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RAYMOND – COSMOPOLIS TRANSMISSION LINE REBUILD PROJECT

PRELIMINARY ENVIRONMENTAL ASSESSMENT

DOE/EA-1425

Preliminary Environmental Assessment

Raymond – Cosmopolis Transmission Line Rebuild Project

Bonneville Power Administration
U.S. Department of Energy

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Purpose of and Need for Action

1.1 INTRODUCTION

This Environmental Assessment (EA) was prepared by Bonneville Power Administration (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 UNDERLYING NEED FOR ACTION

BPA needs to take action because the existing 115-***kilovolt (kv)***[1] transmission line between Raymond and Cosmopolis in Washington is old, physically worn, and structurally unsound in places. Its condition creates risks to public and worker safety and to reliable electrical service.

The Raymond–Cosmopolis transmission line (Figure 1-1) was originally built in the 1920s and was acquired by BPA in the 1930s. BPA fitted portions of the line with new ***conductors*** (wires) and tower tops in 1952. Today, the existing structures and conductors show impact damage from trees falling on the line as well as normal deterioration due to age. Erosion and unstable soils have undermined the structure bases in some areas, and a number of the structures are leaning. Some structures do not have permanent access roads to reach them, which makes normal and emergency maintenance difficult and at times unsafe. The line's poor condition raises concerns about its overall structural reliability and the safety of BPA workers who must maintain it.

As the overloaded conductor heats up, it expands and sags closer to the ground. If it sags below a certain distance from the ground, it is considered to be a safety violation of the National Electrical Safety Code.

1.3 PURPOSES OF ACTION

The project would be expected to accomplish the following purposes:

- Meet transmission system public safety and reliability standards set by the National Electrical Safety Code
- Minimize environmental impacts
- Improve safety for transmission line workers
- Minimize costs
- Use facilities and resources efficiently

Figure 1-1. Project Area Overview
(This map was removed a hard copy is available)

[1] Terms defined in the glossary (Chapter 6) are shown in ***bold, italicized*** typeface the first time they are used.

1.4 OTHER BPA PROJECTS IN THE AREA

BPA recently completed or is planning several other projects along the Raymond-Cosmopolis transmission line. Each of these projects, as described below, is considered a separate project because it is needed regardless of whether the actions evaluated in this EA take place.

The Raymond-Cosmopolis ***danger tree*** removal project was conducted in the summer and fall of 2002. Danger trees are trees that could, within a 15-year period, be a hazard to the transmission line by falling into it. The project was needed because damage from trees caused an average of ten outages per year along this line. Environmental impacts of the project were assessed in a Supplement Analysis (SA-65, BPA 2002), tiered to the BPA Transmission System Vegetation Management Program Final Environmental Impact Statement (EIS) (BPA 2000). Danger trees were removed in areas adjacent to the Raymond-Cosmopolis ***right-of-way*** (***ROW***), generally within 175 feet. As part of the project, a number of roads also were improved.

On-going ***access road*** maintenance was completed in the summer of 2002 to repair failed culverts and to improve roads that had become impassable. Some work was conducted in waterways, including replacing three culverts that are not in fish habitat, replacing four culverts in fish habitat with culverts that meet Washington Department of Fish and Wildlife (WDFW) Fish Passage Guidelines, and replacing one culvert with a bridge. This type of work normally is categorically excluded from further analysis under NEPA.

BPA is proposing repair work on the bridge over Butte Creek on the entrance road to Raymond Substation, to ensure it meets guidelines and specifications for heavy vehicles. Some instream work, including placement of riprap, would be proposed to protect the western abutment of the structure. Environmental analysis and NEPA review has not yet begun; it is not known if it will be accomplished in time for maintenance to proceed in 2003.

BPA proposes to conduct ***vegetation management*** within the existing 50-foot wide ROW during the late winter or early spring of 2003. Tall-growing woody vegetation within the 50-foot ROW that could pose an electrical hazard to the existing or proposed line would be cut with a brush cutting machine or chainsaw. This work would meet the guidelines established in the Vegetation Management Program EIS (BPA 2000); site-specific environmental impacts would be analyzed in a Supplement Analysis to the EIS.

1.5 PUBLIC INVOLVEMENT

On March 28, 2002, BPA sent a letter to people potentially interested in or affected by the proposed Raymond-Cosmopolis Transmission Line Rebuild Project, including adjacent landowners, public interest groups, local governments, Tribes, and state and federal agencies. The letter explained the proposal, the environmental process, and how to participate. The letter also was posted on the BPA website.

BPA determined that eight Tribes have a potential interest in this project, based on their historic or current use of the land within the project area. BPA provided information and comment opportunities to Tribal representatives and contacted their designated cultural resources specialists.

BPA held two public meetings to describe the project and to solicit comments, one on April 17, 2002, in Cosmopolis and the other on April 18, 2002, in Raymond. On August 28, 2002, landowners along the transmission line corridor who had been inadvertently omitted from the project mailing list were sent project information and given an opportunity to comment.

Comments, both written and oral, that were received while the Preliminary EA was being prepared (from April to late November), were considered in the analysis.

Numerous individuals from the Raymond area, including public officials, requested that fiber optic cable be installed on the transmission line should the project go forward. BPA responded to the requests by designing structures that can accommodate fiber optic cable and by proposing to install fiber optic cable as part of the project.

Other questions or issues raised included:

- Where structures would be located
- What the structures would look like
- Health effects of living near a transmission line
- Minimizing costs related to environmental impact analysis
- Ways to minimize impacts to fish and wildlife habitat, species, and water resources
- How project activities would adversely affect communications facilities
- The need for reliable power in the Raymond area
- The historical significance of the line and the availability of an existing structure for display

These issues are addressed in appropriate sections in the EA.

BPA is releasing this Preliminary EA for review and comment. A summary of the EA is posted on the BPA website (www.transmission.bpa.gov/projects). During the review period, BPA will accept comments orally, via e-mail, at public meetings, and by letter. Public meetings will be held in Raymond and Cosmopolis in February of 2003. BPA will consider all comments received during the review period in preparing the Final EA for the proposed project, and the Final EA will include responses to all substantive comments received. Based on the Final EA, BPA will then determine whether to prepare an EIS or a Finding of No Significant Impact (FONSI) for the proposal.

Chapter 2
Proposed Action and Alternatives

2.1 PROPOSED ACTION

The proposed action (the "Rebuild Project") involves removing the existing Raymond-Cosmopolis 115-kV transmission line and replacing it with a new 115-kV transmission line and installing fiber optic cable. The transmission line roughly parallels U.S. Route 101 between Raymond Substation (about 2 miles north of Raymond, Washington) north to Cosmopolis Substation in the southern part of the city of Cosmopolis (Figure 1-1). The Rebuild Project would cost approximately six million dollars (2002 dollars).

The estimated requirements of the proposed action are summarized below. Numbers are subject to variation, depending on site-specific characteristics. Details explaining these requirements are in sections 2.1.1 through 2.1.4.

Corridor length: 18.3 miles

Right-of-way (ROW) width: generally 50 feet

New ROW easement acquisition:
- 0.25 mile of additional ROW to widen existing 50-foot easement to 70 feet
- 0.5 mile (approximately) of additional 50-foot width

Number of structures removed: 171

Number of new structures:

Suspension	98
Angle	34
Dead-end	36
Total:	**168**

Number of guyed structures: 17

Structure height above ground: 48–110 feet

Structure diameter at base:

Suspension	31-42 inches
Angle and dead-end	55-70 inches

Structure bases (type and number):

Embedded	149
Concrete	19

Initial disturbed area:

Structure removal	625 sq. ft. each structure **(3 acres total)**
New structure installation	4,000 sq. ft. per suspension structure **(9 acres total)**
	12,500 sq. ft. per angle/dead-end structure **(20 acres total)**
Stringing/tensioning sites	1 acre every 2.5 miles **(7 acres total)**
Staging area	**5-10 acres**

Conductor: non-lustrous (not shiny), 0.8 inch diameter, non-ceramic insulators

Fiber optic cable: black, dull finish, 0.6 inch diameter

Overhead ground wire: 0.5 mile out of each substation

Access roads (12 – 14 feet wide average)**:**

Within the ROW:		
New roads	0.5 mile	1.7 acres
Improve existing roads	2.6 miles	5.7 acres
Outside of the ROW:		
New roads	0.9 mile	3.1 acres
Improve existing roads	0.9 mile	2.1 acres

2.1.1 Line Route and Right-of-Way

Currently there are 171 structures on the Raymond-Cosmopolis line. The existing lattice steel structures within the 50-foot right-of-way (ROW) are numbered from Structure 1, near Raymond Substation, to Structure 167, near Cosmopolis Substation. To the north of Structure 167, two wood pole structures, numbered 19/1 and 19/2, lead into the Cosmopolis substation, and two additional wood pole structures support conductors near Structures 67 and 69.

The new line would require 168 structures. Most would be constructed within the existing 50-foot ROW, usually no more than twelve feet ahead of or behind the existing structures. However, 18 structures would be moved more than 12 feet ahead or behind, either to avoid wetlands, to move them further from waterways, or to position them outside the Highway 101 safety control zone. In addition, three short segments of the transmission line would be realigned outside the existing 50-foot ROW, as shown in Figure 2-1 and described below.

Figure 2-1. Proposed Realignment of Existing ROW Segments
(This map was removed a hard copy is available)

- Structures 34 and 35 would be moved to the west, outside the existing ROW, to avoid a large wetland area around Structure 35. An additional 1,832 feet of 50-foot ROW would be required, part of it within the WSDOT ROW (which does not require an easement), and the rest owned by a private timber company. No tree clearing would be required because this area was previously logged.

- Structures 91, 92, 93, and 94 would be moved to the west outside the existing ROW. This section would be realigned because Structures 92 and 93 are within the wetlands associated with Joe Creek (one structure is surrounded by water on all sides) with no access to them. An additional 3,124 feet of 50-foot ROW would be required, most of it within the WSDOT ROW (which does not require an easement), and the rest owned by a private timber company. Approximately one acre of forest, which includes both red alder stands and conifers, would be cut in the realignment area.

- Structures 122 to 133 would be moved slightly to the east, from 20 to 40 feet, depending on the structure, within the existing 50-foot ROW. They would be moved closer to the existing access road, an old railway grade, in order to minimize impacts to the Little North River. A few trees that overhang the new alignment would need to be removed or trimmed.

In addition to the easements required for the three realignment areas described above, BPA would need to acquire extra width in one area where strong winds could cause the conductor to swing outside the existing ROW. Existing easements for the segment between structures 115 and 116 (a distance of approximately 1,300 feet) would be widened to 70 feet from the current 50-foot easement, but no additional clearing would be required.

2.1.2 Structure Design

The proposed structures consist of a single steel tube that tapers to the top (Figure 2-2). A photo simulation of the proposed structures in the landscape is in Section 3.9, **Visual Resources** (Figure 3-5). All structures would have the same general appearance but would vary in size depending on their function. They are made of galvanized steel, which weathers to a dull finish after a few years. There would be three different types of structures:

- **Suspension structures** are used where the structures are in a straight alignment or where turning angles are small (less than 15 degrees). They are the lightest structures because they do not have to withstand the stresses created by angles in the conductor, and they are not located at the end of long spans. Of the 168 proposed structures, an estimated 98 would be suspension structures.
- **Angle structures** are located at a point where the line changes direction, generally at an angle of 15 degrees or larger. The stress on the structure created by the angle of the conductor requires a heavier structure; structure size increases with the size of the angle.
- **Dead-end structures** are heavier, stronger structures placed at intervals along the transmission line to independently carry the weight and tension of the conductors. Dead-end structures may either be in a straight alignment, used at angles greater than 15 degrees, or on very long spans such as canyon crossings.

