive vehicles and equipment across wetlands during the dry season. • Comply with applicable Clean Water Act for all work in wetlands. • Install erosion-control measures prior to work in or near wetlands (e.g., silt fences, straw wattles, and other sediment control measures) • Avoid depositing excavated material in wetland areas. • Avoid locating construction staging, equipment or materials storage, or vehicle fueling within 150 feet of wetland areas. • Use existing roads to access structure locations. • 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 native species and monitor revegetated wetland areas to ensure adequate cover.

Table 2-3. Best Management Practices and Mitigation Measures for the Proposed Action

• 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 culverts on structures located within 50 feet of wetlands.
Wildlife
• Install bird diverters where the line crosses rivers, wetlands, or other high bird-use areas, and it would be technically feasible: transmission line spans 2/2 - 2/3, 4/7 - 5/2, 12/7 - 12/8, 13/1 - 14/1, 14/6 - 14/7, and 15/8 - 16/3. • Restore areas disturbed by construction at a minimum to pre-construction condition. • Remove danger trees (including from occupied and suitable marbled murrelet habitat) outside the nesting season (April 1 and September 23). • Provide maps of areas to be avoided by helicopters to minimize impacts on wildlife. • Schedule work as late in the marbled murrelet nesting season as possible, while still ensuring road work is completed prior to the start of the wet season. • Schedule work in suitable (at or between structures 4/1, 5/1 to 5/1, 6/1, 6/3 to 6/5, 13/3 to 13/4, and 14/4 to 14/6) and occupied (13/4 to 13/6) marbled murrelet habitat during the nesting season (April 1 to September 23) to begin two hours after sunrise and end two hours before sunset; pre-work meetings occurring within two hours of sunrise would occur off-site at a developed location. • Remove all food scraps and food packaging of any kind from the project sites and transport off-site after each work day; food cannot be left exposed and unattended for any amount of time; no food may be fed to or left for wildlife. • 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.
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 the vicinity of cultural site 45PC247, as well as areas designated as high probability for containing unidentified archaeological resources. • Follow BPA's Inadvertent Discovery Procedure which requires that if an inadvertent discovery of cultural resources is made all work in the vicinity would stop immediately and the BPA archaeologist, Washington Department of Archaeology and Historic Preservation (DAHP), affected Tribes, and WDNR, if applicable, would be notified immediately. • 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 are 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 WDNR, if applicable. • 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
• Place plastic ground covers and concrete blocks to keep wood poles off the ground in material staging yards. • Provide a construction schedule to all potentially affected landowners. • 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.

Table 2-3. Best Management Practices and Mitigation Measures for the Proposed Action

- 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 right-of-way.
- 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.
- 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 (less than 5 miles per hour) on access roads and in the BPA right-of-way to minimize dust.
- Locate staging areas as close to construction sites as practicable to minimize driving distances between staging areas and construction sites.
- Locate staging areas in previously disturbed or graveled areas to minimize soil and vegetation disturbance where practicable.
- 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 (7:00 a.m. to 7:00 p.m.) to reduce noise impacts.

3 Affected Environment and Environmental Consequences

This section provides a description of the affected environment and resources that could be impacted by the Proposed Action and No Action Alternative. It also describes the potential impacts on these resources and the cumulative impacts that could result from implementation of the action alternative. The impact levels are characterized as high, moderate, low, or no impact. The impact levels are based on the analysis provided, which incorporates the considerations of context and intensity defined in the Council of Environmental Quality Regulations (40 Code of Federal Regulations [CFR] 1508.27). Mitigation measures and BMPs that would help reduce or avoid impacts are identified in Table 2-3. The analysis below is based on 50 percent design data for the proposed transmission line rebuild and access road work.

Table 3-1 identifies resources initially considered for impact analysis. Not all of the resources present in the project corridor would be affected by the alternatives because there would be either no or only an extremely small, insignificant impact on the resource from the project. Because these resources are not issues for the proposed project, they have not been evaluated further.

Table 3-1. Resources Initially Considered for Impact Analysis

Resource	Resource Status	Resource Evaluation
Soils and Geologic Hazards	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Vegetation	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Water Resources, Floodplains and Fish	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Wetlands	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Wildlife	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Cultural Resources	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Land Use	Present, Not Affected	Because the existing transmission line would be rebuilt or repaired (depending on the alternative) in the same location, existing and future land uses would not change in the project corridor.
Recreation	Present, Not Affected	Existing and future recreational uses would not be affected because all activities would take place in the existing corridor. No designated recreational use areas are located in the project corridor except dispersed recreational use on WDNR lands.
Transportation	Present, Not Affected	Use of and access to private, county, or state roads would not change in or near the project corridor. Temporary traffic delays during conductor stringing could occur where the transmission line crosses State Highway 6 between structures 2/4 and 2/5 and State Highway 4 between structures 21/10 and 21/11, but would not result in significant impacts. Residents would be notified of upcoming construction activities and potential disruptions from either alternative.
Visual Quality	Present, Not Affected	Existing views of the project corridor would not change because wood poles would be replaced in kind and existing access roads would be improved. Views of construction work areas would be temporary with all equipment and materials removed after construction and thus, would not result in significant impacts.
Air Quality	Present, Not Affected	Temporary, localized air quality impacts from ground-disturbing activities and construction equipment could occur that would not violate air quality standards. Impacts would be similar to other BPA

Table 3-1. Resources Initially Considered for Impact Analysis

Resource	Resource Status	Resource Evaluation
		transmission line rebuild projects of similar length (BPA 2016) and thus, would not result in significant impacts.
Greenhouse Gases	Present, Not Affected	Temporary, localized emissions from construction equipment would occur. Removal of individual danger trees would likely cause an extremely small loss of greenhouse gas sequestration potential because most of the trees are currently dead or dying. Impacts would be similar to other BPA transmission line rebuild projects of similar length (BPA 2016) and thus, would not result in significant impacts.
Socioeconomic and Public Services	Present, Not Affected	Public services would not be affected in the project corridor. Most of the project corridor is uninhabited except for about eight to ten residences in line miles 2 and 3 and three to five residences near Naselle Substation. Construction workers would likely travel from their homes near the Interstate 5.
Environmental Justice	Present, Not Affected	As discussed above, the majority of the existing project corridor is uninhabited. All persons, regardless of race or income, would experience the same low impacts from either alternative. These impacts would be low because construction would be short-term with temporary inconveniences to the residences located adjacent to the project corridor.
Noise, Public Health and Safety	Present, Not Affected	Noise disturbance would be limited to general construction equipment activities, would be for a short duration, and would occur during daylight hours. Impacts would be similar to other BPA transmission line rebuild projects of similar length (BPA 2016). No hazardous conditions are known or expected and thus, would not result in significant impacts.

3.1 Affected Environment

The project corridor includes the existing transmission line right-of-way (including access roads in the right-of-way), pulling and tensioning sites, danger tree removal area adjacent to the right-of-way, substations, staging areas and helicopter landing zones, and the area within 25 feet of the centerline (for a total width of 50 feet) of access roads that extend beyond the right-of-way. Initial field surveys were conducted in spring 2018 to identify cultural resources, marbled murrelet presence and other wildlife, wetlands and noxious weeds. Additional surveys will be conducted in spring 2019 to further identify marbled murrelet presence, wetlands, special-status plant species on WDNR lands, and noxious weed occurrences.

The transmission line, located in Pacific County, begins about 1.5 miles northeast of the community of Holcomb at the Holcomb Substation and continues south for about 10.5 miles. The transmission line then travels generally west for about 7 miles before turning south for the last two miles to Naselle Substation located about one mile north of the community of Naselle (Figure 1-1). Structures 1/5 to 2/1; 4/1 to 7/1; 13/1 to 13/6; 14/5 to 14/6; 18/5 to 20/9 are located on WDNR lands (about nine miles of the transmission line). The remaining line portions are located on private forestry lands with private rural residential areas in lines mile 2 and 3 and near Naselle.

Soils and Geologic Hazards

The transmission line is located in the Willapa Hills physiographic province. Elevation ranges from about 25 feet near Naselle Substation to 1,250 feet in line miles 18 to 20. Soils are primarily silt loam that formed on steep, hilly topography. Some soils along the transmission line right-of-way are classified as prime farmland, about 15 percent primarily as forest, or farmland of statewide importance, about 33 percent primarily as forest (NRCS 2018).

On slopes less than 8 percent, soils are susceptible to slight-to-moderate levels of erosion when exposed to water or wind. Erosion hazard areas, with slopes greater than 8 percent, are susceptible to severe levels of erosion when exposed to water or wind (NRCS 2018). In general, soils in the project corridor with slight to moderate erosion hazard occur in line miles 2, 5, 11, 12, 15, and at Naselle Substation (about 18 percent). About 82 percent of soils in the project corridor have a severe erosion hazard rating (NRCS 2018).

The project corridor crosses three areas of lands mapped as mass wasting deposits in line miles 17, 18, and 19 (WDGER 2017). The transmission line and access roads cross about 27 acres of landslide deposits with six existing structures on mapped landslide deposits. While the closest earthquake fault is about 10 miles west in Willapa Bay, the project corridor is in a high shaking hazard zone (Czajkowski 2014 and WDNR 2018a). Liquefaction is a process in which loose, granular soils below the groundwater table temporarily lose strength during strong earthquake shaking. Areas of liquefaction susceptibility ratings of moderate to high are present where the transmission line crosses the Willapa River in line mile 2, the Naselle River in line miles 15 and 16, and near Naselle Substation (WDNR 2018b). In line miles 17 and 18, the liquefaction susceptibility rating is low to moderate.

