**Bonneville Power Administration**

# Olympic Peninsula Transmission Line Reinforcement Project

# Preliminary Environmental Assessment

## EA-1576

**February 2008**

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# Chapter 1
# Purpose of and Need for Action

## 1.1 Introduction

Bonneville Power Administration (BPA), a federal agency, owns and operates more than 15,000 circuit miles of electric ***transmission lines***[1]. The lines carry most of the Northwest's high-voltage (115-***kilovolt*** [***kV***] and above) ***capacity*** from the resources of the Federal Columbia River Power System and other interconnected private and federal power generating facilities. Besides moving power throughout the Northwest, BPA's transmission system delivers power as needed to and from nearby regions (*e.g.*, south to California and Arizona and north to Canada). BPA's transmission customers include public utility districts, municipalities, and investor-owned utilities, as well as independent power producers and a few direct service industries. The utility customers, in turn, provide electricity to homes, businesses, and farms.

This environmental assessment (EA) was prepared by BPA pursuant to regulations implementing the National Environmental Policy Act (NEPA) (42 USC 4321 et seq.), which requires federal agencies to assess the impacts their actions may have on the environment. Major federal actions significantly affecting the quality of the human environment must be evaluated in an environmental impact statement (EIS). BPA prepared this EA to determine if the Proposed Action would cause effects that would warrant preparing an EIS.

## 1.2 BPA's Need for Action

The existing BPA transmission system in the Olympic Peninsula and Puget Sound area provides reliable power to BPA's customers. However, as the area population grows, the demand for electrical energy increases and more ***load*** is put on the system.

A major use of electricity is for heating. Heating loads in the winter create heavy electrical demand, so winter is the most critical time for operating the transmission system in this area. Based on historical data, winter loads over the next 20 years are forecasted to increase 1 to 2 percent per year (10 to 20 ***megawatts*** [MW] per year).

BPA's customers on the Olympic Peninsula include Mason County Public Utility Districts Nos. 1 and 3, and Puget Sound Energy. The Olympic Peninsula, which includes Clallam, Jefferson, Kitsap, Harbor, Mason, and a portion of Thurston counties, is served via three 230-kV and two 115-kV transmission lines from BPA's Olympia Substation near Olympia, Washington. Anticipated peak use could now exceed existing system capacity if an ***outage*** of one or two key transmission lines occurred. When system capacity is exceeded, the ***voltage*** on transmission lines can drop below acceptable levels and become unstable, causing ***brownouts,*** or causing automatic devices to disconnect lines and cut off power entirely (a ***blackout***). Voltage collapse could affect the entire Olympic Peninsula and other parts of Thurston County.

[1] Terms defined in the glossary (Chapter 5) are shown in ***bold, italicized*** typeface the first time they are used.

BPA needs to take action on the Olympic Peninsula to increase voltage stability during winter peak electric loads. BPA is proposing to upgrade about 14.5 miles of BPA's existing Olympia-Shelton No. 1 transmission line on the Olympic Peninsula from a ***single-circuit***, 115-kV line to a ***double-circuit***, 230-kV line (see Figure 1).

## 1.3 Purposes of Action

BPA has identified the following purposes that it would seek to achieve in meeting the need for action:

- Maintain transmission ***system reliability*** to BPA and industry standards.
- Comply with BPA's contractual obligations.
- Minimize environmental impacts.
- Minimize cost.

## 1.4 Public Involvement

On December 19, 2006, BPA sent a letter to people potentially interested in or affected by the proposed Olympic Peninsula Transmission Line Reinforcement Project, including adjacent landowners, public interest groups, tribes, and federal, state and local government agencies. The letter explained the proposal, the environmental process, and how to participate. The letter requested that any public scoping comments for the EA be submitted to BPA by January 24, 2007. The letter was also posted on BPA's Web site.

BPA held one public meeting on January 11, 2007 in Shelton, Washington to describe the project and to solicit comments.

BPA received no written comments during the scoping period for the EA. The following comments were received during the public meeting:

- Local growth rates are more than BPA estimates.
- A potential well site and other existing utilities may be near the proposed project.
- Are other transmission lines planned if the Port Angeles area is reinforced?
- What is the timing for construction?
- New residential/commercial development is planned near Shelton Substation and relocating some existing transmission lines should be considered.
- Can the transmission lines be put underground?
- BPA should comply with the State Environmental Policy Act (SEPA).

BPA also met with the Squaxin Island Tribe on December 14, 2006 and received these comments:

- There is concern about the location of any new ***structures*** since a planned golf course development has been designed around the existing structures, and there might be potential drainage and irrigation issues.
- Survey potentially affected ***cultural resources***.
- What was used to preserve the wooden structures that would be removed and how would any contaminated soil be disposed of?

## 1.5 Issues Outside the Scope of the Project

The City of Shelton requested that BPA consider moving the last 1.5 mile section of the Olympia-Shelton Nos. 3 and 4 double-circuit transmission line as it enters the City from the southwest. The City has requested that BPA move this section to the east about 700 feet so that it would be located next to the existing BPA transmission line corridor where BPA is proposing to remove the Olympia-Shelton No. 1 transmission line. Relocating this portion of the transmission line would require BPA to obtain new land rights, remove and replace 6 double-circuit structures, construct a new ***access road*** and string new ***conductors*** at an estimated cost of $1.5 to 2 million.

In October 2007, BPA staff met with representatives of the City of Shelton to discuss issues with the requested relocation of the 1.5-mile portion of the line. Because of the significant cost of the requested relocation and the lack of a need for the relocation from BPA's perspective, BPA informed the City that it would be willing to consider the relocation if the relocation costs were assumed by the City or some other entity such as landowners in the vicinity. At this time, it is uncertain whether the City or any other entity is interested in pursuing this matter.

As indicated above, BPA does not have a need for the requested relocation from either a technical or operational perspective. In addition, the proposed rebuild project can proceed independently of the requested relocation, and vice versa. The requested relocation, therefore, is considered to be outside the scope of the proposed rebuild project and this EA. If a mutually agreeable proposal for the relocation is developed in the future, BPA would evaluate any environmental effects of such a proposal in a subsequent NEPA document as appropriate.

# Chapter 2
# Proposed Action and Alternatives

## 2.1 Proposed Action

BPA is proposing to upgrade about 14.5 miles of its existing Olympia-Shelton No. 1 transmission line on the Olympic Peninsula from a single-circuit, 115- kilovolt (kV) line to a double-circuit, 230-kV line (see Figures 1 and 2). A double-circuit line carries two transmission lines on one structure or tower. The following sections describe what actions are proposed.

### *2.1.1 Background*

There are currently two main BPA transmission ***corridors*** on the Olympic Peninsula, each with many BPA transmission lines. One corridor runs from BPA's Olympia Substation west to Satsop Substation. The other corridor extends from Olympia Substation north to BPA's Shelton Substation, then continues north on the Olympic Peninsula (see Figure 1).

BPA's existing Olympia-Shelton No. 1 115-kV transmission line is about 60 years old and is mostly supported by ***H-frame*** wood pole structures (see Figure 3). The transmission line is within a 150-200 foot wide ***right-of-way*** (ROW) within a transmission line corridor (about 400-feet wide). Other transmission lines in this corridor include the Olympia-Kitsap No. 3, and the Olympia-Shelton Nos. 2, 3 and 4 transmission lines.

The Satsop-Olympia Nos. 2 and 3 230-kV, the Paul-Satsop No. 1 500-kV, and the Olympia-South Elma No. 1 115-kV lines are in the 435-615 foot-wide BPA transmission corridor between Satsop and Olympia substations (see Figure 1).

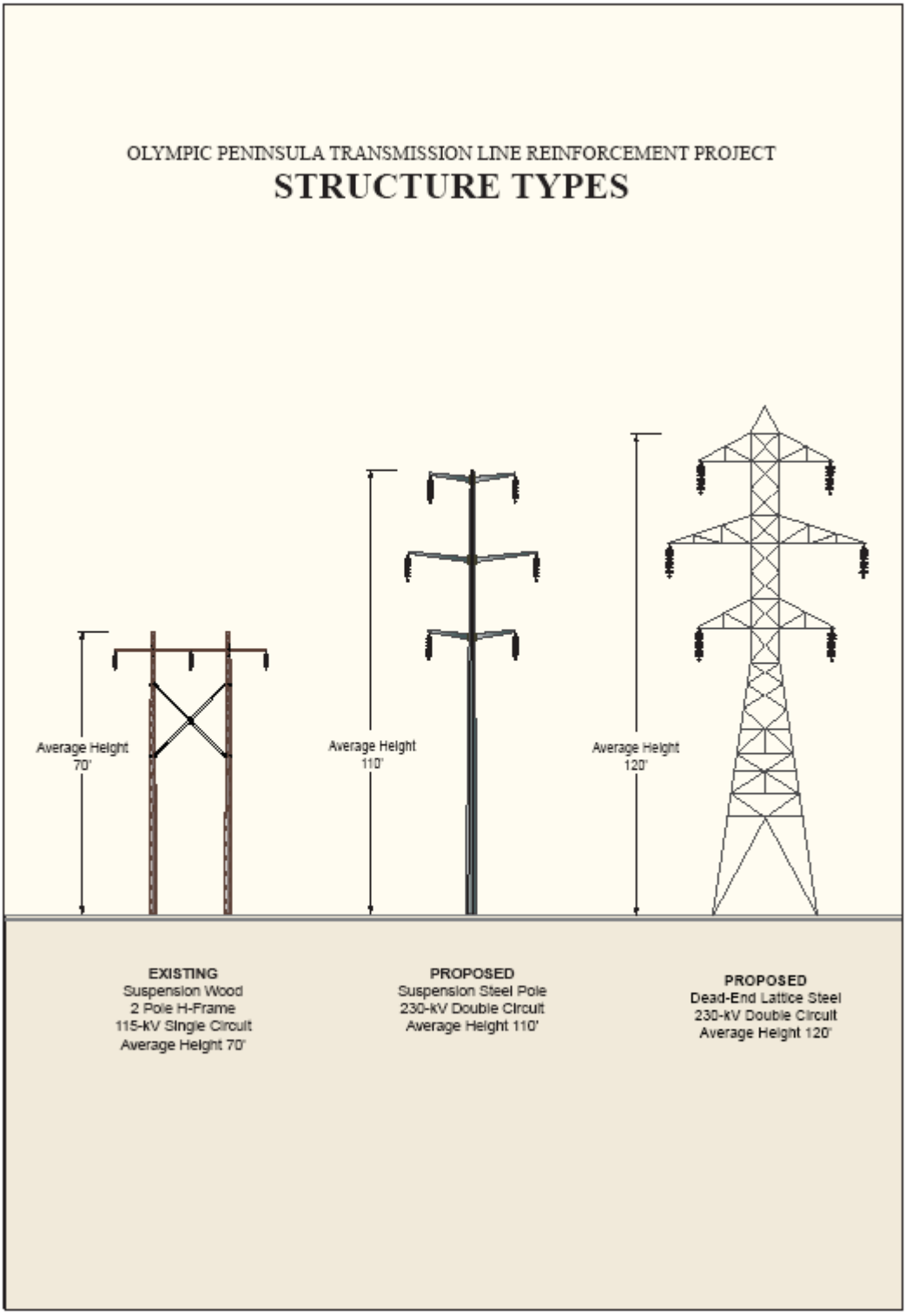
### *2.1.2 Existing Transmission Line Removal*

BPA is proposing to remove most of the existing Olympia-Shelton No. 1 115-kV transmission line (structures and conductor) from Olympia to Shelton substations. The first mile of the line starting from Olympia Substation and the last 0.5 mile into Shelton Substation would not be removed (see Section 2.1.4 and Figure 2). From structure 1/1 (first structure in mile 1) to structure 6/1 (first structure in mile 6) and from structure 9/3 to Shelton Substation, the existing line is near the center of the corridor and has one or more lines on either side of it. From structure 6/1 to structure 9/3, the existing Olympia-Shelton No. 1 transmission line is on the west side of the corridor. The existing ROW has an access road system maintained by BPA and other entities. The ROW crosses private, state and tribal lands.

The first mile of the Olympia-Kitsap No. 3 230-kV line (H-Frame and ***lattice steel*** structures and conductor) would also be removed. This would be completed after this line is rerouted (see Section 2.1.4 and Figure 2).

At the south end of Olympia Substation, one existing 500-kV lattice steel tower would be removed. This would accommodate a short reroute of a line south of the substation into a different bay within Olympia Substation (see Section 2.1.4 and Figure 4).

**Figure 3 Existing 115-kV Structures and Proposed 230-kV Structures**



Structure removal would disturb an area about 625 square feet at each structure site (total disturbance about 1.7 acres combined for all structures). Most structures would be removed by cutting them at their bases. Wood poles would be lifted onto a truck with a crane and removed from the site for recycling or disposal in an appropriate location. The existing steel structures that are currently on concrete foundations would be cut about 1.5 feet below the base, leaving the footings in place. Wood structures in ***wetlands*** would be cut at the base and lifted onto a rubber-tired vehicle and removed from the site.

### *2.1.3 Rebuild Transmission Line to Double-Circuit 230-kV*

BPA would replace the Olympia-Shelton No. 1115-kV line with a new double-circuit 230-kV line, using lattice steel towers and steel poles (see Figure 3 and Section 2.1.5). Each side of the tower or pole would carry a single-circuit 230-kV transmission line. The west side of the double-circuit line would go from Satsop Substation to Shelton Substation, renamed the Satsop-Shelton No. 1 230-kV line (see Section 2.1.4). The east side of the double-circuit line would go from Olympia Substation to Shelton Substation (named the Olympia-Shelton No. 5 230-kV line).

The rebuilt transmission line would be about 14.5 miles long and would be built on existing ROW (see Figures 1 and 2). About 12 miles of the rebuilt line – from structure 6/1 north to about structure 18/4 – would follow the route of the removed 115-kV Olympia-Shelton No. 1 line. To avoid having the proposed 230-kV lines cross over the existing Olympia-Shelton Nos. 3 and 4 230-kV transmission lines near structure 18/4, the remaining 2.5 miles of the rebuilt line – from about structure 18/4 to Shelton Substation – would be placed on existing steel towers currently supporting the Olympia-Shelton Nos. 3 and 4 lines (see Figure 5). The ROW for the Olympia-Shelton Nos. 3 and 4 lines extends northwest about 1,500 feet from structure 18/4, and then generally parallels the main Olympia-Shelton transmission corridor north until it reconnects with the main corridor about 2,000 feet southwest of Shelton Substation. The Olympia-Shelton Nos. 3 and 4 lines would be rerouted to follow the route of the removed 115-kV Olympia-Shelton No. 1 line, and would be placed on new 230-kV steel towers constructed along this route (see Figure 5).

Just to the west of Shelton Substation, BPA would need about 0.45 acre of new ROW to cross over Highway 101 (see Figure 6). This new ROW would be needed to accommodate the new route of the double-circuit line into Shelton Substation. An additional 4.15 acres may be temporarily needed during construction only. The additional temporary ROW would be needed if BPA cannot take outages on some of the transmission lines, especially the Olympia-Kitsap No. 3 line, and temporary structures would be needed outside the existing ROW to support the lines in the interim during construction to keep them in service. Actual new ROW amounts could be less.

### *2.1.4 Reroute Other Existing Transmission Lines*

As noted in Section 2.1.3, one line from Satsop Substation would be rerouted on the new double-circuit transmission line. The Satsop-Olympia 230-kV line would be rerouted so that it no longer would go to Olympia Substation. Instead it would be would be rerouted at the junction of the two corridors (structure 6/1 on Figure 2) onto the new transmission structures and into Shelton Substation. This line would then be called the Satsop-Shelton No. 1 230-kV line.

As also noted in Section 2.1.3, to avoid having the proposed new 230-kV lines cross over the existing Olympia-Shelton Nos. 3 and 4 230-kV transmission lines near structure 18/4, the Olympia-Shelton Nos. 3 and 4 lines would be rerouted at about structure 18/4 onto the new towers from that point into Shelton Substation (see Figures 5 and 6). This change would require additional new ROW on the north side of the existing ROW between structures 18/4 and 18/5 for the proposed Olympia-Shelton No. 1 rerouted line, and directly northeast of existing structure 18/3 of the Olympia-Shelton Nos. 3 and 4 lines (see Figure 5).

One mile north of Olympia Substation, the existing Olympia-Kitsap No. 3, 230-kV transmission line would cross under the adjacent Olympia-Satsop No. 3 transmission line and occupy the last mile of the Olympia-Shelton No. 1 transmission line into Olympia Substation that is not proposed to be removed (see Figure 2).

This line now bypasses Shelton Substation on its way to Kitsap Substation. Also as part of this project, this line would be looped into Shelton Substation using the Olympia-Shelton No. 1 structures in the last 0.5 mile into Shelton Substation that are not proposed to be removed (see Figure 6). The Olympia-Kitsap line would be operated at 115-kV from Olympia to Shelton. It would become the new Olympia-Shelton No. 1 transmission line.

At the southern end of Olympia Substation, BPA would reroute an existing 500-kV tie line from a 500-kV transformer across 54th Avenue from the substation (see Figure 4). One existing lattice steel tower would be removed. Two new lattice steel towers would be constructed along 54th Avenue on BPA fee-owned land (see Figure 4). BPA would reroute the existing 500-kV transmission tie line onto the two new towers and into Olympia Substation.

### *2.1.5 Transmission Structures*

Lattice steel towers or steel tubes would be used to suspend the new double-circuit 230-kV transmission line in the air (see Figure 3). Lattice steel towers average about 120 feet tall, with an average span of about 1,200 feet (see Figure 3). Steel tubes average about 110 feet tall, with an average span of about 900 feet (see Figure 3).

**Lattice Steel** — Lattice steel towers would be attached to the ground at each of the four tower legs. Three types of footings would be used depending on the type of soil and tower design.

- **Plate footings** are 4 foot by 4 foot steel plates buried up to 10 feet deep.
- **Grillage footings** are up to 12 foot by 12 foot assemblies of steel I-beams that are welded together and buried up to 13 feet deep.
- **Rock anchor footings** are used when a tower is built on solid rock. Holes are drilled into the rock and steel anchors are secured within the hole with concrete. The tower footings are anchored to the rods.

A track hoe would be used to excavate an area for the footings. The excavation sidewalls would be sloped or shored to prevent collapse. All the soil and rock materials removed would be used to backfill the excavated area once the footings are installed.

**Steel Tubes** — If no rock is encountered, tubes would be embedded directly into the ground about 20 to 25 feet, in a hole about 5 feet in diameter. If rock is encountered, a 6-foot diameter concrete pier footing with steel reinforcement, with possible rock anchors, would be installed. A track-mounted drill rig would be used to drill holes and the steel tube would be bolted to the top of the concrete footing. The hole would be backfilled up to ground level.

**H-Frame Wood Structure** — One single-circuit H-frame wood pole structure would be needed near Shelton for the reroute of the Olympia-Kitsap No. 3 line (see Section 2.1.4). The wood poles used would also be directly embedded in the ground. This structure would be supported by ***guy wires***. H-Frame structures average about 70 feet tall.

Transmission structures would normally be assembled in sections at a structure site and lifted into place by a large crane (30- to 100-ton capacity). The construction of a tower and its footings could disturb an area of about an acre (200 feet by 200 feet).

### *2.1.6 Conductors and Insulators*

The wires that carry electrical current in a transmission line are called conductors. The conductor proposed for this project would be 1.3 inches in diameter. Conductors are suspended from structures with ***insulators***. Insulators are made of nonconductive materials (rubber, porcelain or fiberglass) that prevent electric current from passing through the towers to the ground. Insulator strings of non-reflective material for BPA's line would be about 10 inches in diameter and 7 feet long.

Conductors and insulators would be installed after the structures have been built. A pulling cable called a "sock line" would be placed in pulleys or travelers that are attached to the insulators on the structures. The sock line would be pulled through the pulleys, usually by helicopter. The end of the sock line would be attached to a "hard line," which then is attached to the conductor on large reels mounted on trucks equipped with a brake system that allows the conductor to be unwound under tension. The sock line would be used to pull the conductors through the series of pulleys mounted on the structures. Conductor tensioning sites would typically be located every 2 to 3 miles.

About 6 tensioning sites would be required for this project. Conductor tensioning sites would typically disturb an area of about 1 acre. Disturbance would be temporary and any disturbed areas would be restored.

A smaller wire, called a ***ground wire***, would also be attached to the top of the transmission structures from Shelton Substation to about 1 mile south of the substation. Ground wires are used for lightning protection. There would also be a series of wires and/or grounding rods (called ***counterpoise***) buried in the ground at each structure. These wires are used to establish a low resistance path to earth, usually for lightning protection.

### *2.1.7 Right-of-Way*

Most of the proposed construction would take place on existing BPA ROW, where BPA has ***easements*** to build, operate and maintain the existing transmission lines. The easements also give BPA rights to upgrade the Olympia-Shelton No. 1 line with a higher-voltage line.

In two locations, BPA would need to acquire additional ROW. Directly northeast of existing structure 18/3 of the Olympia-Shelton Nos. 3 and 4 line, BPA would need to acquire about 0.2 acre of new ROW to allow sufficient ROW for the proposed rerouting of the Olympia-Shelton Nos. 3 and 4 lines (see Figure 5). An additional 0.9 acre of ROW on the north side of the existing ROW between structures 18/4 and 18/5 may be needed during construction only (see Figure 5).

Just west of Shelton Substation, BPA would need about 0.45 acre of additional ROW for to cross over Highway 101 (see Figure 6). An additional 4.15 acres may be needed during construction only.

The additional temporary ROW in both locations would be needed if BPA cannot take outages on some of the transmission lines and temporary structures and lines would be needed outside the existing ROW to keep existing transmission lines in service. Actual new ROW amounts could be less. The maximum possible amount of additional ROW acreage is used in the resource analyses in Chapter 3 of this EA.

### *2.1.8 Right-of-Way Clearing*

The existing ROW has been maintained by BPA so that only low-growing vegetation compatible with transmission lines is on the ROW. There are some tall trees and other vegetation next to the existing ROW, and in the areas where new ROW is needed, that may need to be removed. Tall trees that are a present or future danger to the line (***danger trees***) are trees that could contact the conductor should the tree fall, bend, or grow into the conductor, or trees that the conductor could swing into. If a tree comes in contact with the conductor, it can start a fire or injure or kill someone nearby and disrupt the electrical system. For the whole proposed project, about 10 acres of trees or tall shrubs would be removed.

### *2.1.9 Access Roads*

BPA has an existing access road system in the transmission corridor. BPA would use its existing access roads system as much as possible for construction. Access would be necessary for construction to each existing and new transmission structure site. Roads would be used by cranes, excavators, supply trucks, boom trucks, and line trucks during construction.

To facilitate moving construction equipment and materials, portions of existing roads would need to be cleared of encroaching vegetation, graded, covered with crushed rock, and provided with better drainage, including three new ***culverts***. To install culverts under new roads, soils would be excavated, and excavations would be backfilled in a trench slightly longer than the road width.

About 6.4 miles of existing roads would be improved to provide access to structures. About 2 miles of new access roads are planned, including some new spur roads (about 200 feet long) to individual towers. New roads are designed to be about 14 feet wide; the disturbed area would be about 20 feet. About 5 acres would be disturbed for new roads. No temporary roads are planned, but if construction goes forward, it might be necessary for the contractor to create some temporary roads. Temporary roads would be removed after construction.

### *2.1.10 Gates*

Some landowners/land managers have policies regarding public access to their properties. Locked gates are commonly used to restrict public access. BPA cooperates with landowners on a case-by-case basis on permanent access, gates and locks.

### *2.1.11 Staging Areas*

During transmission line construction, steel, electrical conductors, insulators and hardware are often stockpiled at a site called a staging area or material yard that is near the proposed line. BPA would secure temporary rights to establish a material storage yard and contractor staging area. BPA's storage yard/staging area would be about 10 acres. The location of this staging area would depend on the needs of the project and would be determined prior to construction. To facilitate construction efficiency, staging areas tend to be located next to highways and main roads. In addition, BPA seeks to locate staging areas on previously disturbed areas. Staging areas are only used prior to and during construction. After construction, the staging areas would be removed, and any disturbed areas would be restored to their pre-construction conditions. Miles Sand and Gravel Operation has offered industrial land near Shelton/Matlock Road as a potential staging area. This land has already been disturbed by sand and gravel excavation.

### *2.1.12 Substation Facilities*

Substations contain electrical equipment that enables BPA to interconnect several different transmission lines, disconnect lines for maintenance or outage conditions, and regulate voltage using transformers. BPA proposes to add equipment to its existing Olympia Substation, located near Tumwater and Olympia, Washington and to Shelton Substation, located in Shelton, Washington (see Figure 1). The principal equipment that would be installed at these substations under the Proposed Action is described below. The following equipment would be installed in existing substation yards.