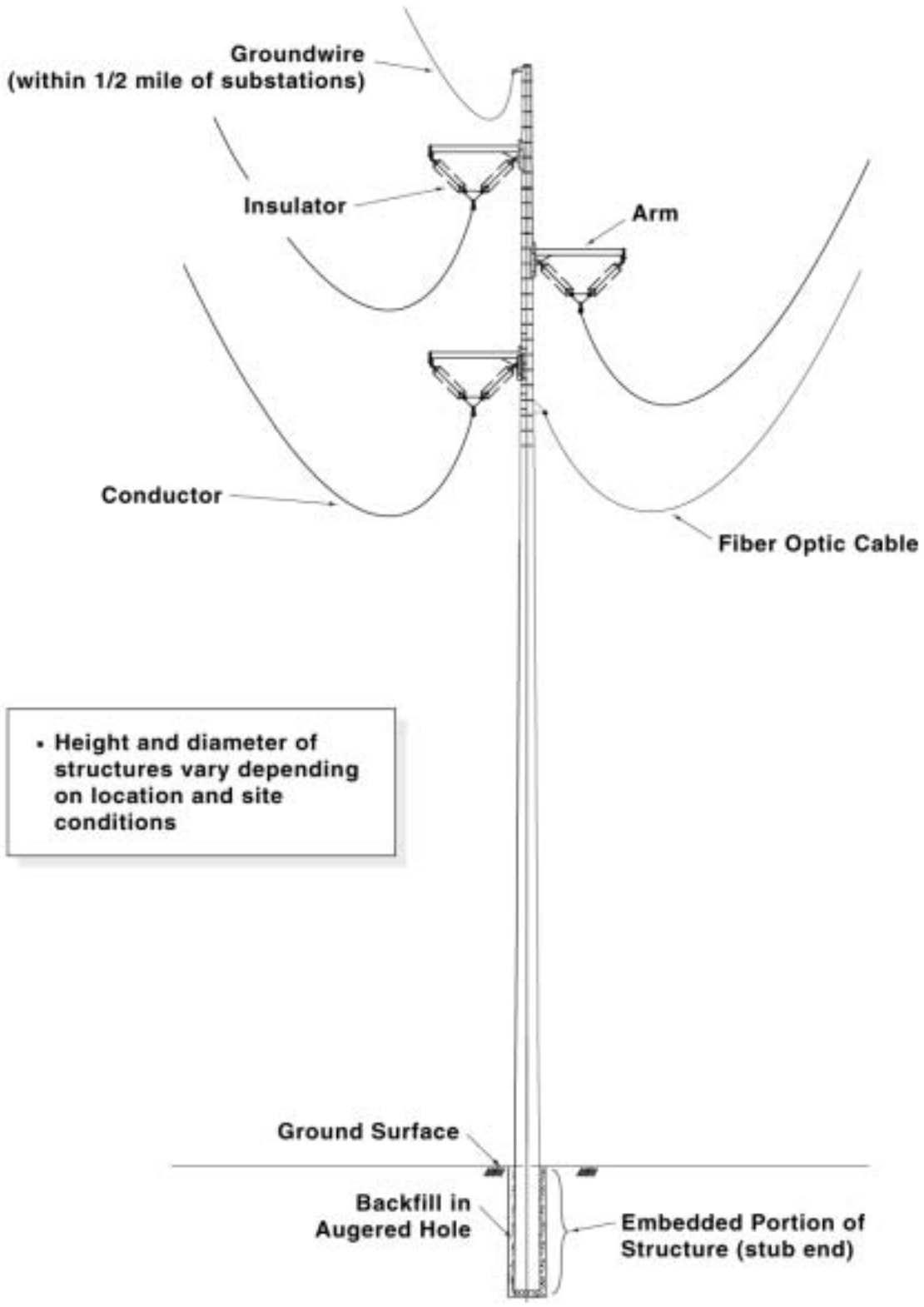

Figure 2-2
Typical Suspension Structure, Direct Embedded

The structure type also depends on whether it has guy wires. Guy wires attach at various points along the structure and are anchored at the ground to lend stability to structures subject to stress, such as dead-end or angle structures. Guy wires would be within the ROW, anchored no further than 110 feet from a structure.

Conductors. Alternating current transmission lines, like the proposed transmission line, require three conductors to make a complete circuit. The proposed structures have three arms; each conductor would attach to one of the arms using non-ceramic insulators. Insulators keep conductors a safe distance from other parts of the structure, preventing the electricity in the conductor from moving to other conductors, the structure, or the ground. Non-ceramic insulators are narrower than the series of disk-shaped ceramic insulators that are most often used on transmission lines; non-ceramic insulators are less susceptible to corrosion and damage from vandalism.

Conductors are made from metal and are not covered with insulating material because the surrounding air serves as insulation. The conductor would be less than one inch in diameter and non-lustrous, which means it is dulled during manufacturing to provide a non-reflective finish.

One overhead ground wire would be attached to the top of structures for the first half-mile out from each substation, to protect the structures and substations from lightning damage. If a structure is struck by lightning, the electricity is routed to the ground through the structure.

Fiber Optic Cable. A fiber optic cable would be added to this transmission line to provide service to Raymond. It would be attached to structures on brackets located beneath the lowest arm. Fiber optic cable is black, dull in finish, and about 0.6 inches in diameter. The lengths of fiber optic cable are joined in splice boxes, which are attached to some structures approximately 20 feet above the ground.

Two vaults that house fiber optic line components would be installed near the Raymond and Cosmopolis substations. Vaults are concrete boxes up to 6 x 6 x 6 feet and are installed either above or below the ground.

2.1.3 Access Roads

Access to tower sites for construction and maintenance would be needed at various locations along the length of the transmission line corridor, both on and off the ROW. Access road construction would consist of improvements to existing roads, construction of new roads, and construction of approaches to individual tower sites.

The existing transmission line was built in the 1920s in fairly rugged landscape. In some locations, structures were erected without creating permanent access roads. In other areas, existing roads would need to be improved to accommodate heavy construction vehicles such as cranes and concrete trucks. BPA would need to acquire easements along some existing roads.

Most of the roads improved or constructed within the ROW would be permanent. BPA prefers permanent access to structures in the event of an emergency. In some areas, such as wetlands,

temporary roads would be constructed for use only during construction. Rock would be placed on geotextile, then all materials removed once construction is complete.

Most roads would be constructed to a finished 12- to 14-foot width, although some would be wider to allow vehicles to negotiate curves or bends in the road.

2.1.4 Construction Activities

Construction is proposed to begin at the earliest on June 1, 2003, and major activities would be completed by November 1, 2003. The various aspects of the construction process are described below. Impacts and mitigation activities are discussed in Chapter 3.

Removal of Existing Structures. Structure removal would disturb an area approximately 25 feet by 25 feet per structure, or a total of approximately 3 acres for all structures. Most structures would be removed by digging one foot below the ground surface and cutting the tower from the base. The existing structures would be lifted onto a truck with a crane and removed from the site for recycling or disposal in an appropriate location. Structures with a concrete base would be cut at the base, leaving the concrete in place, rather than excavating the concrete. This would be done in order to minimize soil disturbance and related environmental impacts. Structures in wetlands would be cut at the ground surface and lifted or dragged out to avoid excavation in wetlands.

Installation of New Structures. New structures would either be directly embedded in the soil or bolted to a concrete base. Most would be directly embedded, except for structures that require extra stability, such as dead-end structures, angle structures that are not guyed, or structures in unstable or wet soils. For each direct-embedded structure, a hole would be augered. At first, the structure would be in several pieces, and would be brought into the work area on a large truck. The bottom piece (the stub) would be inserted into a hole and the hole back-filled with crushed rock. For most structures, the soil that is removed by the auger would be spread around the structures. However, for the two structures in wetlands, the augered soil would be removed from the site (see Section 3.7, **Wetlands)**.

The stub would protrude above the ground. Depending on structure height, the top portion would be assembled on the ground by attaching the arm pieces, then lifted into place. Most suspension structures and some guyed angle and dead-end structures would be directly embedded.

For concrete-based structures, a steel anchor bolt cage would be placed in the augered hole and the hole back-filled with concrete. The concrete base would extend 6-12 inches above the ground surface, approximately 18 inches beyond the structure.

The area disturbed for structure construction depends on the type of structure, the topography, access to the structure, and the presence of any sensitive resources in the area that restrict the work space. Estimates are shown in Section 2.1.

Once the structure is erected, any guy wires that would be used would be installed and anchored at the base. Lighter guy wires can be inserted into the ground with screw anchors. Heavier guy

wires must be anchored, generally with plate anchors—a steel plate that is embedded in concrete in the ground.

The time required to construct a structure varies. Work on the transmission line would be done in phases, with construction occurring on more than one structure at a time, in different parts of the project area.

Stringing and Tensioning Conductors. The conductors and fiber optic line would be strung from structure to structure through pulleys. Stringing and tensioning is done in several stages. Two large trucks, one with reels of conductor and one with tensioning equipment, must be positioned within the ROW. Similarly, a truck with reels of fiber optic line and one with tensioning equipment would occupy the site to pull and tension the fiber optic line. To avoid laying the conductor across roadways while stringing and tensioning, wood-pole H-frame structures would be temporarily erected at or near road crossings and on either side of a road. The conductor would be draped over these safety structures, enabling traffic to flow unimpeded along the roadway.

The location and number of pulling and tensioning sites is not known at this time; they depend on the length of conductor and fiber optic line that is on one reel. Pulling and tensioning generally are done at heavier or larger structures such as dead-end or angle structures. An estimate of acreage needed for these sites is in Section 2.1.

Staging Areas. Staging areas are areas used to stockpile and store the structure pieces, arms, conductor spools, and other equipment during construction. There would be two staging areas, generally located near one other, covering a total of about five to ten acres. The locations are not known, but they would be in industrial/commercial land because a large, vacant, flat area would be needed.

Access Road Construction and Improvement. Roads would be widened, constructed, reshaped and/or finished to a 12- or 14-foot running surface width, with a rock or gravel roadbed. Road improvements could include grading and placing rock on existing roads. Along some existing roads, it would be necessary to clear encroaching or overhanging vegetation within the roadbed or along the side of the road (brushing). Cross drains, dip drains, or culverts would be installed to improve drainage where needed. Access to the project area would be restricted in some areas by installing locked gates at the junction of access roads and public roads.

2.1.5 Vegetation Management

For long-term vegetation maintenance of the transmission line ROW, BPA would develop and implement vegetation management consistent with its Transmission System Vegetation Management Program and associated EIS (BPA 2000), incorporated by reference in this EA. Under vegetation maintenance criteria, no tall-growing vegetation would be allowed to grow inside the ROW except for vegetation in deep canyons when it would not interfere with the much higher conductor. Healthy, stable trees outside the ROW would be left in place, unless removal of adjacent trees would make them vulnerable to wind damage. Only those trees that are leaning toward the transmission line, are dead, or otherwise pose a potential threat would be removed.

BPA maintenance crews would be responsible for managing vegetation consistent with the maintenance criteria.

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 rebuild the transmission line and would continue to operate and maintain the existing transmission line. Construction activities associated with the Rebuild Project would not occur, and the reliability and safety concerns that prompted the proposal for action would continue to be of concern. Fiber optic cable service to Raymond would not be provided. However, maintenance activities would continue within the corridor for the existing line. Given the line's current poor condition (see Section 1.2), it is reasonable to expect that the No Action Alternative would result in more frequent and more disruptive maintenance activities within the corridor than under the proposed project.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

2.3.1 Route Alternatives

Examination of the project area indicated no other usable corridors between Raymond and Cosmopolis. The environmental impacts of locating the transmission line in an undeveloped corridor, versus in an already developed corridor, would be substantially greater because new ROW would have to be cleared and new roads constructed, which could lead to a variety of changes in land use and habitat for the length of the line. Direct costs also would be substantially higher due to the costs of the new clearing and roads, as well as the new easement rights that would need to be obtained.

2.3.2 Installing New Conductor Using Existing Structures

BPA considered using the existing structures to support a new higher-capacity conductor. Because the line was built in the 1920s by another utility, BPA does not have engineering design criteria that document the design strength and structural integrity of the existing structures. Due to the size and poor condition of the existing structures, BPA structural engineers concluded that they would not be able to safely support the new conductor and meet National Electric Safety Code standards.

2.4 COMPARISON OF ALTERNATIVES

Table 2-1 compares how well the Proposed Action and No Action Alternative meet the purposes (goals) of the project defined in Section 1.3. Detailed analysis of the environmental impacts is in Chapter 3.

Table 2-1. Comparison of the Proposed Action and No Action Alternatives

Purpose	Proposed Action	No Action
Meet transmission system public safety and reliability standards set by the National Electrical Safety Code	Meets both public safety (conductor distance from ground) and maintenance of service standards during outages of other lines in the area.	- Does not allow maintenance of service during outages of certain other lines in the area. - Risks public safety during outages due to excessive conductor sag.
Minimize environmental impacts	Construction impacts would be low to moderate, primarily short-term, and mostly can be mitigated. See Table 3-1 for a summary, Chapter 3 for a full discussion.	Avoids construction impacts but maintenance impacts would increase as existing structures and roads deteriorate. See Table 3-1 for summary and Chapter 3 for details.
Improve safety for transmission line workers	- Would reduce the need for maintenance during severe weather conditions. - Deteriorating and unstable structures would be replaced with stable structures. - Structures with no access would be relocated to provide access, making it easier and safer to reach structures during emergencies.	Continues risks to worker safety from maintenance during severe weather conditions and from deteriorating and unstable structures and lack of access.
Minimize costs	- Direct construction costs: $6 million. - Reduces maintenance costs.	- Avoids construction costs. - Incurs maintenance costs higher than proposed action.
Use facilities and resources efficiently	- Avoids continued use of financial and human resources on maintenance of unsound structures. - Provides multi-use structures to improve local technological infrastructure (fiber optic line installation).	- Existing unsound structures require more than normal maintenance, an inefficient use of resources. - No opportunity to use existing structures to improve local technological infrastructure.

Chapter 3
Affected Environment, Environmental Consequences, and Mitigation

3.1 INTRODUCTION

This chapter evaluates the potential impacts of the proposal and alternatives on human and natural resources to determine whether the proposed action has the potential to cause significant environmental effects. For each resource, the chapter describes the existing environment that would be affected by the alternatives, the environmental impacts of the alternatives, and ***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. Definitions of the impact levels vary with each resource and are provided in Appendix A.

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 would constitute a direct impact on wildlife. Generally, direct impacts from the alternatives 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. 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.

Table 3-1 is a summary of the impacts described in detail in the remainder of the chapter.