Vegetation

Vegetation has been extensively modified by forest practices, road and transmission line construction and maintenance, and rural residential development. Vegetation in the project corridor includes coastal coniferous forest, mixed coniferous/deciduous forest, alder woodlands, riparian areas, wetlands, and agricultural land. Nonnative plants, including some noxious weeds, have displaced some of the native plant species that occur in the project corridor.

Kincaid's lupine (*Lupinus sulphureus ssp. kincai*dii), Nelson's checker-mallow (*Sidalcea nelsoniana*), and water howellia (*Howellia aquatilis*), all federally listed as threatened under the Endangered Species Act, have the potential to occur in Pacific and Wahkiakum counties although no designated critical habitat or suitable habitat is located in the project corridor. Queen of the forest (*Filipendula occidentalis*), pink fawn-lily (*Erythronium revolutum*), and loose-flowered blue grass (*Poa laxiflora*), classified as state sensitive species, are known to occur in and near the project corridor in or near line miles 12, 15, and 16 (WDNR 2018c). Three patches of pink fawn-lily were identified in line mile 13 during rare plant surveys.

Throughout the project corridor, many populations of noxious weeds were identified along access roads and where existing transmission structures and guy anchors are located. At these sites, ground disturbance and altered soil characteristics often create habitat that favors undesirable, often introduced plants in areas otherwise dominated by natives or innocuous weeds. The most abundant species identified was hairy (or common) catsear (*Hypochaeris radicata*), with 668 unique populations mapped in the project corridor (Turnstone 2019a). This is a Washington State Noxious Weed Control Board (WNWCB) 'C' list species. Class C status allows a county to enforce control if it is beneficial to that county (for example, to protect crops). Over 349 populations of tansy ragwort (*Senecio jacobaea*) were mapped, concentrated in grassy areas and along roads. Tansy ragwort is a WNWCB 'B' list species designated for mandatory control in regions where they are not yet widespread. Other noxious weeds identified (but not requiring control) include common St. John's wort (*Hypericum perforatum*), oxeye daisy (*Leucanthemum vulgare*), introduced thistles (*Cirsium arvense, C. vulgare*), evergreen, and Himalayan blackberry (*Rubus laciniatus, R. armeniacus*).

Water Resources, Floodplains and Fish

Surface water resources crossed by the transmission line and access roads or within 100 feet of the project corridor include Green Creek (line mile 1), Willapa River (North Fork) (line mile 2), Trap Creek (line mile 4), Alder Creek (lines mile 8, 9, and 10), Naselle River (line miles 12, 14, and 16), Salmon and Russian creeks (access road to line miles 13 and 14), Brock Creek (line mile 15), O'Conner Creek (line mile 19), Johnson Creek (line mile 21), and numerous unnamed tributaries to these waterways. Pacific County's Shoreline Master Program considers Trap Creek, Alder Creek and the Naselle River as "shorelines" and the Willapa River as a "shoreline of statewide significance." Wahkiakum County considers Salmon Creek a "shoreline."

In Pacific County, there are no Federal Emergency Management Agency (FEMA) designated 100-year floodplains or county designated frequently flooded areas located in the project corridor. Generally, FEMA defines the areas of Pacific County crossed by the project corridor as Zone X (areas of minimal flood hazard). In Wahkiakum County, FEMA has designated a 100-year floodplain along Salmon Creek.

The reach of the Willapa River crossed by line mile 2 is listed for temperature on Washington Department of Ecology's (Ecology) 303(d) list. The Willapa River Watershed has a temperature total maximum daily load (TMDL) plan being implemented to meet state water quality standards for temperature (Ecology 2018a). Trap Creek has a 303(d) reach also listed for temperature, included as part of the Willapa River Watershed plan, about 0.8 miles downstream and east of the project corridor (Ecology 2018b).

The closest groundwater wellhead protection areas are about 2 miles southeast of Holcomb Substation and the project corridor. The closest domestic water well is about 1090 feet northwest of line mile 2. A community drinking water protection area that serves residents in Naselle is crossed by the transmission line in miles 18 and 19. The protection area water sources are Lane and O'Connor creeks; the headwaters of O'Connor Creek also cross line miles 18 and 19.

Anadromous fish spawning or rearing habitat for Lower Columbia River coho salmon (*Oncorhynchus kisutch*), Lower Columbia River fall-run chinook salmon (*Oncorhynchus tshawytscha*), and Lower Columbia River winter-run steelhead (*Oncorhynchus Mykiss*) has been identified in Green Creek, Willapa River, Trap Creek, Alder Creek, Naselle River, Salmon Creek, Russian Creek, Brock Creek, Johnson Creek, and in some of the unnamed tributaries crossed by the project corridor. Bull trout habitat is also present where the transmission line crosses the Willapa River in line mile 2.

Wetlands

Twenty-three wetland areas were delineated in the project corridor (Turnstone 2019b). Because the development of tall woody vegetation is prevented in the transmission line right-of-way, the vegetation is managed as low growing. There are no forested wetlands present in the project corridor.

Typical wetland and riparian areas among the Willapa Hills are vegetated with native plants including soft rush (*Juncus effusus*), small-fruited bulrush (*Scirpus microcarpus*), lady fern (*Athyrium filix-femina*), skunk cabbage (*Lysichiton americanus*), nodding semaphore grass (*Pleuropogon refractus*) and a mix ofnon-native pasture grasses. Shrubby wetlands contain native shrubs, including willows (*Salix sitchensis, S. scouleriana & S. hookeriana*), red-osier dogwood (*Cornus sericea*) and salmonberry (*Rubus* *spectabilis*). Valley-bottom wetlands encountered in the project corridor are most often dominated by a dense growth of reed canarygrass (*Phalaris arundinacea*) along with pasture grasses and Douglas-spiraea (*Spirea douglasii*).

Wildlife

Wildlife habitat in the project corridor is generally lower-quality with low species variability and limited structural complexity consisting primarily of young coniferous, young regeneration, and recently harvested forest, as well as developed areas, where non-native species are abundant. Some priority habitats of unique value to wildlife species, such as riparian areas and mature conifer forest, are present, while others, such as old-growth forest and wet meadow, are rare. Other habitat types of varying condition include mixed coniferous/deciduous and deciduous forests.

Marbled murrelet (*Brachyramphus marmoratus*) is a federally-threatened bird under the Endangered Species Act; therefore, the main effects analysis has been documented through the preparation of a Biological Assessment and consultation with the USFWS. The seabird nests in mature forest stands within 50 miles of the coast and is known to occur in occupied habitat in line mile 13. Other suitable habitat is located along line miles 4, 5, 6, and 14. There is also designated critical habitat that crosses the right-of-way in these areas.

During the summer breeding period in Washington State (April 1 through September 23), murrelets fly inland from the coast and back and forth several times a day to fish in the ocean, often using waterways as flight corridors to nesting areas. Murrelets utilize nesting "platforms" present in live conifer trees to lay eggs. A murrelet nesting platform can be described as a fairly level surface at least 4 inches in diameter located at least 33 feet above the forest floor in the live branches of a conifer tree (Evans Mack et al. 2003). Nesting platforms can be composed of a wide bare branch, a branch covered in moss or lichen, or a suitably flat tree deformity (Evans Mack et al. 2003). Other important characteristics of the nesting platform are vertical and horizontal cover and substrate. Commonly, nest sites have platforms that are protected from above by tree branches (vertically covered) and/or protected by tree branches from the sides (horizontally covered). The presence of potential nesting platforms as an indicator of potentially suitable murrelet habitat has been determined to be more important than the size of nesting trees.

Year one of marbled murrelet surveys to assess the current occupancy status in line miles 4, 5, 6, and 14 was conducted in 2018; murrelet presence or occupied behavior was not observed (Turnstone 2019c). Year two surveys will be conducted in 2019. Murrelet presence is assumed in occupied habitat in line mile 13.

Northern spotted owl (*Strix occidentalis caurina*), streaked horned lark (*Eremophila alpestris strigata*) and yellow-billed cuckoo (*Coccyzus americanus*), all federally listed as threatened, have the potential to occur in the project corridor. State listed species with the potential to occur include Dunn's salamander (*Plethodon dunni*), Van Dyke's salamander (*Plethodon vandykei*), western toad (*Anaxyrus boreas*), golden eagle (*Aquila chrys*aetos), Vaux's swift (*Chaetura vauxi*), pileated woodpecker (*Dryocopus pileatus*), and Townsend's big-eared bat (*Corynorhinus townsendii*).

Cultural Resources

A cultural resources inventory, consisting of background research and field surveys, was conducted within the transmission line right-of-way, access roads and all other areas of the project corridor (AECOM 2019). Based on the results of the background research, one previously recorded archaeological site and two historic built environment resources were documented. The field survey identified the following six cultural resources:

- A previously recorded archaeological site, 45PC247, is a precontact camp that may be eligible for listing in the National Register of Historic Places (National Register). Although the site has not been formally evaluated, it is recommended as unevaluated and potentially eligible for listing.
- Two newly recorded isolated finds are precontact-period resources each consisting of a single lithic flake artifact. The isolated finds do not have the qualities required for listing in the National Register and are recommended as not eligible for listing.
- Three built environment resources include the previously recorded Holcomb and Naselle substations, and the newly recorded Holcomb-Naselle transmission line.

Also noted during the survey were 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.

Historic resources evaluation also included assessing the National Register-eligibility of the Holcomb-Naselle transmission line and a re-assessment of the National Register-eligibility of the Holcomb and Naselle substations. The transmission line is recommended as eligible to the National Register for its association with rural electrification and as a representative example of BPA's post World War II transmission line development and system expansion. The Holcomb and Naselle substations do not meet the registration requirements for listing in the National Register as significant elements of the BPA Transmission Network and have been determined not eligible for listing.