**Power circuit breakers** — A breaker is a switching device that can automatically interrupt power flow on a transmission line at the time of a fault, such as a lightning strike, trees or tree limbs falling on a line or other unusual event. New breakers would be installed at both substations to redirect power as desired.

**Switches** — These devices are used to mechanically or electrically disconnect or isolate equipment. Switches are normally located on both sides of circuit breakers. Switches would be added at each substation.

**Bus tubing, bus pedestals** — Power moves within the substation and between breakers and other equipment on rigid aluminum pipes called bus tubing. This tubing is supported and vertically elevated by pedestals called "bus pedestals."

**Substation dead-end towers** — These are the towers within the confines of the substation where incoming and outgoing transmission lines end. Dead-ends are typically the tallest structures in a substation. Substation dead-end structures would be installed inside both substations. The 230-kV lines would terminate on these towers.

**Equipment at Satsop and Kitsap Substations** — BPA would also need some relays installed at Satsop Substation near Satsop, Washington and at Kitsap Substation near Bremerton, Washington. This work would be completed inside the existing substation control houses. No other work would be needed at these two locations.

### *2.1.13 Dayton Tap*

The existing Olympia-Shelton 115-kV line that would be removed is now connected or "tapped" into Mason County PUD No. 3's 115-kV line at about structure 18/5 to provide service to Mason County PUD. BPA needs to maintain this interconnection for Mason County PUD, so after the existing transmission line is removed, a new connection would be made on the existing Olympia-Kitsap No. 3 230-kV line, which is in the same corridor.

### *2.1.14 Schedule*

Construction could begin in summer 2008 and the line would be energized in fall 2009.

### *2.1.15 Cost Estimate*

The estimated project cost for the transmission line and substation improvements is about $25-30 million.

### *2.1.16 Maintenance*

During the life of the project, BPA would perform routine, periodic maintenance and emergency repairs to the transmission line. Periodic maintenance usually involves replacing insulators on an as-needed basis, as well as repairing any structures that show excessive wear or damage. Emergency repairs typically involve the urgent repair of any downed structures or conductors in the aftermath of a significant windstorm or other weather-related event. For both types of maintenance, BPA typically accesses line segments needing repair by vehicle using the existing access road network where possible, and conducts maintenance activities from the ground.

In order to identify portions of the federal transmission system in the Pacific Northwest portions potentially in need of repair, BPA currently conducts routine line inspection patrols of the system by helicopter. BPA would expect to continue to conduct these inspections for the transmission line proposed to be rebuilt, likely twice a year. BPA's ongoing helicopter inspection activities are conducted separately and independently from the proposed rebuild project. In other words, whether or not BPA decides to rebuild the existing line, BPA would continue to inspect the line on an occasional basis as part of normal ongoing operations, and helicopters would be used for that inspection.

Vegetation is also maintained along the line for safe operation and to allow access to the line. The area would need little vegetation maintenance because it is mostly existing ROW.

If vegetation maintenance is needed, BPA's vegetation management would be guided by its Transmission System Vegetation Management Program EIS (DOE/0285). BPA uses an integrated vegetation management strategy for controlling vegetation along its transmission line rights-of-way. This strategy involves choosing the appropriate method for controlling the

vegetation based on the type of vegetation and its density, the natural resources present at a particular site, landowner requests, regulations, and costs. BPA may use a number of different methods: manual (hand-pulling, chainsaws), mechanical (roller-choppers, brush-hogs), biological (insects or fungus for attacking ***noxious weeds***), and herbicides.

Prior to controlling vegetation, BPA sends notices to landowners and requests information that might help in determining appropriate methods and ***mitigation*** measures (such as herbicide-free buffer zones around springs or wells). Noxious weed control is also part of BPA's vegetation maintenance program and BPA works with the county weed boards and landowners on area-wide plans for noxious weed control.

## 2.2 No Action Alternative

The No Action Alternative is usually defined as the status quo alternative. In this case, the No Action Alternative assumes that BPA would not remove and replace the transmission line and would continue to operate and maintain the existing transmission line. Construction activities associated with the project would not occur, and the reliability concerns that prompted the proposal for action would continue to be of concern. Maintenance activities would continue within the corridor for the existing line. The No Action Alternative could result in loss of reliable service on the Olympic Peninsula.

## 2.3 Alternatives Considered But Eliminated From Detailed Study

### *2.3.1 Non-Wires Alternatives*

In 2003, plans for a new transmission line in the Olympic Peninsula were put on hold so that BPA could consider whether non-wires alternatives could postpone the need for construction alternatives. BPA gathered regional leaders in the field (the Non-Wires Round Table) and asked for their insights and suggestions about whether non-wires alternatives could meet the need on the Olympic Peninsula. Non-wires solutions are any demand response, distributed ***generation***, conservation measures, generation siting or pricing strategies that individually, or in combination, delay or eliminate the need for upgrades to the transmission system.

After the formation of the Non-Wires Round Table, BPA initiated another public process to help develop the components of an adequate transmission system and the standards to be used for its decision making. BPA wanted to develop "adequacy" standards to determine when and at what level certain transmission components should be reinforced or replaced. After the public process was concluded, BPA and the region agreed on what standards should be adopted. The 500-kV transmission system would be designed to provide service for an "N-1" contingency, that is, with one line or transformer out of service. For 230-kV lines, the region agreed the standard should be N-2, that is, able to withstand a double outage such as loss of a transmission line *and* a transformer, two transmission lines or two transformers.

After completion of the Adequacy Standards process and through a series of meetings, non-wire pilot programs and studies on the Olympic Peninsula, BPA determined that the amount of average load reduction possible during peak load (about 22 MW) from non-wire solutions would be inadequate to meet the need for reinforcing the transmission system. In addition, since the transmission system on the Olympic Peninsula is a 230-kV system, it must meet the N-2

standard. It was concluded, therefore, that none of the possible non-wires alternatives would solve the problem for normal winter outages in the area.

More information about the Non-Wires Round Table and Transmission Adequacy Standards public process can be found at the following Web sites: http://www.transmission.bpa.gov/PlanProj/Non-Wires_Round_Table/; http://www.transmission.bpa.gov/PlanProj/transadequacy/.

### *2.3.2 Building a 500-kV Transmission Line to Shelton*

BPA considered building a new 500-kV transmission line instead of a 230-kV line. The 500-kV alternative would cause voltage instability and had technical thermal limitations. In addition, because of greater ROW needs or a 500-kV line in comparison to a 230-kV line, this alternative has the potential for a greater amount of land, vegetation, and wildlife disturbance, and thus more significant environmental impacts. This alternative was eliminated from further consideration.

## 2.4 Comparison of Alternatives

Table 2-1 compares the Proposed Action and No Action Alternative by the project purposes (see Chapter 1) and environmental impacts.

## Table 2-1 Comparison of the Proposed Action and No Action Alternative

| Purpose | Proposed Action | No Action |
|---|---|---|
| Maintain transmission system reliability to BPA and industry standards | Maintains system reliability in the event of two outages. | Risks public safety during outages. Brownouts or blackouts could occur on the Olympic Peninsula. |
| Comply with BPA's contractual obligations | Maintains system reliability to BPA's customers on the Olympic Peninsula | System weaknesses could threaten power delivery. |
| Minimize environmental impacts | The rebuilt line would be constructed on existing ROW to reduce environmental impacts and construction impacts would be primarily short term and can be mitigated. | Avoids construction impacts, but could result in impacts to the local economy and public health and safety from decreased reliability. |
| Minimize cost | Total project costs: about $25-30 million. | Avoids near-term costs. May create socioeconomic costs in the future. |

| Environmental Resource | Proposed Action | No Action |
|---|---|---|
| Land Use | About 10 acres of trees and shrubs cleared. Most impacts temporary. About 5 acres of new ROW needed. Low impacts expected. | No change in impacts from existing condition. May inhibit some development in the future. |
| Geology and Soils | Low to moderate impacts expected from construction, can be mitigated with erosion control measures. About 75 acres of soil disturbed. | No change from existing operations and maintenance; maintenance needs could increase over time. |
| Vegetation | About 15 acres of vegetation removed permanently. About 10 acres of trees cleared. Low to moderate impacts expected. | No change from existing operations and maintenance; maintenance needs could increase over time. |
| Fish and Wildlife | No impacts to federally listed threatened or endangered species expected. Low to moderate impacts expected to fish and wildlife. | No change from existing operations and maintenance; maintenance needs could increase over time. |
| Water Quality | Low to moderate impacts expected with erosion control and vegetation management planned. Impacts would be temporary. | No change from existing conditions. |
| Wetlands | Low impacts expected. Most structures would be built outside of wetlands. | No change from existing conditions. |
| Floodplains | Low to moderate impacts expected. Flood storage capacity would not change. | No change from existing conditions. |
| Visual Quality | Temporary impacts during construction. New structures would be taller than existing structures. Low impacts expected. | No change from existing conditions. |
| Air Quality | Temporary impacts during construction. Low impacts expected. | No change from existing conditions. |
| Socioeconomics | Minor positive impacts from the construction project expected. New transmission line could create a more reliable system, which would be a positive impact. | Future transmission system reliability problems could impact the local economy and public health and safety. |
| Cultural Resources | No to low impacts expected. Monitoring and mitigation measures would be used during construction. | No impacts expected. |
| Health and Safety | Low impacts expected. | No changes expected. |
| Noise | Short-term moderate impacts expected during construction. Transmission line corona noise impacts would remain about the same as the existing line. Low impacts expected. | No changes expected. |

# Chapter 3
# Affected Environment, Environmental Consequences, and Mitigation

## 3.1 Introduction

This chapter evaluates the potential impacts of the Proposed Action and the No Action Alternative on natural resources to determine the potential for significant environmental effects from each alternative. For each resource, the chapter describes the existing environment that would be affected, the potential environmental impacts, and proposed ***mitigation***. To evaluate potential impacts from construction, operation, and maintenance activities, four impact levels were used—high, moderate, low, and no impact. High impacts are considered to be significant impacts, while moderate and low impacts are not.

Both direct and indirect impacts were evaluated. Direct impacts are those that would occur within or next to the corridor during a construction activity and would have an immediate effect on the environmental resource being evaluated. For example, removal of vegetation used for foraging or refuge during project construction would constitute a direct impact on wildlife. Generally, direct impacts would be confined to the existing corridor, except in those areas where access road improvements are planned outside the corridor. Indirect impacts are those that would occur after a construction activity or in an area adjacent to construction activities or outside the corridor. For example, the introduction of noxious weeds following the removal of vegetation that results in lower quality habitat for wildlife would be an indirect impact. If the affected environment for a specific natural or other resource extends beyond the general limits of the existing corridor, it is noted under the specific resource.

The impact analysis lists mitigation that could reduce impacts and discusses cumulative effects of the proposal when combined with impacts from past, present, and/or foreseeable future projects in the area. If no ***cumulative impacts*** are expected, none are listed.

The impacts of the No Action Alternative are discussed in the final part of each resource section.

The location of an affected resource may be identified by structure number and local landmarks. Structure numbers refer to specific *existing* structures; numbering proceeds from south to north. Local landmarks used are county roads, parks, and other features.

## 3.2 Land Use

### *3.2.1 Affected Environment*

The area considered for the land use analysis includes the existing Olympia-Shelton No. 1 115-kV transmission line corridor, land outside the corridor that could be affected, and existing or new access roads. Land uses along the corridor include private and public forestlands used for timber production, mineral (gravel, sand and rock) excavation, recreation, transportation, rural residences and small farms. Figure 7 illustrates the typical undeveloped and rural nature of land uses along most of the existing corridor. The existing ROW crosses Highways 8, 101 and 108.

Most of the land is privately owned (see Figure 2). Public lands adjacent to the corridor include forestland and recreation land managed by the Washington State Department of Natural Resources (WDNR).

**Figure 7 Existing Olympia-Shelton No. 1 115-kV Line near Center of the Corridor (looking north)**

## Forestlands

The existing transmission corridor passes through public and private forestlands used for timber production, and timber production activities such as thinning and clear cutting are evident throughout the project area. Western hemlock and Douglas fir are the predominant species harvested.

The Capitol Forest, owned by the state of Washington, is managed by WDNR for the dual purpose of conserving forestland and producing income for schools and other public institutions. Timber, mushrooms, and plants used in the floral industry are harvested. The forest also provides greenspace and recreation opportunities.

## Mineral Extraction

Glacial activity in Mason and Thurston counties left large deposits of sand and gravel. These mineral resources are used for construction projects throughout the area. There are many sand and gravel companies in both counties. The existing corridor crosses the Miles Sand and Gravel Operation, which is located about 1.5 miles southwest of the City of Shelton. Existing transmission structures 19/1 and 19/2 are within the boundary of this operation.

## Recreation

The natural features of the project area provide many varied opportunities for recreation. The lakes, streams and inlets provide opportunities for fishing, boating, swimming, picnicking, and sightseeing. The forested areas provide recreation for mountain bikers, hikers, hunters, horseback riders and others. Views for motorists from many spots on the local highways are scenic and the waters of Hood Canal and the Olympic Mountains are often visible. There are many opportunities for dispersed recreation, such as birdwatching.

The Capitol Forest and other state and local parks provide campgrounds and other facilities for recreation. Capitol Forest is open to the public and provides trails and other features for recreation. More than 800,000 people visit the forest each year (Friends of Capitol Forest, June 7, 2007).

Some of the local lakes, for example Summit Lake and Isabella Lake, have private and public recreation facilities such as boat launches and picnic areas. The existing BPA transmission lines, including the Olympia-Shelton No.1 line, are visible from these facilities, though in the middleground or background.

The Squaxin Island Tribe has a resort and casino facility on their tribal land near Shelton. The existing transmission line corridor crosses tribal property. The Tribe is planning to build a golf course as part of the resort complex and has designed the course around the existing transmission line structures.

## Residential Use

Rural residences are close to the existing transmission corridor in the following areas (from south to north): near Olympia Substation and Black Lake, along Delphi, Cedar Flats, and Maple Valley roads, near where the corridor crosses highways 8 and 108, on the edge of Summit and Isabella lakes, along Hurley-Waldrip Road, near structures 17/6, along Shelton-Matlock Road, and along Deegan Road near structure 18/4. Some access roads to these properties are used by BPA for line maintenance. BPA has acquired rights to use the roads to access BPA lines.

The transmission corridor near Shelton is in the Shelton Urban Growth Area. The existing lines span areas where new commercial and residential developments are planned.

Olympia Substation is within the Urban Growth Area of the City of Tumwater. A local developer plans to build housing next to Olympia Substation.

## Commercial Use

The existing transmission line corridor is near a commercial area in Shelton as the line approaches Shelton Substation from the west. The corridor also is near or spans over a number of business areas south of Shelton. Businesses include gravel operations, a car dealership, and storage facilities. The Squaxin Island Tribe has a commercial complex on their reservation that includes a casino, hotel, and food mart. The Tribe plans to build a golf course next to their casino. The transmission line corridor is next to the casino and hotel complex.

**Transportation**

The transportation network in the vicinity of the existing transmission line corridor includes both highways and local roads. The state has no funded transportation projects planned within the next 4 years within the vicinity of the project (Lorenzo, 2007).

The three main highways in the vicinity are Highways 101, 8 and 108. The existing transmission line corridor crosses Highway 101 three times at mileposts (MPs) 345, 354, and 355. Highway 101 is the principal route along the east side of the Olympic Peninsula, and is heavily used by tourists, local residents, and commercial trucks. The average daily traffic volume is 25,000 vehicles at Kennedy Creek Bridge nearer the southern end of the proposed project, and 15,000 vehicles near Shelton (WSDOT 2006).

Highways 8 and 108 connect to Highway 12, which is a main route to Grays Harbor Estuary and the Washington coast. The existing transmission corridor crosses Highway 8 at about MP 18. The average daily traffic volume on Highway 8 at MP 16 near where the transmission corridor spans the highway is 17,000 (WSDOT 2006). The existing transmission corridor spans Highway 108 at about MP 10.5. The average daily traffic volume on Highway 108 at MP 11 at Skookum Creek near where the transmission corridor spans the highway is 3,400 (WSDOT 2006).

The state of Washington has given certain transportation routes within the state designations concerning their scenic value. Highway 101 at MP 345 just south of where the highway meets Wallace Street in Shelton, and Highway 108 at MP 10.5 just west of the Skookum Creek Bridge, are both designated by the state of Washington as Scenic Class "C," which means secondary scenic importance, that is, scenic characteristics are of marginal importance.

Highway 8, about MP 18, near Perry Creek, about 2 miles west of Highway 101; Highway 101, about MP 354, south of Skookum Creek about 0.5 mile, and Highway 101 about MP 355, near where Highway 101 intersects with Hurley-Waldrip Road about 0.75 mile north of Kennedy Creek Bridge, are classified as Scenic Class "BX." "B" class areas are areas of high scenic value and Subclass "X" is an alternative for Classes A and B for areas where, based on design alternatives, such as configurations, color and location, an aerial facility could be allowed without changing the landscape quality (see Section 3.9, **Visual Resources**).

The project area is also intersected with many public and private local roads that vary from gravel logging roads to paved 4-lane roads. Access is also varied and some landowners have locked gates on their private roads.

**Agricultural Use**

The existing ROW crosses land used for pasture (parcels of various sizes in miles 1, 2, 3, 4, 5, 10, 17 and 18 of the existing line corridor).

### *3.2.2 Environmental Consequences—Proposed Action*

The proposed actions would take place on existing ROW and in substation yards, except for a small area near structure 18/4, and a small area in Shelton near Shelton Substation (see Figures 5 and 6). New ROW would be needed in these areas (about 0.67 acre total). BPA has easements

or owns in fee the land that would be affected except for these small parcels. Easements would be purchased to use these parcels.

**Forestlands**

Most of the proposed project area is an existing ROW where all trees and large shrubs have been removed. From structure 6/1 to 9/3, the existing line is on the west side of the transmission line corridor. The existing line would be removed and the new structures would be built in the same ROW. Because there would be different structures and a double-circuit line built in this area, some existing trees would likely be removed because they would pose a danger to the new line. Some trees would also need to be removed in areas of new or temporary ROW. About 10 acres of trees would need to be removed for the whole project. This would be a low impact because this amount of timber removal would represent an extremely small proportion of existing forest areas and timber base in Mason and Thurston counties.

There would be no other direct or indirect impacts on timber-producing lands because all other construction and operation activities would be entirely within the existing ROW, on existing access roads that would not result in displacement of forestland, accessed from Highway 101 or another highway or local road, or would take place on non-forestland. Because of the small acreage of forestlands that would be affected and the lack of other direct or indirect impacts, impacts to forestlands would be low.

**Recreation**

Recreational use could be affected by construction activities. Existing access roads would be used for construction vehicles and some of these roads are near Isabella and Summit lakes, and streams and rivers. During construction, vehicles would go in and out of the project area regularly, but traffic would not be steady. The presence of large vehicles and equipment and the noise of construction could cause disruptions to recreation areas. During operation and maintenance, vehicles and equipment using the access roads could delay or obstruct recreational use on an intermittent, infrequent basis.

At the Squaxin Island Little Creek Casino, most recreational activities take place inside the buildings. Construction activities would be visible from some hotel rooms and areas inside the casino with windows that face west. Construction vehicle traffic could temporarily impact casino access.

The Squaxin Island Tribe's proposed golf course near the casino has not been built and may not be open before the proposed construction. The golf course has been designed around existing structures and would not be impacted if it is built after the proposed line construction.

In the Capitol Forest, construction vehicles could use the same access roads as recreationists. Noise from construction could temporarily disrupt some recreation.

Because there are many opportunities for recreation in the area, those affected by the temporary disruption of their normal recreation patterns could find other recreational areas to use and impacts to recreation would be low.

**Mineral Extraction**

The ROW crosses the Miles Sand and Gravel Operation. In this area, a new structure would need to be built in the same location as the existing structure 19/1. Construction traffic could interrupt some gravel operations. Because operations have been disrupted by the existing structure and because construction traffic impacts would be temporary, impacts to gravel operations would be low.

**Residential Use**

Construction, operation, and maintenance impacts would be limited to brief, temporary disturbances in most instances because most activities would take place on existing ROW and access roads. Impacts to residents would be limited to temporary inconveniences associated with traffic delays on highways or access roads, and dust and noise from construction activity, including tree removal activities.

Because impacts would be temporary, impacts to residential land uses would be low.

**Commercial Use**

Construction, operation, and maintenance impacts would be limited to brief, temporary disturbances in most instances because most activities would take place on existing ROW and access roads. Impacts to businesses would be limited to temporary inconveniences associated with traffic delays on highways or access roads, and dust and noise from construction activity, including tree removal activities.

Because impacts would be temporary, impacts to commercial uses would be low.

**Transportation**

Construction activities near where the transmission corridor crosses highways may cause brief traffic delays. Occasional delays may also occur on highways when large pieces of equipment are moved along the highway and onto local roads that access the ROW. Traffic on local roads could be disrupted temporarily as equipment and personnel are transported to the construction or staging areas. Delays to transportation from project construction would be short-term and flaggers would be used to direct traffic flow. Maintenance vehicles and activities would not disrupt the flow of traffic. Because transportation would only be disrupted for short periods, impacts would be low.

**Agriculture**

There is limited agricultural land on or next to the existing ROW. Some pastureland could be lost to new tower foundations and would be permanently taken out of production. The area required would be larger than the area taken by the existing structures, but since the existing structures have already impacted the land base, incremental impacts would be low. In the areas where the transmission structures would be removed and not replaced, more land could become available for agricultural use, though the land would remain as part of the transmission line ROW and use could be restricted.

### *3.2.3 Mitigation*

The following mitigation measures have been identified to reduce potential impacts to land use from the project:

- BPA's Project Manager will be available to meet with concerned landowners to discuss issues and concerns.
- A proposed schedule of construction activities will be distributed to all potentially affected landowners along the corridor so they know when they might experience construction-related disruptions.
- BPA will prepare a notice about construction activities and a proposed schedule for posting on the Washington State Department of Transportation (WSDOT) Traffic Advisory.
- Traffic safety signs and flaggers would be used to inform motorists and manage traffic during construction activities along Highways 8, 101 and 108.
- Disturbed areas would be revegetated with seed suitable for the site conditions and land use. Native seed would be used where appropriate.

### *3.2.4 Unavoidable Impacts Remaining After Mitigation*

Some short-term construction impacts would be unavoidable, such as interference with residential activities and recreational use, traffic delays, and noise and dust for those close to construction activities. They would cease once construction is completed. The Proposed Action would not change existing land uses for the long term. Operation and maintenance activities would have a low impact on land use because they would not disrupt the flow of traffic and would have very little impact on forestry, recreational use, agricultural use or residents. The unavoidable impacts remaining after mitigation would be low.

### *3.2.5 Cumulative Impacts*

Timber harvest, mineral extraction, residential and commercial development and other development activities have changed and will continue to change land use in the project area. The existing transmission corridor changed some of the underlying land use when it was constructed and land was taken out of forest or agricultural production or other uses. The Proposed Action would only incrementally add to this impact, since most impacts have already occurred.

### *3.2.6 Environmental Consequences—No Action Alternative*

Construction-related impacts would not occur. Only intermittent impacts such as noise, dust, and disruption caused by maintenance of the existing line would occur. Future limitations on the reliability of the transmission system could restrict changes in land use.

## 3.3 Geology and Soils

### *3.3.1 Affected Environment*

Located south of several Puget Sound inlets at the northern end of the Black Hills, the project area is hilly and dissected by many drainages. The soils predominantly developed on ***glacial outwash*** and till. In the foothills and mountains, soils are those developed in accumulated rock

debris (***colluvium***); ***alluvial*** materials and soils high in organics occupy much of the valley land (Pringle 1982; USDA 1960).

### *3.3.2 Environmental Consequences—Proposed Action*

**Removal of Existing and Installation of New Structures**

The impact on soils from these activities is expected to be low to moderate. Direct impacts on soils could result from grading, compaction of soils by heavy equipment, and some clearing of vegetation. Clearing and grading, commonly with a bulldozer, strips both vegetation and the uppermost, most biologically active portion of the soil. Loss of plants and soil disrupts biological functions, including nutrient retention and recycling, and thus reduces productivity at least temporarily. Compaction from heavy equipment degrades soil structure, reducing pore space needed to retain moisture and promote gas exchange, which is important for respiration and other metabolic functions of soil organisms. The extent of impacts at any one site would depend on the quality of soils, the amount of moisture in the soils, the amount of surface water flowing across the site, the steepness of slopes and, for new structures, the type of structure erected and whether guy wires would need to be anchored. The removal of trees within and adjacent to the ROW would result in low to moderate impacts due to the small area affected by tree removal.