Table 3-1. Summary of Impacts of the Proposed Action and No Action Alternatives

Environmental Resource	Proposed Action	No Action Alternative
Land Use	- Tree cutting on approximately 6 acres (for new roads, brushing of existing roads, and tree clearing in realignment areas) and withdrawal of approximately 10 acres from timber production. - Localized and temporary disruption of residential use, recreation, and traffic.	Occasional but infrequent disruption of residential use or traffic during maintenance of the existing line.
Geology and Soils	- Short-term increases in erosion and run-off from clearing and soil disturbance during removal of old structures and construction of new ones. - Soil compaction by heavy equipment during construction and tree removal. - Localized soil disturbance, erosion and compaction during maintenance.	Continued or slightly increased levels of localized soil disturbance, erosion and compaction associated with maintenance.
Vegetation	- Short-term removal/crushing of vegetation from construction activities. - About 3.1 acres of forest permanently removed for new road construction; about 1 acre removed for realignment areas. - About 0.2 acre vegetation permanently removed for structures bases - Up to one acre of vegetation removed during brushing of existing roads. - Weeds, mainly Scot's broom, thistles, and reed canarygrass, could colonize disturbed areas.	Continued or slightly increased levels of vegetation removal, including periodic danger tree removal outside the right-of-way and cutting of tall-growing vegetation within the right-of-way.
Fish and Wildlife	- Localized and temporary disruption of fish and wildlife from construction noise. - Potential effects on fish and prey organisms from increases in stream turbidity and temperature due to construction activity near streams. - Six acres of existing or potential forest in realignment areas remain shrub dominated; about 3.1 acres of habitat for access roads and 0.2 acres for structure bases permanently removed. - Moderate direct impacts on marbled murrelets from noise-producing activities near nest sites during the late breeding season, but reduced by restrictions on construction noise and timing.	Continued or slightly increased temporary disturbance to fish and wildlife associated with maintenance of the existing line, including moderate, indirect impacts on marbled murrelet from noise-producing activities near nest sites.
Water Quality	- Temporary decrease in surface water quality from short-term increases in erosion and run-off rates and sedimentation due to construction, decreased shade due to tree removal could raise water temperatures, and maintenance. - Minor effects on ground water quality from small reduction in infiltration capacity. - Potential low impact from chemical spills (e.g., petroleum products used during construction).	Continued short-term increases in erosion, run-off rates and sedimentation from periodic maintenance activities, with a possible increase in the number of incidents.

Environmental Resource	Proposed Action	No Action Alternative
Wetlands	- Temporary and low level of impacts to wetlands from removing 9 structures in wetlands and 20 structures near wetlands. - Temporary and moderate impacts to wetlands from installing 2 new structures in wetlands and 19 structures near wetlands, including 0.43 acres of temporary fill. - Minor permanent impacts to wetlands from depositing 0.08 acres of fill for roads and the two structures in wetlands. - Indirect impacts to wetlands from adjacent construction activity.	Continued disturbance to wetlands associated with maintenance, with possible increased levels where structures remain in wetlands with no access.
Floodplains	- Temporary and localized alteration of floodplain functions by removing 6 structures and erecting 4 structures in floodplains. - Minor effects from deposition of up to 100 cubic yards of fill in floodplains for structure construction. - Minimal effect on floodplain functions due to improvements to existing access roads.	Continued disturbance to floodplains at existing levels.
Visual Quality	- Minor visual impacts to motorists, residents, and recreationists; views may be improved for some if they prefer the look of the new structures to the old ones. - Intermittent and moderate impacts on motorists along two sections of Highway 101 classified as scenic highway.	Continued visual impacts of the existing transmission line for motorists, residents, and recreationists.
Air Quality	- Short-term increase in pollutant levels, mainly particulates, during construction.	Continued minor impacts.
Socioeconomics	- Minimal impact on housing availability to meet construction worker needs. - Short-term beneficial impact on employment and local sales tax revenues during construction. - Low potential for trespass and vandalism to homes and businesses - Potential long-term contribution to economic growth from reliable power and access to high-speed communications.	No impacts expected.
Cultural Resources	- No historical or archaeological resources found; therefore, no impacts expected.	No impacts expected.
Public Health and Safety	- Potential risk of fire and injury with the use of heavy equipment, helicopters, and fuel; traffic safety issues during construction activities. -Low potential for nuisance shocks. - Electric fields comparable to the existing line; magnetic fields lower.	Electric and magnetic fields would remain the same.
Noise	- During daytime hours, short-term noise impacts from construction activity for approximately 35 residences.	Short-term noise impacts to residents from maintenance activity.

3.2 LAND USE

3.2.1 Affected Environment

The area considered for the land use analysis includes the existing transmission line corridor and land up to 1,200 feet on either side of the existing corridor. Land uses along the corridor (Figure 3-1) include private and public forest lands used for timber production, some rural residences, recreation areas, and transportation [Highway 101 (U.S. Route 101)]. Most of the land is privately owned (Figure 1-1); the Weyerhaeuser Company is the largest landowner. Public lands adjacent to the corridor include forest land and Butte Creek Picnic Area, both managed by the Washington State Department of Natural Resources (WDNR), and a small parcel of forest land southeast of Cosmopolis owned by Grays Harbor County.

Forestry. The corridor passes through forest used for timber production for most of its length, and timber production activities are evident throughout the project area. Private forest lands within Grays Harbor and Pacific counties produce a significant amount of timber. In 2000, Grays Harbor County produced 531,731,000 board feet of timber and Pacific County produced 341,212,000 board feet, ranking one and two, respectively, in terms of timber production within the state (WDNR 2002b). Grays Harbor and Pacific counties account for 16.5 percent (1,577,000 acres) of timber land in western Washington (USDA Forest Service 1997). The predominant species harvested are western hemlock and Douglas fir.

Recreation. Three recreation areas are located near the corridor. Butte Creek Picnic Area, managed by WDNR, is located just north of the Raymond Substation between Highway 101 and the transmission line ROW. This day-use facility includes picnic tables, restrooms, water supply, and hiking trails, and views of old-growth timber. It is generally open only during the summer. An estimated 50 to 100 visitors use the picnic area weekly (Estep 2002).

Mill Creek Park is within the City of Cosmopolis, approximately 1,200 feet northwest of the Cosmopolis Substation. It includes restrooms, playground equipment, picnic tables, tennis courts, and a pond that is stocked year-round with fish. During summer months approximately 50 to 75 people per day use the park (Raines 2002). The substation is not visible from the park.

Highland Public Golf Course, a privately owned 18-hole course, is located adjacent to the Cosmopolis Substation and the corridor north of Structure 166.

Residential Use. There are few residences along the corridor near Highway 101. Most residences occur in clusters between Structures 21 and 28, 36 and 38, 46 and 49, 115 and 122, 131 and 133, 140 and 143. The largest cluster is between Lund Road and Artic Road (structures 115 to 122). Some existing transmission structures are in the yards of residences.

Transportation. The corridor closely parallels Highway 101 for approximately one-half its length, and it crosses Highway 101 seven times. Highway 101 is the principal coastal transportation route between Oregon and the Olympic Peninsula, and is heavily used by tourists, local residents, and logging trucks. The average daily traffic volume is 5,500 vehicles near the south end of the corridor and 4,400 vehicles near the north end (WSDOT 2001).

Figure 3-1. Land Use
(This map was removed a hard copy is available)

Plans and Policies Affecting Land Use. Within Pacific County, the corridor is zoned as rural residential land. This zone is intended to promote and protect low-density rural residential areas that exist in harmony with the natural environment. Density is limited to one dwelling per acre. Aside from residential areas near the corridor, the predominant land use is timber production. Pacific County's code does not specifically address utility corridors.

Within Grays Harbor County, a county land use map designates the corridor "General Development." There is no written comprehensive plan for this part of the county. The zoning is General Development 5 District (G-5), which permits a wide range of uses appropriate for that district at densities consistent with the level of available public facilities, public services, and the physical characteristics of the area. This zone allows dams, electrical power plants, flowage areas, transmission lines, and substations together with necessary accessory buildings.

The Cosmopolis Substation is located on land designated and zoned Mixed-Use (MU). This zone permits residential and commercial uses. It is immediately adjacent to lands zoned for industrial and Public Preserve (Highland Public Golf Course). The City's Comprehensive Plan and Zoning do not specifically address utility corridors. For more information on consistency with local plans and policies, see Section 4.5.

WSDOT classifies two sections of Highway 101 as having high scenic value (Class BX) (WAC 468-34-330), but transmission lines can be allowed. The sections are between milepost 66.2 and 70.9 and between 77.0 and 78.5 (structures 48 to 95 and 150 to 165). The classification is intended to influence land uses along scenic highways (see Section 3.9, **Visual Resources**).

3.2.2 Environmental Consequence—Proposed Actions

Forestry. For all construction, including access roads and realignment areas, the proposed project would require cutting trees on approximately 6 acres of forest managed for timber production. Including areas that already have been cut or were slated for cutting by a private timber company, approximately 10 acres total would be permanently withdrawn from timber production to meet road or ROW needs of the line. This is considered to be a low impact because less than 0.1% of the county's timber base would be affected.

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 forest land, accessed from Highway 101, or would take place on non-forest land.

Recreation. Recreational use could be affected by construction activities. Access to Structures 3 to 6 would be from the Butte Creek Picnic Area access road. These construction activities could require the temporary closing of the park or interfere with its use (Estep 2002). Road work would be done between August 5 and September 15; structure construction could not begin until after September 15, due to marbled murrelet restrictions (see sections 3.5.3). During these periods, vehicles will go in and out fairly regularly, but traffic would not be steady. Construction impacts on recreation at the Butte Creek Picnic Area would be moderate because there is the potential for frequent interference. During operation and maintenance, vehicles and equipment

using the picnic area's access road could delay or obstruct recreational use on an intermittent, infrequent basis.

Similarly, construction activities could interfere with access to the Highland Public Golf Course because the transmission line crosses the golf course's paved access road on its approach to Cosmopolis Substation. A new access road would be built from the golf course parking lot to the ROW. There would be no direct interference with use of the golf course during operation and maintenance. Overall impacts to the golf course would be low. Construction and operation would not interfere with use of Mill Creek Park.

Residential Use. Construction, operation and maintenance would be limited to brief, temporary disturbance in most instances because most construction activities would take place on existing ROW and access roads. Impacts to residents near but not immediately adjacent to the corridor would be limited to temporary inconveniences associated with traffic delays on Highway 101, and to dust and noise from, as well as the presence of, construction activity.

Where construction activities take place within the "active" portions of private property, such as front yards or driveways, temporary and intermittent noise, dust, and interference with access to homes could cause a moderate impact on homeowners. Locations most likely to experience these effects are near Structures 22, 23, 38, 47, 115, and 121. Structures 22, 23, and 115 are in front yards of residential properties adjacent to Highway 101. Replacement of these structures would result in disturbance of up to 4,000 square feet each. Access to Structures 38 and 121 may temporarily interfere with use of driveways. At Structure 46, the line crosses to the west side of Highway 101, to Structure 47, which is in the middle of a residence's mowed lawn. Replacement of Structure 47 could disturb up to 4,000 square feet of this lawn. Additional mowed lawn would be disturbed temporarily by a temporary rock road that would be laid down so that equipment could gain access to structures 47 and 48. Due to other physical constraints such as wetlands or span lengths, structure locations could not be moved from these front yards.

Transportation. Construction activities near highway crossings may cause brief traffic delays. Sixty-four structures would be close to Highway 101, likely requiring one-lane traffic in short sections. Impacts to transportation from project construction would be short-term and moderate. Maintenance vehicles and activities would not disrupt the flow of traffic.

Plans and Policies Affecting Land Use. The proposed project is consistent with the land use plans, policies, and zoning of Pacific and Grays Harbor counties and the City of Cosmopolis (see Section 3.2.1). Although construction activities could detract from the high scenic values of the designated sections of Highway 101, transmission lines are allowed along those sections.

3.2.3 Mitigation

If the project is implemented, the following mitigation would be used 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 WSDOT Traffic Advisory.
- Traffic safety signs and flaggers will be used to inform motorists and manage traffic during construction activities along Highway 101.
- Construction activities and equipment will be kept clear of residential driveways as much as possible.
- Disturbed areas will be revegetated with native seed, except in residential areas, where property owners will be consulted on plant selection.

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 activity. They would cease once construction is completed. The proposed action would not change existing land uses for the long term except where new access roads cross timber land (approximately 3 acres), within the realignment areas (approximately 7 acres), and where use is restricted on the 1,300 feet of wider easement proposed for acquisition.

3.2.5 Cumulative Impacts

The activities associated with BPA's danger tree removal project and road maintenance in the summer and fall of 2002 contributed to increased traffic and traffic disruption as well as nuisance-type impacts on residential use. Private forest lands near and adjacent to the corridor will continue to be harvested and replanted over time. These operations would cause nuisance impacts to nearby areas similar to the noise and dust from the proposed transmission line construction, could disrupt traffic, and would temporarily alter the look of the land until it is replanted. Although there are no maintenance or construction projects planned along Highway 101 during the construction of the proposed project, paving from Raymond to the Pacific county line near Structure 58 is planned for 2005 to 2006. This activity could once again cause delays to highway users, with only a year's respite. The additional traffic, noise, and dust caused by BPA's proposed project would add to irritants already caused or planned by BPA and others in the area, but the proposal's contribution to these cumulative effects is very minor.