3.2 Environmental Consequences

3.2.1 Soils and Geologic Hazards

Proposed Action

Impacts on soils would occur from re-auguring structure holes; construction of landings; removal of vegetation; temporary soil piling; compaction or rutting from heavy equipment; spreading of excess soils around the base of the structure; 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 that has been cleared of vegetation would be susceptible to erosion and establishment of invasive plants (Section 3.2.2). The erosion potential for disturbed soils would be greatest during and immediately after construction before disturbance areas are revegetated. 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 corridor likely occurred when the line and roads were constructed and trees were removed. Soils have likely recovered adjacent to these facilities since 1949 and also would recover from the proposed project as vegetation becomes reestablished, organic matter is naturally added over time, and the soils' capacity to absorb water is regained.

At structure sites, replacement of 114 structures and use of construction equipment would temporarily disturb about 57 acres of soils. In sensitive habitats, such as wetlands, the disturbance area could be reduced by using temporary equipment mats to provide ground stabilization under the weight of large construction equipment (Section 3.2.4). To minimize soil disturbance, existing structure holes would be re-augered where possible except for structures 10/1 and 17/4. These two structures would require new holes although both locations are within existing roads in previously disturbed areas. 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 about 15 by 15 feet (0.005 acre) would be permanently disturbed at structures without guy wires (total of about 0.7 acre) and about 30 by 50 feet (0.03 acre) with guy wires (total of about 1 acre). Excess soil removed during plate anchor installation also would be spread around the structure site.

Landings at structures would permanently compact a total of about 1 acre of soil because these areas would be reused during line maintenance activities. Prompt mulching and seeding of exposed soils would help reduce the potential for erosion from disturbed sites. Until vegetation becomes reestablished, soil erosion could occur; however, once vegetation is established erosion would be unlikely. With the use of BMPs (Table 2-3) and conducting peak construction work during the dry season, impacts from structure replacement and landing construction would be **low** due to the small acreage affected.

As discussed in Section 2, the wood preservative PCP would be used to treat the wood poles for the transmission structures to lessen wood rot and extend the life of the poles. PCP contains chlorinated dibenzodioxins and chlorinated dibenzofurans that have the potential to leach into adjacent soils or water (such as in a wetland). PCP can move through the pole and leach from the bottom of the pole into the soil near the underground portion of the pole (EPA 2008). PCP tends to move through the pole rapidly for the first few years of use, and then becomes relatively constant with time (EPA 2008). PCP also tends to rapidly degrade in the environment, and concentrations decrease rapidly with distance by as much as two orders of magnitude between 3 and 8 inches from the wood pole, but that migration is dependent on localized factors such as soil type, soil chemistry, local weather and topography, initial level of pole treatment, and age of pole (EPRI 1995 or 1997). Pole wraps would be used on structures located within 50 feet of wetlands and streams or floodplains to contain PCP and help prevent it from leaching into surrounding soils (Section 3.2.3). Because the closest drinking water well is about 1090 feet from line mile 2, these poles would not require wraps. Structure 19/1, nearest to O'Connor Creek and in the Naselle community drinking water protection area, would not be replaced.

Improvement of about 11 miles of the existing access road system would disturb soils. Reconstruction of the u-shaped turn in line mile 9 would permanently impact about 1 acre from construction of the cut and fill slopes and would impact about 1 acre temporarily. The 1 acre temporarily disturbed around the perimeter of the widening work would be stabilized with BMPs and vegetation would be allowed to regrow. Except for this area, work 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 work would occur during the dry season and would include installing water bars and drain dips, and new gravel surfacing. All of these features are designed to reduce erosion and minimize impacts on soil and adjacent water bodies. Additionally, erosion and sediment control measures would be installed prior to and used during road work but there would still be a **low** risk of erosion on slopes 8 percent or less and a **moderate** risk of erosion on slopes greater than 8 percent.

About 1.2 miles of road improvement work in landslide hazard areas could increase the risk of landslides in line miles 17, 18 and 19. However, BPA would follow geotechnical BMPs and would repair slumps during construction to avoid overburdening unstable areas. Therefore, there is a **low** risk for landslides to occur from access road improvement. If an earthquake occurs, structures 2/2 and 2/3 on either side of the Willapa River are likely to survive settlement from liquefaction with only minor structural damage. Transmission structures are designed to withstand some level of movement. The same is true for structures near the Naselle River in line miles 15 and 16 and near Naselle Substation.

Soil compaction could occur where staging areas and pulling/tensioning sites are located. The staging area near Naselle Substation would be located in an existing quarry so soils are either disturbed or previously compacted. Compaction would likely occur in the Holcomb Substation staging area from placement of plastic ground cover and concrete blocks to keep wood poles off the ground. Soil disturbance and compaction also would occur within 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 and pulling and tensioning.

Impacts from danger tree removal could include soil erosion and dust generation. Stumps would be left in place to minimize impacts on soils. However, impacts would be **low** with the use of BMPs (Table 2.3) and because they would be short-term, in a relatively small area, and adjacent vegetation would be left in place.

Impacts After Mitigation

Mitigations measures and BMPs listed in Table 2-3 would be used to reduce or avoid impacts. Impacts remaining after mitigation would include soil compaction and reduced soil productivity around structures and along access roads and soil erosion in areas with steep slopes.

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 construction would not occur. 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 the transmission line 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** for planned activities during the dry-season work; however, should work occur during the wet season under emergency conditions, impacts would be **moderate**.

3.2.2 Vegetation

Proposed Action

Transmission line structure replacement would require clearing and crushing of vegetation causing damage to plants, including some plant roots. Compaction of soils by heavy equipment, installation of plate anchors and counterpoise through excavation and trenching also would disturb plant roots. The extent of impacts at each structure site would depend on the quality of existing vegetation, the size of the disturbance area, soils, and topography.

At structure sites, vegetation in the 0.5 acre temporary disturbance area would be disturbed (about 80 acres total). In the transmission line right-of-way, vegetation consists primarily of low-growing salal, Oregon grape, and weed species with a few transmission structures located in agricultural areas. Impacts would be temporary and **low** because these shrub species would be expected to eventually recolonize disturbed areas at structure sites. Impacts on areas immediately adjacent to the wood poles would be **moderate** because the spreading of subsoils in these areas would likely prevent the regrowth of native vegetation.

At pulling and tensioning sites, vegetation would be crushed or removed to create a level site to set up equipment (about 9 acres would be temporarily disturbed). Impacts would be **low** because vegetation would eventually regrow.

Access road improvements along 11 miles of roads would impact some vegetation. There would be some trimming or removal of roadside woody vegetation, mainly shrubs with approximately eight trees removed in line mile 5. Grading of the road shoulder also would remove some herbaceous species. Impacts would be temporary to low-growing species because roadside vegetation would be expected to recover along access roads. Access road improvements would cause **low** impacts because most work would occur in the existing access road prism and vegetation on the shoulder and along the roads would only be temporarily removed and vegetation would regrow along roads.

Access road reconstruction of 90 feet of existing access road would remove vegetation along the sides of the road. The area impacted would depend on the width of the strip of vegetation affected, but disturbance could extend up to 10 feet on each side of the road, for a total width of 20 feet (about 0.04 acres of vegetation removed). About 1 acre of vegetation (about 97 trees from 4 to 8 inches in diameter consisting of Douglas fir and red alder) would be permanently removed in the reconstructed u-shaped turn in line mile 9 where cut and fill slopes would be constructed. Impacts would be permanent and **moderate** because vegetation would not be expected to reestablish in these areas. In the outer 1 acre temporary disturbance area, vegetation would be allowed to regrow so impacts would be **moderate**.

Culvert replacement and installation in wetter areas along access roads would cause **low-to-moderate** impacts on vegetation depending on species disturbed. Impacts on wetland plant communities are discussed in Section 3.2.4, Wetlands.

About 415 danger trees would be removed along the 21-mile long right-of-way during construction (about 198 are located on WDNR lands). This is about 19 trees per line mile with the majority in line miles 1, 4, 18, 20, and 21. Tree removal also would occur at the structure 1/2 pulling and tensioning site and along an access road in line mile 5. While almost all tree removal would require single tree removal rather than removal of groups of trees (except for the pulling site at structure 1/2 and the reconstructed u-shaped turn in line mile 9), removal would open up small forested areas to light, making these areas more vulnerable to invasion by weed species, many of which require sunlit areas to grow. Native understory plants that tend to grow in the shade may not grow as well in these forest openings as well. However, because so few trees would be removed, trees would be allowed to regrow, and the potential for increased weeds and decreased understory plants would be slight, impacts would be **low**.

Installation of the Holcomb staging area, helicopter landing zones, two fiber vaults, three wood poles for fiber, and two gates would disturb or remove vegetation. These impacts would be **low** because while a small amount of vegetation would be disturbed, the activities would occur in close proximity to previously disturbed areas such as access roads, substations and previously cleared areas.

Special-status Plant Species

State sensitive plant populations could be present during the construction season, either in vegetative form, blooming, or fruiting and, therefore, vulnerable to disturbance. Three patches of pink fawn-lily, found in near structures 13/2 and 13/5, would be avoided resulting in **no** impact.

Weeds

During and after construction, existing noxious weed populations could spread and colonize disturbed areas. Construction equipment, vehicles, workers, and materials contaminated with seeds, roots, and other weed parts could spread weeds from one work area to another. Bare, disturbed, and compacted soils are vulnerable to weed invasion through natural dispersal, such as wind-blown seeds. Weeds could displace native plants, reducing biodiversity and degrading vegetative communities, whether natural or managed. Impacts from noxious weed spread would be **low** with use of BMPs.