Because most existing structures would be cut at the base, effects on soils would be localized to structure locations. Structures in wetlands would be cut above ground, resulting in little to no impact to soils. Structure removal would disturb a total of about 1.7 acres for all structures. For new structures, excavation and ground disturbance at structure sites for footings, assembly, and backfill would total about 75 acres over the length of the line. Otherwise, there would be minimal long-term disturbance to soils resulting in minor ***sheet erosion*** and occasional small channels.

The indirect impact on soils from erosion is expected to be low to moderate. Minor gullying and other erosion could occur if soils were left bare or were slow to grow new plant cover after mulching and seeding. The risk of erosion would be highest on steep slopes and during heavy rainfall. Mulching and prompt seeding or replanting of bare soils would reduce erosion and help disturbed sites recover more quickly.

**Access Roads**

Portions of existing roads would be cleared of encroaching vegetation, graded, covered with crushed rock, and provided with better drainage, including three new culverts. The direct impact on soils from this work is expected to be low to moderate. The areas at greatest risk of soil erosion are steep slopes. Routes to a few structures appear to lead up steep, overgrown terrain that would incur direct impacts from grading, and cutting and filling to accommodate construction equipment. A number of short segments of road are to be improved in areas of steep slopes.

About 2 miles of new road would be built. About 5 acres of soil would be disturbed. About 6.4 miles of existing access roads would be improved. Direct impacts on soils would include compaction and severe loss or elimination of most natural biological functions.

To install culverts under new roads, soils would be excavated, and excavations would be backfilled in a trench slightly longer than the road width. Only limited and minor erosion would be likely, a low impact.

The indirect impact on soils from road work and culvert installation is expected to be low to moderate. The project area receives 50 to 60 inches of precipitation a year, most of it in winter. Erosion could be moderate during the rainy season, especially on steep slopes where clearing and grading are required. The potential for erosion would be greatest just after construction, before damaged or cleared vegetation is restored and bare soils are stabilized.

**Tensioning Sites**

The direct impact of tensioning sites on soils is expected to be low. Up to 6 acres of vegetation would be cleared or crushed at these sites. Vehicles and other equipment may compact soils in a limited area. The indirect impact of subsequent erosion is expected to be low, because tensioning sites would be on more level ground, in use for a short time, and would then be revegetated.

**Operation and Maintenance**

Maintenance of the corridor would require incidental repairs to access roads and management of vegetation, which could cause localized soil disturbance. In most cases, operation and maintenance would have a low direct impact on soils because the areas affected would be small, confined to the area of a particular maintenance action, and dispersed both in time and along the length of the corridor. Danger tree removal could result in low to moderate impacts due to clearing, grading, soil compaction, and erosion.

### *3.3.3 Mitigation*

The following mitigation measures have been identified to avoid or reduce potential impacts to soils, landforms, and other resources:

- Existing structures will be cut at the ground to minimize soil disturbance.
- Structures and new roads will be located as far as possible from nearby streams and wetlands.
- Culverts, cross-drains, and ***water bars*** will be spaced and sized properly.
- To minimize erosion, sedimentation, and soil compaction as much work as possible will be conducted during the dry season, when stream flow, rainfall, and runoff are low.
- In disturbed areas, mechanical barriers to erosion, as specified in the Storm Water Pollution Prevention (SWPP) plan, will be used.
- Vegetative buffers will be retained where possible to prevent sediment from eroding into water bodies.
- Disturbed areas would be revegetated with seed suitable for the site conditions and land use. Native seed would be used where appropriate.
- After construction, access roads, culverts, and other facilities will be inspected and maintained to ensure proper function and nominal erosion levels.
- Revegetation work and sites will be inspected to verify adequate growth; implement contingency measures as needed.

### *3.3.4 Unavoidable Impacts Remaining After Mitigation*

The mitigation measures described above would reduce unavoidable impacts to low or moderate levels. Long-term impacts remaining after mitigation would be limited to soil compaction, erosion of formerly vegetated ground, and loss or elimination of most natural biological functions from some access roads needed to reach currently isolated structures.

### *3.3.5 Cumulative Impacts*

The principal past and ongoing activities that affect soils in the vicinity of the proposed project are related to timber production and commercial and residential development. Much of the land adjacent to the ROW is managed for silviculture by private timber companies or the state of Washington. A network of logging roads covers the landscape and facilitates tree harvest. The area has been sparsely developed, but the area is growing and more development is planned.

BPA's proposal to rebuild the transmission line would add only minor, mostly temporary effects on soils to the much more widespread effects from timber production and development.

### *3.3.6 Environmental Consequences—No Action Alternative*

Construction impacts would be avoided, and the No Action Alternative thus would not have any construction-related impacts on geology or soils. However, continued operation and maintenance of the existing transmission line would have low to moderate impacts (mainly compaction and erosion) on soils from vegetation maintenance, incidental use of access roads, improvement of existing roads, and construction of new roads, if needed to reach structures for which there is currently no access. The increasing amount of maintenance that would be likely as existing structures deteriorate could lead to more erosion and compaction than currently experienced.

## 3.4 Vegetation

### *3.4.1 Affected Environment*

The vegetation in the project area is in the Western Hemlock Zone (Franklin and Dyrness 1988). The project area has been defined more broadly for wildlife habitat as part of the Westside Lowlands Conifer-Hardwood Forest, the most extensive habitat type in the lowlands west of the Cascade Mountains (Johnson and O'Neil 2001).

Elevations in the area are relatively low, ranging from about 50 feet to 300 feet above sea level. Moist air from the Pacific Ocean, 50 miles to the west, moderates temperatures and produces a mild, wet climate with a long growing season. About 80 percent of the precipitation falls during the winter. Summers are relatively dry (Pringle 1986).

The existing transmission line corridor has been cleared of all tall-growing trees. Smaller trees, especially deciduous trees, are present in some areas of the ROW. Much of the ROW is relatively low-growing invasive shrub and grass species. Forest stands along the ROW range from seedling-sapling to mature timber. No old growth timber is present.

Most of the forested areas adjacent to the ROW are mixed coniferous forest dominated by western hemlock, Douglas fir, red alder and big-leaf maple. Western red cedar is present in some stands. Salal, sword fern, and deer fern are common on the forest floor (understory), with limited cover by cascara, red huckleberry, and vine maple.

Scot's broom and Himalayan blackberry are common in open and disturbed sites, such as in the ROW. Plant species commonly found in wetlands and ***riparian*** (streamside) areas include red alder, salmonberry, skunk cabbage, small-fruited bulrush, and slough sedge. Large areas of reed canarygrass occur in disturbed wetlands.

The transmission line corridor crosses heavily forested timber lands owned by the state and private timber companies. ***Silvicultural*** practices, along with road construction and some residential development, cause the major changes to the project area's vegetation today. Human actions have resulted in less diverse plant communities. Wind is the primary natural disturbance mechanism, but events causing severe damage are infrequent (Johnson and O'Neil 2001).

**Noxious Weeds**

Noxious weeds are non-native plants that have been designated as undesirable plants by federal law or noxious weeds by state law. Noxious weeds can degrade farm and rangeland, injure people and animals, and threaten native plant communities by displacing native species and decreasing species diversity. Many weeds do not bind soil well and so contribute to erosion. County noxious weed control boards bear the main responsibility under Washington State law for directing efforts to control noxious weeds and were contacted for information on weed species of concern in the project area. Washington State law requires that Class A noxious weeds be eradicated, Class B noxious weeds be controlled or designated for control, and Class C noxious weeds be controlled on a local basis, depending on threats and the feasibility of control.

Noxious weeds are widespread throughout the project area and surrounding areas. Dense stands of Scot's broom, Himalayan blackberry and reed canarygrass are common all along the ROW. Common tansy, tansy ragwort, Canada thistle, and bull thistle are also found throughout the more disturbed areas.

**Rare Plants**

A review of the 2007 Washington Natural Heritage Program data indicated no rare plants have been documented in or near the project areas. Only one federally listed plant species (golden paintbrush) is known to occur in the region and it has only been documented in a few upland prairie locations in Thurston County. Two species of concern have been documented in or near the project areas, one in Thurston County (white-top aster), and one in Mason County (triangular-lobed moonwort).

### *3.4.2 Environmental Consequences—Proposed Action*

**Removal of Existing Structures and Installation of New Structures**

The direct impact on plants of these activities is likely to be low to moderate. Construction could result in clearing and crushing of vegetation, damage to plant roots from compaction of soils by heavy equipment, and soil disturbance. The extent of direct impacts at any one site would

depend on the quality of existing vegetation and soils, site topography, and (for new towers) whether guy lines would be used.

Removal of the existing structures would require only minimal vegetation clearing for access to the structures, and in some cases the clearing would be very near the location of new structures.

Tower installation would require the temporary clearing of about 1 acre of vegetation at each structure site, for a total of about 75 acres. Tower bases would permanently remove about 0.2 acre total of vegetation. Because no mature vegetation would be removed and the vegetation type removed would be mostly invasive native species, and the amount removed in any one are would be small, impacts would be low.

The indirect impact on vegetation from the removal of existing structures and the installation of new towers is expected to be low. Noxious weeds would re-colonize disturbed areas where they are already present, and some new areas if soils are left bare, but mulching and prompt revegetation through seeding and planting make recolonization with noxious weeds less likely.

**New ROW**

Up to 0.67 acre of ***mid-successional*** vegetation could be removed where new ROW would be needed if the vegetation poses a danger to the transmission line. Because there are large acreages of mid-successional vegetation in the project area and because the potential amount of mid-seral vegetation that could be removed is small, the proposed project would create no to low impacts to this type of vegetation.

**Access Roads**

Although existing access roads would be used in most cases, about 2 miles of new road would be built, and about 6.4 miles of existing access roads would be improved. The new roads would convert about 5 acres of existing ROW land to bare road surfaces. Improvements to existing roads would involve cutting back vegetation on each side of some existing roads and within the existing road bed. The direct impact of new road construction and existing road improvement on vegetation is expected to be low because the vegetation type removed is mostly invasive weed species, no mature vegetation would be removed, and the amount of vegetation removed in any one area is relatively small.

Temporary roads would be built for use during construction to reach sensitive areas such as wetlands. Temporary roads would crush existing vegetation, damage roots and compact soils, but vegetation would likely recover over time; the areas would be seeded to speed the process. This impact would be considered low because the vegetation type removed is mostly invasive weed species, no mature vegetation would be removed, and the amount of vegetation affected in any one area is relatively small.

The indirect impact on vegetation from roadwork is expected to be low. Noxious weeds already exist throughout much of the area, and could rapidly re-colonize disturbed soils along the road edge and along new roads. The limited amount of new disturbance and the dominance of invasive plants in much of the ROW means that any additional impact from noxious weeds is likely to be low.

**Tensioning Sites**

Approximately 6 acres would be disturbed for tensioning sites. Tensioning sites would be in existing ROW and would only be cleared of larger shrubs and trees. Heavy trucks may damage roots and compact soils, but would usually only damage the above-ground portions of low shrubs and grasses. The relatively small area of temporary clearing within the ROW, where vegetation is already maintained, would limit the impact. Noxious weeds could colonize areas where the ground surface is disturbed, especially if they are present next to the tensioning sites, but this impact would be considered low because the vegetation type removed is already mostly invasive weed species, no mature vegetation would be removed, and the amount of vegetation removed in any one area is relatively small. Thus, the direct and indirect impacts of tensioning sites on vegetation would be low.

**Operation and Maintenance**

The direct impact on vegetation from operation and maintenance of the transmission line would be low. Maintenance of the corridor would require vegetation management activities, including periodic trimming, cutting, or clearing of trees and shrubs to allow access to transmission facilities, and removal of danger trees. This work currently occurs, and would continue to be conducted under BPA's Vegetation Management Program, which uses a variety of methods to keep plants from interfering with transmission lines, including manual, mechanical, herbicide, and biological methods to foster low-growing plant communities (BPA 2000). Periodic removal of danger trees would continue, causing recurring impacts on maturing trees.

### *3.4.3 Mitigation*

Mitigation would reduce both potential impacts on vegetation and the impacts on other resources from the loss of vegetation. The following mitigation activities have been identified to avoid or reduce the adverse impacts of the proposed project:

- Use existing road systems, where possible, to access structure locations.
- Limit disturbance of native plant communities to the minimum necessary.
- Develop and implement a noxious-weed control plan to minimize the introduction and broadcast of weed seeds, which will be submitted to the county weed control boards' specialists for recommendations.
- Revegetate disturbed areas with seed suitable for the site conditions and land use. Native seed would be used where appropriate.
- Inspect revegetation work and sites to verify adequate growth and implement contingency measures as needed.
- See Section 3.7.3 for wetland mitigation measures to minimize impacts to wetland vegetation.

### *3.4.4 Unavoidable Impacts Remaining After Mitigation*

Construction of new access roads and ROW would permanently reduce vegetative cover in the project area by approximately 15 acres and temporarily remove vegetation in up to about 90 acres. Areas cleared of mature plant communities that can be revegetated would have a temporary loss of mature plants, habitat complexity, and species diversity. Because of the limited length of new ROW and road surface required and the temporary nature of the disturbance, unavoidable impacts remaining after mitigation are expected to be low to moderate.

### *3.4.5 Cumulative Impacts*

Timber production is responsible for most of the past and ongoing impacts on vegetation in the vicinity of the proposed project, a situation that is likely to persist in the future as well. Much of the land adjacent to the ROW is managed by the state and private timber companies, which grow and harvest conifers on large plantations. Development within the project area that could affect vegetation consists mainly of rural residences, with few paved roads.

Gravel mining would continue in generally the same area as current mining operations and could expand beyond the current boundaries if new sources are discovered.

BPA periodically removes danger trees along the ROW, which will continue into the future. The number and type of trees removed in the future depends on how often danger tree removal will be required, tree growth characteristics and local climate.

WSDOT performs several types of vegetation control along Highway 101 in the vicinity of the proposed project, including yearly spring applications of herbicides, summer and fall applications of herbicides to control noxious weeds, and mechanical cutting of vegetation (Ambrosino 2002).

BPA conducts regular vegetation management activities within the ROW in the spring and summer. This work involves the removal of tall-growing species such as cascara, red alder, elderberry, or vine maple that pose a threat to transmission line safety and reliability. The work is done under the guidance of BPA's Vegetation Management EIS (BPA 2000).

Cumulative impacts on vegetation from rebuilding the transmission line would be minor compared with the impacts of commercial logging and development on adjacent properties because most vegetation removed as part of the project would reestablish within several years following construction.

### *3.4.6 Environmental Consequences—No Action Alternative*

The nature of impacts to vegetation from the No Action Alternative would be similar to those described for the proposal. Their intensity would be less than those of the proposal, but could increase slightly over current levels of disturbance as maintenance needs of the old wood pole structures increase. Activities that could affect vegetation include transmission structure replacement, vegetation management activities, and access road improvements, with associated loss of vegetation.

## 3.5 Fish And Wildlife

### *3.5.1 Affected Environment*

**Fish**

The ROW crosses or is adjacent to 16 streams considered to be fish-bearing streams or probable fish-bearing streams (see Table 3-1). Thirteen of these streams contain salmonids (see Table 3-1). All streams likely have some or all of the following fish species known to occur in the region: resident cutthroat and rainbow trout, winter steelhead trout, fall Chinook, coho and chum salmon, sculpin, Coast Range sculpin, and reticulate sculpin; Western brook lamprey; and three-spine stickleback.

### Table 3-1 Streams Crossed or Near Existing Right-of-Way

| Stream | Salmonids Present |
|---|---|
| Black River | Chinook, Coho, Chum, Steelhead |
| Unnamed Creek (tributary to McClane Creek) | Coho |
| McClane Creek | Chum, Coho |
| Unnamed Creek (tributary to McClane Creek) | No Salmonids; other species likely present. |
| Swift Creek | Coho, Chum |
| Perry Creek | Coho, Chum, Steelhead |
| Unnamed Creek (tributary to Schneider Creek) | No Salmonids; other species likely present. |
| Kennedy Creek | Chum, Coho, Steelhead |
| Unnamed Creek (tributary to Skookum Creek) | No Salmonids; other species likely present. |
| Skookum Creek | Chum, Coho, Steelhead |
| Little Skookum Creek | Coho, Chum, Steelhead |
| Unnamed Trib to Gosnell Creek (Crossing A) | Coho |
| Unnamed Trib to Gosnell Creek (Crossing B) | Coho |
| Gosnell Creek | Coho, Steelhead |
| Coffee Creek | Coho, Chum |
| Goldsborough Creek | Coho, Chum, Steelhead |

**Wildlife**

The proposed project area is dominated by upland forest habitat consisting of ***early***- to mid-successional mixed coniferous forest, but also several other wildlife habitat types including wetlands and rural residential areas. Trees have been removed within the ROW, leaving it dominated by shrubs and herbaceous vegetation. Wetland and riparian habitats are scattered throughout the ROW.

More than 300 vertebrate species are associated with the forests of western Washington (Johnson and O'Neill, 2001). There is a high density of these species, especially where habitats encompass riparian wetlands and urban, agricultural, and pasture lands. Key habitat elements within the project area include old-growth forests, early-successional stands, riparian forests, and forest edges. Most wildlife using the project area are likely to use all habitat types at one time or another for cover, breeding, nesting, foraging, or migrating.

Mammals common or present in the ROW and adjacent areas include mule deer, elk, coyote, raccoon, mice, rat, shrew, squirrel, bat, and mink. Mule deer, elk, coyote, and raccoon likely use the ROW as a corridor to move between foraging areas. Birds common or present in the ROW and adjacent areas include chickadee, swallow, woodpecker, owl, hawk, and thrush. Songbirds are the largest wildlife group within the ROW and adjacent areas. Reptiles and amphibians common or present in the ROW and adjacent areas include garter snake, bullfrog, various salamander species, newts, and tree frogs.

**Threatened and Endangered Species**

Four species listed as ***threatened*** under the federal Endangered Species Act (ESA) are known to occur in the region around (and possibly including) the project area: Puget Sound Chinook salmon, Puget Sound steelhead trout, marbled murrelet, and northern spotted owl. The bald eagle is state-listed as threatened. Each species is discussed below.

The potential for bull trout, a listed species, to be found in the project area was investigated. None of the streams have been documented as containing bull trout, and no critical habitat has been designated for any of the streams affected by the proposed project.

**Puget Sound Chinook Salmon**. The Puget Sound Chinook salmon is federally-listed as Threatened. Chinook salmon are only found in the Black River, near the southern end of the project area. The Black River in this area is only used as a migratory corridor and is not used for spawning.

**Puget Sound Steelhead Trout.** The Puget Sound Steelhead is federally-listed as threatened. Steelhead are found in six creeks crossed by the project area: Kennedy Creek, Skookum Creek, Little Skookum Creek, Perry Creek, Gosnell Creek and Goldsborough Creek. Skookum Creek is used by steelhead for spawning in the area crossed by the project, but the other creeks are only used by steelhead as migratory corridors between the ocean and upstream spawning areas.

**Marbled Murrelet.** The marbled murrelet is a federally and state-listed threatened bird. Marbled murrelets require large blocks of mature coniferous forest for nesting, in particular trees with large branches high above the ground. Most of the habitat in and near the project area does not have large trees with large branches, and there is no critical habitat near the project area. Overall, the young age of the surrounding stands and the high levels of disturbance make it very unlikely that marbled murrelets would be found in or near the project area.

**Northern Spotted Owl.** The northern spotted owl is federally-listed as threatened and state-listed as endangered. Its habitat requirements are similar to the marbled murrelet. Forested areas alongside the ROW could provide limited roosting and foraging habitat, but suitable stands are small and scattered. Many stands are located near Highway 101 and are continually affected by traffic noise and road activity. No critical habitat is nearby. Use of the ROW and adjacent areas by the owl is unlikely is limited due to stand size, fragmentation, and related edge effects.

**Bald Eagle.** The bald eagle is state-listed as threatened. Although bald eagles are commonly seen near coastal areas, which are within a mile of the project area in some places, their use of the project area is likely limited to occasional fly-overs and perching. No bald eagle nests have

been identified within the ROW, although there are several known nests within 2 miles of the ROW (the closest nest is approximately 1 mile from the ROW). Bald eagles may winter throughout the project area and they may forage in the larger streams where anadromous salmonids are found.

**Essential Fish Habitat (EFH)**

Both Chinook and coho salmon, which are administered under the amended Magnuson-Stevens Fishery Conservation and Management Act (see Section 4.3.1), occupy streams in the vicinity of the proposed project. The Act designates Essential Fish Habitat for these species. EFH may be found in the streams in Table 3-1 that are known to contain Chinook and/or coho salmon.

### *3.5.2 Environmental Consequences—Proposed Action*

**Fish**

**Removal of Existing Structures and Installation of New Structures**. Direct impacts on fish from these activities are expected to be low. No equipment would enter streams to remove existing structures or install new ones. Existing structures located immediately adjacent to fish-bearing streams or wetlands would be cut off at ground level to minimize impacts. Structures would be dragged out or lifted out by crane to avoid bringing construction equipment into streams and wetland areas. No new structures would be placed near streams or within riparian areas.

Removing and installing structures has the potential for indirect impacts on fish due to the introduction of sediment into fish-bearing streams. Increased ***turbidity***, the suspended sediment carried by the stream, affects fish directly by abrasion, clogging of gills, decreased feeding success due to reduced visibility, degradation of spawning gravels, increased egg and fry mortality, and reduced fry growth rates, and also could affect aquatic prey. BPA would use standard construction practices and best management practices (BMPs) that would minimize or eliminate the delivery of sediments into streams (see Section 3.6.3, **Water Quality**). Accordingly, no to low indirect impacts are expected.

**New ROW.** New ROW would be acquired near Coffee Creek, and this ROW would need to be cleared of vegetation for the proposed project. New ROW would not be necessary near any other creeks or streams that could serve as fish habitat. For the ROW near Coffee Creek, clearing would be limited to upland plants and trees. There would be no impacts to riparian vegetation from clearing of new ROW, therefore, no to low impacts would be expected, with corresponding no to low impacts to fish.

**Access Roads.** No work associated with access roads would take place within fish-bearing streams. Some roadwork would take place near fish bearing streams, such as ditch cleaning and repairing, rocking, and minor grading. However, these activities would improve the road surface and road drainage, which would reduce the amount of fine sediment that could otherwise runoff into fish-bearing streams. Road work is not expected to endanger fish populations in the vicinity of the proposed project and impacts to fish would be low.

**Tensioning Sites.** No impacts to fish from conductor tensioning sites are expected because these areas would not be placed within 50 feet of streams.

**Operations and Maintenance.** Direct impacts on fish from existing and future routine maintenance activities are expected to be low. Maintenance activities could include access road improvements, culvert cleaning, and vegetation management. Maintenance activities would be unlikely to result in the injury or death of fish, so this impact would be no to low.

Maintenance activities could result in habitat alteration due to cutting riparian vegetation, use of pesticides, changes in runoff and infiltration patterns (from upland vegetation clearing), sedimentation from cleared areas, and maintenance of access roads across streams. Effects from vegetation management activities are expected to be low because impacts would be minimized by implementing the standard mitigation described in the BPA's Vegetation Management EIS (BPA 2000). Impacts from road maintenance would be low.

**Wildlife**

**Removal of Existing Structures and Installation of New Structures**. Direct impacts on wildlife from these activities are expected to be low to moderate. Loss of foraging habitat and ground-nesting habitat around existing structures is expected to have a low impact because the small amount of habitat that would be disturbed is unlikely to result in their injury or death. About 6 acres within two realignment areas could be cleared of trees. After construction if tall vegetation would be a danger to the transmission lines in the corridor, only smaller shrubs would be allowed to grow in the ROW.

Increased noise from construction equipment and human activities during the non-breeding season is expected to have a low impact on wildlife, as species would likely avoid construction sites temporarily. Increased noise during the general breeding season (March to August) could result in moderate impacts on wildlife, if noise levels reduce the foraging effectiveness of adults or cause adults to abandon nest sites, thus leading to mortality in their young.

Low indirect impacts on wildlife are expected because the amount of habitat that would be disturbed is a small percentage of the habitat available to wildlife in and along the ROW. Although noxious weeds could establish themselves in the disturbed area surrounding structures, BPA's vegetation management program is expected to minimize that potential.

**Access Roads.** Direct impacts on wildlife from access road work are expected to be low because removal of a small amount of low quality habitat, including some trees, is not expected to endanger wildlife populations or result in their injury or death. Species are expected to use surrounding non-affected areas for foraging and ground-nesting activities. Increased noise may cause wildlife to temporarily avoid the immediate work areas.

Indirect impacts on wildlife that could result from roadwork include the introduction of sediments to undisturbed areas, the introduction of weed species, increased levels of noise, and some increased human access. Impacts are expected to be low to moderate. The work would cause only short-term degradation in the quality of wildlife habitat and generally would not disturb ESA-listed species.