BPA's road maintenance project was conducted within the existing ROW and did not contribute to changes in land use. Timber harvest and other development activities have changed and will continue to change land use in the project area. Compared to these activities, land use changes caused by BPA's project will be barely noticeable because the vast majority of the ROW has already been cleared; the few acres disturbed by tower installation and other construction activities will add only a minor amount to the total disturbed land in the area.

3.2.6 Environmental Consequences—No Action Alternative

Construction-related impacts would not occur. Only intermittent impacts such as noise, dust, and the intrusion caused by the activity itself would occur during maintenance of the existing line.

3.3 GEOLOGY AND SOILS

3.3.1 Affected Environment

Located in the Willapa Hills, the project area is hilly and dissected by many steep-sided drainages. Three geological formations, all marine sedimentary rocks, underlie the project area. Soils primarily are those developed in accumulated rock debris at the base of steep slopes (***colluvium***); ***alluvial*** materials associated with drainages such as the North River, South Creek, and Elkhorn Creek; and soils derived from glacial materials at the extreme northwestern end of the project area (Pringle 1986).

The separation of different layers of sedimentary rock along weathered siltstone beds is a primary mechanism of landsliding in the geological formation found in the northern third of the project area (West et al. 1980). A 2001 study evaluated slope stability along three portions of the transmission line (Shannon & Wilson 2001). These portions covered just over 3 miles of the 18-mile project area. An active landslide was described adjacent to a steep-banked creek just south of Structure 10. Three landslides have occurred on slopes of 40 to 70 percent in the vicinity of Structure 97. Several old landslides and localized erosion and sloughing were observed at several locations between Structures 147 and 167. Additional studies were conducted in July and September 2002 (Shannon & Wilson 2002). Although evidence of landslides or slope movement was observed near some structure sites, the overall conclusion was that generally stable slope conditions are present along most of the transmission line ROW.

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 clearing of vegetation, grading, and compaction of soils by heavy equipment. 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.

Because most existing structures would be cut just below 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. For new structures, there would be minimal disturbance to soils resulting in minor ***sheet erosion*** and occasional small channels.

The indirect impact on soils via 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 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 clearing, grading, and cutting and filling to accommodate construction equipment. Within the ROW, 144 structures stand in areas with soils mapped at 30 percent slopes or less, and 27 stand in areas having soils on slopes of 30 to 65 percent. Only a few short lengths of road are to be improved in areas of steep slopes.

Approximately 1.4 miles of new road would be constructed to provide access to structures. The new roads would convert approximately 4.8 acres of land now covered by trees, shrubs, and herbaceous plants to road surfaces. Tree removal in areas adjacent to new roads would disturb up to 1 acre of land that would be allowed to re-grow. 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 at least 80 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. An estimated 0.57 mile of new road to access structures lies in areas of greater than 20 percent slopes. 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 7 acres of vegetation would be cleared 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

If the project is implemented, the following mitigation measures, used alone or in combination, will be used to reduce the adverse impacts on soils, landforms, and other resources:

- Existing structures within 50 feet of waterways will be cut at the base rather than

excavated, to minimize soil disturbance.

- Structures 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 and Pollution Prevention (SWPP) Plan, will be used.
- Vegetative buffers will be retained where possible to prevent sediment from eroding into water bodies.
- Construction activities and equipment will be kept clear of residential driveways as much as possible.
- Disturbed areas will be revegetated with native seed.
- 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. Much of the land adjacent to the ROW is managed for silviculture by private timber companies. A network of logging roads covers the landscape and facilitates the harvest of plantation-grown conifers. The area is sparsely developed, consisting of scattered clusters of rural residences. Few paved roads intersect with Highway 101 within the project area.

The Washington State Department of Transportation (WSDOT) has scheduled improvements to Highway 101 within the project area over the next few years. The planned improvements include paving 4.4 miles of existing roadway south of the town of Artic and adding guard rails. This could cause some compaction and erosion of soils within the existing road ROW (Ambrosino 2002).

The removal of danger trees along the transmission line ROW in summer of 2002 resulted in compaction of soils by heavy equipment and scarification of soil surfaces during logging operations. BPA also replaced eight culverts with seven culverts and one bridge, and graded some access roads. Some danger tree logging was on moderate to steep slopes and across or up to the edges of streams. ***Best Management Practices (BMPs)*** for the BPA danger tree removal project, including mulching, matting, and hydroseeding, reduced the impact on soils.

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.

3.3.6 Environmental Consequences—No Action Alternative

Construction impacts would be avoided. 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. No new impacts on soils are expected under this alternative. 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 influenced by the topography, climate, soils, and current and past human activities. It is in a transition area between the coastal Sitka Spruce Zone and the Western Hemlock Zone. The Western Hemlock Zone dominates the foothills and lowlands west of the Cascade Mountains (Franklin and Dyrness 1988; Cassidy et al. 2002). 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 80 feet to 500 feet above sea level. Moist air from the Pacific Ocean, 20 miles to the west, moderates temperatures and produces a mild, wet climate with a long growing season. The area receives from 80 to more than 100 inches of precipitation annually, 80 percent of which falls from October through March. Summers are relatively dry (Pringle 1986).

Table B-1 in Appendix B lists plant species that are common in the ROW. Forest stands along the ROW range from seedling-sapling to mature saw timber, with a few patches of older trees. The largest old-growth stand adjacent to the ROW is located within the Butte Creek Picnic Area, near Raymond.

Most of the forested areas adjacent to the ROW are mixed coniferous forest dominated by western hemlock, Douglas fir, and Sitka spruce. Western red cedar is present in some stands but is not common. Salal, sword fern, and deer fern are common on the forest floor (understory), with limited cover by cascara, red huckleberry, and vine maple.

Pacific blackberry, bracken fern, red elderberry, and cascara are common in open and disturbed sites, such as in the ROW. Plant species commonly found in wetlands and ***riparian*** (streamside) areas include Sitka spruce, red alder, salmonberry, skunk cabbage, small-fruited bulrush, and slough sedge. Although relatively few non-native species are found in most of the ROW, patches of reed canarygrass occur in disturbed wetlands. In drier, open areas, non-native species

include Himalayan and evergreen blackberry, Scot's broom (also known as Scotch broom), and foxglove.

The transmission line corridor crosses heavily forested timber lands owned by 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.

A noxious weed survey of the existing transmission line corridor was done in the summer of 2002. Noxious weeds found in multiple locations include St. Johnswort, Scot's broom, common tansy, tansy ragwort, reed canarygrass, Canada thistle, and bull thistle. Japanese knotweed was observed near the transmission line corridor in several areas. One individual of diffuse knapweed, found on the ROW near Cosmopolis, was destroyed.

All weed species found in the project area are Class C weeds, except for diffuse knapweed and tansy ragwort, which are Class B species. In both Pacific and Grays Harbor counties, control of diffuse knapweed is mandatory. Tansy ragwort is a Class B "Select" weed in Pacific County, which has assigned highest priority to its control.

Rare Plants. No federally-listed, proposed, or candidate plant species are known to occur in the project area. Two federal "species of concern" are known to occur in either Pacific County or Grays Harbor County. White-top aster is recorded for Grays Harbor County and frigid shooting star is recorded for Pacific County (Washington Natural Heritage Program 2002). Neither plant was observed by botanists during field visits in the summer of 2002, nor was habitat for either plant observed.

The transmission line crosses land owned by the WDNR near Butte Creek north of Raymond. The Washington Natural Heritage Program, which maintains a database of sites where rare species are known to occur, has no record of Washington state-designated rare plant species within at least one mile of the project area (Estep 2002). Specifically, no occurrences of rare plants are recorded in the Butte Creek parcel (Caplow 2002), and no observations of state-listed plants were made by botanists who surveyed the area adjacent to the Butte Creek Picnic Area during site visits in the spring and summer of 2002.

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 structures) whether guy lines would be used. Installation of structures could require temporary clearing of vegetation from a total of about 29 acres. Structure bases would permanently remove vegetation from about 0.2 acre in total. The realignment area near Joe Creek would require the permanent removal of approximately one acre of forest.

The indirect impact on vegetation is expected to be low. Noxious weeds could colonize disturbed soils if soils are left bare, but mulching and prompt revegetation through seeding and planting make it less likely.

Access Roads. The direct impact on vegetation from road improvements is expected to be low. The impact would result from cutting back vegetation on each side of some existing roads and within the existing road bed. The direct impact of new road construction on vegetation is expected to be moderate. New roads would convert approximately 3.1 acres of forest land to bare road surfaces; an additional estimated 2 acres would be cleared of trees but allowed to revegetate. 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.

The indirect impact on vegetation from roadwork is expected to be low. Noxious weeds could colonize disturbed soils along the road edge, and new roads could provide new avenues for the dispersal of noxious weeds. Mitigation practices to avoid weed introduction (see Section 3.4.3), the relatively limited area of disturbance, and the dominance of native plants in much of the ROW means that the impact of noxious weeds is likely to be low.

Tensioning Sites. The direct and indirect impacts of tensioning sites on vegetation would be low. Heavy trucks may damage roots and compact soils. The relatively small area of temporary clearing within the ROW, where vegetation is already maintained, would limit the impact. Noxious weeds could colonize areas cleared of vegetation, but clearing would be both limited and temporary.

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. The work would 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.

The indirect impact from operation and maintenance is expected to be low. BPA's use of herbicides and other methods would reduce the growth of noxious weeds targeted for control rather than promote their spread.

3.4.3 Mitigation

Mitigation would reduce both potential impacts on vegetation and the impacts on other resources from the loss of vegetation. If the project is implemented, the following mitigation activities will be used to 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 a noxious-weed control plan to minimize the introduction and broadcast of weed seeds.
- Revegetate disturbed areas with native seed.
- Inspect revegetation work and sites to verify adequate growth and implement contingency measures as needed.

3.4.4 Unavoidable Impacts Remaining After Mitigation

Construction of new access roads would permanently reduce vegetative cover in the project area by approximately 3 acres and temporarily remove vegetation in up to 1 acre. Improving existing access roads could further reduce cover, temporarily or permanently. Structure bases would permanently remove approximately 0.2 acres of vegetation. The realignment area near Joe Creek would permanently remove approximately 1 acre of forest. Areas cleared of mature plant communities that can be revegetated would still suffer temporary loss of mature plants, habitat complexity, and species diversity. Because of the limited length of new road surface required, 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 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.

BPA removed more than 21,000 danger trees in and along the transmission line ROW during the summer of 2002. Trees were cleared up to 275 feet from the ROW centerline, disturbing a total of about 118 acres. In addition to large saw logs of harvestable age, isolated individual trees and small groups of old-growth Douglas fir, western hemlock, and Sitka spruce were cut in several locations. A few large trees were removed that were from 90 to more than 140 years old and from 5 to 7 feet in diameter at breast height.

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 plans to conduct vegetation management activities within the ROW in the late winter or early spring of 2003. The work would involve 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 would be done under the guidance of BPA's Vegetation Management EIS (BPA 2000) and site-specific Supplement Analysis (BPA 2002).

Impacts on vegetation of rebuilding the transmission line would be quite modest compared with the impacts of commercial logging on adjacent property and of the danger tree project.

3.4.6 Environmental Consequences—No Action Alternative

The nature of impacts to vegetation 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 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

Washington Department of Natural Resources (DNR) classifies streams based on Types: Type 1-3 streams are ***perennial***, known fish-bearing streams; Type 4 streams are perennial, probable fish-bearing or non-fish-bearing streams; and Type 5 and 9 streams are ***intermittent*** streams. The ROW crosses or is adjacent to 30 fish-bearing streams or probable fish-bearing streams, and 33 non-fish-bearing streams (Table B-2, Appendix B).

The main stream systems in or near the project area include Butte Creek, Smith Creek, Elkhorn Creek, Lower Salmon Creek, North River, Little North River, and Mill Creek. Fish species known or likely to occur in these streams and their fish-bearing tributaries are summarized in Table B-2 (Appendix B) (Williams et. al. 1975; Smith 1999; Smith and Wenger 2001; WDFW 1998 and 2002c; WDNR 2002a). Fish species known to occur in the project area include anadromous and resident cutthroat trout; fall chinook, coho, and chum salmon; winter steelhead trout; sculpin, coast range sculpin, and reticulate sculpin; western brook lamprey; and three-spine stickleback.

Wildlife

The proposed project area is dominated by upland forest habitat consisting of ***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 (Olson et. al. 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, ***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.

A list of wildlife likely to be found in the project area is shown in Table B-3 in Appendix B. Mammals common or present in the ROW and adjacent areas include mule deer, elk, coyote, raccoon, mice, rat, shrew, squirrel, bat, and mink (WDFW 2002c). 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 area (WDFW 2002c). Reptiles and amphibians common or present in the ROW and adjacent areas include garter snake, bullfrog, giant salamander, newt, and tree frogs (WDFW 2002c). Dunn's salamander and the Columbia torrent salamander have been found in one area in the ROW (WDNR 2002a).