Impacts After Mitigation

Mitigations measures and BMPs listed in Table 2-3 would be used to reduce or avoid impacts on vegetation. Danger tree removal would occur in areas of predominantly native plant communities, resulting in the slight loss of habitat although trees would be allowed to regrow. Long-term soil compaction with reduced soil productivity around structures and along access roads would make it difficult for native species to recover in those areas. Noxious weeds present in the project corridor could spread into areas not currently infested.

No Action Alternative

Under the No Action Alternative, the existing transmission line would not be rebuilt. However, maintenance activities would likely increase as existing structures deteriorate and more structure repair and replacement could be required. Maintenance of access roads would continue to occur. Emergency repair activities requiring unplanned movement of vehicles through existing noxious weed infestations, could potentially allow the spread of noxious weeds. Emergency maintenance during the wet season could also limit the ability to avoid sensitive plant species or sensitive habitats. These activities would continue to result in **low-to-moderate** impacts from localized vegetation disturbance and danger tree removal.

3.2.3 Water Resources, Floodplains, and Fish

Proposed Action

Streams

Vegetation and soil disturbance from structure work could increase the rates of wind and water erosion, resulting in sediment deposition into streams, degrading water quality. Under the Proposed Action, 12 structure work areas would be located within 100 feet of streams (the closest is 50 feet). Six of these structures (8/7, 10/1, 10/3, 12/7, 14/6 and 16/1) are located in the 200 foot shoreline areas of Alder Creek and the Naselle River. All structures (except 10/1 and 17/4) would be replaced in the same general location in already disturbed areas so no new permanent disturbance would occur near streams. Structure 10/1 currently is about 123 feet from Alder Creek but after relocation would be about 194 feet from the creek (still within the shoreline area). As stated above, structure 19/1 near O'Connor Creek would not be replaced. Each structure would have a small area of exposed soils for a few weeks that is unlikely to be a substantial source of sediment to nearby streams. Vegetative buffers between the structures and the structure work areas would help absorb and sediments dispersed from work areas. Most construction work would occur during the dry season, which would reduce the potential for runoff and erosion. Soil excavated from structure holes that would not be used to backfill the hole would be disposed of offsite or in upland areas away from streams depending on the location of the structure.

PCP from wood poles could possibly reach receiving surface streams although PCP concentrations decrease rapidly with distance and none of the structures would intersect surface water in the project corridor. Structure 21/8 is closest to water at about 35 feet from an unnamed tributary and pond to Johnson Creek. As described above, pole wraps would be used on structures located within 50 feet of wetlands, streams or floodplains. Additionally, materials storage/temporary staging areas where PCP-treated wood poles would be temporarily stored would be located on existing level, cleared upland sites with runoff containment, such that potential impacts from PCP-treated wood poles would be **low**. The proposed staging area near Holcomb Substation is a cleared agricultural field about 65 feet from Rue Creek (a fish-bearing stream). The proposed staging area near the Naselle end of the line is a cleared of vegetation, rock quarry about 0.1 mile from an unnamed stream.

Road widening in the line mile 9 turn would occur within about 100 feet of a tributary to Alder Creek. About 0.2 miles of road improvement would occur within the shoreline designations of Alder Creek and the Naselle River. The amount of fine sediment introduced to streams during widening, grading and gravelling of access roads would be similar to natural erosion processes because work would occur during the dry season. There would be little or no flowing water on road surfaces and temporarily disturbed soils would be mulched and reseeded to minimize erosion.

Culvert replacement or installation would occur in 15 streams. Replacement would occur in already disturbed areas so there would be no new permanent disturbance areas near these streams. Three new culverts would be installed in intermittent, non-fish bearing streams. All but two of the 12 culvert replacements also would be in intermittent, non-fish bearing streams. The remaining two culvert replacements would occur in fish-bearing streams (in unnamed tributaries to Trap Creek) in line mile 4. One culvert replacement would occur in the headwaters of O'Connor Creek. Replacement and installation work would occur within the in-stream work window if water is present and BMPs would be used to prevent sediment movement downstream (Table 2-3). Because erosion and sediment control BMPs would be used during all road work including near or in streams and disturbed areas would be mulched and seeded to facilitate restoration, impacts on water resources including Naselle's community drinking water protection area would be **low**.

If construction extends into the wet season, traffic on gravel roads has the largest potential to deliver sediment to stream channels. About 2.8 miles of direction of travel road use would occur in these shoreline designations plus those along the Willapa River and Salmon Creek; no road improvement would occur for direction of travel roads. Because BMPs would be used to minimize sediment runoff to streams, travel on roads would result in a **low** impact on water resources.

Removal of danger trees from the project corridor could reduce stream shading but is unlikely to cause a detectable increase in water temperature; about 10 individual trees would be removed within 50 feet of streams, distributed among 6 different streams throughout the length of the project corridor. Some of the trees proposed for removal at the pulling and tensioning site at structure 1/2 would be within 100 feet of Green Creek. Because they are small, these trees likely do not provide shade to the creek. At the Willapa River crossing, where a temperature TMDL plan is being implemented, the closest danger tree proposed for removal is over 1000 feet away. Because there would be very little tree removal near streams, impacts from danger tree removal to water quality from an increase in water temperature would be **low**.

Groundwater

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 be temporary in small construction areas spread over a wide geographic area. Potential impacts on groundwater quality during construction and over the long term from the accidental release of hazardous chemicals used during construction (e.g., fuels, lubricants, solvents, etc.); the removal of existing creosote-treated wood poles and creosote-contaminated soil excavated from existing structure holes; and leaching of PCP from new PCP-treated wood poles into groundwater could occur. Mitigation measures would be used to minimize the spread of PCPs and petroleum products, including proper handling and disposal of creosote-treated wood poles and creosote-contaminated soils; spill prevention, containment, and cleanup; and wood-pole storage methods to minimize the risk to groundwater from the accidental release of hazardous chemicals. However, any spills that would 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 (Table 2-3) would be used to minimize the risk to groundwater quality from the accidental release of PCPs and petroleum products, impacts would be **low**.

Floodplains

Structure work would not occur in floodplains. While the transmission line right-of-way is already cleared where it crosses floodplains, five danger trees would be removed along the edge of Green Creek's floodplain in line mile 1 and three danger trees would be removed along the edge of an unnamed stream's floodplain in line mile 21. Five existing bridges on direction of travel roads cross the floodplains of Green Creek, Alder Creek, Naselle River (2 times), and Salmon Creek. Since no trees would be removed and no new structures or roads would be constructed in floodplains, floodway storage capabilities would be unchanged, resulting in **none-to-low** impacts.

Fish

Replacement of the fish-bearing stream culverts in line mile 4 would maintain or improve fish passage and fish access to upstream aquatic habitats. Increases in stream water temperatures could temporarily result from shrubby vegetation removal within the culvert footprints although no trees would be removed. Vegetation, including shrubby species, is expected to regrow quickly.

As described above, conducting work during in-water work windows would limit impacts on fish. Site isolation to minimize the downstream transport of turbid water would be required in the unnamed tributaries to Trap Creek in line mile 4, if there is flowing water present at the time of construction. BMPs including erosion and sediment control measures at these work areas would contain overland flow and typically prevent sediment from entering fish habitat, minimizing temporary impacts from construction activities. If sediments reach fish habitat, sediment inputs are expected to be a small pulse and temporary in duration. The aquatic noise and vibration disturbance generated by the removal and replacement of structures within 100 feet of fish-bearing streams would not be expected to exceed background ambient underwater noise levels. If fish are temporarily displaced from waters near construction work areas due to noise and activity, they would be expected to return once the work in that area ceases. BMPs and mitigation measures (Table 2-3) would be used, including setback distances for fueling and staging areas from water bodies to minimize spills.

Overall, because the two culvert replacements in fish-bearing streams would not permanently remove or degrade fish habitat and would not harm any fish present with BMPs and mitigation measures implemented, impacts would be **low**.

Bull Trout

Vegetation removal or structure replacement would not occur within 300 feet of the Willapa River where bull trout habitat may be present; therefore there would be **no-to-low** impact. Additionally, there are no roads between structures 2/2 and 2/3 where the Willapa River is located.

Endangered Species Act-Listed Salmon

The unnamed tributaries to Trap Creek where culverts would be replaced may contain habitat for salmon. As described above, use of BMPs during culvert installation work would result in a **low** impact on listed salmon.

Impacts After Mitigation

Mitigations measures and BMPs listed in Table 2-3 would be used to reduce or avoid impacts. Transport of sediment to streams could result in the temporary degradation of water quality.

No Action Alternative

Since there would be no planned construction, BPA would continue to maintain the transmission line and access roads. Initially, impacts on waters resources and fish would be the same as existing conditions, with **no** or **low** impact. Undersized and/or damaged culverts would remain as is possibly impeding fish passage. As existing structures and access roads continue to deteriorate, and emergency structure repair and replacement is required, impacts could occur. Emergency repairs in areas of or during 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 the emergency repairs required, the No Action Alternative could result in **low-to-moderate** impacts depending on the timing and location.

3.2.4 Wetlands

Proposed Action

Structures 2/4, 2/6, and 21/10 would be replaced in wetlands. The portion of the poles below the ground surface would have pole wraps and be enclosed in a 4-foot diameter vertical corrugated metal pipe backfilled with crushed rock to eliminate movement of preservative from the treated wood into the wetland. Structure 2/7 is located in a wetland but would not be replaced. Existing permanent impacts at these structures would not increase; no new fill would be placed in wetlands. Wetland mats would be used to lessen impacts on wetland soils and vegetation during structure work. Six structures (2/5, 2/10, 7/7, 10/1, 18/4, and 21/9) would be replaced within 100 feet of wetlands. Native and non-native wetland vegetation would be temporarily disturbed during construction at structures in or near wetlands (about 5 acres of temporary disturbance). Work areas would be marked in the field to restrict vehicles and equipment access to designated routes and areas to minimize impacts. Using BMPs (Table 2-3) would restore temporarily disturbed areas. Impacts would be **low**.