**Tensioning Sites.** Direct and indirect impacts on wildlife from conductor tensioning sites are expected to be low to moderate, depending on their locations. There would be short-term degradation to wildlife habitat inside and outside of the ROW from damage to vegetation and the possible short-term destruction of local prey species. Also, indirect impacts on wildlife could result from noxious weeds becoming established before native species have recovered.

**Operation and Maintenance.** Some small level of bird mortality would be expected as a result of collisions with conductors and structures. However, it is not expected to be higher than current levels as there are no known unusual circumstances, such as flyways in the project area, which would contribute to high levels of mortality, and there is an existing facility already in place. The 230-kV conductors are too widely spaced for an electrical connection to occur that would result in the electrocution of raptors. The overall level of impacts would be low.

Migratory waterfowl have the highest incidence of mortality from collision with transmission lines, particularly near wetlands, feeding areas, or ***open water*** (Stout and Cornwell 1976). The line crosses few areas of open water or wetlands; it primarily crosses forestland. Because the existing line has not been documented to be a problem in the past, it is unlikely that the new line would have an increased adverse effect on waterfowl.

Maintenance activities would remove trees and temporarily displace wildlife from work areas, but impacts are expected to be low, as this type of disturbance currently occurs regularly within the ROW.

## Priority Habitats

Direct and indirect impacts on priority habitats and species from the construction, operation, and maintenance of the transmission line are expected to be low to moderate. The ROW crosses several priority habitats for wildlife, but impacts to all priority habitat and species areas are expected to be low, because no new ROW would be required in these areas and the project takes place in previously cleared and disturbed areas.

## Threatened and Endangered Species

Federally and state listed species are not expected to be affected by the project.

No direct or indirect impacts on bull trout are expected because no population of bull trout exists within the project area.

No impacts to Puget Sound chinook and steelhead are expected because no in-water work will take place in the four streams in the project area that support these species.

There would be no effect upon northern spotted owls, as no large trees suitable for nesting would be removed and no critical habitat would be affected. Although some small areas of trees that could be suitable for perching or foraging may be removed, these impacts would be negligible because surrounding habitat quality is poor. Increased noise due to construction activities could cause spotted owl to avoid construction areas, a minor and temporary impact. Because the proposed project is near several highways, any spotted owls in the vicinity would likely be accustomed to higher ***ambient noise*** levels and would be less affected by construction noise.

There would be no effect on marbled murrelet, as no removal of habitat (nesting) trees would take place and no critical habitat would be affected.

There would be no effect upon bald eagles since their use of the project area is likely to be incidental. No known roosting or nesting trees would be removed. The brief increase in construction-related noise could possibly cause bald eagles to avoid active construction areas, a temporary impact; however background noise levels are high in the project area, which likely already precludes eagle use.

### *3.5.3 Mitigation*

The following mitigation measures have been identified to avoid or reduce impacts to fish and wildlife:

- When working in or next to water bodies, disturbance would be limited to the minimum necessary.
- Existing structures would be cut at the ground surface to minimize soil disturbance.
- Removal of forest habitat will be limited to those trees that would interfere with transmission lines or those cut to create access roads.
- BPA would adopt additional measures identified by the USFWS and/or NOAA Fisheries to avoid or minimize impacts to fish and wildlife, such as avoiding construction in certain areas during spawning, breeding, or nesting seasons.
- Disturbed areas would be revegetated with seed suitable for the site conditions and land use. Native seed would be used where appropriate.
- Tensioning sites would not be located within 50 feet of streams or wetlands.

### *3.5.4 Unavoidable Impacts Remaining After Mitigation*

Construction could cause short-term, localized degradation of habitat quantity or quality. Some forested habitats would be permanently converted to roads (about 5 acres) or shrub-dominated ROW (about 10 acres). This would not substantially affect fish and wildlife or their habitat because of mitigation measures, seasonal work restrictions for in-water work (culvert replacements), the short-term nature of the effects on water quality, and the amount of remaining wildlife habitat in the project area. Therefore, impacts would be low to moderate.

### *3.5.5 Cumulative Impacts*

Forested lowlands in western Washington have been managed for timber production for more than 100 years, resulting in the loss of most, and the fragmentation of the remaining, ***late-successional*** forests. Species dependent on these forests, such as marbled murrelets and northern spotted owls, have declined dramatically in the region as a result (Johnson and O'Neill 2001).

Past and future danger tree removal may contribute to the loss of upland and riparian vegetation. Logging operations conducted along the ROW adjacent to water bodies have the potential to adversely affect water quality and fish habitat through erosion and release of sediments to fish-bearing waters downstream. Past culvert replacements by BPA and others typically have improved fish passage as old culverts have been replaced with WDFW-recommended culverts.

WSDOT's scheduled road improvements and vegetation control along highways could also remove or degrade small amounts of fish and wildlife habitat. WSDOT does not use herbicides in sensitive areas such as streams (Ambrosino 2002).

Impacts related to this project are unlikely to contribute to further cumulative loss of wildlife habitat. The amount of habitat lost due to the proposed project is relatively small. Important corridors connecting key wildlife habitats, such as streams and riparian zones, would not be substantially affected by the project. In addition, because the proposed project would not affect old growth habitat, it would not contribute to the cumulative loss of remaining late-successional forests or species that use such areas.

### *3.5.6 Environmental Consequences—No Action Alternative*

Current levels of disturbance to fish and wildlife and their habitat would continue, or perhaps increase slightly. Activities that could affect fish, wildlife, or their habitat include vehicular traffic, replacement of transmission structures, vegetation management, and access road improvements. The current condition of the transmission line may contribute to the need for increased emergency and on-going repairs as the condition of structures continues to deteriorate. These activities could cause loss of vegetation, temporary increases in turbidity, and temporary increases in noise. Impact levels would range from low to moderate. In an emergency situation, it may be impossible to avoid maintenance activities or major repairs during sensitive periods for species that use the area. For these reasons, impact levels would be expected to be low.

## 3.6 Water Quality

### *3.6.1 Affected Environment*

**Surface Water**

The existing transmission line corridor crosses 16 ***perennial*** streams, 13 of which contain salmonids (see Table 3-1).

The streams along the ROW lie within the Kennedy-Goldsborough ***watershed***, Water Resource Inventory Area (WRIA 14). The state is required under Section 303(d) of the Federal Clean Water Act and the U.S. Environmental Protection Agency's (EPA's) implementing regulations (40 CFR 130) to prepare a list of water-body segments that do not meet state water quality standards for surface water. The Washington Department of Ecology's WRIA is part of an integrated report designed to meet the Federal Clean Water Act requirements of sections 305(b) and 303(d). Waters, including streams, are classified into the following categories (Washington Department of Ecology, 2004):

***Category 1*: Meets tested standards for clean waters**. Placement in this category does not necessarily mean that a water body is free of all pollutants. Most water quality monitoring is designed to detect a specific array of pollutants, so placement in this category means that the water body met standards for all the pollutants for which it was tested. Specific information about the monitoring results may be found in the individual listings.

***Category 2*** is for **waters of concern**. There are several reasons why a water body would be placed in this category. A water body might have pollution levels that are not quite high enough to violate the water quality standards, or there may not have been enough violations to categorize it as impaired according to WDOE's listing policy. There might be data showing water quality violations, but the data were not collected using proper scientific methods. In these situations, these waters will need to continue to be tested.

***Category 3*** - There is no Category 3 classification.

***Category 4*****: Polluted waters that do not require a Total Maximum Daily Load** (TMDL) is for waters that have pollution problems that are being solved in one of three ways.

> ***Category 4*****a** is for water bodies that have an approved TMDL.
>
> ***Category 4*****b** is for water bodies that have a pollution control plan in place. While pollution control plans are not TMDLs, they must have many of the same features and there must be some legal or financial guarantee that they will be implemented.
>
> ***Category 4*****c** is for water bodies that are impaired by a non-pollutant. These impairments include low water flow, stream channelization, and dams. These problems require complex solutions to help restore streams to more natural conditions.

***Category 5*****: Polluted waters that require a TMDL**. Placement in this category means that Ecology has data showing that the water quality standards have been violated for one or more pollutants, and there is no TMDL or pollution control plan. TMDLs are required for the water bodies in this category.

EPA approved Category 5 of the Water Quality Assessment on November 4, 2005. Category 5 represents the state's 303(d) list of impaired waters. Table 3-2 lists the streams the transmission line crosses and their respective classification.

## Table 3-2 303(d) Listed Streams within Right-of-Way

| Stream Name | Category | 303(d) list parameter |
|---|---|---|
| Coffee Creek | 1 | Fecal Coliform |
| Goldsborough Creek | 4C | Instream Flow |
| Kennedy Creek | 5 | Dissolved oxygen, Fecal Coliform |
| Kennedy Creek | 4A | Temperature |
| Skookum Creek | 5 | Fecal Coliform, Temperature |
| Skookum Creek | 4C | Instream Flow |
| Little Skookum Creek | 1 | Fecal Coliform |
| McLane Creek | 5 | Fecal Coliform |
| McLane Creek | 2 | pH |
| Black Lake Ditch | 5 | Temperature |
| Source: Washington Department of Ecology, 2004. | | |

## Groundwater

The groundwater and hydrology in the project area primarily consists of layered sediments deposited by glaciers that covered the region up until 10,000–14,000 years ago (Washington Department of Ecology, 2004). Sediment deposition within the project area varied depending on the landscape positioning (i.e., ***glaciofluvial*** deposits from meltwater streams in lower lying elevations produce stratified sediment deposition). As a result of the varied stratigraphy within the project area***, transmissivity***, the rate at which water passes through a unit width of an ***aquifer***, can vary widely. No ***sole-source aquifers*** have been designated or proposed by EPA in the area (US EPA 1996). Groundwater quality in the Kennedy-Goldsborough watershed is generally fair and efforts are underway by both Thurston and Mason counties to improve water quality through various means (e.g., adopting a risk-based approach to approving septic tank permits) (Washington Department of Ecology, 2004).

### *3.6.2 Environmental Consequences—Proposed Action*

## Surface Water

**Removal of Existing Structures and Installation of New Structures.** The potential for direct impacts on water quality is expected to be low. In general, impacts would depend on the timing of construction, weather conditions, local topography, the erosion potential of soils, and the effectiveness of BMPs implemented during construction to minimize soil erosion. The activities with the greatest potential for direct impacts would be removal or installation of structures immediately adjacent to water bodies, especially perennial, fish-bearing streams (see Section 3.5, **Fish and Wildlife**, for a discussion of increased turbidity on fish), because of the likely resulting erosion and increased runoff to these water bodies. However, there is only one structure (Structure 18/4) within the entire proposed project ROW that is within 50 feet of a ditch which is hydrologically connected to Coffee Creek. In addition, direct impacts from excavation for new structures are expected to be low because excavated soils would not be discharged to surface waters.

Vegetation removal and soil disturbance along the existing right-of-way also would increase wind and water erosion rates, which could result in increased sediment deposition into stream channels and increased turbidity. Erosion rates would return to their current levels once vegetation becomes reestablished. BPA would implement standard construction practices and BMPs that would minimize direct impacts on water quality. Turbidity and sedimentation impacts on water resources would be reduced after temporary and permanent runoff and erosion controls are installed and would continue to diminish after revegetation. Impacts to water quality from vegetation removal and soil disturbance thus would be expected to be low.

Direct impacts on water quality also could result from dewatering holes that are augered for new structures. Such impacts are expected to be low because only clean infiltration water that meets state water quality standards for turbidity would be discharged to streams or other waters of the state, and only if the discharge rate does not cause erosion or flooding. Clean water would not be mixed with dirty water. Turbid water from the holes would be conveyed to temporary holding areas, pumped to water trucks, infiltrated, or dispersed in nearby vegetated areas.

Direct impacts on surface water quality resulting from oil and fuel spills from construction equipment used adjacent to streams or wetlands are expected to be low. Tanks and equipment containing oil, fuel or chemicals will be checked regularly for drips or leaks and will be maintained to prevent spills onto the ground or into state waters. All equipment and vehicles would be maintained and repaired on an impervious surface away from all sources of surface water. If the work must be done in the rain, it will take place undercover. Refueling and equipment maintenance would be carried out at least 200 feet from streams and wetlands, and spill containment and cleanup would be provided. All equipment fueling operations will utilize pumps and funnels and absorbent pads. Fueling will not take place adjacent to any natural or manmade drainage conveyance including ditches, catch basins, ponds, wetlands, and pipes. Spill prevention kits will be provided at designated locations on the project site and at the hazardous material storage areas.

It is not expected that there would be any impacts from fresh concrete coming in contact with surface water and elevating surface water pH. Concrete would not be poured directly into any surface waters, and it is extremely unlikely that large volumes of fresh concrete would inadvertently enter surface water.

**Access Roads.** Direct impacts would be similar to those from structure removal and installation. Culvert installation and replacement could disturb bank soils and streambank vegetation. Where roads are improved immediately adjacent to stream channels, direct deposition of soil into the stream channel could increase turbidity and sedimentation. Eroded soils carried to water bodies by wind and sheet flow could also lead to this effect. As a result, water quality criteria in the project area could be exceeded at times during construction, but this would be considered a low impact because of the extremely short-term nature of the exceedences and the low level of exceedences that would be expected to occur due to implementation of standard BMPs by BPA.

Two culverts would be placed in unnamed ephemeral ditches (one between structures 11/3 and 11/4, and one at structure 17/9) to provide reliable access during the winter months. Another culvert would be placed in an unnamed ephemeral tributary to Coffee Creek at structure 18/4 to provide reliable access during the winter months.

Overall, the effect on temperature and turbidity to streams associated with access road improvements would be localized and short term. Impacts on surface water quality would be minimized because construction would occur during the dry season and implementation of BMPs would reduce the potential for erosion. This impact thus would be expected to be low.

**Tensioning Sites.** There are 6, one-acre tensioning sites proposed for the project. Direct and indirect impacts on surface water quality are expected to be low because tensioning sites would not be located within 50 feet of waterways and wetlands. Equipment used for tensioning conductors may compact soils, potentially resulting in increased surface runoff. Depending on how close the sites are to surface water, activities there could result in minor direct impacts on surface water quality such as increasing turbidity through transport of soil via surface runoff. Any impacts on surface water quality would be short term, localized, and likely would not exceed state or federal criteria.

**Operation and Maintenance.** Direct impacts on surface water quality from routine access road maintenance are expected to be low to moderate. Activities such as grading and placing rock on roads, replacing failed culverts, and controlling vegetation could increase erosion and surface water turbidity, possibly causing water quality criteria to be exceeded temporarily in a short stretch of stream. Perennial fish-bearing streams located near maintenance activities are at greatest risk for water quality impacts. A variety of factors, including the effectiveness of BMPs, could affect the nature and amount of impact, as described in the section on structure impacts.

Direct and indirect impacts on water quality from herbicides used in vegetation management are expected to be low to moderate. Herbicides would be applied with buffer widths as specified in BPA's Vegetation Management Program (BPA 2000). Because only spot spraying is proposed for the vegetation management activities planned, buffers would be 0 feet if herbicides classified as Practically Non-toxic to Slightly Toxic were used; 25 feet if herbicides are classified Moderately Toxic or are labeled with an Advisory for Ground/Surface Water; and 35 feet if the herbicide is classified as Highly Toxic to Very Highly Toxic) (BPA 2000). In the event of overspray, herbicides could be inadvertently applied directly to surface waters. Impacts could also occur if herbicide residues on vegetation and soil are transported to surface waters when it rains or snows.

**Groundwater**

Direct impacts on groundwater from project activities are expected to be low. The project could directly affect groundwater quality through soil compaction, reducing infiltration capacity, increasing surface runoff to streams, and possibly increasing groundwater turbidity. However, the ratio of the potential impact area to the area available for groundwater recharge is extremely small. Any impacts would be localized, short-term, and likely would not exceed state or federal water quality criteria.

It is expected that direct impacts on groundwater quality from petroleum spills would be low. Such spills could infiltrate to the groundwater ***aquifer,*** but such an event is unlikely, given the precautions required (see previous discussion under **Surface Water)**. Any chemical spills would be of small volume, contained, and cleaned up.

### *3.6.3 Mitigation*

The following mitigation measures have been identified to decrease surface runoff and exposed soil, and to avoid or reduce other potential water quality impacts:

- An environmental specialist would meet with contractors and inspectors in the field to visit wetlands and waterways near or within construction areas to review avoidance and mitigation measures and any permit requirements.
- A Stormwater Pollution Prevention Plan would be prepared and implemented, addressing measures to reduce erosion and runoff and stabilize disturbed areas.
- Existing structures within 50 feet of waterways would be cut at the ground surface to minimize soil disturbance.
- When working in or near water bodies and wetlands (buffer areas), disturbance would be kept to the minimum necessary.
- Vegetative buffers would be retained where possible to prevent sedimentation into water bodies.

- To minimize erosion, sedimentation, and soil compaction, as much work as possible would be conducted during the dry season, when stream flow, rainfall, and runoff are low.
- No construction vehicles and equipment would be placed within 50 feet of any stream or wetland unless it is authorized by a permit or is on an existing permanent or temporary road constructed for access to the site.
- Tensioning sites would not be located within 50 feet of streams, wetlands, or ***floodplains***.
- Roads and structures would be located to avoid wetlands whenever possible.
- Roads would be designed and constructed to minimize drainage from the road surface directly into water features, including wetlands.
- Mitigation measures required by WDFW would be followed when conducting instream work.
- A Spill Prevention Control and Countermeasure (SPCC) Plan would be developed and implemented to minimize the potential for spills of hazardous material.
- Machinery would be refueled and stored at least 200 feet from wetlands and waterways and would be inspected regularly for leaks.

### *3.6.4 Unavoidable Impacts Remaining After Mitigation*

Implementation of identified mitigation and revegetation would return the ROW to essentially existing conditions. However, even with mitigation, construction activities would be expected to cause some short-term, localized water quality degradation during construction. These activities would not be expected to substantially affect water quality because of the mitigation measures implemented, seasonal work restrictions for in-water work (culvert replacements), and the short-term, episodic nature of the effects on water quality. Therefore, water quality impacts after implementation of mitigation are expected to be low.

### *3.6.5 Cumulative Impacts*

Various other activities in the project vicinity have the potential to adversely affect water quality through erosion and overland transport of suspended sediments to streams downstream of these operations. They include past, present, and future residential development; logging operations; ongoing road and bridge maintenance; and BPA's danger tree removal program. Because the anticipated post construction conditions within the ROW would be essentially the same as the existing baseline conditions, it is expected that the proposed project would not result in adverse impacts to the aquatic environment or contribute to significant cumulative impacts.

As previously described, herbicides would be applied with buffer widths as specified in BPA's Vegetation Management Program (BPA 2000). BPA would only use herbicides in vegetation control where appropriate. Where there is flowing water present, no herbicides are applied. Herbicides are applied according to the product label directions and are not applied in sensitive areas such as streams. WSDOT also uses mechanical and biological vegetation control methods.

### *3.6.6 Potential Impacts—No Action Alternative*

Potential impacts to surface and groundwater quality would be similar to those described for the proposal's operation and maintenance program because the existing line would continue to be operated and maintained.

## 3.7 Wetlands

### *3.7.1 Affected Environment*

Field surveys in December 2006 and May 2007 identified several wetland areas within and adjacent to the existing ROW. Wetlands in the project area are associated mainly with topographic depressions or riparian areas. Forested, emergent, and ***scrub-shrub*** wetlands are all present within or adjacent to the existing ROW. Most of the ***palustrine emergent wetlands*** adjacent to creeks or ditches had monotypic vegetation structure consisting of reed canarygrass. Other palustrine emergent wetlands are isolated, forming in depressions, and have a mix of vegetation consisting of small-fruited bulrush, slough sedge, common horsetail, yellow iris, and soft rush. Scrub-shrub wetlands within the existing ROW were located adjacent to the reed canarygrass dominated wetlands and are mostly Douglas spirea and salmonberry.

### *3.7.2 Environmental Consequences—Proposed Action*

**Removal of Existing Structures and Installation of New Structures**

Removal of the existing Olympia-Shelton No.1 115-kV line would involve the removal of five existing structures within wetlands, resulting in 0.05 acre of temporary impacts (see Table 3-3). To minimize impacts associated with the removal of existing structures, existing pole structures would be cut at the base with no soil disturbance, and lifted or dragged from the wetland area. Plants within a small radius of the existing structures may be trampled, broken, or crushed by equipment when the structures are dismantled and removed by crane. However, these impacts are only expected to result in brief loss of wetland functions such as nutrient assimilation reduction as a result of vegetation loss. Wetland boundaries in these areas would be marked to restrict the work area so that disturbance would be minimized. Impacts to wetlands associated with the removal of existing structures would be low.

Construction of each new structure of the 230-kV line would temporarily disturb about 1 acre (200 feet by 200 feet). Most new structures would be built outside of wetlands. However, six proposed structures would be located in wetlands, which would result in a total of about 6 acres of temporary impacts to wetlands from construction of the new structures. Each new structure would create about 0.009 acre of permanent impacts, totaling 0.054 acres of permanent impacts to wetlands (see Table 3-3).

For the six new structures built in wetlands, impacts to wetland hydrology associated with the installation of the tower footings are expected to be temporary and minor, as the hydrologic source in depressional wetlands occurs above the 6 foot depth of the minimal footing depth. The riparian wetlands hydrology is strongly influenced to the surface water elevation of the adjacent stream; placement of footings well below the seasonal low water elevation is not expected to have a permanent impact to riparian wetland hydrology. Additionally, most of the hydric soils within the project site have a high water holding capacity because their texture is largely loamy-clay. The top 18 inches of soil would be removed and kept separate from the remaining soil column removed for footing installation. After installing each footing, BPA would backfill using the top 18 inches of the original soil. By maintaining the soil column, native vegetation could reestablish from the seedlings within the upper 18 inches of native soil. Where invasive species (i.e., reed canarygrass) is present, BPA could replant with native species, but past replanting

attempts have failed to outcompete reed canarygrass with native emergent species. Accordingly, this impact would be considered low to moderate.

## Table 3-3 Structures In Wetlands

| Existing Structure in Wetland | Temporary Impacts for Removal (acres) | Proposed Structure within Wetland | Temporary Impacts for Installation (acres) | Permanent Impacts for Installation (acres) |
|---|---|---|---|---|
| | | 12/2 | 1 | 0.009 |
| 11/7 | 0.01 | 11/7 | 1 | 0.009 |
| 18/1 | 0.01 | 18/1 | 1 | 0.009 |
| 18/2 | 0.01 | 18/2 | 1 | 0.009 |
| 18/3 | 0.01 | 18/3 | 1 | 0.009 |
| 18/4 | 0.01 | 18/5 | 1 | 0.009 |
| **Total** | **0.05** | | **6** | **0.054** |
| *Note that installation impacts are not in addition to removal impacts. | | | | |

### Access Roads

To provide sufficient access for construction, operation, and maintenance of the transmission line, BPA would construct and/or improve several access roads impacts (see Table 3-4). All road construction and/or improvements would use clean fill material to achieve necessary grades. Proposed road improvements would consist of blading/shaping for site preparation, installation of geotextile for soil stability, rocking of road surfaces, and installing culverts to improve maintenance access. Five wetlands would be impacted by access road construction and improvements (see Table 3-4). Most of the wetlands that would be impacted by access road improvements or construction extend beyond the existing ROW and have varying vegetative structure and functional value. Within the existing ROW where access roads would be improved or constructed, wetland functional value is typically low based on the dominance of reed canarygrass and low habitat value. Outside of the existing ROW wetland functions increase based on vegetative specie diversity that provide better habitat. Approximately 1.38 acres of wetland would be impacted by blading/shaping for site preparation, installation of geotextile for soil stability, and rocking of road surfaces. Access road construction and improvements to existing access roads are expected to have a low to moderate impact on wetland functions and values because of limited road construction and improvements planned within wetlands, and the functional value of impacted wetlands (Jones and Stokes, 2007).

### Tensioning Sites

The use of tensioning sites would have impact on wetlands because the sites would not be located within wetlands.

### Operation and Maintenance

Overall, operation and maintenance is expected to have a low impact on wetlands and waterways. Maintenance would include occasional trimming or removal of tall-growing vegetation from wetlands and adjacent uplands and road maintenance activities near or within wetlands. Maintenance of structures or roads in or directly adjacent to wetlands would rarely be needed, but could result in minor disturbance of wetland or adjacent upland vegetation. This would be considered a low impact.

## Table 3-4 Road Improvements In Wetlands

| Access Road within Wetland (Wetland Identification number*) | Type of Activity | Permanent Impacts (acres**) |
|---|---|---|
| 10/5-1 | Construct New Access Road | 0.01 |
| 11/3-1 | Improve Existing Access Road | 0.15 |
| 16/6-1 | Improve Existing Access Road | 0.18 |
| 17/8-1 | Construct New Access Road | 0.74 |
| 18/4-1 | Improve Existing Access Road | 0.30 |
| Total | | 1.38 |

* Wetland identification numbers are from Jones & Stokes. 2007. Final Wetland Delineation Report. Olympic Peninsula Reinforcement Project.