Priority Habitats and Species

The Washington Department of Fish and Wildlife (WDFW) has identified fish and wildlife species of special concern and listed these species as threatened, endangered, sensitive, candidate, or monitor species. WDFW has designated priority habitats as part of a strategy to maintain suitable habitat for these species. According to the WDFW Priority Habitat and Species Database (WDFW 2002b), the ROW crosses eight streams with habitat for both priority anadromous and resident fish and an additional three streams with habitat only for priority resident fish (Table B-2, Appendix B). The ROW does not cross any areas identified as supporting priority wildlife species or their habitat; however, priority habitat for wood duck, mink, Roosevelt elk, marbled murrelet, and northern spotted owl is located adjacent to the ROW.

Threatened and Endangered Species

Three species listed as ***threatened*** under the federal Endangered Species Act (ESA) are thought to occur in the proposed project area: bald eagle, marbled murrelet, and northern spotted owl (Table B-3 [Appendix B]; Berg 2002). Each is discussed below.

The potential for bull trout, a listed species, to be found in the project area was investigated. The lower reach of the only stream that could support bull trout contains an impassable cascade where a dam has been constructed to create a small reservoir. The cascade and dam prevent the upstream migration of bull trout into the upper reaches of the creek. Fisher, a Species of Concern, historically was found in the area but has not been seen in Pacific or Grays Harbor counties for almost 100 years.

No state-listed fish species are known to occur within the ROW and adjacent area (WDFW 2002b, 2002c and 2002d).

Bald Eagle. The bald eagle is both federally and state-listed as threatened. Although bald eagles are commonly seen near the Chehalis and Willapa rivers, which are within a mile of the project area, 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 five known nests within 1.5 miles of the ROW. Bald eagles may winter throughout the project area (WDFW

2002b; K. Berg 2002). Eagles may forage where anadromous salmon are found (e.g., North River, Lower Salmon River, and Smith Creek).

Marbled Murrelet. The marbled murrelet is a federally and state-listed threatened bird. As part of the BPA danger tree removal project, stands of timber adjacent to the project area that meet the characteristics of potential habitat for marbled murrelet were identified. Twenty stands of potential habitat, encompassing approximately 347 acres, were identified near the project area. Of those twenty stands, two stands were identified by WDFW as occupied by nesting marbled murrelets. Approximately 19 acres of potential marbled murrelet habitat was removed from stands as part of the BPA danger tree removal project in 2002.

Northern Spotted Owl. The northern spotted owl is ESA-listed as threatened and state-listed as endangered. Its habitat requirements are similar to the marbled murrelet. Forested areas alongside the ROW could provide roosting and foraging habitat, but suitable stands are small and scattered. Most are located near Highway 101 and are continually affected by traffic noise and road activity. Use of the ROW and adjacent areas by the owl likely is limited due to stand size, fragmentation, and related edge effects (Harza 2002). Surveys conducted by adjacent landowners have documented northern spotted owl activity east of the ROW near the North River. The ROW crosses the edge of a single established northern spotted owl territory.

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 (EFH) for these species. EFH may be found in Butte, Elkhorn, Lower Salmon, and Joe creeks, the North and Little North rivers, and other unnamed tributaries that cross, or flow adjacent to, the project corridor.

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 and limited to temporary disturbances from increased noise in the vicinity of fish-bearing streams. No equipment would enter streams to remove existing structures. 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. The temporary disturbances to fish are not expected to result in injury or death.

Removing and installing structures could have moderate indirect impacts on fish due to the introduction of sediment into fish-bearing streams. There is some probability of fish mortality due to sediments entering fish-bearing streams during spawning and incubation periods. Increased ***turbidity***, the suspended sediment carried by the stream, could affect 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. Ten of the proposed structures would have construction areas within 50 feet of fish-bearing streams or primary tributaries to fish-bearing streams (Table 3-2 in Section 3.6.2,

Water Quality). BPA would use standard construction practices and BMPs that would minimize or eliminate the delivery of sediments into streams. See Section 3.6.3, **Water Quality**.

Riparian vegetation near the Joe Creek crossing of Highway 101 would be removed to create the new ROW alignment, a moderate impact. Trees, mainly red alder and one cottonwood, would be removed to the edge of the creek, and trees would be removed along two non-fish bearing tributaries of Joe Creek. Removal of alder trees would expose a short reach of Joe Creek to more solar radiation, especially during the summer months. Additionally, it would remove cover and a source of terrestrial insects and organic matter. For some time after tree removal, it is possible that increased surface runoff and erosion could increase turbidity in Joe Creek. Because the creek appears to support a healthy riparian corridor along much of its length (3.8 miles), it is not expected that removal of the stand of alder trees just north of Structure 90 would substantially affect EFH. Any adverse impacts to EFH that would occur could be mitigated. Trees would be hand-cut and felled into Joe Creek to serve as large woody debris, where possible, and if consistent with WSDOT safety requirements. Planting of low-growing woody species in the riparian area would partially mitigate for the removal of these trees.

Some danger trees may need to be trimmed in one stretch along the Little North River and along two fish-bearing tributaries. Only trees with that would be a hazard to the new conductor would be trimmed.

Two trees would be removed within 50 feet of a fish-bearing tributary to the Little North River. These trees could be left as snags or felled into waterways to provide large woody debris, if WDFW and NOAA Fisheries consider this desirable.

Access Roads. Direct impacts on fish from road work would be similar in type and intensity to those for structure removal and installation. Road improvements are proposed over fish-bearing streams, including constructing a ford in one fish-bearing stream and rocking the existing road surface over several streams. The temporary disturbances to fish are not expected to result in injury or death because, after construction, fords would be used only during maintenance—on average four times per year.

Indirect impacts on fish are expected to be low to moderate and result primarily from the removal of riparian vegetation, disturbance of soils, and the introduction of sediment into fish-bearing streams. Removal of riparian vegetation and soil disturbance could introduce sediment into streams and cause increases in stream temperatures. Potential impacts on fish and prey organisms would depend on construction timing and whether sediment reached the stream. Road work would not endanger fish populations in the vicinity of the proposed project.

Tensioning Sites. No impacts on 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 routine maintenance activities are expected to be low. Maintenance activities could include access road improvements, culvert replacement, and vegetation management. They would have impacts on fish similar to those

described for access road improvements. Maintenance activities would be unlikely to result in the injury or death of fish unless, in the future, it is necessary to replace culverts in fish streams.

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 to moderate, depending on the type of activity and proximity to streams, but WDFW requirements would be followed for all instream work, thus minimizing impacts.

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. Approximately 1 acre of the 6 acres within two realignment areas would be cleared of trees; these areas would not be allowed to re-grow as forest but would be maintained as a shrub-dominated 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. Mitigation to minimize noise impacts to marbled murrelet, a listed species, is discussed in Section 3.5.3.

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 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 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. A possible exception is some road work that would be done during the late breeding season near occupied marbled murrelet habitat in order to observe instream work periods. To mitigate potential impacts, dusk-to-dawn noise restrictions would be observed.

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 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. The 115-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 forest land. 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.

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 fish, where sedimentation impacts would be low, unless sediment was introduced during the spawning and incubation season, in which case impacts could be moderate from short-term decline in the quality of fish habitat. The ROW does not cross any priority habitats for wildlife.

Threatened and Endangered Species

As required by Section 7 of the Endangered Species Act (ESA), BPA prepared a Biological Evaluation (BE) of the potential effects of the proposed project on listed species and to aid BPA in their consultation with the U.S. Fish and Wildlife Service (USFWS). It was submitted to USFWS as an aid to ESA decision-making.

Most listed species are not expected to be adversely 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.

Impacts on bald eagles would be low to moderate since their use of the project area is likely to be quite limited. No known roosting trees would be removed. The brief increase in construction-related noise could possibly cause bald eagles to avoid active construction areas, a temporary impact. Potential direct effects could result from increased construction-related noise and helicopter use. Construction would not begin until after the time when eagles are known to be most sensitive to disturbance (February 1 to mid-April). Helicopter use for construction

activities would be prohibited until after September 15. Most construction activities would be completed before November 1, limiting any impacts to eagle use of the area during the November 15 to March 15 wintering period.

Impacts on spotted owls would be low to moderate. No large trees suitable for nesting would be removed. Although some trees suitable for perching may be removed, the impacts would be low. Increased noise due to construction activities could cause spotted owl to avoid construction areas, a temporary impact. Because the proposed project is adjacent to Highway 101, any spotted owls in the vicinity would likely be accustomed to higher ambient noise levels and would be less affected by construction noise. The use of helicopters would be restricted until September 15, avoiding the critical nesting and fledging period.

There would be no direct effects to marbled murrelet from the removal of habitat (nesting) trees during the nesting season. However, trees within one occupied habitat area would be limbed to remove branches that extend into the 50-foot ROW. In two other areas, a clump of red alder trees would be removed from the edge of a potential habitat stand immediately adjacent to Highway 101. These trees are not suitable nesting trees and are located more than 100 feet from any suitable nesting trees. Tree limbing and removal would be done after September 15 to avoid affecting nesting marbled murrelet.

Noise above ambient sound levels can cause adult marbled murrelets to startle and abandon their nests. Marbled murrelets are most sensitive to noise during the early breeding season, April 1 to August 5, and are thought to be less sensitive to noise in the late breeding season, from August 6 to September 15. Marbled murrelets are most sensitive to noise during dawn and dusk periods when adults arrive at the nest from ocean feeding areas bringing fish to chicks, or leave to return to ocean feeding areas.

In some marbled murrelet habitat in the vicinity of the project, noise may be above ambient levels and persist for several hours to several days. However, approximately half of the marbled murrelet areas are near or directly adjacent to US highway 101, where the ambient noise level generated by the heavy vehicle use (primarily logging trucks and other construction-related vehicles) is very high.

Mitigation is required to avoid nest abandonment. To minimize disturbance to nesting marbled murrelets, the USFWS and state agencies require or recommend noise restrictions of various types and degrees near habitat, depending on the type of activity. Fewer restrictions are recommended for construction activities that do not involve blasting, aircraft use, or other very noisy activities. For the construction activities involved in this project, dusk-to-dawn restrictions would be observed within ¼ mile of habitat areas during the early and late nesting period (April 1 to September 15) to prohibit noise in the early morning and evening hours: work cannot commence until 2 hours after sunrise and must cease 2 hours before sunset. Additional noise restrictions would be observed within 75 yards of occupied marbled murrelet stands and no construction activities would occur in the early breeding season, from April 1 to August 5. Therefore, with mitigation, noise would likely have a moderate impact on marbled murrelets.

3.5.3 Mitigation

If the project is implemented, the following mitigation measures will be used to reduce impacts to fish and wildlife:

- When working in or next to water bodies, disturbance will be limited to the minimum necessary.
- Existing structures within 50 feet of waterways will be cut at the base rather than excavated, 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.
- Existing structures located within 50-feet of fish-bearing streams would be cut off at ground level to minimize ground disturbance.
- Disturbed areas will be revegetated with native seed.
- Tensioning sites would not be located within 50 feet of streams or wetlands.
- Mitigation measures required by WDFW will be followed when working in streams.
- No structure construction would be carried out within 75 yards of the boundary of occupied marbled murrelet sites until after September 15.
- Instream work and other roadwork adjacent to occupied marbled murrelet stands would not commence until after August 5.
- Helicopters will not be used to string the conductor until after September 15 to avoid noise impacts to nesting marbled murrelet.
- Dusk-to-dawn restrictions will be in place within 0.25 mile of all occupied or potential marbled murrelet habitat stands until September 15.
- Any trees felled within 50 feet of Joe Creek would be felled into the stream to provide large woody debris, if approved by WSDOT, the landowner.
- The riparian area within 50 feet of Joe Creek would be replanted with native, low-growing shrubs.
- Any trees felled within 50 feet of the Little North River and tributaries would be cut as snags and felled into the riparian area, if approved by WDFW and NOAA Fisheries.
- A Biological Evaluation has been prepared as required under the Endangered Species Act. It provides detailed actions to reduce or eliminate impacts on listed species. If an incidental take permit is issued, any terms and conditions will be implemented.

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 3.1 acres) or shrub-dominated ROW (about 6 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 (Olson et al. 2001).

Approximately 19 acres of marbled murrelet habitat were removed as part of the BPA danger tree removal project in 2002. Past and future danger tree removal may also contribute to the loss of 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 Highway 101 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.

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.

3.6 WATER QUALITY

3.6.1 Affected Environment

Surface Water. The transmission line crosses or is adjacent to 66 streams, 30 of which are classified as ***perennial*** fish-bearing streams and 33 as non-fish bearing, perennial or ***intermittent*** streams (see Table B-2 in Appendix B for stream types and fish presence in the corridor).

The streams south of Structure 150 lie within the North River basin of the Willapa Basin Water Resource Inventory Area (***WRIA*** 24). Those streams in the short stretch between Structure 151 and Cosmopolis Substation lie within the Lower Chehalis WRIA (WRIA 22). All of the latter are intermittent streams except Mill Creek, which is west of the ROW between Structures 156 and 157. Mill Creek is a perennial, fish-bearing stream.

Water Resource Inventory Area 24. The Willapa River is classified under the Washington Administrative Code as "Class A (Excellent)" (WAC 173-201A-130). Although its tributaries that cross the transmission corridor are not specifically classified, under the WAC, by definition, unclassified waters in this case would also be considered Class A.