Road improvement in wetlands would occur along six sections of access road. Four other existing road sections are located adjacent to wetlands. Although improvement would not include road widening, temporary impacts would occur from removal of vegetation along roads distributed across 10 wetlands. One new culvert would be placed in a wetland in line mile 1 to provide drainage under an existing road. The existing wetland may have developed in the roadbed from compaction and poor drainage. Because road improvement work would be in the existing road prisms including the culvert installation, impacts would be **low**. The 90 feet of access road reconstruction would not occur within 100 feet of wetlands, resulting in **no** impacts on wetlands.

One pulling and tensioning site would be partially located in a wetland at structure 21/10. Wooden mats would be used to minimize impacts on wetland vegetation. Construction would temporarily disturb wetland vegetation (e.g., crushing of vegetation and soil compaction from heavy construction equipment). All temporary disturbance areas in wetlands would be reseeded with an appropriate native seed mix and BPA would monitor these areas for adequate growth and implement contingency measures as necessary. BPA would monitor revegetation until uniform perennial vegetation provides 70 percent or more of the density of coverage that was provided prior to earth-disturbing activities. Because wetland functions are expected to return to pre-construction conditions after construction and restoration, impacts would be **low**.

Three danger trees would be removed within 50 feet of two wetlands in line miles 2 and 21, although none would be removed in a wetland. The trees do not provide shade or other functions such as water filtration or storage but may provide perching or nesting habitat for wildlife species that use the wetland. Because the removal of trees would not remove or degrade wetlands, but could affect species that visit the wetland, impacts would be **low**.

Impacts After Mitigation

Mitigations measures and BMPs listed in Table 2-3 would be used to reduce or avoid impacts.

No Action Alternative

Under the No Action Alternative, existing structures and some access roads would continue to deteriorate requiring structure replacement and road improvement. However, with only four structures and portions of six access roads located in wetlands, impacts from emergency or planned maintenance activities would be **low**.

3.2.5 Wildlife

Proposed Action

Impacts from vegetation clearing/disturbance and access road work could cause incidental injury or mortality to wildlife or temporarily displace them from habitat areas. Danger tree removal and vegetation clearing could affect common wildlife species in areas where ongoing periodic vegetation management activities occur along the transmission line right-of-way. Wildlife, especially nesting birds, could be temporarily displaced by the removal of danger trees. Danger tree removal would be avoided between April 1 and September 23 to minimize displacement of nesting birds and to avoid injuring bat individuals in trees that contain cavities or other features that could support bat colonies. Species displaced would be anticipated to find habitat in adjacent forested areas. It is unlikely that nesting habitat is limited by the availability of suitable trees for use as roosts, perches, nests, or foraging locations in adjacent forested areas. Since danger tree removal also would occur at the edge of one existing road and transmission line right-of-way and would be a relatively small amount compared to existing surrounding habitat, impacts would be **low**.

Degradation of wildlife habitat would occur temporarily where vegetation is removed and could occur if invasive plants establish themselves in areas disturbed by construction activities. Non-native plants provide poor forage for grazing animals, and impenetrable thickets of weed species can impede wildlife movement. Weed control activities may be conducted during construction in order to avoid degradation of habitat below existing conditions. Therefore, impacts on wildlife species from degradation of habitat would be **low** with the use of appropriate weed control measures.

Impacts on wildlife from noise and construction activities would vary depending on the proximity to wildlife and the duration of the noise and activity. Increased noise from heavy equipment during construction and the transportation of equipment to and between sites would temporarily exceed ambient noise levels potentially displacing wildlife. Because noise and activity levels would be temporary and wildlife would be expected to return after construction is complete, impacts would be **low**.

Bird collisions with conductors could occur; conductor spacing on 115-kV transmission lines is wide enough that electrocution of raptors and large birds is rare. Bird-conductor collisions are more likely in areas where the line crosses rivers or ridges that can be flyways for birds. To reduce the potential for collision, bird flight diverters would be placed on the conductors in eight locations along the transmission line to make them more visible to birds and lessen the risk of potential collisions. The bird flight diverters would be placed on the two outside conductors (there are three on this line) spaced 30 feet apart and offset from each other. Since the existing line does not have bird diverters, placement of the diverters would help reduce the current potential for avian collisions; a beneficial impact.

Overall, impacts on common wildlife species would be **low** because most of the species are highly mobile and would avoid temporary construction disturbance. Incidental mortality is not expected to affect regional population levels and habitat changes would be minimal when compared to the current land uses in the habitat adjacent to the transmission right-of-way and access roads. The spread of noxious weeds would be minimized though mitigation measures and the installation of bird flight diverters would reduce the risk of collision with conductors.

State Listed Species

Occurrences of Dunn's salamander and Van Dyke's salamander have been identified along Trap Creek about 0.2 mile southwest of line mile 5. However, all construction work would occur in the cleared transmission line right-of-way and along existing roads. Riparian areas crossed by the right-of-way and roads are cleared of all tall growing vegetation so impacts on heavily forested stream borders, rocky seeps and wet talus slopes where the salamanders may be present would be **none-to-low**.

Western toad utilizes various habitats around ponds and slow-moving rivers and streams. Installation of new culverts would disturb stream banks along roads. Because the streams where work would occur are intermittent, work would occur in the dry season, and the western toad would likely not be present or would be temporarily displaced; impacts would be **low**.

The closest bald eagle nest is along the Willapa River about 1.2 miles northwest of line mile 2. Construction activities and danger tree removal would not be visible from the nest and would be outside the recommended 660 feet nest disturbance buffer. Helicopter use also would be outside the 1,000 feet nest disturbance guideline for operating aircraft. Additionally, bird flight diverters would be installed on the transmission line span across the Willapa River in the event eagles use the river area to fly between the nest and foraging areas and roost sites. Since construction activities and danger tree removal would be outside the recommended 660 feet nest disturbance buffer, impacts would be **none-to-low**.

There are no known occurrences of golden eagles, Vaux's swifts, and pileated woodpeckers in the project corridor. While there are known occurrences of these species within 5 miles of the project, work would not occur in old-growth forest or rocky cliffs and only individual danger trees would be removed in second growth forest along the right-of-way. No known occurrences of Townsend's big-eared bats have been found within 5 miles of the project corridor. If pileated woodpeckers forage along the corridor, they would be temporarily displaced by construction noise and activity, a **low** impact.

Federally Listed Species

Marbled Murrelet

Marbled murrelet, assumed present in occupied habitat (line mile 13) and potentially present in suitable habitat (line miles 4, 5, 6, and 14), could be disturbed by construction during the nesting season (April 1 through September 23). Access road work and landing construction would occur July through October 2020 with transmission line work occurring July 2020 through May 2021. Both activities would overlap the nesting season for 3 months between July and September 23, 2020 and 2 months in April and May of 2021.

Construction activities including road maintenance, danger tree removal, hauling wood pole structures, and the use of helicopters, chainsaws, and heavy equipment within 0.25 miles of marbled murrelet nests could elevate noise above ambient levels and potentially disrupt normal nesting behaviors. Normal murrelet nesting behaviors can be disrupted by loud noises that occur in close proximity to an active nest or when the activity occurs in the line-of-sight of a nesting murrelet. Activities within 100 yards of an active nest or unsurveyed but likely to be occupied nesting habitat could lead to the disruption of nesting.

Potential murrelet responses to disturbance include delay or avoidance of nest establishment, flushing of an adult from a nest or branch in nesting habitat, aborted eggs or delayed feeding of juveniles, or increased vigilance/alert behaviors of adults and chicks at nest sites with implications for reduced individual fitness and reduced nesting success. These behavioral disruptions create a likelihood of injury by increasing the risk of predation, and by reducing the fitness of nestlings from missed feedings. Noise and visual disturbance would not always result in direct nest failure, but such disturbance creates a likelihood of injury due to an increased risk of predation or reduced fitness of both adults and young.

Not all work would cause disturbance to marbled murrelet throughout the entire project corridor during construction, so each individual location would likely be exposed to less than 3 months of disturbance. Additionally, because construction is expected to move through any one potential habitat area at a moderate pace, disturbing marbled murrelets for less than five days, impacts would temporary but **low-to-moderate**.

Approximately 66 danger trees would be removed in marbled murrelet habitat. Trees range from 11 to 38-inches in diameter and include Douglas fir, western hemlock, Sitka spruce, and red alder. All trees proposed for removal have some characteristic (a dead top, are forked, are leaning, or are diseased) that makes them susceptible to fall into the conductor or grow too close to the conductor. Additionally, these trees either have no marbled murrelet nesting platforms or do not have potential structure for nesting platforms. Danger tree removal and tree removal at structure 1/2 and along the access road in line mile 5 would occur after the marbled murrelet nesting period ends on September 23 so impacts would be **low** from clearing.

Northern Spotted Owl

Two northern spotted owl management circles are located along the east side of the project corridor in line miles 6 to 7 and 9 to 12 (crosses through the western edge of the circle). Both nest trees are greater than 0.25 miles from the project corridor (closest nest tree is about 2 miles east). Although nesting northern spotted owl and their young are generally limited to the immediate vicinity of the nest, continuous loud activities within 0.25 mile of the nest during the critical breeding period (March 1 to July 15) would disturb natural behavior. Forested habitat near the project corridor is mostly unsuitable or dispersal habitat and may not contain enough suitable nesting, roosting and foraging habitat. At least

40 percent suitable habitat is needed within a northern spotted owl home range (a 3.6-mile wide circle) to support either a nesting pair or resident single northern spotted owl.