** Based on 20-foot wide disturbance.

### *3.7.3 Mitigation*

The following mitigation measures have been identified to avoid or reduce impacts on wetlands:

- Roads and structures will be located to avoid wetlands and streams wherever possible.
- Any construction activities within wetlands will be designed and implemented to minimize impacts, and BPA will coordinate with the Army Corps of Engineers (ACOE) to obtain a permit pursuant to Section 404 of the Clean Water Act for any fill placed in waters of the United States (i.e., jurisdictional wetlands) and comply with any required mitigation required by the ACOE.
- An environmental specialist will meet with contractors and inspectors in the field to visit wetlands and waterways near or within construction areas to go over avoidance and mitigation measures and any permit requirements.
- Wetland boundaries in the vicinity of construction areas will be flagged or staked so wetlands and streams can be avoided.
- When working next to wetlands and water bodies, disturbance will be limited to the minimum necessary.
- No machinery, construction vehicles and equipment will be placed within 50 feet of any stream or wetland unless it is authorized by a permit or is on an existing permanent or temporary road constructed for access to the site.
- Tensioning sites will not be located within 50 feet of wetlands.
- Machinery will be refueled and stored at least 200 feet from wetlands and waterways and inspected regularly for leaks.
- Mitigation measures required by the Washington Department of Fish and Wildlife (WDFW) will be used when conducting instream work.
- Erosion control measures to avoid sedimentation of wetlands and streams will be used.
- When temporary roads are built in wetlands, contractors will underlay temporary fill with geotextile fabric, remove all fill, and revegetate according to required permits.

- When holes are excavated for structures in wetlands, contractors will avoid depositing excavated material into wetlands by placing geotextile fabric around the excavation site, removing all excavated material from the wetland, and stabilizing it in an upland area.
- Disturbed areas will be revegetated with native species if possible, and specific revegetation guidelines in permits will be followed.

### *3.7.4 Unavoidable Impacts Remaining After Mitigation*

BPA will work with the ACOE to determine the appropriate compensatory mitigation for the proposed impacts. Based on operational constraints such as not allowing large trees within the ROW, BPA would either seek on-site emergent wetland enhancement opportunities or off-site in-kind mitigation. While these measures would lessen project impacts, the disturbance and removal of existing wetlands would be unavoidable.

### *3.7.5 Cumulative Impacts*

Wetland and water resources have been impacted in the region because of past and current development and agricultural and forestry operations. Future development activities could result in the further degradation and reduction of wetlands and water resources in the region.

County-funded and WSDOT's routine maintenance of existing roads and bridges could be done in or near wetlands in the project area, but, similar to BPA's road maintenance work, such activities are expected to have no or low impact on wetlands. Past, present, and future vegetative maintenance activities in the project area, including BPA's danger-tree removal project, have affected wetland functions. BPA has removed danger trees in and near some wetland areas along the ROW; wetland vegetation was crushed and soils were compacted in some wetlands and wetland buffer areas. Road maintenance conducted by BPA resulted in impacts to some wetlands associated with stream crossings.

The ACOE issues permits under Section 404 of the Clean Water Act for the discharge of dredged or fill material into waters of the United States, as defined in 33CFR 328.3. Waters of the United States includes wetlands as specified in 33CFR 328.3. The Seattle District of the ACOE issues hundreds of Section 404 permits each year. Although total acreage of wetlands in the two counties affected by this project is unknown, given the limited size and scope of the project, the temporal impacts associated with the proposed project, and the compensatory wetland mitigation that would be provided, it is reasonable to believe the implementation of the proposed project would not result in or contribute to adverse cumulative impacts to wetlands or other riparian areas.

### *3.7.6 Potential Impacts—No Action Alternative*

Construction impacts would be avoided, and the No Action alternative thus would not have any construction-related impacts on wetlands. However, continued operation and maintenance of the existing transmission line could result in low to moderate impacts to wetlands from ongoing vegetation maintenance, incidental use of access roads, improvement of existing roads, and construction of new roads, if needed to reach structures for which there is currently no access.

The increasing amount of maintenance that would be likely as existing structures deteriorate could lead to more wetland disturbance than currently experienced.

## 3.8 Floodplains

### *3.8.1 Affected Environment*

The Federal Emergency Management Agency (FEMA) identifies areas with a one-percent chance of being flooded in a given year as ***100-year floodplains***. The floodplains of Black River, McClain Creek, Swift Creek, Perry Creek, Gosnell Creek, Kennedy Creek, Skookum Creek, Coffee Creek, and Goldsborough Creek are in or near the ROW.

### *3.8.2 Environmental Consequences—Proposed Action*

**Removal of Existing Structures and Installation of New Structures**

There would be about 6 acres of temporary and less than 1 acre of permanent impacts to floodplains associated with the removal or installation of new structures (see Table 3-5). Although all streams and associated floodplains would be spanned, there are several existing and proposed structures within floodplains. Direct and indirect impacts to floodplains are expected to be low and limited to incidental amounts of sediment deposition in the floodplain from soil erosion from disturbed areas. The amount of potential sediment deposition would not change existing flood storage capacity or alter the course of floodwaters.

### Table 3-5 Activities within 100-year Floodplains

| Access Road or Structure within 100-yr Floodplain | Type of Activity (e.g., structure removal or road improvement) | Temporary Impacts (acres) | Permanent Impacts (acres) |
|---|---|---|---|
| 10/5 | Install New Structure | 1 | 0.009 |
| 10/6 | Remove Existing Structure | 0.01 | 0 |
| 13/1 | Remove Existing Structure and Install New Structure | 1.01 | 0.009 |
| 18/1 | Remove Existing Structure and Install New Structure | 1.01 | 0.009 |
| 18/2 | Remove Existing Structure and Install New Structure | 1.01 | 0.009 |
| 18/3 | Remove Existing Structure and Install New Structure | 1.01 | 0.009 |
| 18/4 | Remove Existing Structure | 0.01 | 0 |
| 18/5 | Install New Structure | 1 | 0.009 |
| **Removal/Installation Subtotal** | | **6.06** | **0.054** |
| Road | Construction of new access road to Structure 10/5 | 0.11 | 0.11 |
| Road | Construction of new access road to Structure 13/1 | 0.15 | 0.15 |
| Road | Construction of new access road between Structures 18/1 and 18/2 | 0.73 | 0.73 |
| **Access Road Subtotal** | | **0.99** | **0.99** |
| **Total** | | **7.05** | **1.044** |

**Access Roads**

No improvements of existing roads are proposed within floodplains. Construction of new access roads are expected to have a low to moderate impact on floodplain functions because only limited new access roads are planned within floodplains. Proposed new road construction would consist of blading/shaping for site preparation, installation of geotextile for soil stability, and rocking of road surfaces. Less than 1 acre of floodplain would be impacted. Construction of new access roads would not result in the disconnection of the floodplain from the stream. Indirect impacts on floodplains are expected to be low due to limited extent of the proposed work.

**Tensioning Sites**

There would be no impact to floodplains because floodplains would be marked on project maps and tensioning sites would be restricted to areas outside of floodplains.

**Operation and Maintenance**

Direct impacts on floodplains from routine maintenance activities are expected to be low because such activities would be infrequent, short-term, and localized, and would not substantially alter floodplain functions. Routine maintenance of structures and access roads in or directly adjacent to floodplains could result in minor disturbances of floodplains. Maintenance of access roads and the ROW, including such activities as grading or rocking of road surfaces, replacement of culverts, and vegetation removal, could result in minor soil compaction and erosion.

### *3.8.3 Mitigation*

The following mitigation measures have been identified to avoid or reduce impacts to floodplains:

- All roads and structures will be located to avoid floodplains, where possible.
- Erosion control measures will be used to avoid sedimentation of floodplains.
- Tensioning sites will not be located in floodplains.
- Disturbed areas will be revegetated with seed from native species.

### *3.8.4 Unavoidable Impacts Remaining After Mitigation*

Construction activity in or near floodplains are not anticipated to permanently affect the capacity of affected floodplains to dissipate flood energy, reduce the capacity to filter nutrients and contaminants to maintain water quality, and reduce structural complexity within the floodplains. The area within floodplains affected by the proposed project is relatively small, so unavoidable impacts are expected to be low.

### *3.8.5 Cumulative Impacts*

Floodplains have been impacted in the region because of past and current development and agricultural and forestry operations. Future development activities could result in the further degradation and reduction of floodplains in the region.

County-funded and WSDOT's routine maintenance of existing roads and bridges could be done in or near floodplains in the project area, but, similar to BPA's road maintenance work, such activities are expected to have no or low impact on floodplains. The extent to which WSDOT's

scheduled road improvements may affect floodplains is unknown. Effects on floodplains from road work and vegetation management associated with BPA's Proposed Action, when added to other similar activities, would be minor.

Past, present, and future activities in the project area, including vegetation maintenance activities, could affect floodplains. Affects would depend on the location, activity type (e.g., BPA danger tree removal), and extent of the activity. Impacts to vegetation in floodplains could reduce the floodplain's capacity to dissipate flood energy and to filter nutrients and contaminants that maintain water quality; and could reduce structural complexity within the floodplain. Overall, though, the Proposed Action is not expected to contribute noticeably to cumulative changes in floodplain qualities and function, due to the small area involved.

### *3.8.6 Environmental Consequences—No Action Alternative*

The No Action Alternative would have a greater impact to floodplain functions and values, as the lack of improved access road stream crossings would require maintenance crews to continue to traverse the streams in low areas with maintenance equipment. Because the streambanks are mostly comprised of loamy-clay, episodic disturbances associated with stream crossings would reasonably cause large turbidity plumes. Additionally, the compaction of soil and vegetation could result in increased streambank erosion and thus increase turbidity.

## 3.9 Visual Quality

### *3.9.1 Affected Environment*

The project area in Mason and Thurston counties has a variety of topography and physical features that provide visual diversity. The high peaks of the Olympic Mountains in northwestern Mason County are visible from many portions of the project area. The Black Hills that border Mason and Thurston counties are more rounded and lower in elevation. Near the inlets of Hood Canal, the land is rolling or nearly level.

The varied topography provides intermittent views of open water and small creeks, distant mountains and nearby hills, and open forest contrasted with urban growth in the towns and villages along the waters' edge.

The topography, with its varied relief, obstructs long views of the transmission line corridor. The corridor is visible intermittently from highways, rural roads, residences, commercial developments and recreation areas. Much of the project area has been logged and the cleared ROW mimics this landscape. Where forests have been replanted, the swath of clearing for the transmission lines and the mixture of steel and wood structures are distinctive. The existing wood structures blend more with the newly planted forestlands. In the lower elevations the corridor crosses pastureland and mineral extraction (gravel operations) areas. In the city of Shelton, the lines cross over Highway 101 and run near a commercial area into Shelton Substation.

WSDOT has developed four classifications for scenic highways within the state. These designations range from Class A (superior scenic quality) through Class D (industrial, heavily

urbanized or deteriorated area). The transmission line corridor crosses state highways 8, 101 and 108.

The transmission line corridor crosses Highway 8 at about MP 18, near Perry Creek, about 2 miles west of Highway 101. This section of Highway 8 is Scenic Class "BX." "B" areas are areas of high scenic value and Subclass "X" is an alternative for Classes A and B for areas where based on design alternatives, such as configurations, color and location, an aerial facility could be allowed without changing the landscape quality.

The transmission line corridor crosses Highway 101 at about MP 354, about 0.5 mile south of Skookum Creek, and at about MP 355, near where Highway 101 intersects with Hurley-Waldrip Road, north of Kennedy Creek Bridge. These sections of Highway 101 are also classified as "BX."

The transmission line corridor crosses over Highway 101 at MP 345 just south of where the highway meets Wallace Street in Shelton, and Highway 108 at MP 10.5, just west of the Skookum Creek Bridge. These sections are both Scenic Class "C," which means secondary scenic importance, that is, scenic characteristics are of marginal importance.

The existing transmission line corridor created visual impacts and has changed the landscape quality. Figure 8 shows a representative scene of the existing corridor. In general, existing impacts are most apparent where the corridor is adjacent to or near highways, near residences, or near recreation sites.

### *3.9.2 Environmental Consequences—Proposed Action*

Construction, operation and maintenance of transmission facilities can affect visual resources on a long- and short-term basis. Any part of the proposed facilities can contribute to visual impacts: structures, conductors, insulators, spacers, ROW clearing, access roads, removal of existing structures, clearing for structures, staging areas, and conductor pulling and tensioning sites. Construction activity within the corridor would cause short-term impacts on the visual environment. Potential long-term impacts would result from a change in the visual appearance of the transmission line and corridor by replacing the existing wood structures (and occasional steel deadend towers) with taller lattice steel towers, tubular steel poles or, in one location, a new wood H-frame structure.

Different landforms and vegetation influence visual impact; the topography and forest cover screen transmission line features at many locations.

**Impacts on Residents**

Residents are generally sensitive to changes in their surrounding environments and views. Residences tend to occur in small clusters near the corridor. The new line would be within the existing corridor; residents close to the corridor already have the existing line, other lines and the corridor in their view. Those residents with direct views of transmission line structures on their property would be more sensitive to changes in views than those residents near the corridor with partial or no views. Their views would be affected by short-term construction activity and the long-term presence of the line. The new structures would be about 25 feet from the location of

the existing structures in most areas. Visual impacts would be less for residents who believe the new structures provide less contrast or who prefer the appearance compared to the existing structures. Impacts would be greatest for those living closest to the corridor or those that consider the steel towers or poles more intrusive than the existing wooden structures.

**Figure 8 Mile 6 of the Existing Corridor Looking East**

The new structures would also be taller than the existing structures and would be visible from longer distances. Clearing required to remove danger trees could remove some screening and some residents would have expanded views of the transmission corridor. See Figures 9 and 10.

Work proposed in and near Shelton and Olympia substations would require adding equipment in existing industrial settings. The new equipment proposed for the substations would be consistent with the existing industrial setting.

In the areas where the structures would be removed and not replaced, local residents would have one less transmission line in their views.

Because the existing ROW has been impacted by transmission lines, and because the new towers would be similar to existing towers in the ROW, impacts to residents would be low.

**Figure 9 Existing Right-of-Way at Structure 18/4**

## Impacts on Motorists

Motorists would continue to view the transmission line structures and conductors in the areas adjacent to and near highways 8, 101 and 108 where the transmission line would cross. Views would not change much from the existing views, except that the wood structures would be replaced with lattice steel towers or steel poles. The new structures would continue to be part of a larger corridor. For the most part, views would be intermittent and the topography and forested landscape and rural development would continue to dominate the visual setting. In general, visual impacts to motorists would be low.

**Figure 10 Simulation of New Structures at Structure 18/4**

The corridor crosses over three highway sections classified as Scenic Class BX. The proposed project would create a low impact in these locations because these portions of the highways already have these views, and the proposal would not be a major change from current conditions. Similarly, highway sections classified as Scenic Class C that would be spanned have also been previously impacted and the proposal would not be a major change from current conditions.

Access to structures near or adjacent to the highways would be from existing access roads. Motorists would be exposed to construction activity; some traffic restrictions may be necessary. Construction activities and temporary traffic restrictions would create low to moderate impacts because views would be brief and the effect short term.

**Impacts on Recreation**

The new transmission line structures would be taller than the existing structures near recreation areas. Though construction activities and the new structures would be visible from recreation areas, these areas have already been impacted by transmission lines, and the impact of the existing transmission lines in the corridor has occurred. The incremental impact of the taller transmission line structures would be low. See Figures 11 and 12.

**Figure 11 Existing Corridor from Little Creek Casino**

Additions at the substations would have low impacts because new equipment would be added in an industrial setting, not in recreation areas.

### *3.9.3 Mitigation*

The following mitigation measures have been identified to help the transmission line blend more effectively with the surrounding environment, and therefore avoid or reduce potential impacts to visual quality:

- ***Non-lustrous*** conductors would be used.
- Contractors would maintain construction sites free of debris.
- BPA would maintain the corridor free of debris resulting from transmission line operation, maintenance, and construction activities after construction.

### *3.9.4 Unavoidable Impacts Remaining After Mitigation*

Construction activities would be visible, resulting in unavoidable temporary impacts. The transmission structures and conductors would become part of the visual setting and be visible to motorists, residents, and recreationists, which would be an unavoidable permanent impact but similar in nature to the existing transmission line corridor. Unavoidable impacts, after mitigation, would be low.

**Figure 12 Simulation of New Structures at Little Creek Casino**

### *3.9.5 Cumulative Impacts*

Areas cleared for timber harvest and commercial and residential development have substantially changed the visual quality of the landscape. BPA's existing transmission line corridor and substations have also changed the landscape's visual character. In some places, the corridor is more visible and open due to the removal of vegetation. Over time, vegetation regrowth in cleared areas would help these areas blend with the landscape. Timber harvesting and commercial and residential development will continue to alter the visual setting and contribute substantially to visual impacts. BPA's ongoing vegetation management activities would also affect the area's visual character. Because the proposed project would replace an existing transmission line, most of the visual impact occurred when the original line was built; as a result, the new line and the minor substation additions would add a small increment of cumulative visual effect when added to past, present, and future activities in the area.

### *3.9.6 Environmental Consequences—No Action Alternative*

Motorists, residents, and recreationists would continue to experience visual impacts of the existing transmission line corridor and the industrial nature of the substations.

## 3.10 Air Quality

### *3.10.1 Affected Environment*

The agency with primary air quality jurisdiction in Thurston and Mason counties is the Olympic Region Clean Air Agency (ORCAA). The ORCAA has adopted the standards established by WDOE (WAC 173-470). Given the project's rural setting, the three pollutants of potential interest are particulates, ***carbon monoxide*** and ***ozone***. The southernmost portion of the project area (Olympia Substation to Black Lake) is located in the Thurston County Particulate Matter Maintenance area, which corresponds to the City of Tumwater City boundary. A maintenance area is an area that was previously considered to be a non-attainment area and is being monitored for a period of 10 years to ensure maintenance of good air quality. None of the project area is within a designated non-attainment area.

In Mason County in 2006, the Air Quality Index (AQI) was *Good* for 334 days and *Moderate* for 17 days. The main air pollutant during the Moderate days was PM2.5. Air quality was only measured for 351 days in Mason County. In Thurston County in 2006, the AQI was *Good* for 323 days and *Moderate* for 41 days and *Unhealthy for Sensitive Groups* for one day. The main air pollutants during the *Moderate* days were PM2.5 and ozone.

**Particulates**

Particulate matter consists of fine particles of smoke, dust, pollen, or other materials that remain suspended in the atmosphere for a substantial period of time. Particulates are measured in two forms: Total Suspended Particulate (***TSP***) and ***PM10*** (a subset of TSP). PM10 is fine particulate matter, defined as smaller than 10 micrometers in diameter that is easily inhaled (***respirable***). The annual average air standard for PM10, as established by WDOE and adopted by ORCAA, is 50 micrograms per cubic meter ($\mu g/m^3$). The 24-hour standard for PM10 is 150 $\mu g/m^3$. In Thurston County, the annual PM10 was 13 $\mu g/m^3$, and the 24-hour maximum PM10 was 16 $\mu g/m^3$, both well below the standard (U.S. EPA, October 23, 2007). PM10 records are not available for Mason County. PM2.5 (smaller particles than PM10) standards have also been issued by the U.S. EPA. The average annual air standard for PM2.5 is 15 $\mu g/m^3$, and the 24-hour standard has recently been revised to 35 $\mu g/m^3$. However, records are not available for PM2.5 for Thurston or Mason counties.

**Carbon Monoxide**

Carbon monoxide (CO) is an air pollutant generally associated with transportation sources. The highest ambient CO concentrations often occur near congested roadways and intersections during periods of low temperatures, light winds, and stable atmospheric conditions. The 8-hour average standard, as established by WDOE and adopted by the ORCAA, is 9 parts per million (ppm). CO data was not available for Thurston or Mason County (U.S. EPA, October 23, 2007).

**Ozone**

Ozone is primarily a product of more concentrated motor vehicle traffic on a regional scale. It is created during warm sunny weather by photochemical reactions involving hydrocarbons and nitrogen oxides. Small amounts of ozone may be produced by the existing 115-kV transmission

line as a result of ***corona*** (the breakdown of air at the surface of conductors). The 1-hour average standard for ozone is 120 parts per billion (ppb) and the 8-hour standard is 80 ppb. In 2006 in Thurston County, the average measured ozone was 81 and 68 ppb, respectively, both below the standards (U.S. EPA, October 23, 2007).

### *3.10.2 Environmental Consequences—Proposed Action*

During the construction period, air quality could be affected. Activities could increase dust and particulate levels on a temporary basis in a localized area. Water trucks would be used to control dust. Air quality impacts would be low because the amount and type of vegetation present within the ROW and the generally high levels of soil moisture and organic matter are not conducive to the development of dust, and when dusty conditions are present, they would be controlled using water and any dust produced would be very local.

Vegetation cleared in conjunction with access road improvements and ongoing vegetation management activities would, in most cases, be left lopped and scattered, piled, or chipped. Because cleared vegetation would not be burned, there would be no increase in particulates from burning and no air quality impacts.

The operation of heavy equipment during construction could affect air quality. Heavy equipment and vehicles emit pollutants such as carbon monoxide, carbon dioxide, sulfur oxides, particulates, oxides of nitrogen, and volatile organic hydrocarbons. Vehicle emissions would be short-term and localized, and thus would be expected to have a low impact on air quality.

During operation, the transmission lines would emit limited amounts of ozone and nitrogen oxides as a result of the corona effect. However, these substances would be released in quantities generally too small to be measured or to have any adverse effect on humans, animals or plants. In addition, there would be occasional vehicle emissions during maintenance activities, but as with construction, these emissions would be short-term and localized. Impacts on air quality during operation and maintenance thus would be low.

### *3.10.3 Mitigation*

The following mitigation measures have been identified to avoid or minimize impacts to air quality:

- Water trucks will be used to control dust during construction.
- All vehicle engines will be in good operating condition to minimize exhaust emissions.

### *3.10.4 Unavoidable Impacts Remaining After Mitigation*

Emissions of pollutants associated with vehicles and equipment during construction and maintenance and with corona during operation could not be totally mitigated or avoided. However, these impacts would be low, and the mitigation measures identified in Section 3.10.3 would further reduce the level of impacts associated with vehicles and equipment. In addition, even with mitigation, some dust would occasionally be generated by construction activities.

### *3.10.5 Cumulative Impacts*

Vehicular traffic on highways 8, 101, and 108 and local roads, logging activities, residential wood burning, and industrial emissions in the past have resulted in and currently result in pollutant emissions. These sources of pollutants will continue in the future. Ongoing activities in the project area do not violate air quality standards. The proposed action would contribute a small amount to pollutant levels; it is unlikely cumulative concentrations would violate air quality standards.

### *3.10.6 Environmental Consequences—No Action Alternative*

Impacts to air quality from construction activities would be avoided. Low impacts on air quality could be associated with corona during operation of the existing line and with vehicle use during maintenance activities.

## 3.11 Socioeconomics

### *3.11.1 Affected Environment*

The project is located on the Olympic Peninsula in both Thurston and Mason counties. The Olympic Peninsula is served by five transmission lines from the Olympia Substation and the affected electrical systems include Clallam, Grays Harbor, Jefferson, Kitsap, Mason and Thurston counties. During winter peak load conditions, the Olympic Peninsula is at risk for voltage stability (see Chapter 1).

**Population.** The population estimates for Clallam, Grays Harbor, Jefferson, Kitsap, Mason and Thurston counties for July 2006, the latest estimate available, was approximately 702,000 residents, about 11 percent of the state-wide total, which was about 6,395,800 residents at the time (U.S. Census Bureau, March 22, 2007).

The growth rate for these six counties on the Olympic Peninsula has exceeded that for the state since 2000, as well as for the previous 10 years. The six counties have increased their resident population by 32.5 percent over the 16-year period, while the state has expanded by 31.4 percent, due primarily to net immigration. In the 6 years from 2000 to 2006, Washington ranked 7th in the country for most population gain, an increase of over 103,000 people (U.S. Census Bureau, March 22, 2007).

**Housing.** The 2000 Census showed that of the 25,515 housing units in Mason County, 18,912 were occupied, and of these about 80 percent or 14,945 were owner-occupied, and about 20 percent or 3,967 were renter-occupied. The remaining 6,603 housing units were vacant, which is a vacancy rate of 25.9 percent. Of the 86,652 housing units in Thurston County in 2000, 81,625 were occupied, and of these about 66 percent or 54,371 were owner-occupied, and about 33 percent, or 27,254 were renter-occupied. The remaining 5,027 housing units were vacant, which is a vacancy rate of 5.8 percent (U.S. Census Bureau, 2000).