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 North River and some of its tributaries crossed by the transmission line, including Elkhorn Creek, Joe Creek, Little North River, and Smith Creek, are included on Washington Department of Ecology's (WDOE's) 1998 303(d) list of streams that exceed the state's temperature criterion of 18°C.

A primary function of stream riparian zones is to moderate water temperature by providing shade. Washington State's Forest Practices Rules (WAC 222-30-040) establishes shade requirements to maintain water temperature. Most of the Lower North River mainstem, Lower Salmon Creek, and Joe Creek rate low in riparian shade (Herger 1997 [in] Smith 1999). Although the Little North River riparian area is among the best in the sub-basin, shade levels are still rated as low. About 78 percent of the stream miles of the North River mainstem do not meet shade requirements (Smith 1999).

Water Resource Inventory Area 22. Like the Willapa River, the Chehalis River and its tributaries are Class A waters. The mainstem of the Chehalis River is at least a half mile from the ROW at the closest point, although eight intermittent tributaries cross the ROW. Many reaches of the mainstem Chehalis River are on the 303(d) list for temperature, dissolved oxygen, and fecal coliform violations (Smith and Wenger 2001), but no information on the unnamed tributaries was found. The Washington Conservation Commission recommends restoration of riparian vegetation and improving dissolved-oxygen concentrations in tributaries and the mainstem of the Chehalis River.

Groundwater. Little information is available on groundwater quality or hydrology in the project area. Surface water is the primary source of drinking water for both counties (Toy 2002). No ***sole-source aquifers*** have been designated or proposed by EPA in the area (US EPA 1996). Groundwater quality in the Chehalis basin is generally good, although there are concerns about the potential impacts of wastewater storage sites on groundwater quality (Smith and Wenger 2001).

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 to moderate. Specific areas within the ROW that could be subject to water quality impacts are listed in Table 3-2. Direct impacts are most likely from erosion and increased runoff where structures are 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). Vegetation removal and soil disturbance can increase wind and water erosion rates, resulting in sediment deposition directly into stream channels and increased turbidity. Erosion rates likely would return to their current levels once vegetation becomes reestablished. 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. Direct impacts from excavation for new structures are

expected to be low because excavated soils would not be discharged to surface waters. 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.

Table 3-2. Structures In or Within 50 Feet of Streams

Existing Structure in Stream	Proposed Structure in Stream (Type of Structure)	Existing Structure within 50 feet of Stream	Proposed Structure w/in 50 feet of Stream (Type of Structure)
			*13 (suspension)
		*21	
			*22 (suspension)
		*27	
		*31	*31 (suspension)
		*32	*32 (suspension)
		*40	*40 (suspension)
		43	43 (suspension)
*67			*67 (suspension)
		*73	*73 (angle suspension)
		*74	*74 (suspension)
		*80	
*92			
*93			
		*128	*128 (suspension)
		*131	
		*133	*133 (suspension)
		138	138 (angle suspension)

(* This structure is within or near a known or probable fish-bearing stream)

Riparian vegetation near the Joe Creek crossing of Highway 101 would be removed to create the new ROW alignment. Trees, mainly red alder and one cottonwood, would be removed to the edge of the creek and trees would be removed along two non-fish bearing tributaries of Joe Creek. Removal of alder trees would expose a short reach of Joe Creek to more solar radiation, especially during the summer months, which could raise water temperatures. This would be partially mitigated by replanting this area with shrubs. For some time after tree removal, it is possible that increased surface runoff and erosion could increase turbidity in Joe Creek. The effect on temperature and turbidity would be localized and likely short term and therefore would be a low to moderate impact.

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 in Class A streams (WAC 173-201A) 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.

Potential impacts of fresh concrete coming in contact with surface water and elevating surface water pH would be low. 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 shoreline 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 temporarily exceeded. A culvert would be replaced in one perennial stream that may be fish-bearing; the culvert would be installed in a ditched portion of the stream, adjacent to Highway 101. Impacts on surface water quality are expected to be minimized because construction would occur during the dry season and implementation of BMPs would reduce the potential for erosion.

Tensioning Sites. 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 for 2003, 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

If the project is implemented, the following mitigation will be implemented to decrease surface runoff and exposed soil:

- An environmental specialist will 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 will be prepared, addressing measures to reduce erosion and runoff and stabilize disturbed areas.
- Existing structures within 50 feet of waterways will be cut at the base rather than excavated, to minimize soil disturbance.
- When working in or near water bodies and wetlands (buffer areas), disturbance will be kept to the minimum necessary.
- Vegetative buffers will be retained where possible to prevent sedimentation into water bodies.
- 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.
- No 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 road.
- Tensioning sites will not be located within 50 feet of streams, wetlands, or floodplains.
- Roads and structures will be located to avoid wetlands whenever possible.

- Roads will be designed and constructed to minimize drainage from the road surface directly into water features, including wetlands.
- Mitigation measures required by WDFW will be followed when conducting instream work.
- The riparian area within 50 feet of Joe Creek will be replanted with native, low-growing shrubs.
- A Spill Prevention Control and Countermeasure (SPCC) Plan will be developed to minimize the potential for spills of hazardous material.
- Machinery will be refueled and stored at least 200 feet from wetlands and waterways and will be inspected regularly for leaks.

3.6.4 Unavoidable Impacts Remaining After Mitigation

Short-term, localized water quality degradation during construction 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 nature of the effects on water quality. Therefore, water quality impacts would be low to moderate.

3.6.5 Cumulative Impacts

Several activities in the area 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 logging operations; Pacific County's culvert replacement program; ongoing road and bridge maintenance; and BPA's danger tree removal project. Especially compared to the extensive logging by private timber companies throughout the area (see Section 3.2, **Land Use,** or Section 3.4, **Vegetation),** the proposed Rebuild Project would contribute only a small increment to water quality impacts relative to other activities.

BPA and WSDOT both use herbicides in vegetation control. Every spring WSDOT applies Oust and Round-Up to roadside shoulders along Highway 101, usually two to three feet from the pavement edge. Where there is water in the roadside ditches, no herbicides are applied. During the late spring, summer, and fall WSDOT uses several different herbicides to control noxious weeds and other nuisance vegetation. 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.

BPA plans to conduct vegetation management activities within the ROW in the late winter or early spring of 2003. Although BPA's ROW is in the Highway 101 ROW for about a third of its distance, areas sprayed by the two agencies are not likely to overlap. WSDOT's vegetation management focuses on the edge of the road. BPA proposes only spot spraying of tall-growing species and weeds when they are seen to be a problem, so duplicate spraying of the same areas by the two agencies is unlikely. The policies and precautions of both agencies would thus limit the cumulative impacts from herbicide use.

3.6.6 Potential Impacts—No Action Alternative

Impacts to surface and groundwater quality would be similar in nature and intensity to those described for the proposal's operation and maintenance program. However, the number of maintenance events and thus the level of impact could increase as structures deteriorate. Areas where structures are in or adjacent to streams and wetlands, especially those with no access, are at greater risk of experiencing increasing impacts to water quality.

3.7 WETLANDS

3.7.1 Affected Environment

A field survey in August and September of 2002 identified numerous wetland areas within the 50-foot wide ROW, and in areas off the ROW where roads would be improved or constructed.

Wetlands in the project area are associated mainly with topographic depressions or riparian areas. Most wetlands in the ROW are dominated by shrubs (scrub-shrub wetlands). The most common shrub species in these wetlands is salmonberry, associated with a sparse cover of a few herbaceous species such as reed canarygrass, small-fruited bulrush, and slough sedge. Other shrubs found in scrub-shrub wetlands include various willows and Douglas spirea. Scrub-shrub wetlands are commonly found in low-lying areas adjacent to Highway 101 where water tends to back up against the highway berm, in other low-lying areas, and adjacent to stream channels.

About one third of the wetlands in the ROW are dominated by herbaceous species (emergent wetlands). The most common species in these wetlands include reed canarygrass, small-fruited bulrush, and slough sedge.

Although some forested wetlands adjacent to the ROW were logged as part of BPA's danger tree removal project, there are none within the ROW. Forested wetlands in the project area are dominated by trees such as alder, Sitka spruce, western hemlock, and western red cedar.

3.7.2 Environmental Consequences—Proposed Action

Removal of Existing Structures and Installation of New Structures. Twenty existing structures are within 50 feet of wetlands; of those, nine are in wetlands. Nineteen of the proposed structures would be within 50 feet of wetlands, only two of which would be in wetlands (Table 3-3).

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. Their removal could cause minor and temporary damage to wetland vegetation and soils. Plants within a small radius around the existing structures may be trampled, broken, or crushed by equipment when the structures are dismantled and removed by crane. Wetland boundaries in these areas would be marked to restrict the work area so that disturbance would be minimized.

Table 3-3. Structures In or Within 50 Feet of Wetlands

Existing Structure in Wetland	Proposed Structure in Wetland (Type of Structure)	Existing Structure within 50 feet of Wetland	Proposed Structure w/in 50 feet of Wetland (Type of Structure)
			22 (suspension)
25	**Moved to Upland Site**		25 (angle suspension)
28	28 (suspension)		
		33	33 (angle suspension)
		34	34 (dead end w/ concrete base)
35	**Moved to Upland Site**		35 (angle suspension)
39	**Moved to Upland Site**		39 (suspension)
		43	43 (suspension)
		44	44 (suspension)
		47	47 (suspension)
		48	48 (suspension)
		63	63 (suspension)
		64	64 (suspension)
65	**Moved to Upland Site**		65 (suspension)
67			67 (suspension)
72	72 (suspension)		
		73	73 (angle suspension)
		74	74 (suspension)
92	**Moved to Upland Site**		
93	**Moved to Upland Site**		
		140	140 (angle suspension)

Impacts on wetlands from installing new structures *in* wetlands are expected to be low to moderate and mostly temporary. Proposed Structures 28 and 72 would be erected in wetlands; both would be suspension structures, which require the smallest disturbance area. Permanent disturbance would be limited to the portions of wetlands that are excavated or filled to embed the structure base. The total fill would be about 15 cubic yards, or 25 square feet per structure.

Work on structures that are *near* wetlands could temporarily disturb them; the amount of disturbance would depend on the structure type. Where possible, construction activities within wetlands would be avoided, and impacts minimized by restricting work while soils are wet.

Access Roads. Impacts on wetlands from improving existing roads are expected to be low to moderate. Direct disturbance to vegetation or soils could result from excavation, grading, or placing rock within a few wetland areas. Loss of upland vegetation adjacent to wetlands would cause indirect impacts by removing protective upland vegetation buffers.

Low to moderate impacts on wetlands associated with streams would result from depositing fill associated with culvert installation or replacement and installing a ford in existing access roads. Permanent impacts to wetlands from the deposition of fill would occur in the following locations and from the activities described:

- Wetlands associated with the stream between Structures 5 and 6: replace culvert, widen road to 12 feet, and rock road surface.
- Wetland and stream between Structures 15 and 16: create a rocky crossing (ford) of the stream area, widening the road to 12 feet.

A few temporary access roads would be constructed in wetlands, resulting in moderate impacts at the following sites:

- Approaches (short spur roads) to Structures 28 and 72.
- Access road between Structures 46 and 48. A temporary culvert would be placed in a ditch at the edge of this wet meadow.

Tensioning Sites. The use of tensioning sites would have no to low impact on wetlands because the sites would not be located within 50 feet of wetlands.

Operation and Maintenance. 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.

3.7.3 Mitigation

If the project is implemented, the following mitigation activities will be used to reduce impacts on wetlands:

- Roads and structures will be located to avoid wetlands and streams whenever possible.
- Any construction activities within wetlands will be designed and implemented to minimize impacts, and BPA will coordinate with the Army Corps of Engineers to obtain a permit for any fill placed in wetlands.
- 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 (buffer areas) 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 road.
- 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 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 any permits.
- When holes are excavated for structures in wetlands, contractors will avoid deposit of 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, and specific revegetation guidelines in permits will be followed.

3.7.4 Unavoidable Impacts Remaining After Mitigation

In areas where temporary roads would be constructed in 0.43 acres of wetlands, some wetland functions would be lost or impaired during construction until revegetation and other mitigation efforts result in full recovery. Installation and replacement of culverts and a ford, and vegetation clearing for road and structure construction, would temporarily increase the discharge of sediment into wetlands, even with the use of silt fences, mulching, and other best management practices. The construction of two structures and some access road improvements would result in permanent fill in wetlands (0.08 acres), a minor amount.

3.7.5 Cumulative Impacts

Pacific County'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 logging activities in the project area, including BPA's danger-tree removal project, have affected wetland functions. BPA 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 the impacts to some wetlands associated with stream crossings.

The U.S. Army Corps of Engineers (Corps) issues permits under Section 404 of the Clean Water Act for filling (adding material) to wetlands. In the last 10 years, the Seattle District of the Corps issued a total of 312 Section 404 permits for wetland fill in Pacific and Grays Harbor counties. A total of 300.07 acres of wetland fill was permitted in the two counties, with a total of 393.10 acres (131 percent) of mitigation required (U.S. Army Corps of Engineers 2002). Although total acreage of wetlands in the two counties is unknown, given the prevalence of wetlands in the project area, it is likely that only a small fraction of the total wetland acreage in the project area has been filled during the last ten years. The proposed action, including the approximate 0.08 acres of permanent fill and 0.43 acres of temporary fill in wetlands, would add only a minor amount to the total of past, present, and future wetland impacts in the area.