It is possible that project activities could result in short-term disturbance to spotted owls that may be moving through the project corridor. Such flush responses that occur away from an active nest site are considered to be insignificant, because the owls are simply moving away from a source of disturbance, rather than being forced to flush away from an active nest site. Potential impacts on spotted owls from heavy equipment noise and activity (e.g., disruption of nesting behavior) would be **low**.

Streaked Horned Lark and Yellow-billed Cuckoo

Suitable habitat for streaked horned lark and yellow-billed cuckoo may occur in the project corridor in riparian areas. Because trees would not be removed in riparian areas, there would be **no** impact.

<u>Impacts After Mitigation</u>

Mitigations measures and BMPs listed in Table 2-3 would be used to lessen impacts. Listed species could be temporarily displaced from some of their normal foraging areas by construction noise and activity. Tree removal would remove some habitat that could be used wildlife. Also there is still the potential for avian collisions with the conductor in areas where bird flight diverters were not installed.

No Action Alternative

Under the No Action Alternative, reconstruction of the existing transmission line would not occur and maintenance activities would continue. Depending on the timing of normal or emergency activities, vegetation removal could result in the mortality or disruption of nesting birds or construction noise could disturb wildlife such as marbled murrelet during critical periods (such as nesting/breeding). Overall, depending on the nature of the emergency repairs required, the No Action Alternative could result in **low-to-moderate** impact depending on timing or location.

3.2.6 Cultural Resources

Proposed Action

Rebuilding the transmission line would not adversely affect the characteristics that make the transmission line eligible for listing in the National Register of Historic Places. The replacement structures would be the same as the existing structures and the transmission line would retain its current alignment. Because the material type and pole design of the structures would remain the same and because the alignment and function would be unchanged, the transmission line’s visual uniformity would remain and the integrity of the transmission line would remain intact, resulting in **no** impact.

Holcomb and Naselle Substations have also been determined ineligible for listing to the National Register so replacing a structure in Holcomb Substation and equipment in Naselle Substation would have **no** effect on cultural resources.

Cultural site 45PC247 is located in and around an existing structure and has been disturbed by the previous construction and maintenance of the line. The existing structure is not proposed for replacement and access road work would not occur in the site boundaries. To prevent temporary disturbance to the site, all vehicles and equipment would be parked outside the site boundary east of the structure. Site boundaries would be marked for avoidance prior to construction and the right-of-way would be blocked by flagging to prevent disturbance to the site. Impacts on this site would be **none-to-low** with cultural monitoring during construction to ensure implementation of avoidance measures.

One isolate was found in the middle of an approximate 440 foot span between two structures where no construction activities would occur. The second isolate was found about 28 feet from a structure proposed for replacement and where access road work would occur. Because the isolates are recommended as not eligible for listing, there would be **no** impact on cultural resources.

Construction activities could result in disturbance to unknown cultural resources through accidental discovery depending on the extent of the resources and their proximity to structures and access roads. Use of mitigation measures (Table 2-3) would ensure that any previously undiscovered resources found would be managed properly and would minimize any inadvertent disturbance or destruction of cultural resources from the Proposed Action.

Impacts After Mitigation

Mitigation measures and BMPs listed in Table 2-3 would be used to reduce or avoid impacts. As described above, unknown cultural resources could be disturbed during construction.

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.

3.3 Cumulative Impacts

Cumulative impacts are the effect on the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal), organization, or person undertakes such other actions (40 CFR 1508.7). Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. The effects of past actions in the vicinity of the Proposed Action are considered to form a part of the affected environment baseline for each resource. Past actions that have adversely affected natural and human resources in the project corridor include construction and maintenance of the existing transmission system, silvicultural and agricultural activities, highway construction, transmission line access road construction, communication site construction, and rural residential development.

Reasonably Foreseeable Future Projects

Reasonably foreseeable future actions considered in the cumulative effects analysis include the following:

- BPA would continue to operate and maintain other transmission lines in and near the Holcomb-Naselle transmission line. Routine work may include hardware replacement, vegetation management, danger tree removal, and minor access road work.
- BPA proposes to expand the Holcomb Substation to replace the control house with a power control assembly building following completion of the NEPA process in spring 2019.
- WDNR would continue to manage state trust lands in the project corridor and adjacent areas for marbled murrelet and their habitat. WDNR is currently, with the USFWS, preparing an environmental impact statement to amend WDNR's 1997 State Trust Lands Habitat Conservation Plan (Table 4-1).

- Forestry activities would continue on WDNR and private lands, including road construction, timber harvest, planting, thinning, and other management activities.
- Dispersed recreational use would continue on WDNR lands.
- Farming activities would continue in and adjacent to the right-of-way.
- Residential development may continue in the vicinity of Naselle and Holcomb.

Cumulative Impacts

The Proposed Action, in combination with past, present, and reasonably foreseeable future actions, could potentially cause cumulative impacts on the resources described in Section 3.2 of this EA. The effects remaining after avoidance and minimization measures are the effects that could contribute to cumulative impacts. The following analysis describes these potential cumulative impacts from the remaining effects of the Proposed Action.

Soils and Geologic Hazards

Past, present and future activities that affect soils in the project corridor are primarily timber harvest, including road and landing construction, timber skidding, and tree planting, and maintenance of transmission line access roads. Agricultural activities near the Holcomb Substation end of the project would continue to disturb soils during the planting and harvest cycle and from grazing.

The Proposed Action would contribute to cumulative effects on soils through compaction and reduced productivity around structures and at landings and from erosion along access roads in areas with steep slopes. These effects would decrease when the disturbed areas return to existing conditions as vegetation matures and soils stabilize. With erosion control measures implemented to reduce the risk for erosion (Table 2-3), the Proposed Action would have a **low** cumulative impact on soils.

Vegetation

Past and present transmission line clearing and tree removal, access road construction and maintenance, and silvicultural activities have caused changes in the vegetation composition in the project corridor , decreasing the diversity of native species and introducing non-native vegetation, including noxious weeds.

Reasonably foreseeable future actions, such as BPA's vegetation management, danger tree removal and ongoing forest management would continue to impact vegetation. Although BMPs would be used to minimize the spread of invasive plants by the Proposed Action (Table 2-3), it is possible that impacts would still occur. Soil compaction with reduced soil productivity would make it difficult for native species to recover, increasing the potential for noxious weed infestations especially at structure sites. Thus, the Proposed Action could contribute to a **low-to-moderate** cumulative impact on vegetation through the spread of invasive plant species, as well as through the modification of existing vegetation.

Water Resources, Floodplains and Fish

Past and ongoing silvicultural activities and transmission line activities in the project corridor, including construction of roads across streams and in riparian areas have impacted streams, floodplains and fish. Future forest management activities with road construction and transmission line access road maintenance are expected to continue to contribute to these impacts.

The Proposed Action could temporarily disturb streams and water quality during construction from erosion and sedimentation if work occurs in the wet season. Use of BMPs would reduce impacts regardless of when the impact occurs (Table 2-3). Because the anticipated post-construction conditions in the transmission line right-of-way and access road areas would be similar to existing conditions, the Proposed Action would have a **low** cumulative impact on water resources and fish. Because impacts on floodplains would be minimal, the Proposed Action would have **no** to a very **low** contribution to cumulative impacts on floodplains.

Wetlands

Wetlands in the project corridor have been cleared and filled by past and ongoing forest management, agricultural uses, road construction and construction of the transmission line. Future forest management and access road maintenance activities may contribute to additional wetland disturbance from clearing and fill.

The Proposed Action would have limited temporary impacts on wetlands from structure work and access road improvements. There would be no loss of wetlands under the Proposed Action. Due to the very limited quantity of wetland impacts under the Proposed Action, the Proposed Action would have **no** to a very **low** contribution to cumulative impacts on wetlands.

Wildlife

Past and present forest management, access road construction and use, and transmission line construction have had a cumulative impact on wildlife and their habitat (including marbled murrelet) in the project corridor. The clearing and conversion of land for forest management, utility infrastructure (such as the existing transmission line, and public and private roads), and other uses have resulted in loss of general wildlife and marbled murrelet habitat. Future activities in marbled murrelet habitat that occur during the nesting period would contribute to cumulative impacts if disturbance causes behavioral disruptions and injury to this species.

Impacts from the Proposed Action would generally be limited to temporary noise disturbance and a minimal amount of habitat clearing from danger tree removal. Cumulative impacts on general wildlife species would be **low** because sufficient habitat is available in the project corridor and avoidance of the construction areas would be temporary. However, while the Proposed Action is located entirely in an existing transmission line right-of-way and using existing roads, construction activities would occur during the marbled murrelet nesting season and within northern spotted owl dispersal habitat, resulting in a **moderate** cumulative impact on these species.

Cultural Resources

Past and present actions that likely impacted cultural resources include forest management, access road and transmission line construction, communication site construction, residential development and agricultural practices.

Like the Proposed Action, other reasonably foreseeable future projects in the project corridor including forest management, agricultural uses, and transmission line maintenance activities have the potential to disturb previously undiscovered cultural resources. Because the Proposed Action occurs in previously disturbed transmission line right-of-way and access roads, and with the use of BMPs (Table 2-3), cumulative impacts on cultural resources are anticipated to be **low**.