While Thurston County's housing vacancy rate was lower than for the U.S. as a whole (5.8 percent vs. 9.0 percent), Mason County's was remarkably higher at 25.9 percent. The reason

for this is likely due to the preponderance of second homes in Mason County, and although this number is high, it dropped significantly from what it was in 1990, which was 34.7 percent (U.S. Census Bureau, 1992).

**Ethnicity.** The Olympic Peninsula is composed of principally Caucasians (83.8 percent), Hispanics (4.9 percent), Asians (3.6 percent), American Indians (2.4 percent), and Blacks (2.1 percent). This compares with the ethnicity of the state as a whole, Caucasians (77.1 percent), Hispanics (8.8 percent), Asians (6.4 percent), Blacks (3.5 percent) and American Indians (1.7 percent), and the U.S as a whole, Caucasians (66.9 percent), Hispanics (14.4 percent), Blacks (12.8 percent), Asians (4.3 percent), and American Indians (1 percent) (U.S. Census Bureau, 2000).

While this information shows that the ***minority population*** is less in these six counties on the Olympic Peninsula for both the state and the US as a whole, the Native American population is higher than both (U.S. Census Bureau, 2000).

**Economic Characteristics.** Employment in the six county area is weighted towards the professional, service, sales and office occupations along with construction and transportation related work. The largest industries in terms of employment are education, health and social services, manufacturing, and retail trade. Forestry, fishing and mining employment also contribute to the economies of the counties on the Olympic Peninsula (U.S. Census Bureau, 2000).

**Income Characteristics.** ***Per capita income*** for these six counties on the Olympic Peninsula in 1999, the most recent information available, ranged from a low of $16,800 for Gray's Harbor County, to a high of $22,415 for Thurston County, compared with a state-wide median per capita income of $22,970, and $21,585 for the U.S. as a whole (U.S. Census Bureau, 2000).

The *median household income* for these six counties in 2004, the most recent information available, ranged from a low of $36,785 for Gray's Harbor County to a high of $52,500 for Kitsap County, and compares with the State's median household income of $44,335 and the U.S as a whole of $43,320 for the same year (U.S. Census Bureau, 2004).

With respect to the percent of households who reside in these counties who have incomes below the poverty line, defined as below 75 percent of the country's median household income, the range is from a low of 9 percent for Thurston County to a high 15 percent for Grays Harbor County for 2003, the latest information available. This compares to 11 percent for the State of Washington and 12.5 percent for the U.S. as a whole (U.S. Census Bureau, 2004).

**Property Taxes.** Property taxes help support the activities of local taxing districts, such as schools, and local government services, and are paid by private property owners, unless in a tax exempt status. All federal, state and local government real property is exempt from paying property taxes. When BPA acquires an easement across private property, the landowner continues to pay property taxes, but often at a lesser value, based on any limitation of use created by the encumbrance.

**Sales/Use Taxes.** The Washington state sales/use tax is currently 6.5 percent. Each jurisdiction in the state also assesses a tax on retail sales, which when combined with the state sales tax ranges from 7.0 to 8.9 percent. Although BPA, as a federal government agency, is exempt from paying Washington state sales taxes on materials purchased within the state of Washington, it is not exempt from paying a use tax on materials purchased outside of the state that would be used within the state of Washington. Additionally, BPA workers are taxed on all local purchases of goods and services while in Washington, unless those individuals reside in states that grant them a tax exempt status from paying sales taxes while in Washington. The current sales tax rate for Mason County and the City of Shelton is 8.3 percent. The current sales tax rate for unincorporated Thurston County is 7.8 percent and slightly higher in some of the larger communities in the county (Washington State Department of Revenue, April 1, 2007).

**Property Values.** When BPA acquires new rights-of-way, landowners are offered fair market value for the land established through the appraisal process. The appraisal accounts for all factors affecting property value, including the impact the transmission line right-of-way would have on the remaining portion of the property. Each property is appraised individually using neighborhood–specific data to determine fair market value. Where existing rights-of-way accommodate new transmission facilities, and no new acquisition would be made, no additional compensation is paid.

**Lodging Accommodations.** Within 20 miles of Shelton, Washington there are over 20 motels/hotels with an excess of 1,400 rooms and four RV parks/campgrounds with about 230 campsites offering utility hookups for trailers. Most of these facilities are located in and around the Olympia area. (ePodunk Inc., April 30th, 2007 and Good Sam Club, 2003).

### *3.11.2 Environmental Consequences/Potential Impacts of the Proposed Action*

**Housing Availability.** Construction would likely begin in spring 2008 and be completed in the 2009. A maximum of 25 workers would be expected to work at any one time, and since transmission construction is mostly specialized work, the prime contractor would likely come from outside of the local area, so temporary housing accommodations would be needed for most crews. Since there are many housing options in the area (many vacant houses possibly for rent, over 1,400 hotel/motel rooms, and about 230 trailer sites in the area) contract workers would be expected to easily find accommodations from among the existing housing supply, and proposed project thus would not be expected to impact housing in the area.

**Employment and Income.** The proposed project would stimulate the area's economy during construction through material purchases in the local area, payroll and related direct and indirect spending, what is commonly referred to as the ***multiplier effect***.

Purchases of local supplies and materials and other spending by construction workers would create a positive impact on the local economy. These expenditures typically amount to 5 percent or more of total project costs, estimated at $25-30 million (2007 dollars), about half materials and half labor costs. Construction workers typically spend about 40 percent of their wages locally, which would amount to about $5 million. Both material purchases by the contractors ($1.2 million) and salary expenditures by the workers ($5 million) would have an additional ***multiplier effects*** on the local economy in the area, and be considered a short-term impact, and

while positive, they would be considered to be low in relation to all of the other economic activity in the area.

**Property Taxes.** The construction of this project would not affect the amount of property taxes collected by the two counties where the project is located. Property owners would continue to pay property taxes in accordance with existing valuations; no property devaluations are expected.

**Sales/Use tax.** States cannot directly tax purchases by the federal government; however, Washington Department of Revenue can assess taxes on materials purchases out of state by the federal government for materials that would be used within the state, such as the materials and equipment that would be used on the proposed project. Since these materials would be expected to cost approximately $12.5 Million, approximately $1 million is use tax would be paid. Additionally, Washington would tax local purchases by government contractors building the line (Excise Tax Bulletin 316.08.193 and WAC 458-20-17001). Workers would also be taxed on all local purchases of goods and services while in Washington, unless those individuals' permanent residences are within states or other jurisdictions that are exempt from paying a local sales tax within the state. While not considered large, these additional taxes collected would be considered a positive impact.

**Property Impacts.** Since only a small amount of permanent new ROW (0.67 acres) would need to be acquired for the project, and BPA would pay compensation for the land acquired, this would be a low impact.

**Environmental Justice.** The Executive Order on Environmental Justice (Executive Order 12898) was enacted in February 1994 to focus federal attention on the economically disadvantaged and minority groups within the United States or any of its territories. The Executive Order states that federal agencies shall identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and ***low-income populations***.

To ensure that each federal agency complies with the Executive Order, each agency was required to develop a strategy for outlining how it would address the intent of the order. The Department of Energy (DOE) of which BPA is a part, has developed a proposed environmental justice strategy that outlines the Department's approach to identify DOE actions that may have a disproportional high and adverse environmental effect on minority and low-income populations. The draft strategy focuses on developing a partnership with stakeholders, affected communities, government agencies, tribes and the general public in the early stages of planning and implementation of environmental justice procedures.

Since BPA would be rebuilding an already existing transmission line under the Proposed Action, and the small amount of additional ROW that would be acquired would not displace any persons, the Proposed Action would not be expected to result in disproportionately high and adverse effects on minority and low-income populations.

### *3.11.3 Mitigation*

No mitigation measures are recommended; only no or low socioeconomic impacts would occur under the Proposed Action:

### *3.11.4 Unavoidable Impacts Remaining After Mitigation*

Unavoidable impacts would be the same as described in Section 3.11.2 since no mitigation is recommended.

### *3.11.5 Cumulative Impacts*

The transmission line could contribute to economic growth, along with ongoing local efforts, by providing reliable electrical power.

Because of its short-term nature, BPA's proposed transmission project would not add noticeable long-term benefits or impacts to employment, housing demand or tax revenue in the area. However, the new transmission line could contribute to economic growth by providing reliable electric power on the Olympic Peninsula.

### *3.11.6 Environmental Consequences—No Action Alternative*

For the No Action Alternative, the socioeconomic impacts of construction activity, both beneficial and adverse, would not occur. The negligible socioeconomic effects of current maintenance activities would continue. Voltage stability problems could occur resulting in loss of firm load on the Olympic Peninsula. Loss of firm load would mean that residents and businesses could experience voltage fluctuations, brownouts or blackouts resulting in inconvenience, loss of income and threats to public health and safety.

## 3.12 Cultural Resources

### *3.12.1 Affected Environment*

**Historic Overview**

The native people within the project area were part of two Southern Coast Salish groups, the Upper Chehalis and the Twana. In 1792, George Vancouver sailed up the Hood Canal and Puget Sound, and contact with Euro-Americans began. The new settlers that followed in the 1800s harvested the resources of the land and sea. Oysters and other shellfish and fish were harvested from the Hood Canal region. The timber industry was lucrative and harvesting was extensive on the Olympic Peninsula, leading to overcutting in some areas. Farming was less economical since agricultural land was sparse (Wilt and Roulette, 2001).

**History of the Olympia-Shelton No. 1 Transmission Line.** The Olympia-Shelton No. 1 transmission line was constructed in 1951 as part of a post-World War II push to increase BPA's transmission grid. During the postwar years, there was a surprising and unprecedented increase in the consumer demand for electricity. This was due in part to the extension of rural electrification.

The Olympia-Shelton No. 1 line is in its original corridor (see Figure 13). Most structures are not original and a number of structures have been moved and/or altered or redesigned during ongoing operations and maintenance (see Figure 14). The Olympia-Shelton No. 1 line does not retain integrity because of these changed materials, and is not eligible to the National Register of Historic Places (NRHP).

**Figure 13 Olympia-Shelton No. 1 Transmission Line (on the right) Looking North**

**Figure 14 Olympia-Shelton No. 1 Transmission Line (on the right)**

**History of the Olympia and Shelton Substations.** Olympia Substation was built in 1951 and Shelton Substation was built in 1952. These facilities were part of the post-World War II expansion of the transmission grid discussed above. Substantial changes have been made to the Olympia Substation control house. Shelton Substation has been enlarged and this work has masked its original features. Because of these changes, neither is eligible for the National Register.

**Cultural Resources Survey Results.** In 2001, BPA contracted with Applied Archaeological Research (AAR) to conduct a literature search, records review, and a pedestrian survey for a ***fiber optic cable*** project on the same transmission line corridor as the Olympia-Shelton No. 1 transmission line. The survey covers the entire BPA right-of-way from Olympia Substation to Port Angeles, including the area proposed for this project. In the area proposed for this project, no artifacts were found. However, two portions of the ROW in the project area for the Proposed Action were identified as having a high potential for artifacts.

### *3.12.2 Environmental Consequence—Proposed Action*

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of their actions on historic properties. The NHPA provides a process (known as the Section 106 process) that enables agencies to access impacts to historic properties, and then avoid, minimize, or mitigate for these impacts. Historic properties may be prehistoric or historic sites, including objects and structures that are included in or eligible for inclusion in the NRHP. Historic properties also include artifacts or remains within historic sites and properties of traditional and cultural importance to Tribes.

No cultural artifacts were found in the project area, but two portions of the ROW have a high potential for artifacts. Because the existing ROW has been disturbed in the past in these areas and because BPA would monitor all construction in these areas, impacts are expected to be low.

Because the transmission line and the substations do not meet NRHP eligibility criteria, BPA has determined there would be no adverse historic impact. BPA has consulted with the Washington State Department of Archaeology and Historic Preservation (DAHP) under Section 106 for the Proposed Action. BPA has asked the Washington DAHP to concur with its determination that no historic properties would be affected by the project as proposed and that the transmission line and substations do not appear to be eligible to the National Register of Historic Places. The Washington DAHP concurred with BPA determination on January 16, 2008 (Holter, 2008).

### *3.12.3 Mitigation*

The following mitigation measures have been identified to avoid or minimize impacts on cultural resources:

- Monitor all construction work in the portions of the ROW identified as having a high potential for artifacts.

- In the event that archaeological material is encountered during project construction, the BPA archaeologist will immediately be notified and work will be halted in the vicinity of the finds; BPA will immediately notify the Washington DAHP.
- If previously unknown artifacts are identified during construction, immediately contact representatives of affected tribes.
- Immediately stop all construction activities in the vicinity should human remains and/or burials be encountered. Secure the area, placing it off limits for anyone but authorized personnel and immediately notify proper law enforcement, BPA archeologist, and appropriate tribes.

### *3.12.4 Unavoidable Impacts Remaining After Mitigation*

With implementation of the proposed mitigation, it is expected that there would be no adverse effect on cultural or historic resources.

### *3.12.5 Cumulative Impacts*

Although past, on-going, and future timber harvesting activities by other entities could affect cultural resources in the area, BPA's proposal would not add to those effects. Construction and operation of the existing transmission line and the other lines in the corridor could already have affected archaeological resources if any were present. The Proposed Action would not add impacts to cultural and archeological resources caused by past, present, or future activities in the area.

### *3.12.6 Environmental Consequences—No Action Alternative*

It is unlikely that any adverse impacts to cultural resources would occur during operation and maintenance of the existing transmission line because there would be very little ground disturbance and there are no known cultural resources.

## 3.13 Health and Safety

### *3.13.1 Affected Environment*

This section summarizes public health and safety concerns such as electrical shocks, fires, the effects of ***electric and magnetic fields*** (***EMF***) related to transmission facilities, and construction activities.

Transmission lines, like all electric devices and equipment, produce electric and magnetic fields. The strength of electric and magnetic fields depends on the design of the line and on distance from the line. Electric and magnetic fields are found around any electrical wiring, including household wiring and electrical appliances and equipment. There are no federal or Washington state guidelines or standards for electric fields from transmission lines. BPA designs new transmission lines to meet its electric-field guideline of 9-kilovolt/meter (kV/m) maximum on the ROW and 5-kV/m maximum at the edge of the ROW.

Transmission lines and distribution lines (the lines feeding a neighborhood or home) can be a major source of magnetic field exposure throughout a home located close to the line. Similar to electric fields, there are no federal or state guidelines or standards for magnetic fields.

### *3.13.2 Environmental Consequences—Proposed Action*

Potential health and safety impacts associated with the project include those that could affect construction workers, operation and maintenance personnel, the public, and others who have occasion to enter the project corridor. Impact levels depend on public and occupational use of the land. The potential for public health and safety impacts increases in areas where human activities take place.

**Impacts During Construction**

During construction and installation of the structures and conductor/ground wires, there is a risk of fire and injury associated with the use of heavy equipment, hazardous materials such as fuels, cranes, helicopters, and other activities associated with working near high-voltage lines. There is also a potential for accidental fire during refueling of hot equipment such as trackhoes and bulldozers that cannot be taken off site for refueling. In addition, there are potential safety issues as construction increases traffic on the highways and roads in the project area. The level of potential impacts during construction is expected to be low because standard construction safety procedures would be implemented, and these procedures would make the risk of hazards and injury low.

**Impacts During Operation and Maintenance**

**Electrical Safety.** Power lines, like electrical wiring, can cause serious electric shocks if certain precautions are not taken. The National Electric Safety Code (NESC) specifies the minimum allowable distance between the lines and the ground or other objects. Given that the new line would be higher than the existing line, impacts related to electrical safety would be reduced relative to the existing line.

**Short-term Effects – Electric Fields.** Electric fields from high-voltage transmission lines can cause nuisance shocks when a grounded person touches an ungrounded object under a line or when an ungrounded person touches a grounded object. The proposed double-circuit line would meet the BPA electric-field guidelines at the edge of the ROW, as well as NESC requirements. Therefore, it is highly unlikely that nuisance shocks would be perceived under the line; the level of impacts would be low.

**Short-term Effects – Magnetic Fields.** Magnetic fields from transmission lines can induce currents and voltages on long conducting objects parallel to the lines, which can interfere with electrical devices and also serve as a source of nuisance shocks.

Under maximum current conditions magnetic fields from the proposed line would fall below 10 mg at distances from 15 to 105 feet from the edge of the corridor depending on side of the ROW. Under average current conditions, the field would be less than 10 mG at distances greater than 0 to 65 feet from the edge. Generally the fields beyond the edge of the ROW would be less for the Proposed Action.

The magnetic fields on and near the corridor for the Proposed Action would be comparable to those from the existing lines on the corridor. Therefore, it is expected that the impacts from

magnetic fields would be unchanged from those present on and near the existing lines (Bracken, 2007b).

**Long-term Health Effects.** The issue of whether there are long-term health effects associated with exposure to fields from transmission lines and other sources has been investigated for several decades. A review of recent literature on this subject suggests there is little evidence that electric fields cause long-term health effects such as adult cancer, or adverse effects on reproduction, pregnancy, or growth and development of the embryo. National and international organizations have established public and occupational EMF exposure guidelines on the basis of short-term stimulation effects, rather than long-term health effects. In so doing, these organizations did not find data sufficient to justify the setting of a standard to restrict long-term exposures to electric or magnetic fields (Bracken July 2007a).

**Electric and Magnetic Field Levels.** An increase in public exposure to magnetic fields could occur if field levels increase and if residences or other structures draw people to these areas. The predicted field levels are only indicators of how the proposed project may affect the magnetic-field environment, not measures of risk or impacts on health.

BPA has predicted and compared the fields from the proposed double-circuit line with the fields from the existing line (the No Action Alternative). Peak electric field levels are expected to be about the same as the existing conditions (Bracken, 2007b). The public health and safety impacts associated with electric and magnetic fields for the Proposed Action would be low. Short-term effects, such as nuisance shocks, would be unlikely.

**Toxic and Hazardous Substances.** There are no known occurrences of hazardous materials or contaminants within the transmission line corridor; no impacts are expected.

### *3.13.3 Mitigation*

The following mitigation measures have been identified to avoid or minimize potential health and safety risks if the project is implemented:

- Before starting construction, the contractor will prepare and maintain a safety plan in compliance with Washington requirements. The plan will be kept on-site and will detail how to manage hazardous materials such as fuel, and how to respond to emergency situations.
- During construction, the contractors will hold crew safety meetings at the start of each workday to review potential safety issues and concerns.
- BPA will meet with the contractor each month to discuss safety issues.
- At the end of each workday, the contractor and subcontractors will secure the site, as much as possible, to protect equipment and the general public.
- BPA will construct and operate the new transmission line to meet the National Electrical Safety Code.
- If a hazardous material is discovered that could pose an immediate threat to human health or the environment, BPA requires that the contractor notify the Contracting Officer's Technical Representative immediately and stop work in that area until given notice to continue work.

### *3.13.4 Unavoidable Impacts Remaining after Mitigation*

Since the health and safety impacts of the proposed double-circuit line are similar to those from the existing line, no unavoidable impacts would remain after mitigation.

### *3.13.5 Cumulative Impacts*

Existing public health and safety risks related to logging, commercial and residential development and traffic on local highways would continue. The proposed project would contribute a small increase in the overall risk of fire and injury to the public that could occur during construction and operation and maintenance.

### *3.13.6 Environmental Consequences—No Action Alternative*

Electric and magnetic field levels in the project area are the same as for the proposed double-circuit line. No difference in public health and safety impacts would be expected between the Proposed Action and No Action Alternative, except that the safety risks associated with construction activities would be avoided.

## 3.14 Noise

### *3.14.1 Affected Environment*

The environment that could be affected by noise includes the existing noise levels of the area, and the people who would be impacted by changes in noise levels.

The existing noise levels in the project area are influenced by traffic on highways 8, 101 and 108 and local roads, adjacent transmission lines, local industries and other noise-generating activities. Most of the transmission line corridor is in rural, undeveloped areas.

The conductors of high-voltage transmission lines are designed to be corona-free under ideal conditions. However, protrusions on the conductor surface—particularly water droplets on or dripping off the conductors—cause the partial electrical breakdown of the insulating properties of air around the transmission line wires and corona occurs. Therefore, audible noise from transmission lines is generally a foul-weather (rain, fog, snow, or icing) phenomenon. Corona-generated noise can be characterized as a hissing, crackling sound.

Environmental noise, including transmission line noise, is usually measured in ***decibels*** on the A-weighted scale (***dBA***). This scale models sound as it corresponds to human perception. Table 3-6 shows typical noise levels for common sources expressed in dBA.

## Table 3-6 Noise Levels

| Noise Levels | |
|---|---|
| **Sound Level, dBA*** | **Noise Source or Effect** |
| 110 | Rock-and-roll band |
| 89 | Combined Equipment at 50 feet |
| 85 | Road Grader, Bulldozers, Crane, Pneumatic Tools, and Implosive fittings at 50 feet |
| 80 | Truck at 50 feet |
| 70 | Gas lawnmower at 100 feet |
| 60 | Normal conversation indoors |
| 50 | Moderate rainfall on foliage |
| 40 | Refrigerator |
| 25 | Bedroom at night |
| *Decibels (A-weighted)<br>Sources: Adapted from Bonneville 1986, 1996. | |

During foul weather, noise from the existing line is a source of background noise, along with wind and rain hitting vegetation. In the more developed areas, traffic and noise associated with human activity would be major contributors to background noise.

The Washington Administrative Code (WAC 173-60) specifies noise limits according to the type of property where the noise would be heard (the "receiving property"). Transmission lines are classified as industrial sources for purposes of establishing allowable noise levels at a receiving property.

BPA has established a 50 dBA design criterion for corona-generated audible noise from transmission lines at the edge of the ROW. The State of Washington has interpreted this criterion to meet their respective noise regulations. The existing transmission corridor noise level during foul weather is from 37 to 43 dBA (Bracken, 2007a).

There are several homes and businesses in the project area that could be affected by noise. (See Section 3.2, **Land Use** for more details.)

### *3.14.2 Environmental Consequences—Proposed Action*

Impact levels depend on use of the land. The potential for noise impacts increases in areas where human activities take place.

## Impacts During Construction

Construction activities create short-term noise that typically does not cause any serious long-term disturbances to residents. Sources of noise associated with construction of the proposed project would include:

- removal of existing structures and erection of new structures
- construction of access roads
- tree removal activities
- use of helicopters for conductor stringing.

Access roads and foundations at each structure site would be installed using conventional construction equipment, and noise levels occurring during use of this equipment would be in the range of 80 to 90 dBA at 50 feet from the equipment (see Chapter 2 and Table 3-6). In addition, a helicopter could be used to string the conductors. The helicopter would be at a given location for only a few seconds, causing momentary exposure to very high noise levels (i.e., exceeding 100 dBA).

Construction noise impacts would not occur over most of the corridor due to its sparse development and population. Potential impacts during construction would be limited mainly to the small clusters of rural residences next to the ROW. Overall, for those residents that would be affected, the level of impact would be moderate.

## Impacts During Operation and Maintenance

Operation and maintenance of the proposed project would result in noise impacts that would be similar to current noise impacts related to operation and maintenance of the existing transmission lines in the proposed rebuild corridor. Operational noise would include any noise generated by the conductors during certain weather conditions. During fair weather, the proposed conductors would generate very little noise, similar to the existing lines. Noise from the conductors thus would be unlikely to be perceived beyond the edge of the ROW along the corridor.

During foul weather, the calculated noise levels at the edges of the ROW for the Proposed Action would range from 39 to 45 dBA compared to existing conditions of from 37 to 43 dBA. It is very likely that noises at this level would be masked by the sound of wind and/or rain during foul weather beyond the edge of the ROW. Noticeable increases in foul weather audible noise (> 3 dBA) would occur in the section where the new line is along the west edge of the ROW (from structures 6/1 to 9/3). These increases would be by 8 to 10 dBA, representing a perceived doubling of the noise level. However, at and beyond the edges of the ROW, the levels of audible noise from the proposed line during foul weather would be well below the 50-dBA BPA criterion and the 55-dBA level that can produce interference with speech outdoors (Bracken 2007b).

Maintenance noise for the new transmission line would include noise generated by occasional maintenance and repair activities, similar to the maintenance noise that currently occurs for the existing transmission line. Both activities would use equipment that would generate noise levels similar to the construction equipment identified in Table 3-6. In addition, during periodic vegetation maintenance activities, noise would be generated by various cutting devices, such as

chainsaws, to remove vegetation from the ROW. Noise levels from these devices also would be similar to the noise levels from construction equipment identified in Table 3-6**.**

Although not part of the proposed project, BPA also conducts routine helicopter inspection patrols of the federal transmission system in the Pacific Northwest, including the transmission lines in the proposed rebuild corridor. As part of these routine patrols, BPA would continue to use helicopters to fly the line to look for any problems or repair needs. These patrols typically occur two or three times a year, generally in March, July, and/or October. Any noise experienced by receptors on the ground during these flyovers thus would be extremely infrequent, as well as very short-term (i.e., only for the few seconds it would take for the helicopter to pass over the receptor).