3.7.6 Potential Impacts—No Action Alternative

The nature of impacts to wetlands would be similar to those described for the proposal. Activities that could affect wetlands include vehicular traffic, replacement of transmission structures, vegetation management, and access road improvements, including culvert replacement. Under this alternative, seven structures would not be relocated from wetlands to uplands. Current levels of disturbance to wetlands would continue or increase as existing structures deteriorate, particularly structures in wetlands with no access.

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 Lower Salmon Creek, the North River, and the Little North River are in or near the ROW (Figure 3-2).

3.8.2 Environmental Consequences—Proposed Action

Removal of Existing Structures and Installation of New Structures. Impacts on floodplains from these activities are expected to be low to moderate (Table 3-4). Six existing structures within or on the boundaries of floodplains would be removed; two of these structures would be relocated outside the floodplain.

Activities within floodplains would be temporary, short-term, and localized, only minimally altering their functions. The primary direct impacts on floodplains are expected to result from soil compaction and removal of vegetation, leading to possible subsequent erosion. Soil compaction may interfere with the subsurface water flow in the floodplain, while vegetation removal may destroy some habitat and hinder the capacity of the floodplain to dissipate water energy during floods. Both of these actions could lead to erosion. Drilling holes that would support new structures may also result in some excavated soils being deposited within the floodplain. However, for the 4 structures, only 100 cubic yards of fill covering about 100 square feet would be permanently deposited in floodplains. The new tubular steel structures are less likely than existing structures to collect flood debris. BPA would use standard construction practices and BMPs that minimize damage to floodplains.

Indirect impacts on floodplains are expected to be low and limited to incidental amounts of sediment deposition in the floodplain from soil erosion in disturbed areas. Installation of structures that are located directly upslope from floodplains, such as Structure 143, could cause erosion and the deposition of soils in floodplains. The amount of sediment deposited would not change existing flood storage capacity or alter the course of floodwaters.

Access Roads. Improvements to existing roads are expected have a low to moderate impact on floodplain functions because only limited road improvements are planned near floodplains (Table 3-4). Indirect impacts on floodplains from road improvements are expected to be low because only incidental amounts of rock would be deposited in floodplains.

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.

Figure 3-2. Floodplains
(This map was removed a hard copy is available)

Table 3-4. Activities in Floodplains and Their Impacts

Floodplain	Structure	Access Road	Proposed Structure
Lower Salmon Creek	66	No Impact: No road construction or improvements.	Low impact: Move structure location 10.8 feet to place it at the edge of the floodplain.
	73	No Impact: No road construction or improvements.	Low Impact: Move structure location 9.4 feet to increase distance from a perennial, fish-bearing stream; structure remains in floodplain.
North River	120	Moderate Impact: Improve approximately 200 feet of the existing access road at edge of floodplain.	No impact: Existing and proposed structures are outside the floodplain.
	121	No Impact: Access on existing driveway and lawn would be restored.	Low Impact: Move structure location 10 feet to place it outside the floodplain.
	136	Moderate Impact: Improve approximately 270 feet of the existing access road at edge of floodplain.	Low Impact: Replace existing structure; it remains on floodplain boundary, about 10 feet above the floodplain elevation.
Little North River	142	No Impact: Access through existing yard.	Low Impact: Replace existing structure within floodplain.
	143	No Impact: Access from outside of floodplain.	Low Impact: Move proposed structure outside of floodplain.

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

If the project is implemented, the following mitigation activities will be used to reduce impacts:

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

3.8.4 Unavoidable Impacts Remaining After Mitigation

Construction activity in or near floodplains could, on a very small scale, 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. However, 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

Pacific County's routine maintenance of existing roads and bridges could be done in or near floodplains in the project area; similar to BPA's road maintenance activity, it is expected to have no or low impact on floodplains. The extent to which WSDOT's scheduled road improvements may affect floodplains is unknown. None of the proposed WSDOT vegetation control projects appear likely to directly or indirectly affect floodplains. 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 logging activities in the project area, including BPA's danger tree removal activities, could adversely affect floodplains. Danger trees were removed in floodplains at Structures 66, 73, 121, 142, and 143. Depending on their extent, future tree removal and logging operations 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. In addition, removal of two structures from floodplains would slightly reduce the impact to floodplains from future maintenance work.

3.8.6 Environmental Consequences—No Action Alternative

Removal of two transmission structures from floodplains (Table 3-4) and their replacement by structures on upland sites would not occur under this alternative. Few additional impacts on floodplains beyond those from current transmission line operation and maintenance would be expected, although maintenance needs could increase as structures deteriorate. Existing impacts are low because activities within or adjacent to floodplains result in only short-term, localized disturbances and only minimally affect floodplain functions. Furthermore, BPA would continue to follow BMPs that minimize damage to floodplains.

3.9 VISUAL QUALITY

3.9.1 Affected Environment

The visual setting is the Willapa Hills area of western Washington, which is characterized by rolling, heavily forested hills. Locally, the topography has considerable relief, which obstructs long-distance views from most locations. The existing transmission line corridor is a dominant visual feature of the setting, providing contrasts with the surrounding forest land in terms of a cleared linear feature and the differing form and texture inherent in the existing ***lattice steel*** box

structures. The affected area for visual resources extends beyond the corridor to adjacent forest lands dominated by coniferous species, Highway 101, and nearby residences. Areas where timber has been harvested, including areas cleared as part of the BPA danger tree removal project in 2002, are important visual features.

Washington State Department of Transportation (WSDOT) has classified a few sections of Highway 101 as scenic. The agency 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). Portions of Highway 101 in the project area are designated Class B (high scenic value), with a sub-classification known as BX. This designation refers to areas where an aerial facility (such as a transmission line) could be allowed if factors such as configuration, color and location allow landscape quality to be maintained.

The existing transmission line corridor creates visual impacts. In general, they are most apparent where the corridor is adjacent to or near Highway 101, near residences, or near recreation sites. Figure 3-3 shows a representative scene of the existing corridor.

Figure 3-3. Looking North at Structure 112 and 113

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, and pulling and tensioning sites for the conductors. 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 steel lattice structures with taller tubular steel poles.

The greater the distance of the proposed line from sensitive viewpoints, the less visible it would be. Different landforms and vegetation influence visual impact; the topography and forest cover screen transmission line features at many locations.

Impacts on Motorists. Motorists would continue to view the transmission line and structures in the areas adjacent to and near Highway 101. For the most part, views would be intermittent and the topography and forested landscape would continue to dominate the visual setting. For some motorists, the visual experience may be improved because the proposed single-pole structures would result in less contrast with the visual setting than the existing structures (Figures 3-4 and 3-5). Contrasts would be less because of their simpler form and texture. In general, visual impacts to motorists would be low. Visual impacts along those areas of Highway 101 classified as having high scenic quality would be similar to that described above, but impacts would likely be moderate because of the greater visual sensitivity of these areas.

The corridor passes within two sections of Highway 101 that are classified BX. These sections are between Mile Posts 66.2 to 70.9, and 77.0 to 78.5 (structures 45 to 95 and 150 to 165, respectively). Structures 51 to 57, 68 to 78, 84, 87, and 90 would be seen between Mile Posts 66.2 to 70.9 (Figure 3-6). Structure 163 is visible from Highway 101 between Mile Post 77.0 and 78.5. Thus, approximately 30 percent of the highway classified as having high scenic value would have views of the transmission line, but this would be a low impact because this portion of the highway already has these views, and the proposal would not be considered a significant change from current conditions.

Access to structures near or adjacent to Highway 101 would be from Highway 101 or existing access roads (except Structures 55 and 56 where new access would be developed). Motorists would be exposed to construction activity and intermittent lane closures while the new structures are erected. Construction activities and temporary lane closures along Highway 101 represent a low to moderate impact, because views would be brief and the effect short-term.

Impacts on Residents. Residents are generally sensitive to changes in their surrounding environments and views. 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. Residences tend to occur in small clusters near the corridor. However, the rebuilt line would be mostly within the existing corridor; residents close to the corridor already have the existing line in their view. Similar to impacts on motorists, visual impacts may be less for those residents who believe the new single-pole structures provide less contrast or who prefer the appearance of the proposed structures compared to the existing structures.

Figure 3-4. Looking North at Structure 26 near Dixon Road

Figure 3-5. Tubular Steel Pole Structure Simulation

Figure 3-6. Looking North at Structure 52 in Foreground, in WSDOT Scenic Classification BX

North of the Raymond Substation, the corridor passes near or adjacent to several homes (near Structures 21 to 28, 37 and 38, and 46 to 48). Views from six residences would be affected. Structures 22, 23 and 47 are located on the properties of residences, and the new structures would be visible to those residents (Figure 3-7 shows a sample view). Their views would be affected by short-term construction activity and long-term presence of the line, but impacts would be low because structure locations are moving less than 10 feet from the existing position in most places, and where they are moving more, they would be moved further from the houses. Impacts to remaining residents in this area are anticipated to be low because the line would be a less dominant feature in their view.

There are 25 homes between structures 115 and 144 that have partial or no views of the corridor. A few residents along Lund Road have intermittent background views of Structures 115 and 116 in the distance, because the structures are on higher ground. Structure 142 is partially visible in the background against a stand of trees. Impacts to these residents would be low because the majority of the corridor is shielded from view by the existing rugged, wooded landscape. There is one single-family home immediately north of the Cosmopolis Substation. Impacts to this residence would be low because the view is partially screened and the corridor already has established impacts.

Figure 3-7. Looking North Towards Structure 47 (foreground) and 48 & 49 in the Background

Impacts on Recreation. Impacts on recreational use would be low. Between Structures 2 and 4, the corridor passes adjacent to Butte Creek Picnic Area, which is heavily wooded. No structures are visible from within the park. Some hiking trails may pass near or under the line. Hikers would see some of the structures intermittently against a backdrop of old-growth trees.

As the corridor enters the Cosmopolis Substation, it passes near Highland Public Golf Course. Structure 167 is partially visible from one of the golf course fairways. A brief section of the main entrance to the golf course has a short glimpse of the substation.

Mill Creek Park, which is located below and approximately 1,200 feet west of the substation, has no views of either the substation or the corridor. Impacts to these recreation facilities would be low because views are shielded by the existing landscape.

A gun club just northeast of the Raymond Substation has views of the substation but not the corridor. There would be no impacts to the gun club as a result of the proposed action.

3.9.3 Mitigation

If the project is implemented, the following mitigation will be used to help the transmission line blend more effectively with the surrounding environment:

- Non-luminous insulators (i.e., non-ceramic insulators) and conductors will be used.
- Contractors will maintain construction sites free of debris.
- BPA will maintain the corridor free of debris after construction.

3.9.4 Unavoidable Impacts Remaining After Mitigation

Construction activities would be visible, resulting in temporary impacts. The transmission structures and conductors would become part of the visual setting and be visible to motorists, residents, and recreationists, a permanent impact but similar in nature to the existing transmission line.

3.9.5 Cumulative Impacts

Areas cleared for timber harvest have substantially changed the visual quality of the landscape. BPA's danger tree removal project has 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, the growth of vegetation in cleared areas would help cleared areas blend with the landscape. Timber harvesting 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 is replacing an existing transmission line, most of the visual impact occurred when the original line was built; as a result, the rebuilt line would not noticeably add to the cumulative visual effect of 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 and its maintenance.

3.10 AIR QUALITY

3.10.1 Affected Environment

The agencies with primary air quality jurisdiction in Grays Harbor and Pacific counties are the Olympic Region Clean Air Agency (ORCAA), the Environmental Protection Agency (EPA), and Washington Department of Ecology (WDOE). 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. None of the project area is within a designated non-attainment area.

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.

The cities of Aberdeen, Hoquiam, and Cosmopolis were the focus of two short-term studies in late 1997 and early 1998. The primary study focused on particulate matter (PM10); emissions were largely smoke and particles from solid fuel-burning devices such as woodstoves and fireplaces, as well as road dust and industrial emissions. None of the sampling equipment measured values exceeding the National Ambient Air Quality Standards (NAAQS) for PM10.

Mills in Cosmopolis and Raymond emit air pollutants, including particulates. According to ORCAA, there have been no recent violations of standards or emission problems related to routine operations at mills in either location (Moody 2002). Principal sources of particulates near the corridor are wood stoves and fireplaces, dust from exposed soils in logged areas, logging equipment emissions, and burning of logging slash.

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.

Vehicles along Highway 101 are the primary source of CO in the project area. Because ORCCA does not operate CO monitoring stations in Grays Harbor or Pacific counties, it is not possible to determine CO concentrations for the project vicinity. However, because the traffic volumes on Highway 101 rarely result in congestion, it is unlikely that CO levels exceed standards.

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). ORCAA does not monitor ozone in Grays Harbor or Pacific counties. Ozone concentrations in the project area are anticipated to be less than the 1-hour average standard of 0.12 ppm because the area is sparsely developed and traffic levels are relatively low.