4 Environmental Consultation, Review, and Permit Requirements

Several federal and state statutes, implementing regulations, Executive Orders, and other consultation, review, and permit requirements are potentially applicable to this project (see Table 4-1). For this table, 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

Potentially Applicable Requirement	Relevant Project Information
All Resources	
National Environmental Policy Act (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 their actions may have on the environment before major federal actions are taken.
Vegetation, Wildlife, and Fish	
Endangered Species Act of 1973 16 U.S.C. § 1531 *et seq*.	In November 2019, BPA plans to submit a biological assessment to USFWS in support of formal consultation to address potential impacts on ESA-listed species including marbled murrelet, northern spotted owl, streaked horned lark, yellow-billed cuckoo, and bull trout plus an assessment of potential impacts on marbled murrelet designated critical habitat. It is expected that USFWS will issue a biological opinion regarding potential impacts on marbled murrelet. BPA plans to use National Oceanic Atmospheric Administration (NOAA) National Marine Fisheries Service's 2016 Programmatic Biological Opinion (PBO) for Standard Local Operating Procedures for Endangered Species (SLOPES) for BPA's transmission line and access road actions in Oregon, Washington, and Idaho to address effects on listed salmon (Lower Columbia River Coho salmon, Lower Columbia River fall-run Chinook Salmon, and Lower Columbia River winter-run steelhead). The BPA SLOPES PBO provides take coverage for most BPA maintenance activities, including transmission line rebuild projects.
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 corridor. Compliance with the Magnuson-Stevens Act will be achieved through compliance with BPA's SLOPES PBO.
Bald Eagle and Golden Eagle Protection Act (Eagle Act) of 1940 16 U.S.C. § 668-668d	The closest bald eagle nest is 1.2 miles northwest of the project corridor. If a nest is identified, BPA would comply with the Eagle Act by avoiding construction activities within 0.5 mile of an active bald eagle nest during the breeding season and avoiding snag and large tree removal to the extent possible (Table 2-3). No golden eagle nests have been documented or observed near the project corridor.
Migratory Bird Treaty Act (MBTA) of 1918 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 corridor and some undoubtedly nest in the general vicinity or the corridor. Potential impacts on nesting birds are described in Section 3.2.6, Wildlife. BPA would meet its responsibilities under the MBTA with mitigation measures, such as using seasonal timing restrictions during the breeding season and avoiding removal of snags and large trees to the extent possible (Table 2-3). Bird diverters also would be installed on conductors in high bird-use areas.

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

Fish and Wildlife Conservation Act 16 U.S.C. § 2901 *et seq*. Fish and Wildlife Coordination Act 16 U.S.C. § 661 *et seq*.	BPA has consulted with the USFWS and plans to incorporate BMPs to avoid and minimize potential impacts on fish and wildlife resources (Table 2-3). Impacts on fish and wildlife are described in Section 3.2.3, Water Resources, Floodplains, and Fish, and Section 3.2.5, Wildlife.
Waters, Wetlands, and Floodplain Protection	
Clean Water Act 33 U.S.C. § 1251 *et seq*. Floodplain/Wetlands Environmental Review Requirements 10 CFR 1022.12 Floodplain Management Executive Order 11988 Protection of Wetlands Executive Order 11990	BPA will obtain the necessary permits for this project as regulated under Clean Water Act Sections 401, 402 and 404. Project corridor wetlands were delineated in 2018 and 2019 (Turnstone 2019). Potential impacts on floodplains and wetlands from the Proposed Action and mitigation for these impacts are described in detail in Section 3.2.3 Water Resources, Floodplains, and Fish and 3.2.4 Wetlands and Table 2-3. Applicants receiving a Section 404 permit from the Corps of Engineers are required to obtain a Section 401 water quality certification from Ecology through a joint application process. BPA anticipates submitting the joint permit application in the winter before the first construction season, if needed. For construction that disturbs soils at federal facilities in Washington, the U.S. Environmental Protection Agency (EPA) would issue a National Pollutant 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.
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 Ecology. Because the proposed project is in Washington's Coastal Zone, which includes both Pacific and Wahkiakum 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 proposed project is consistent with Washington's Coastal Zone Management Program. BPA will submit a consistency statement to Ecology in fall 2019, 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.
Final Mandatory Reporting of Greenhouse 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 1906 16 U.S.C. § 431-433 Historic Sites Act of 1935 16 U.S.C. § 461-467 National Historic Preservation Act (NHPA), as amended, inclusive of Section 106 54 U.S.C. § 306108 *et seq.* Archaeological Data Preservation Act of 1974 (16 U.S.C. § 469 – 469-1) Archaeological Resources Protection Act of 1979, as amended 16 U.S.C. § 469 a-c Native American Graves Protection and Repatriation Act 25 U.S.C. § 3001 *et seq.* Indian Sacred Sites Executive Order 13007 American Indian Religious Freedom Act of 1978 (42 U.S.C. § 1996)	BPA identified and documented cultural resources in the project corridor and evaluated them for eligibility for listing in the National Register of Historic Places. BPA's compliance with these regulations is described in Section 3.2.6, Cultural Resources. If 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.
Spill Prevention Control and Countermeasures 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*.	Small amounts of hazardous chemicals such as PCPs, fuels, motor and lubricating oils, and solvents could be released into the environment by the Proposed Action or used during construction work. Use of chemicals would be controlled via use of a Spill Prevention Plan. Any generated waste material would be disposed of according to state law and the Resource Conservation and Recovery Act. Solid wastes would be disposed of at an approved landfill or recycled.
The Toxic Substances Control Act 15 U.S.C. 2601 *et seq*.	BPA adopted guidelines to ensure that polychlorinated biphenyls (PCBs) are not introduced 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.

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 requirements relating to radio and television interference from the Proposed Action if any such interference occurs.
Environmental Justice	
Environmental Justice	The Proposed Action would not cause disproportionately high and adverse impacts on minority and low-income populations.
State, County, and Local Plan Consistency	
Washington Department of Natural Resources State Trust Lands Habitat Conservation Plan	WDNR and the USFWS are preparing a revised draft environmental impact statement (RDEIS) to amend WDNR's 1997 State Trust Lands Habitat Conservation Plan (1997 HCP). 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 promotes conservation of the species as a whole. The amendment will replace 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 DNR'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 would be added to the 1997 HCP to minimize impacts from new or expanded forest management and land use activities in marbled murrelet habitat. The measures would limit 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 would 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. Regardless of the alternative chosen by WDNR and USFWS in the RDEIS, BPA's existing transmission line right-of-way and access road easements would only be subject to the conditions of the 1997 HCP and are not affected by the alternatives in this RDEIS. However, BPA would consult with WDNR and USFWS and substantively comply as much as is possible with conservation measures proposed in the amended HCP.
Pacific County Critical Areas and Resources Lands Ordinance as guided by the Washington State Growth Management Act (GMA)	Under the GMA, Pacific County has designated wetlands; fish and wildlife habitat conservation areas; frequently flooded areas; critical aquifer recharge areas; and geologically hazardous areas as critical areas with associated ordinances and plans designed to protect them. Also designated are resource lands including agricultural, forest lands, and mineral lands. BPA strives to meet or exceed the substantive standards and policies of state and local plans and programs to the maximum extent practical. The Proposed Action would be consistent with the provisions of

	these ordinances and plans because BPA would avoid critical areas and critical area buffers to the maximum extent possible. Other BMPs and mitigation measures that would protect these critical areas are listed in Table 2-3.
Pacific County Shoreline Management Program as guided by the Washington State Shoreline Management Act (SMA)	Under the SMA, Trap Creek, Alder Creek and the Naselle River are identified as "shorelines" and the Willapa River as a "shoreline of statewide significance." Six transmission structures and about 3 miles of access road are located within 200 feet of the shores of these streams and thus would be regulated by the SMA. BPA would take the following measures, where practicable, to assure consistency with Pacific County's Shoreline Master Program: • Placing transmission facilities near shorelines of the state in existing rights-of-way and corridors. • Reconstructing, operating, and maintaining transmission facilities with no net loss to shoreline ecological functions. • Clearing that is limited to the minimum necessary to prevent interference by trees and other vegetation with the transmission line. • Minimizing interference with public uses and public access to the shorelines. • Minimizing adverse effects on the aesthetic characteristics of the shoreline areas. Other BMPs and mitigation measures that would protect waterbodies are listed in Table 2-3.
Wahkiakum County Critical Areas Ordinance as guided by the Washington State Growth Management Act	Under the GMA, Wahkiakum County designated critical areas include frequently flooded areas; geologically hazardous areas; aquifer recharge areas; wetlands excluding small Category II and IV wetlands; and fish and wildlife habitat conservation areas. Designated resource lands include agricultural, forest lands, and mineral lands. As described above for Pacific County, BPA strives to meet or exceed the substantive standards and policies of state and local plans and programs to the maximum extent practical. Because no road or transmission line work would occur in Wahkiakum County, the Proposed Action would be consistent with the provisions of these ordinances and plans.
Wahkiakum County Shoreline Management Program as guided by the Washington State Shoreline Management Act	Under the SMA, Salmon Creek is identified as a "shoreline." About 1.7 miles of a direction of travel access road would be used during construction and maintenance of the transmission line. The existing road, which spans the creek in one location with a bridge, is located within 200 feet of the creek in some areas. BPA would implement the actions listed above for Pacific County, where practicable, to assure consistency with Wahkiakum County's Shoreline Master Program.

5 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 groups of stakeholders have directly received or have been given instructions on how to receive all project information made available so far, 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. Senator Patty Murray

U.S. Senator Maria Cantwell

U.S. Representative Jaime Herrera Beutler

Tribes and Tribal Groups

Confederated Tribes of the Chehalis Reservation

Cowlitz Indian Tribe

Chinook Indian Tribe

Quinault Indian Nation

State Agencies and Officials

Washington Department of Archaeology and Historic Preservation

Washington Department of Ecology

Washington Department of Fish and Wildlife

Washington Department of Natural Resources

Washington Department of Transportation

Washington State Parks and Recreation Commission

Washington State Representative Brian Blake

Washington State Representative Jim Walsh

Washington State Senator Dean Takko

Local Government and Utilities

Pacific County Board of Commissioners

Pacific County Commissioner, Lisa Olsen

Pacific County Commissioner, Frank Wolfe

Pacific County Commissioner, Michael Runyon

Wahkiakum County Board of Commissioners

Wahkiakum County Commissioner, Mike Backman

Wahkiakum County Commissioner, Daniel Cothren

Wahkiakum County Commissioner, Gene Strong

Pacific County Public Utility District #2

Libraries

Ilwaco Timberland Library

Naselle Timberland Library

Ocean Park Timberland Library

Raymond Timberland Library

South Bend Timberland Library

6 References

AECOM. 2019. Cultural Resources Survey for the BPA Holcomb-Naselle Transmission Line Rebuild Project, Pacific and Wahkiakum Counties, Washington.