Noise levels would remain the same at the existing Olympia, Shelton, Satsop and Kitsap substations because no transformers are being added. In the areas where transmission lines would be removed and not replaced, noise levels would be reduced.

Corona on transmission line conductors can also cause radio and television interference. If the proposed project were found to be the source of radio or television interference in areas with reasonably good reception, measures would be taken to restore the reception to a quality as good as or better than before the interference.

Overall, because of the short-term and infrequent nature of noise generated by operation and maintenance, the low level of development along the corridor, and the generally similar nature of noise impacts under the proposed project as compared to existing conditions, noise impacts during operation and maintenance would be low.

### *3.14.3 Mitigation*

The following mitigation measures have been identified to avoid or minimize potential noise-related impacts:

- All construction equipment and vehicles will have muffled exhaust.
- Landowners directly impacted along the corridor will be notified prior to construction activities.
- Near residences, construction activities will be limited to daytime hours, i.e., between 7:00 a.m. and 7:00 p.m.
- To endure construction personnel are aware of these measures, all measurew will be incorporated into contract specifications. .
- If radio or television interference occurs that is caused by BPA's transmission line, measures will be taken to restore the reception to a quality as good as or better than before the interference.

### *3.14.4 Unavoidable Impacts Remaining After Mitigation*

Construction-related noise impacts would not be completely mitigated. However, implementation of the mitigation measures identified in Section 3.14.3 would ensure that impacts would remain low to moderate.

### *3.14.5 Cumulative Impacts*

Construction noise from the proposed project would temporarily add to noise from other activities in the area, such as logging, commercial, industrial, and residential development, and traffic on highways. Once the new line is built, corona-generated noise would be slightly increased at the edge of the ROW. In the area where the existing line is removed and a new line is not put in its place, noise levels would be reduced.

### *3.14.6 Environmental Consequences—No Action Alternative*

Existing background noise levels in the project area would continue, including corona-generated noise. Other noise impacts would be similar to those described for maintenance of the new line.

## 3.15 Intentional Destructive Acts

Intentional destructive acts, that is, acts of sabotage, terrorism, vandalism, and theft sometimes occur at power utility facilities. Vandalism and thefts are most common, and recent increases in the prices of metal and other materials have accelerated thefts and destruction of federal, state and local utility property. BPA has seen a significant increase in metal theft from its facilities over the past several months due in large part to the high price of metals on the salvage market. There were more than 50 burglaries at BPA substations in 2006. The conservative estimate of damages for these crimes is $150,000, but the actual amount is likely much higher since this number does not factor in all the labor-related costs associated with repairing the damage.

The impacts from vandalism and theft, though expensive, do not generally cause a disruption of service to the area. Stealing equipment from electrical substations, however, can be extremely dangerous. In fact, nationwide, many would-be thieves have been electrocuted while attempting to steal equipment from energized facilities. On Oct. 11, 2006, a man in La Center, Washington, was electrocuted while apparently attempting to steal copper from an electrical substation.

Federal and other utilities use physical deterrents such as fencing, cameras, warning signs, rewards, etc. to help prevent theft, vandalism and unauthorized access to facilities. In addition, through its Crime Witness Program, BPA offers up to $25,000 for information that leads to the arrest and conviction of individuals committing crimes against BPA facilities. Anyone having such information can call BPA's Crime Witness Hotline at (800) 437-2744. The line is confidential, and rewards are issued in such a way that the caller's identity remains confidential.

Acts of sabotage or terrorism on electrical facilities in the Pacific Northwest are rare, though some have occurred. These acts generally focused on attempts to destroy large transmission line steel towers. For example, in 1999, a large transmission line steel tower in Bend, Oregon was toppled.

Depending on the size and voltage of the line, destroying towers or other equipment could cause electrical service to be disrupted to utility customers and end users. The effects of these acts would be as varied as those from the occasional sudden storm, accident or blackout and would depend on the particular configuration of the transmission system in the area. While in some situations these acts would have no noticeable effect on electrical service, in other situations, service could be disrupted in the local area, or if the damaged equipment was part of the main transmission system, a much larger area could be left without power.

When a loss of electricity occurs, all services provided by electrical energy cease. Illumination is lost. Lighting used by residential, commercial, industrial and municipal customers for safe locomotion and security is affected. Residential consumers lose heat. Electricity for cooking and refrigeration is also lost, so residential, commercial, and industrial customers cannot prepare or preserve food and perishables. Residential, commercial, and industrial customers experience comfort/safety and temperature impacts, increases in smoke and pollen, and changes in humidity, due to loss of ventilation. Mechanical drives stop, causing impacts as elevators, food preparation machines, and appliances for cleaning, hygiene, and grooming are unavailable to residential customers. Commercial and industrial customers also lose service for elevators, food preparation, cleaning, office equipment, heavy equipment, and fuel pumps.

In addition, roadways experience gridlock where traffic signals fail to operate. Mass transit that depends on electricity, such as light rail systems, can be impacted. Sewage transportation and treatment can be disrupted.

A special problem is the loss of industrial continuous process heat. Electricity loss also affects alarm systems, communication systems, cash registers, and equipment for fire and police departments. Loss of power to hospitals and people on life-support systems can be life-threatening.

The Proposed Action is made up of many components. Olympia and Shelton substations are both fenced to restrict access to authorized workers. Security cameras and other specialized equipment are in place to safeguard the area.

Overhead transmission conductors and the structures that carry them are mostly on unfenced utility rights-of-way. The conductors use the air as insulation. The structures and tension between conductors make sure they are high enough above ground to meet safety standards. Structures are constructed on footings in the ground and are difficult to dislodge.

While the likelihood for sabotage or terrorist acts on the Proposed Action is difficult to predict given the characteristics of the project, it is unlikely that such acts would occur. Even if such an act did occur, any impacts from sabotage or terrorist acts likely could be quickly isolated. In addition, the Department of Energy, public and private utilities, and energy resource developers include the security measures mentioned above and others to help prevent such acts and to respond quickly if human or natural disasters occur.

# Chapter 4
# Environmental Consultation, Review, and Permit Requirements

This chapter addresses federal statutes, implementing regulations, and Executive Orders potentially applicable to the proposed project. This EA will be sent to tribes, federal agencies, and state and local governments as part of the consultation process for this project.

## 4.1 National Environmental Policy Act

BPA prepared this EA pursuant to regulations implementing the National Environmental Policy Act (NEPA) (42 USC 4321 et seq.), which requires federal agencies to assess the impacts that their actions may have on the environment. NEPA requires preparation of an environmental impact statement (EIS) for major federal actions significantly affecting the quality of the human environment. BPA prepared this Preliminary EA to determine if the Proposed Action would create any significant environmental impacts that would warrant preparing an EIS, or if a finding of no significant impact (FONSI) is justified.

## 4.2 Threatened and Endangered Species and Critical Habitat

The Endangered Species Act of 1973 (ESA, 16 USC 1536) as amended in 1988, establishes a national program for the conservation of threatened and endangered species of fish, wildlife and plants, and the preservation of the ecosystems on which they depend. The ESA is administered by the USFWS and, for salmon and other marine species, by NOAA Fisheries.

Section 7(a) of the ESA requires federal agencies to ensure that the actions they authorize, fund, and carry out do not jeopardize endangered or threatened species or their critical habitats. Section (7c) of the ESA and other federal regulations require that federal agencies prepare biological assessments addressing the potential effects of major construction actions on listed or proposed endangered species and critical habitats.

BPA reviewed USFWS species lists to identify the listed and proposed species that are either known to occur or have the potential to occur in the project area. The bull trout, marbled murrelet and northern spotted owl are threatened species to be addressed. BPA checked the NOAA Fisheries Web site and determined that Puget Sound Chinook salmon and Puget Sound steelhead, administered by NOAA Fisheries, may occur in the project area.

**Bull Trout.** No bull trout are documented in or near the project area and therefore no bull trout habitat would be adversely affected. The proposed project would have no effect on bull trout.

**Marbled Murrelet.** The marbled murrelet is a federal and state-listed threatened bird. Marbled murrelets require large blocks of mature coniferous forest for nesting, in particular trees with large branches high above the ground. Most of the habitat in and near the project area does not have large trees with large branches, and there is no critical habitat near the project area. Overall, the young age of the surrounding stands and the high levels of disturbance make it very unlikely

that marbled murrelets would be found in or near the project area. The proposed project would have no effect on the marbled murrelet.

**Northern Spotted Owl.** The northern spotted owl is federal listed as threatened and state-listed as endangered. Its habitat requirements are similar to the marbled murrelet. Forested areas alongside the ROW could provide limited roosting and foraging habitat, but suitable stands are small and scattered. Many stands are located near Highway 101 and are continually affected by traffic noise and road activity. No critical habitat is nearby. Use of the ROW and adjacent areas by the owl is unlikely due to stand size, fragmentation, and related edge effects. The proposed project would have no effect on the northern spotted owl.

**Puget Sound Chinook Salmon.** Chinook salmon are present in some of the streams crossed by the proposed project. However, no roadwork or other work would take place in these streams. The project is within an existing ROW, so no new vegetation clearing would be required. Some danger trees would be removed; however these trees are not located in areas near Chinook salmon streams where they would reduce stream shading. Erosion and sediment control measures would be put in place at all construction sites to prevent material from entering streams. The proposed project would have no effect on Puget Sound Chinook salmon.

**Puget Sound Steelhead.** Steelhead are present in some of the streams crossed by the project area, however no construction would take place in these streams. Potential impacts are similar to those described for Chinook salmon. The proposed project would have no effect on Puget Sound steelhead.

## 4.3 Fish and Wildlife

### *4.3.1 Fish and Wildlife Conservation*

The Fish and Wildlife Conservation Act of 1980 (16USC 2901 et seq.) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife and their habitats. In addition, the Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires federal agencies with projects affecting water resources to consult with the USFWS and the state agency responsible for fish and wildlife resources. The analysis in Section 3.5, **Fish and Wildlife**, indicates that the alternatives would have no impacts on fish and minor impacts on wildlife.

### *4.3.2 Essential Fish Habitat*

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan. EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the proposed project, streams containing coho and/or Chinook salmon are considered to be EFH and include the Black River, McClane Creek, Kennedy Creek, Skookum Creek, Little Skookum Creek, Gosnell Creek, Coffee Creek, Perry Creek, and Goldsborough Creek. The MSA requires federal agencies to consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (MSA §305(b)(2)).

None of the streams containing coho or Chinook salmon would be adversely affected by the proposed project, therefore no consultation is required.

### *4.3.3 Migratory Bird Treaty Act*

The Migratory Bird Treaty Act implements various treaties and conventions between the United States and other countries, including Canada, Japan, Mexico, and the former Soviet Union, for the protection of migratory birds (16 U.S.C. 703-712, July 3, 1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986, and 1989). Under the Act, taking, killing, or possessing migratory birds, or their eggs or nests, is unlawful. The Act classifies most species of birds as migratory, except for upland and nonnative birds such as pheasant, chukar, gray partridge, house sparrow, European starling, and rock dove.

The proposed project may affect birds. Potential impacts, such as the loss of habitat, are discussed in Section 3.5, **Fish and Wildlife**.

Operation of the transmission line could result in the injury or death of birds caused by collisions with the transmission line. Collisions typically occur in locations where conditions combine to create a high potential for birds striking lines (Avian Power Line Interaction Committee, 1994). Three factors contribute to this potential: the type of power lines, the amount of use of the area by birds, and the inherent tendency of a species to collide with overhead wires. Since bird collisions with the existing line have not been documented in the past and no unusual circumstances exist that would increase the likelihood of collisions, it is unlikely that the new line would have any such impact on birds.

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

The Bald Eagle Protection Act prohibits the taking or possessing of and commerce in bald and golden eagles, with limited exceptions (16 U.S.C. 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978). Because a small number of bald eagles reside within foraging distance of the proposed project, there is a remote possibility some bald eagles could die after hitting structures or conductors. However, as discussed in Section 4.3.3, this effect is unlikely.

Because the Act covers only intentional acts, or acts in "wanton disregard" of the safety of bald or golden eagles, this project is not considered to be subject to its compliance because any impacts would not be intentional or result from disregard.

### *4.3.5 Responsibilities of Federal Agencies to Protect Migratory Birds*

Executive Order 13186 directs each federal agency that is taking actions that may negatively impact migratory bird populations to work with the USFWS to develop an agreement to conserve those birds. The protocols developed by this consultation are intended to guide future agency regulatory actions and policy decisions; renewal of permits, contracts, or other agreements; and the creation of or revisions to land management plans. BPA is developing a memorandum of understanding with the USFWS to fulfill Executive Order 13186.

Construction, operation, and maintenance of the proposed project would result in low impacts to migratory birds, due to loss of habitat or direct mortality, as discussed in Section 3.5, **Fish and Wildlife**.

## 4.4 Cultural and Historical Resources

A cultural resource is an object, structure, building, site or district that provides irreplaceable evidence of natural or human history of national, state, or local significance, such as National Landmarks, archeological sites, and properties listed (or eligible for listing) on the National Register of Historic Places (NRHP). Regulations established for the management of cultural resources include:

- Antiquities Act of 1906 (16 U.S.C. 431-433)
- Historic Sites Act of 1935 (16 U.S.C. 461-467)
- Section 106 of the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470 et seq.), as amended
- Archaeological Data Preservation Act (ADPA) of 1974 (16 U.S.C. 469 a-c)
- Archaeological Resources Protection Act (ARPA) of 1979 (16 U.S.C. 470 et seq.), as amended
- Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 3001 et seq.)
- Executive Order 13007 Indian Sacred Sites.

A cultural resource survey of the project area was conducted in 2001. The investigation consisted of background research and archaeological field studies. Based on the survey findings, significant archaeological resources were not found and are unlikely to be located within the project area for the proposed project (see Section 3.12, **Cultural Resources**).

The report was submitted to the Squaxin Island Tribe in December 2006. No comments from the Tribe were received. In a meeting with the Tribe on December 14, 2006, the Tribe was concerned about any ground disturbance in many areas near creeks and lakes where the potential for cultural resources is high. As part of the proposed project, two areas of high potential for impacts would be monitored during construction.

On August 1, 2007, BPA submitted the cultural resources report to the Washington State Department of Archaeology and Historic Preservation (DAHP) requesting concurrence with the determination that no historic properties would be affected. On December 20, 2007, BPA submitted additional information about Olympia and Shelton substations and requested concurrence with the determination that no historic properties would be affected. In a January 16, 2008 letter to BPA, the DAHP concurred that the current project as proposed will have no adverse effect on National Register eligible or listed historic and cultural resources (Holter, 2008).

## 4.5 State, Areawide, and Local Plan and Program Consistency

Though as a federal agency, BPA is not required to comply with state and local land-use approvals or permits, BPA strives to meet or exceed these substantive standards and policies to the maximum extent practical.

### *4.5.1 State Environmental Policy Act*

The state of Washington has adopted a State Environmental Policy Act (SEPA), which is intended to ensure that environmental values are considered during decision-making by state and local agencies. The objectives and requirements of SEPA are similar to those of NEPA. SEPA allows the use of NEPA documents to meet SEPA requirements (WAC 197-11-610). Although SEPA compliance is not required for the proposed project, preparation of the EA under NEPA fulfills the same basic objectives of SEPA.

### *4.5.2 Washington Forest Practices Act*

The Washington Forest Practices Act and Forest Practices Rules and Regulations are the state's principal means of regulating activities on non-federal forestlands. BPA has existing ROW or would purchase an easement from the landowner for the small amounts of additional ROW needed and some trees would be removed that pose a danger to new and existing transmission lines. The Forest Practices Act does not apply to federal agencies and so no permit needs to be obtained from the state. BPA, however, incorporates many of the best management practices described in the Forest Practices Act into its construction and maintenance plans. A second consideration, which lessens any conflict with the Forest Practices Act, is that Chapter 222-20 of the Washington Administrative Code states that the development of utility rights-of-way shall not be considered to be conversions under the Act.

### *4.5.3 Coastal Zone Management Act*

The proposed project is within Washington's Coastal Zone. As such, BPA is subject to the requirements of the Coastal Zone Management Act of 1972 (CZMA) (16 U.S.C. Sections 1451-1464), which requires that federal agencies carry out their activities affecting a coastal zone in a manner that is, to the maximum extent practicable, consistent with the state coastal zone management program. The state of Washington has an approved Coastal Zone Management Program, which is implemented by the state Department of Ecology. The program includes the Shoreline Management Act and state air and water quality requirements.

BPA believes that the proposed project is consistent to the maximum extent practicable with Washington's Coastal Zone Management Program. BPA submitted a consistency statement to WDOE on December 10, 2007. In a January 17, 2008 letter, WDOE agreed that this proposed project is consistent with Washington's Coastal Zone Management Program (McFarland, 2008).

### *4.5.4 Land Use Planning Framework*

The following local land use plans guide development in the project area:

- Mason County's Comprehensive Land Use Plan was adopted in April 1996 and updated in 2005. The County's plan specifically addresses existing transmission lines; and the need for future utility corridors on the Olympic Peninsula. The plan encourages using existing corridors for improvements.

- Thurston County's Comprehensive Land Use Plan was adopted in 1995 and updated in 2004. The County's plan specifically addresses existing transmission lines; and the need

for future utility corridors on the Olympic Peninsula. The plan encourages using existing corridors for improvements.

- The City of Shelton has a Comprehensive Plan that was amended in 2005. The City's Comprehensive Plan addresses future utility needs. The small areas of new ROW needed in the state highway ROW (see Figure 6) are within Shelton's Urban Growth Area.

- The City of Tumwater adopted its comprehensive plan in 1993 and updated it in 2004. The City's comprehensive plan specifically addresses utility corridors and facilities. The area next to Olympia Substation where BPA would remove one tower and build two new towers is on BPA property within Tumwater's Urban Growth Area.

The proposed project would use an existing corridor for all but a small portion of the new transmission line. The proposed project would be consistent with these land use plans to the extent practicable.

## 4.6 Air Quality

The Federal Clean Air Act, as revised in 1990 (PL 101-542 (42 USC 7401), requires the EPA and individual states to carry out a wide range of regulatory programs intended to assure attainment of the National Ambient Air Quality Standards. In the state of Washington, EPA has delegated authority to the WDOE, which in most areas has delegated authority to local air pollution control agencies. Each of those agencies has regulations requiring all industrial activities (including construction projects) to minimize windblown fugitive dust.

The southernmost portion of the project area (Olympia Substation to Black Lake) is located in the Thurston County Particulate Matter Maintenance area, which corresponds to the City of Tumwater City boundary. A maintenance area is an area that was previously considered to be a non-attainment area and is being monitored for a period of 10 years to ensure maintenance of good air quality. The Washington Administrative Code has standards for fugitive emissions:

> **WAC 173-400-040 General standards for maximum emissions.**
>
> (3) **Fugitive emissions.** The owner or operator of any emissions unit engaging in materials handling, construction, demolition or other operation which is a source of fugitive emission:
>
> (a) If located in an attainment area and not impacting any nonattainment area, shall take reasonable precautions to prevent the release of air contaminants from the operation.
>
> (b) If the emissions unit has been identified as a significant contributor to the nonattainment status of a designated nonattainment area, the owner or operator shall be required to use reasonable and available control methods, which shall include any necessary changes in technology, process, or other control strategies to control emissions of the air contaminants for which nonattainment has been designated.

Reasonable precautions would be used to minimize fugitive emissions in attainment and maintenance areas. Water trucks would be used to minimize fugitive dust from construction sites

during dry periods. There would be no burning of cleared material, due to the small amount of land where tree removal would take place. Finally, vehicles and equipment used during construction of the proposed project would be maintained so as to minimize emissions.

The urban growth areas of Olympia, Tumwater and Shelton have burning bans. Mason County has designated certain areas as Smoke Management Zones where no land-clearing burning permits will be issued. No burning would take place in these areas and it is likely that no burning would take place on the project.

## 4.7 Global Warming

Gases that absorb infrared radiation and prevent heat loss to space are called greenhouse gases. Greenhouse gases are thought to be connected to global warming and include water vapor, carbon dioxide, methane, nitrous oxide, nitrogen oxides, non-methane volatile organic compounds and stratospheric ozone-depleting substances such as chlorofluorocarbons. At a maximum, the proposed project would clear or disturb vegetation on about 15 acres, which could release up to 15 tons of carbon dioxide to the atmosphere primarily through decay. No slash would be burned, so no additional carbon would be released into the atmosphere. Because most disturbed areas would be revegetated, the project's contribution to global warming would be temporary and negligible.

## 4.8 Floodplains and Wetlands Protection

The U.S. Department of Energy mandates that impacts to floodplains and wetlands be assessed and alternatives for protection of these resources be evaluated in accordance with Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR 1022.12), and Federal Executive Orders 11988 and 11990.

Wetland management, regulation, and protection is addressed in several sections of the Clean Water Act, including Sections 401, 402, and 404, as well as to a combination of other state and Federal laws. Other laws include the Coastal Zone Management Act, the critical areas ordinances of local governments, the Endangered Species Act, Historic Preservation Act, Rivers and Harbors Act, and the Wild and Scenic Rivers Act.

Evaluation of project impacts on floodplains and wetlands are discussed briefly below and in more detail in Sections 3.7, **Wetlands**, and 3.8, **Floodplains**.

### *4.8.1 Wetlands*

Numerous wetlands are found in the project area, but only a limited number would be impacted by activities in or near them. Five of the existing structures are within wetlands, resulting in 0.05 acre of temporary impacts. The impact on wetlands from removing existing structures would be low. Structures in wetlands would be cut at the base with no soil disturbance and lifted or dragged from the wetland area.

Impacts on wetlands from installing new structures *in* wetlands and construction or improvement of access roads are expected to be low to moderate and mostly temporary. Six proposed structures are located in wetlands, totaling approximately 6 acres of temporary impacts and

approximately 0.054 acre of permanent impacts. There are five proposed access road improvements and/or access road construction within wetlands that would result in about 1.38 acres of permanent impacts. Impacts to wetland hydrology associated with the installation of the tower footings are expected to be minor, as the hydrologic source in depressional wetlands occurs above the 6 feet depth of the minimal footing depth. Additionally, the top 18 inches of soil would be removed and used as backfill upon structure installation. By maintaining the soil column, hydric soils would retain their attributes and native vegetation could reestablish from the seedlings within the upper 18 inches of native soil. Activities adjacent to wetlands could impair some wetland functions by degrading the quality of the wetland buffer. Operation and maintenance is expected to have a low impact on wetlands. Mitigation measures that would be implemented to minimize impacts to wetlands are discussed in Section 3.7.3, **Wetlands**.

### *4.8.2 Floodplains*

Floodplains of Black River, McClain Creek, Swift Creek, Perry Creek, Gosnell Creek, Kennedy Creek, Skookum Creek, Coffee Creek, and Goldsborough Creek are within the ROW. Construction activities within floodplain areas would be temporary and localized, only minimally altering floodplain functions. Impacts from structure removal and installation are expected to be low to moderate. Although the proposed transmission line would span all streams and associated floodplains, there could be about 1 acre of permanent impacts to floodplains associated with the removal of existing structures, installation of new structures, and proposed access road construction (see Table 3-5 in Section 3.8.2). The primary direct impacts on floodplains are expected to result from soil compaction and removal of vegetation, leading to possible subsequent erosion. Drilling holes that would support new structures would result in the deposition of approximately 100 cubic yards of fill covering about 100 square feet. Indirect impacts on floodplains are expected to be low and limited to incidental amounts of sediment deposited in the floodplain due to soil erosion from construction activities near the floodplain. Improvements to existing roads are expected have a low to moderate impact on floodplain functions because only limited road improvements are planned in and near or within floodplains (see Table 3-5 in Section 3.8.2). Operation and maintenance is expected to have a low impact on floodplains. Mitigation measures that would be implemented to minimize impacts to floodplains are discussed in Section 3.8.3.

## 4.9 Permits for Discharges Into Waters of the United States

The Clean Water Act (CWA) regulates discharges into waters of the United States. The various sections applicable to this project are discussed below.

### *4.9.1 Section 401*

A federal permit to conduct an activity that causes discharges into navigable waters is issued only after the affected state certifies that existing water quality standards would not be violated if the permit were issued. BPA would submit the Joint Aquatic Resource Permit and WDOE will review it. This review would take place concurrently with the Army Corps of Engineers (ACOE) review for Section 404 compliance. A Section 404 permit would not be issued by ACOE until a 401 Certification from the Washington Department of Ecology is issued for the proposed project.

### *4.9.2 Section 402*

This section authorizes storm water discharges under the National Pollutant Discharge Elimination System. The EPA, Region 10, has a general permit for federal facilities for discharges from construction activities. BPA would issue a Notice of Intent to obtain coverage under the EPA general permit and is preparing a Storm Water Pollution Prevention Plan (SWPP) that will address stabilization practices, structural practices, stormwater management, and other controls (see Section 3.6, **Water Quality**).

### *4.9.3 Section 404*

Authorization from the ACOE is required in accordance with the provisions of Section 404 of the CWA when there is a discharge of dredged or fill material into waters of the U.S., including wetlands (33 CFR 328.3). Impacts to wetlands are described in Section 3.7, **Wetlands**. A wetland determination and delineation located, described, and mapped all wetlands within the project area. The project was designed to avoid and minimize impacts to waters of the U.S., including wetlands to the greatest extent practicable. Examples of avoidance minimization include moving proposed structures and access roads to uplands.

For all unavoidable impacts to waters of the U.S., including wetlands, BPA would apply for a Section 404 permit from the ACOE. There could be about 6 acres of temporarily impacts from mechanized land clearing and temporary side-casting of excavated material within jurisdictional wetlands, and about 1.38 acres of permanent impacts to wetlands resulting from the discharge of fill material within jurisdictional wetlands. Several Nationwide Permits, such as Nationwide Permit 12 for Utility Line Activities, (33 CFR 330) may apply to different types of activities. For project activities covered under an existing Nationwide Permit, all conditions of the permit, including regional general conditions and special conditions, would be followed.

## 4.10 Hazardous Materials

Various environmental laws related to hazardous materials and pollution control acts have the potential to apply to this project. The Spill Prevention Control and Countermeasures Act and Title III of the Superfund Amendments and Reauthorization Act potentially apply to the proposed project, depending upon the exact quantities and types of hazardous materials stored on-site. Regulations would be enforced by WDOE. In addition, development of a Hazardous Materials Management Plan in accordance with the Uniform Fire Code may be required by local fire districts.

The Resource Conservation and Recovery Act (RCRA), as amended, is designed to provide a program for managing and controlling hazardous waste by imposing requirements on generators and transporters of this waste, and on owners and operators of treatment, storage, and disposal (TSD) facilities. Each TSD facility owner or operator is required to have a permit issued by EPA or the state. Typical construction and maintenance activities in BPA's experience have generated small amounts of these hazardous wastes: solvents, pesticides, paint products, motor and lubricating oils, and cleaners. Small amounts of hazardous wastes may be generated by the proposed project. These materials would be disposed of according to state law and RCRA.

The Toxic Substances Control Act is intended to protect human health and the environment from toxic chemicals. Section 6 of the Act regulates the use, storage, and disposal of PCBs. BPA adopted guidelines to ensure that PCBs are not introduced into the environment. Equipment used for this project will not contain PCBs. Any equipment removed that may have PCBs will be handled according to the disposal provisions of this Act.

The Federal Insecticide, Fungicide and Rodenticide Act registers and regulates pesticides. BPA uses herbicides (a kind of pesticide) only in a limited fashion and under controlled circumstances. Herbicides are used on transmission line rights-of-way and in substation yards to control vegetation, including noxious weeds. When BPA uses herbicides, the date, dose, and chemical used are recorded and reported to state government officials. Herbicide containers are disposed of according to RCRA standards (see Section 4.14).

If a hazardous material, toxic substance, or petroleum product is discovered, and may pose an immediate threat to human health or the environment, BPA requires the contractor to notify the Contracting Officer's Technical Representative (COTR) immediately. Other conditions such as large dump sites, drums of unknown substances, suspicious odors, stained soil, etc. must also be reported immediately to the COTR. The COTR will coordinate with the appropriate personnel within BPA. In addition, the contractor will not be allowed to disturb such conditions until the COTR has given the notice to proceed.

## 4.11 Executive Order on Environmental Justice

In February 1994, Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, was released to federal agencies. This order states that federal agencies shall identify and address as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income population. The project would not cause disproportionately high and adverse impacts on minority and low-income populations; see Section 3.11, **Socioeconomics**.

## 4.12 Noise

The Federal Noise Control Act of 1972 (42 USC 4901) declares that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare. The Act further states that federal agencies are authorized and directed, to the fullest extent consistent with their authority under federal laws administered by them, to carry out the programs within their control in such a manner as to further this policy. As described in Section 3.14, **Noise**, the proposed project would have primarily temporary low to moderate noise impacts, and mitigation measures are identified to further reduce noise impacts.

## 4.13 Federal Communications Commission

Federal Communications Commission (FCC) regulations require that transmission lines be operated so that radio and television reception would not be seriously degraded or repeatedly interrupted. Further, the FCC regulations require that the operators of these devices mitigate such interference. It is expected that there would be no interference with radio, television, or other reception as a result of the proposed project (see Section 3.14, **Noise**). BPA would comply

with FCC requirements relating to radio and television interference from the proposed project if any such interference occurs.

## 4.14 Federal Aviation Administration

As part of the transmission line design, BPA seeks to comply with Federal Aviation Administration (FAA) procedures. Final locations of structures, structure types, and structure heights would be submitted to the FAA for the project. The information includes identifying structures taller than 200 feet above ground and listing all structures within prescribed distances of airports listed in the FAA airport directory. General BPA policy is to follow FAA recommendations for airway marking and lighting.

# Chapter 5
# Persons and Agencies Consulted

The project mailing list contains over 500 interested or affected landowners; tribes; local, state, and federal agencies; utilities; public officials; interest groups; businesses; special districts; libraries and the media. They 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 EA.

## 5.1 Federal Agencies

NOAA Fisheries
U.S Department of Commerce, Bureau of the Census, Seattle Regional Office
U.S. Army Corps of Engineers
U.S. Department of Energy, Department of NEPA Policy and Compliance, Brian Mills
U.S. Fish & Wildlife Service

## 5.2 State Agencies

Washington Department of Fish & Wildlife
State of Washington Division of Lands – Dept. of Natural Resources
Washington Department of Ecology
Washington Department of Revenue
Washington State Department of Archaeology and Historic Preservation
Washington Department of Transportation

## 5.3 Local Agencies

City of Shelton Planning and Community and Economic Developments
City of Tumwater
Mason County Planning Department and Public Works Department
Thurston County Development Services and Department of Road and Transportation
City of Olympia
Mason County Fire District 16

## 5.4 Tribes

Chehalis Tribe
Jamestown S'Kallam Tribe
Lower Elwa Tribe
Makah Tribe
Muckleshoot Tribe
Nisqually Tribe
Squaxin Island Tribe
Suquamish Tribe

## 5.5 Utilities

British Columbia Ministry of Energy & Mines – Electricity Department
Cascade Natural Gas Corporation
Clallam County PUD No. 1
El Paso Natural Gas Company
Williams Power Company Inc. Northwest Pipeline
Mason County PUD No. 1
Mason County PUD No. 3

## 5.6 Libraries

Washington State Library, Olympia, WA
Olympia Timberland Library, Olympia, WA
Johnson Library, Shelton, WA
Mason County Law Library, Shelton, WA
Shelton Timberland Library, Shelton, WA
Squaxin Island Museum Library and Research Center, Shelton, WA
William G. Reed Public Library, Shelton, WA

**Depository Libraries:**
Brooks Library, Central Washington University, Ellenburg, WA
Eastern Washington University Library, FK Library, Cheney WA
University of Washington Libraries - Government Publications: Suzzallo Library, Seattle, WA
University of Washington Libraries - Map Collection & Cartographic Information Services: Suzzallo Library, Seattle, WA
The Seattle Public Library Seattle, WA
University of Washington School of Law Library, Seattle WA
Washington State Law Library, Olympia, WA
Washington State University Libraries, Pullman WA

## 5.7 Media

The Olympian

## 5.8 Interest Groups

14 Ventures LLC
301 WKB LLC
ABC Corporation
Ash Inc.
Bonneville Environmental Foundation
BP West Coast Products
Burlington Northern & Santa Fe RR Company
Centennial Bank Real Property
Chans Plaza Partners LLC

Climate Solutions
CNL APF Partners
Congregation of Celts
CSK Auto Inc.
Daimond Parking Inc
Estate of Arnold Stoehr
Estate of Betty Marshall
Exceptional Foresters
Faunce Markeley LLC
Five Talents Investment LLC
Gedora Asset Management Company
Gedora Business Company
Green Diamond Resource Company
Hancor Inc.
Heritage Bank
Hilburn Family Inc LLC
Hillcrest Congregation of Jehovah's Witnesses
Is Lincoln Oaks LIM Partnership et al
Jones Quarry
JT Neely Properties LLC
Kalon International
Kaufman Development LP
Kekaba LLc
Kneeland Plaza One LLC
L Stoehr Family LTD Partnership
Lashcorp Inc.
Life Estate Alfred Spain
Manke Family Resources Ltd Partnership
Manke Lumber Company Inc.
Maple Valley Estate Comm. Assoc.
McDonald's Corporation
Miles Sand & Gravel Company
Miller, EC Botanical Garden Endowment Trust
Mottman Business Park LLC
Mountaineers
Mt. View Alliance Church
Musser Family Farm LLC
National Wildlife Federation
Natural Resources Defense Council
NEW Realty LP
Newcomb RVCBL Family Trust
Niemann Family Limited Partnership No.2
Non-Wires Solutions Round Table
North Fork Timber Company
Northwest Energy Coalition
Northwest Sportfishing Industry Association

Northwest Sustainable Energy for Economic Development
Opportunity Council
Pacific West Landscaping
Parksierra Corporation
Pavilion at Sentry Park LLC
PMB 2792
Port Blakely Tree Farms LP
Prairie Place
Ranum Investments LLC
Rayoniew Properties LLC
Renewable Northwest Project
Sandra LLC & Roann LLC&S Ellison Tax Department
Save Our Wild Salmon
Schoen Enterprises
Sea Breeze Regional Transmission Systems, Inc.
Sentry Mini Storage
SH2 LLC
Shelton Property Venture
Sierra Club
Silver M&M LLC
Simpson Community Credit Union
Simpson Timber Company
Soundvue Enterprises
Summerwalk Lacey LLC
Swanson Trust
Taylor Timber Investment Company
Thompson Living Trust
Thurman Family Partnership LP
Triway Investments LLC
Trust – Robert Job
Trust Accounting Center
Un Rosen Enterprises
Vovi Friendship Association in Washington
W O H K Inc.
Wal Mart Real Estate Business Trust
Wells Foods LLC
West Coast Bank
West Washington Corporation 7th Day Adventist Trustee
Western Washington Corporation
Zukle Trust

# Chapter 6
# Glossary and Acronyms

**ACOE** – Army Corps of Engineers

**Access road** – Roads and road spurs that provide vehicular access to the corridor and structure sites. Where county roads, logging roads, driveways or other access is already established, access roads are built as short spurs to the structure site. Access roads are maintained even after construction except for temporary access roads. Temporary access roads are laid down on geotextile in sensitive areas such as wetlands or yards, so that they can be removed after use and the site restored.

**Alluvial** – Deposited by flowing water, as *alluvial* sediment.

**Ambient noise –** Noise within the surrounding area from sources such as a substation or traffic that are part of the background noise level.

**Aquifer** – Water-bearing rock or sediments below the surface of the earth.

**AWQC** – Ambient water quality criteria are elements of state water quality standards, expressed as constituent concentrations representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use.

**Blackout** – The disconnection of the source of electricity from all the electrical loads in a certain geographical area. Brought about by an emergency forced outage or other fault in the generation, transmission, or distribution system serving the area.

**BMP –** Best Management Practices, a practice or combination of practices that are the most effective and practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.

**BPA** – Bonneville Power Administration.

**Brownout** – A brownout is a partial reduction of electrical voltages that causes lights to dim and motor-driven devices to lose efficiency.

**Capacity** – A measure of the ability of a transmission line, groups of lines (path) or transmission system to carry electricity.

**Carbon Monoxide (CO)** – Colorless, odorless, poisonous gas produced when carbon burns with insufficient air.

**Clean Water Act** – A federal law intended to restore and maintain the chemical, physical, and biological integrity of the nation's waters and secure water quality.

**Colluvium** – Soil material, rock fragments, or both accumulated at the base of steep slopes.

**Conductor** – The wire cable strung between transmission towers through which electric current flows.

**Corona** – Corona occurs in regions of high electric field strength on conductors, insulators, and hardware when sufficient energy is imparted to charged particles to cause ionization (molecular breakdown) of the air.

**Corridor** – Multiple transmission line rights-of-way adjacent to each other.

**COTR** – Contracting Officer's Technical Representative

**Counterpoise** – A buried wire system connected to the footings of towers or poles supporting a transmission line. Used to establish a low resistance path to earth, usually for lightning protection.

**Culvert** – A corrugated metal or concrete pipe used to carry or divert runoff water from a drainage such as a ditch or stream; usually installed under roads to prevent washouts and erosion.

**Cultural Resources** – Those historic and archeological properties, properties of traditional and cultural significance, sacred sites, Native American human remains and associated objects, and cultural landscapes which are entitled to special consideration under federal statute, regulations, and/or executive orders.

**Cumulative Impacts** – impacts created by the incremental effect of a specific action when added to other past, present, or reasonably foreseeable actions.

**Current** – The amount of electrical charge flowing through a conductor (as compared to voltage, which is the force that drives the electrical charge).

**Danger trees** – Trees (or high-growing brush) in or alongside the right-of-way, which are hazardous to the transmission line. These trees are identified by special crews and must be removed to prevent tree-fall into the line or other interference with the wires. BPA's Construction Clearing Policy requires that trees be removed that meet either one of two technical categories: Category A is any tree that within 15 years will grow to within about 18 feet of conductors when the conductor is at maximum sag (212ºF) and swung by 6 lb per sq feet of wind (58 mph); Category B is any tree or high-growing brush that after a year of growth will fall within about 8 feet of the conductor at maximum sag (176ºF) and in a static position.

**dBA** – The first two letters (dB) are an abbreviation for "decibel," the unit in which sound is most commonly measured. The last letter (A) is an abbreviation for the scale (A scale) on which the sound measurements were made. A decibel is a unit for expressing relative difference in power, usually between acoustic signals, equal to 10 times the common logarithm of the ratio of two levels.

**Decibel** – A decibel is a unit for expressing relative difference in power, usually between acoustic signals, equal to 10 times the common logarithm of the ratio of two levels.

**DNR** – State of Washington, Department of Natural Resources.

**DOE** – Department of Energy

**EA** – Environmental Assessment; an environmental document prepared by federal agencies under the National Environmental Policy Act to determine whether the proposed action has the potential to cause significant environmental effects.

**Easement** – The right, privilege, or interest obtained by BPA through negotiated contract or condemnation to construct, maintain, and operate transmission facilities within a right-of-way.

**Electric and magnetic fields (EMF)** – The two kinds of fields produced around the electric wire or conductor when an electric transmission line or any electric wiring is in operation.

**Electromagnetic interference (EMI)** – Interference caused by corona (see corona).

**Electromagnetic noise** – The noise generated in the frequency bands used for radio and television signals caused by corona on transmission line conductors.

**Emergent Wetland–**Wetlands dominated by herbaceous species.

**EPA** – Environmental Protection Agency.

**Equivalent sound level ($L_{eq}$) –** Generally accepted as the average sound level.

**Exceedence levels (L levels)** – Refers to the A-weighted sound level that is exceeded for a specified percentage of the time during a specified period.

**FAA** – Federal Aviation Administration.

**FCC** – Federal Communications Commission.

**Fecal coliform** – Bacteria found in the intestinal tracts of birds and mammals that can be passed to the environment via fecal matter.

**FEMA –** Federal Emergency Management Agency; produces flood insurance maps used to determine the location of floodplains.

**Fiber optic cable** – Special wire installed on the transmission line that is used for communication between one location and another.

**Floodplain** – That portion of a river valley adjacent to the stream channel that is covered with water when the stream overflows its banks during flood stage.

**Glacial outwash** – Materials deposited by glacial meltwaters.

**Glaciofluvial** – Used of sediments transported by ice and deposited from the flowing meltwaters of a glacier.

**Ground wire** – A protective wire strung above the conductors on a transmission line to shield the conductors from lightning; also called shield wire or overhead ground wire.

**Guy wire** – Steel wire used to support or strengthen a structure.

**H-Frame** – Refers to a type of transmission line structure usually made of wood, with vertical poles and horizontal crossarms. When erected, it resembles a capital letter "H."

**Insulators** – A ceramic or other non-conducting material used to keep electrical circuits from jumping over to ground.

**Intermittent** –Creeks or streams with seasonal or periodic water flow; under the Washington state water typing classifications, Type 5 streams are intermittent.

**Kilovolt (kV) –** One thousand volts.

**Lattice steel** – Refers to a transmission tower constructed of multiple steel members that are connected together to make up the frame.

**Load** – The amount of electric power or energy delivered or required at any specified point or points on a system. Load originates primarily at the energy-consuming equipment of customers.

**Mbf** – Thousand board feet; a way to measure amount of lumber.

**Megawatt (MW) –** The electrical unit of power which is equal to 1,000 kilowatts, or 1,000,000 watts.

**mG** – Milligauss – A unit used to measure magnetic field strength. One-thousandth of a gauss.

**Mitigation** – Steps or measures taken to lessen the potential effects predicted for a resource. They may include reducing the impact, avoiding it completely, or compensating for the impact. Some mitigation, such as adjusting the location, of a tower to avoid a special resource, is taken during the design and location process. Other mitigation, may be done during construction, such as measures to reduce noise, or after construction, such as reseeding access roads with desirable grasses in order to help prevent the proliferation of weeds.

**Multiplier Effects –** The total increase in income and employment that occurs in the local economy for each dollar of local project expenditure.

**NAAQS** – National Ambient Air Quality Standards.

**National Environmental Policy Act (NEPA)** – A law passed in 1969 that requires Federal agencies to assess the impacts that their actions may have on the environment.

**NESC** – National Electrical Safety Code.

**NHPA – N**ational Historic Preservation Act.

**Non-lustrous** – Non-reflecting conductor made of metal with a dull finish.

**Noxious weeds** – Plants that are injurious to public health, crops, livestock, land or other property, as identified by state law.

**NRHP** – National Register of Historic Places.

**OAHP** – Office of Archeology and Historic Preservation.

**100-year floodplain** – Areas that have a 1 percent chance of being flooded in a given year, designated by FEMA (see Floodplain.)

**Open water –** Water covers the surface at a mean annual depth greater than 6.6 feet or, if less than 6.6 feet in depth, the habitat does not support rooted plant species.

**ORCAA** – Olympic Region Clean Air Agency.

**Outage** – Events caused by a disturbance on the electrical system that requires BPA to remove a piece of equipment or a portion or all of a line from service. The disturbances can be either natural or human-caused.

**Overloaded** – Too much current trying to flow over transmission facilities. Equipment has safeguards: in the event of overloading of the system, switches will disconnect sensitive equipment from the flow of electricity.

**Ozone** – A form of oxygen, $O_3$, produced when an electric spark or ultraviolet light passes through air or oxygen.

**Palustrine –** A term used to classify wetlands; includes freshwater wetlands vegetated with plants and wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand.

**Peak Use** – The highest demand for power during a stated period of time.

**Per capita income** – Total personal income divided by population.

**Perennial** – Refers to a stream or creek with continuous, year-round water flow; under the state water typing system includes Type 1-4 streams. When this term refers to plants, it means species that live for several years.

**Permanently Flooded –** An area where water covers the land surface throughout the year in all years.

**Personal income** – Labor earnings (proprietors income & wages and salaries); dividends, interest, and rent; and transfer payments.

**PM10 –** Particulate matter having a nominal aerodynamic diameter less than or equal to 10 microns.

**PPM –** Parts per million.

**RCRA –** Resource Conservation and Recovery Act

**Respirable** – Easily inhaled.

**Right-of-way (ROW)** – An easement for a certain purpose over the land of another, such as a strip of land used for a road, electric transmission line, pipeline, etc.

**Riparian** – Pertaining to, living on, or situated on the banks of rivers and streams.

**Safety** – The state of being safe from the risk of experiencing or causing injury, danger, or loss.

**Scrub-shrub –** Includes areas dominated by woody vegetation less than 6 m (20 feet) tall. The species include true shrubs, young trees (saplings), and trees or shrubs that are small or stunted because of environmental conditions.

**Seasonally flooded –** Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

**Semi-permanently flooded –** Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land's surface.

**Sheet erosion –** Removal of a uniform, thin layer of soil by raindrops or water runoff on bare soil.

**SHPO** – State Historic Preservation Office.

**Silvicultural** – Concerning the cultivation and management of trees to establish or maintain age structures, species composition, and growth rates that contribute to forest management goals. This may include planting, thinning and selective cutting, and clear-cutting, often of single-species plantations.

**Single-circuit** – A line with one electrical circuit on the same tower.

**Sole source aquifer** – An aquifer designated by the Environmental Protection Agency which provides at least half of an area's drinking water.

**Staging area –** The area cleared and used by BPA/BPA's contractor to store and assemble materials or structures.

**STP –** Shovel test probes; are the hole dug and process undertaken to conduct subsurface cultural resource investigations.

**Structure** – Refers to a type of support used to hold up transmission or substation equipment. Structures can be made of wood or steel, depending on the size of the line or equipment.

**Substation** – The fenced site that contains the terminal switching and transformation equipment needed at the end of a transmission line.

**Successional** – Refers to the gradual process of progressive change and replacement of ecological communities at a particular site over time. Age and structure of successional forest categories vary significantly by forest type and from one biogeoclimatic zone to another.

> **Early-successional** – Early-successional stands typically comprise herbaceous plants, shrubs, seedlings, saplings, and small trees, including many shade-intolerant species.
>
> **Mid-successional** – Typically includes stands of medium-sized pole and saw timber. Understories begin to open up as lower-growing species are shaded out.
>
> **Late-successional** – Typically includes stands of larger trees (at least 24 inches in diameter at breast height), multi-layered canopies, downed logs, and standing dead trees (snags). Heavily shaded understories are more open but include shade-tolerant shrubs and herbaceous species.

**System reliability** – The ability of a power system to provide uninterrupted service, even while that system is under stress.

**Take** – Section 3 of the Endangered Species Act defines take as an act to a listed species with the effect "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct." The USFWS further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavior patterns such as breeding, feeding, or sheltering," and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to breeding, feeding or sheltering."

**Tap -** To tie a substation into an existing line by running a new single-circuit line from the substation to the line.

**Temporarily flooded –** An upland or wetland area where surface water is present for brief periods during growing season, but the water table usually lies well below the soil surface.

**Terrace** – A flat, often narrow remnant of an old floodplain, which stands above a stream that has eroded its bed down to a new floodplain.

**Thermal rating** – The maximum current that can flow in a transmission line conductor, device or electrical machine without a failure or damage caused by excessive temperature.

**Threatened species** – Species officially designated that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range; states also designate threatened species.

**TMDL** – Total Maximum Daily Load. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The calculation must include a margin of safety to ensure that the waterbody can be used for the purposes the state has designated. The calculation must also account for seasonal variation in water quality. The Clean Water Act, section 303, establishes the water quality standards and TMDL programs.

**Transmission line** – The structures, insulators, conductors, and other equipment used to transmit electrical power from one point to another.

**TSD** – Treatment, storage, and disposal facilities.

**TSP** – Total suspended particulate; a measure of water turbidity.

**Turbidity** – A measure of the amount of particulate matter, such as suspended sediment, per unit volume of water.

**USFWS** – U.S. Fish and Wildlife Service.

**Vegetation management –** BPA's policies and protocols that guide methods of controlling vegetation within and near electric power facilities. Vegetation that is controlled includes tall-growing species that

pose a hazard to power lines, as well as noxious weeds. It also includes methods to encourage the growth of low-growing, desirable species that resist noxious weed invasion.

**Voltage –** The driving force that causes a current to flow in an electric circuit. Voltage and volt are often used interchangeably.

**Water bars** – Smooth, shallow ditches excavated at an angle across a road to decrease water velocity and divert water off and away from the road surface.

**Watershed** – A drainage basin defined by an elevated boundary area separating tributaries draining into different river systems.

**WDFW –** Washington State Department of Fish and Wildlife.

**WDNR –** Washington State Department of Natural Resources**.**

**Wetland** – An area where anaerobic conditions (lack of oxygen) develop in the soil because of prolonged saturation or inundation by water during the growing season. Indicators of wetlands include plant species adapted to such conditions, characteristic soil colors and chemical properties, and physical evidence of flooding or waterlogged soils.

**WRIA** – Water Resource Inventory Areas are administrative and planning boundaries developed and managed by the Washington State Department of Ecology.

**WSDOT** – Washington State Department of Transportation.

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[2] Now the National Resources Conservation Service.