Altman, B. 1999. Status and conservation of grassland birds in the Willamette Valley. Unpublished report submitted to Oregon Dept. Fish and Wildlife, Corvallis.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for avian protection on power lines: State of the art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Available online at: http://www.aplic.org/mission.php

Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C. Available online at: https://www.aplic.org/documents.php

Boas, Franz. 1901. Kathlamet texts. Bureau of American Ethnology Bulletin 26. Washington, DC. American Ethnology Bulletin 40(1):1–79, 563–677.

Bonneville Power Administration (BPA). 2000. Transmission System Vegetation Management Program Final Environmental Impact Statement/Record of Decision. USDOE/BPA EIS-0285.

Bonneville Power Administration (BPA). 2016. Hills Creek-Lookout Point Transmission Line Rebuild Project Draft Environmental Assessment, DOE/EA-1967.

Boyd, Robert, Kenneth Ames, and Tony Johnson, eds. 2013. Chinookan Peoples of the Lower Columbia. University of Washington Press.

Camp, Pamela. 2011. Field Guide to the Rare Plants of Washington. University of Washington Press.

Curran, Christine Ann. 1998. Master’s Thesis. A Historic Context for the Transmission of Hydroelectricity by the Bonneville Power Administration, 1939-1945. University of Oregon.

Czajkowski, J. L.; Bowman, J. D., 2014. Faults and earthquakes in Washington State: Washington Division of Geology and Earth Resources Open File Report 2014-05, 1 sheet, scale 1:750,000

Electrical Power Research Institute (EPRI). 1995. Interim Report on the Fate of Wood Preservatives in Soils Adjacent to In-Service Utility Poles in the United States. TR-104968. June.

Emerson, Stephen. 2012. Cultural Resources Survey for the Washington Department of Fish and Wildlife’s Fork Creek Hatchery Emergency Domestic Water Repair Project, Pacific County, Washington. Cheney, WA: Eastern Washington University, Archaeological & Historical Services.

Evans Mack, D., W. P. Ritchie, S. K. Nelson, E. Kuo-Harrison, P. Harrison, and T. E. Hamer. 2003. Methods for surveying Marbled Murrelets in forests: a revised protocol for land management and research. Pacific Seabird Group. Available at: http://www.pacificseabirdgroup.org

Franklin, Jerry F., and C.T. Dyrness. 1988. Natural Vegetation of Oregon and Washington. Oregon State University Press.

Hobbs, Nancy and Donella J. Lucero). 2005. The Long Beach Peninsula. Mt. Pleasant, South Carolina: Arcadia Publishing.

Kramer, George. 2010. Corridors of Power: The Bonneville Power Administration Transmission Network. Historic Context Statement. For the Bonneville Power Administration, Portland, Oregon under Master Agreement #38010.

Kramer, George. 2012. Bonneville Power Administration [BPA] Pacific Northwest Transmission System. Multiple Property Documentation Form. National Park Service. United States Department of the Interior.

Krauss, Michael. 1990. Kwalhioqua and Clatskanie. In Northwest Coast. Handbook of North American Indians, vol. 7. Smithsonian Institute. Washington, D.C.

National Resources Conservation Service (NRCS). 2018. Web Soil Survey, at http://websoilsurvey.nrcs.usda.gov/. Website accessed September 2018.

Ray, Verne. 1938. Lower Chinook ethnographic notes. University of Washington Publications in Anthropology 7(2):29–165.

Ruby, Robert H., and John A. Brown. 1976. The Chinook Indians: Traders of the Lower Columbia River. University of Oklahoma Press, Norman and London.

Silverstein, Michael. 1990. Chinookans of the Lower Columbia. In Northwest Coast. Handbook of North American Indians, vol. 7. Smithsonian Institute. Washington, D.C.

Sullivan, B.L., C.L. Wood, M.J. Iliff, R.E. Bonney, D. Fink, and S. Kelling. 2009. eBird: a citizen-based bird observation network in the biological sciences. Biological Conservation 142: 2282-2292.

Tipton, Katherine and Sunshine Schmidt. 2018. Cultural Resources Survey for the Holcomb-Naselle No. 1 Access Road Bridge Replacement. Portland, OR: Bonneville Power Administration.

Turnstone Environmental Consultants. 2019a. Noxious Weed Survey Report for the BPA Holcomb-Naselle Rebuild Project Pacific County, Washington.

Turnstone Environmental Consultants. 2019b. Wetland Delineation Report for the BPA Holcomb-Naselle Rebuild Project Pacific County, Washington.

Turnstone Environmental Consultants. 2019c. Interim Survey Results Summary: Marbled Murrelet Surveys for the BPA Holcomb-Naselle Rebuild Project Pacific County, Washington.

Turnstone Environmental Consultants. 2019d. Rare Plant Survey Report for the BPA Holcomb-Naselle Rebuild Project Pacific County, Washington.

U.S. Fish and Wildlife Service (USFWS). 2015. Recovery plan for the coterminous United States population of bull trout (Salvelinus confluentus). Portland, Oregon. 179 pages.

U.S. Fish and Wildlife Service (USFWS). 2018. Pacific County Information for Planning and Consultations (IPaC). https://ecos.fws.gov/ipac/. Website accessed August 2018.

U.S. Geological Survey. 2018. U.S. Geological Survey Gap Analysis Program, 20160513, GAP/LANDFIRE National Terrestrial Ecosystems 2011: U.S. Geological Survey, https://doi.org/10.5066/F7ZS2TM0https://doi.org/10.5066/F7ZS2TM0

Washington Department of Ecology (Ecology). 2018. EIM Groundwater Map Search https://fortress.wa.gov/ecy/eimreporting/Map/Map.aspx?MapType=Groundwater&MapLocationExtent=-13873343.3370313%2c5700556.15576673%2c-13028904.8061874%2c6275200.77356957&WellsOnlyFlag=True. Website accessed November 2018

Washington Department of Ecology (Ecology). 2018a. Washington State Water Quality Assessment 303(d) List – Willapa River. https://fortress.wa.gov/ecy/publications/SummaryPages/0510073.html. Website accessed November 2018

Washington Department of Ecology (Ecology). 2018b. Washington State Water Quality Assessment 303(d) List – Trap Creek. https://apps.ecology.wa.gov/approvedwqa/ApprovedSearch.aspx. Website accessed March 2019

Washington Department of Fish and Wildlife (WDFW). 2006. 24K (and MSH) Fish Distribution (fishdist) Washington Dept. of Fish and Wildlife, Olympia, WA, 2006, (StreamNet Reference)

Washington Department of Fish and Wildlife (WDFW). 2018. SalmonScape. http://apps.wdfw.wa.gov/salmonscape/map.html. Website accessed November 2018 WDFW

Washington Department of Natural Resources (WDNR). 2018a. Washington Geologic Portland, at https://geologyportal.dnr.wa.gov/#natural_hazards. Website accessed September 2018

Washington Department of Natural Resources (WDNR). 2018b. Earthquakes and Faults. https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/earthquakes-and-faults. Website accessed September 2018

Washington Department of Natural Resources (WDNR). 2018c. Pers. comm. with Walter Fertig (State Botanist) on October 24, 2018.

Washington Department of Natural Resources (WDNR). 2018d. Data Products and Requests. County Lists-Vascular and nonvascular species (PDF, Excel). www.dnr.wa.gov/NHPdata Website accessed September 2018.

Washington Department of Natural Resources (WDNR). 2018e. Rare Plant Field Guide. www.dnr.wa.gov/NHPfieldguide. Website accessed August 2018.

Washington Division of Geology and Earth Resources (WDGER). 2016. Surface geology, 1:100,000--GIS data, November 2016: Washington Division of Geology and Earth Resources Digital Data Series DS-18, version 3.1, previously released June 2010.

Washington Division of Geology and Earth Resources (WDGER). 2017. Landslides and landforms--GIS data, August, 2017: Washington Division of Geology and Earth Resources Digital Data Series 12, version 5.0, previously released February, 2016. [http://www.dnr.wa.gov/publications/ger_portal_landslides_landforms.zip]

Washington State Department of Health. 2019. Source Water Assessment Program (SWAP). https://fortress.wa.gov/doh/swap/index.html. Website accessed March 2019.

Washington State Noxious Weed Control Board (WNWCB). 2018a. Noxious Weeds That Harm Washington State. Western Washington Field Guide.

Washington State Noxious Weed Control Board (WNWCB). 2018b. Washington State Noxious Weed List.

Whitson, Tom D. Weeds of the West. Western Society of Weed Science in Cooperation with the Western United States Land Grant Universities Cooperative Extension Services and the University of Wyoming, 2002.

Xcel Energy. 2014. Overhead vs. Underground: Information about undergrounding high-voltage transmission lines. Available online at: http://www.xcelenergy.com/staticfiles/xe/Regulatory/Transmission/OverheadvsUnderground.pdf.

Zenk, Henry, Yvonne P. Hajda, and Robert Boyd. 2016. Chinookan Villages of the Lower Columbia. Oregon Historical Quarterly, Vol. 117, No. 1, pp. 6-37.

Bonneville Power Administration
DOE/BP- 4917 • August 2019