3.10.2 Environmental Consequences—Proposed Action

During the construction period from May to November 2003, 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.

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. Wood burning could increase particulates, but the amount of burning would be limited, so air quality impacts are expected to be minor.

The operation of heavy equipment during construction could impact 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. Impacts on air quality during operation and maintenance would be low.

3.10.3 Mitigation

- Water trucks would be used to control dust during construction.
- All vehicle engines would 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.

3.10.5 Cumulative Impacts

Vehicular traffic on Highway 101 and local roads, logging activities, recent BPA danger tree removal activities, residential wood burning, and industrial emissions near Cosmopolis and Raymond 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

Population Characteristics. Grays Harbor and Pacific counties, the two counties crossed by the corridor, have a combined 2002 population of about 89,400, which is about 1.5 percent of the state's population (Washington State Office of Financial Management 2002). Both of these counties are classified as nonmetropolitan. Grays Harbor County has more than 75 percent of the two counties' population (68,400) and includes the largest city in the area, Aberdeen, with a 2002 population of 16,250. Pacific County has a population of 21,000. See Table B-4 in Appendix B.

Between 1990 and 2000, the two counties grew at a combined rate of about 6 percent, much slower than Washington State's overall growth rate of 21 percent. Most of that growth was due to people moving into the area (about 82 percent), compared to the state where in-migration was responsible for only 63 percent of the gain. Between 2000 and 2002, population in the two-county area increased at a much-reduced rate of 1.4 percent, compared to the state at 2.5 percent.

Economic Characteristics. Historically, the economy of these two rural counties has been based on natural resources. Timber harvesting, commercial fishing, farming, and value-added processing (e.g., sawmills, pulp and paper mills, food and fish processors) continue to dominate economic activities. One in every six workers within the two-county area is engaged in natural resource industries. Grays Harbor is the state's top ranked county in annual timber harvest and

Pacific County is one of the leading counties for commercial and recreational fish and shellfish harvest. Agriculture is not prevalent in these counties except that both are among the leading counties in the United States in the production of cranberries.

Despite their dependence upon natural resources, the leading employment sectors for both Grays Harbor and Pacific counties are services**,** retail, and government (U.S. Bureau of Economic Analysis 2002 and WA State Employment Security Department 2000). These three sectors account for over 60 percent of total employment in the two-county area. See tables B-5 and B-6 in Appendix B.

Income Characteristics. For the two-county area, dividends, interest, rent, and especially transfer payments (primarily retirement income), represent a greater share of total ***personal income*** than for the state (Table B-7, Appendix B). While total personal income in the state more than doubled in real terms over the two-decade period, personal income within the two-county area increased by only 17 percent. Because dividends, interest, and rent and transfer payments have grown in the area, this was enough to offset the real decline in net earnings during the twenty-year period.

Both Grays Harbor and Pacific counties had modest growth in ***per capita income*** between 1980 and 2000. In spite of overall growth in real per capita income, both counties had lower per capita incomes than Washington State and the gap has widened during the time period.

Environmental Justice. Environmental justice, as described under Executive Order 12898 of 1994, directs federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority or low-income populations.

Minority Population. The minority population for the two-county area is 11.2 percent, less than the state's share of 14.6 percent (U.S. Bureau of the Census 2002). The 11.2-percent minority population does not surpass the minority threshold (50 percent) established as an indicator for whether a minority population is meaningfully greater than that represented within the state as a whole. However, the minority population for American Indian or Alaska Native in the two-county area is meaningfully greater than for the state (4.1 percent versus 1.6 percent). Using this latter threshold, a minority population is present in the two-county area. See Table B-8, Appendix B.

Low-Income Population. According to 2001 estimates, the two-county study area has a median household income of $36,468 or 75 percent of the median income according to federal income limits (WA Office of Financial Management 2001). This median income level does not meet the "very low income" threshold for poverty status (i.e., 50 percent of the state median income). However, Grays Harbor and Pacific counties' median household income falls below the 80-percent "low income" threshold of the state's median household income, which meets federal low-income criteria (Table B-9, Appendix B).

3.11.2 Environmental Consequences—Proposed Action

Housing Availability. During peak construction in the summer of 2003, a maximum of 50 workers would work along various segments of the 18-mile corridor. The origin of the work

force is not known at this time and would depend upon where the construction contractor is based. If a local contractor is used, it is likely nearly all workers would commute and there would be no impact on housing.

If workers (and possibly some dependents) are from out of the area they would require temporary lodging in the local area during construction. In the immediate project area (Raymond to Aberdeen), there are 12 motels with a total of 255 rooms and 6 RV parks and campgrounds. A number of the lodging facilities have kitchen units and could be used for extended stays by workers. Many construction workers could rent parking for RVs or other vehicles in which they reside. Also, rental housing vacancy rates in each of the counties are relatively high compared to that of the state.

Because construction workers can be housed and they would not place an undue burden on communities in the area, impacts are considered low.

Employment and Income. The proposed project would stimulate the area's economy during construction through material purchases in the area, payroll, and related indirect and induced spending, or "multiplier effects." These economic benefits would occur for a limited time during construction.

Purchases of local supplies and materials and other spending by construction workers would create positive economic impacts. Total project costs have been estimated at approximately $5 million (2002 dollars) for the proposed project. An estimated 5 to 10 percent of total project costs ($250,000 to $500,000) would involve local purchases of fuel, vehicle parts and other goods and services in the two counties. Income (net) earned by construction workers would be about $1.3 million. Non-local workers spend an estimated 40 percent of their net pay locally. If the entire construction crew temporarily relocates in the project area, local spending by construction workers would amount to about $520,000 during the 6-month construction period. Both material purchases and salary would have additional multiplier effects that would create added short-term income.

These impacts are very small relative to the amount of economic activity in the two counties, and are short-term by nature. Therefore, the impacts of these additional expenditures on overall area economic activity, while positive, would be low.

After construction, the new transmission line would not increase economic activity in the area. However, the transmission line and fiber optic cable may contribute to regional stability and economic growth by reliably meeting power demands and providing access to high-speed communications. These are potential long-term positive impacts.

Property Taxes. The construction of this project would not affect the amount of property taxes collected by the counties crossed by the proposed transmission line. Property owners would continue to pay property taxes in accordance with existing valuations; no property devaluations would be likely because few additional use restrictions are contemplated. Possible exceptions include an extra 20 feet of width between structures 115 and 116 (a distance of approximately 1,300 feet) where strong winds could cause the conductor to swing outside the existing ROW;

and the small areas where roads would be constructed. No direct beneficial tax effects would occur because sales of privately owned property to BPA for transmission line and access road right-of-ways are not subject to real estate tax (WAC 458-61-420 (1) (c)).

Sales Taxes. States cannot tax direct purchases by the federal government; however, 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 while in Washington, unless those individuals' permanent residences are within states or other jurisdictions that are exempt from paying a local sales or "use tax" within the state. State sales tax in Washington is 6.5 percent. Each local jurisdiction also has a sales tax which, when combined with the state sales tax, could be 7.6 to 8.1 percent in the project area.

With the exception of local purchases of crushed rock for access road widening, and other minor purchases such as fuel and replacement tools, few construction materials would be purchased by the contractor. Structure steel, conductors, insulators and steel grills for footings would be supplied by BPA and would not be taxed. Any tax revenue received, however, would be a positive impact.

Nuisance, Trespassing, and Vandalism. Local residents with land crossed by the corridor could have their land use restricted by construction and periodic maintenance activities. Maintenance of the transmission line requires periodic inspection and occasional action by maintenance crews. Landowners are contacted prior to crew entry. However, vegetation and soils may sometimes be damaged by vehicles used for maintenance, particularly for emergencies.

Access roads could be used by unauthorized motorists and hunters who could be a nuisance to industrial forest owners and other landowners. However, because most of the corridor is remote and access is generally restricted by the use of locked gates, potential impacts from trespassing and vandalism would be low. Some gates are left open by timber land owners during hunting season so that hunters may enter private timber lands.

Property Impacts. Some short-term adverse impacts on property value and salability could occur on an individual basis. However, these impacts are highly variable, individualized, and unpredictable. The project is not expected to cause overall long-term adverse effects on property values along the existing ROW.

If landowners refuse BPA's offers to buy land rights (ROW easements), BPA would acquire the rights through condemnation. In limited cases, adjustments to ROW location may be made or feasible alternative means of access may be found.

Environmental Justice. The statistical data indicate that the more restrictive environmental justice thresholds are exceeded (the minority population for American Indian or Alaska Native in the two-county area is meaningfully greater than for the state, and Grays Harbor and Pacific counties' median household income falls below the 80-percent "low income" threshold of the state's median household income). However, given the limited extent of the corridor in Grays Harbor and Pacific counties and the corridor's passage through sparsely populated privately-owned lands, the project would not affect a disproportionately high percentage of low-income or

minority residents. In addition, even if disproportionate impacts were to occur, they would be limited to visual resource impacts. Such impacts would be low to moderate.

3.11.3 Mitigation

BPA engineers would work with industrial forest owners and other landowners to site structures and roads to minimize impacts to forestry activities.

3.11.4 Unavoidable Impacts Remaining After Mitigation

Unlikely, but potentially low visual impacts on low income or minority populations could occur.

3.11.5 Cumulative Impacts

In 2002, the BPA danger tree removal project created a small demand for temporary housing/lodging, stimulated a relatively small level of economic activity and, through acquired easements, had a small-scale effect on timber production and possibly taxes. Because of its short-term nature, BPA's proposed transmission project would not add noticeable long-term benefits or impacts to employment, housing, or tax revenues in the area. However, the transmission line and fiber optic cable could contribute to economic growth, along with ongoing local efforts, by providing reliable electrical power and access to high speed communications.

3.11.6 Environmental Consequences—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.

3.12 CULTURAL RESOURCES

3.12.1 Affected Environment

Historic Overview. Before early pioneers settled in Grays Harbor and Pacific County, the Chehalis or Tsihalis and Chinook people inhabited the area in several villages, most located along the major rivers, Grays Harbor, and Willapa Bay. Other Tribes that once lived in the area were the Hookium, Humptulips, Wynoochee, Satsop and Quinault. There is little information on the area's use by visiting Tribes, although several tribes report their historic use of the area.

Euro-American exploration of the Grays Harbor region began in the late 1700s and early 1800s. Early settlers were mainly farmers. Because of the region's isolation from markets, the timber and fishing industries did not thrive until the arrival of schooners, which provided transportation for local products to outside markets. The Grays Harbor and Willapa Bay regions then developed to take advantage of the nearby abundant natural resources. The settlement of the Grays Harbor region was predicated on sawmills and timber. The earliest efforts began in 1852, when a sawmill was established on the Chehalis River at its confluence with Cedar Creek, near present day Oakville (Van Syckle 1980).

The Willapa Valley area was first settled in 1852. Development of the area followed the same pattern as the Grays Harbor area to the north. Electric power was produced in the Willapa Bay

region as early as the 1890s, albeit on a limited scale and possibly only intermittently. The earliest power generation plants were located onsite to provide power to run the lumber mills.

Cultural Resource Surveys. Four cultural resource surveys were conducted in the project area for BPA over the past year; collectively they covered the entire ROW and areas outside of the ROW that could be affected by project activities. It was observed that previous disturbances within the transmission line ROW have resulted from logging and clearing activities, and the construction and maintenance of access roads; surface visibility was poor in many locations. No artifacts or evidence of cultural resources were observed during the surveys.

The State Historic Preservation Office (***SHPO***) and Tribes, including one Tribal Historic Preservation Office (***THPO***), were given an opportunity to provide input on survey methodology and results of the first three of the surveys; they were provided with the Rebuild Project report in December 2002. Concurrence was received from the SHPO for the first three surveys and BPA is currently consulting with the SHPO on the proposed action.

Historical Background of the Existing Transmission Line. The origin of the transmission line is obscured by conflicting accounts and numerous business dealings that prevent a simple accounting of when it was built and by whom. It is believed the transmission line was constructed around 1927 to connect the Grays Harbor area with the Willapa Bay region to the south, and to increase the amount of available electricity to Raymond and surrounding communities. Ownership of the line changed hands on several occasions in the ensuing years. According to the Public Utility District (PUD) #2 of Pacific County, the Willapa Electric Company purchased the existing transmission line in 1936 from the Western Washington Electric Light and Power Company (PUD n.d.).

Subsequently, the Pacific County PUD #2 agreed in 1939 to buy the "business," including the generation and distribution equipment, from the Willapa Electric Company while the newly created BPA agreed to purchase the Raymond Substation and the Raymond-to-Cosmopolis transmission line (PUD 1939). These facilities were added to BPA's growing power grid anchored by the Bonneville and Grand Coulee dams. The PUD #2 then contracted with BPA to sell the PUD's surplus power (PUD 1939). With the acquisition of the Willapa Electric Company's power distribution facilities, the PUD #2 began supplying power to Pacific County in 1940. The transmission line was constructed prior to construction of Highway 101.

No original plans, schematics, or blueprints exist that show the design work or engineering that went into the construction of the original transmission line. The structures have been substantially modified and upgraded as needed over the years to keep pace with changing power requirements in the region. In 1952, the BPA added new structure tops and replaced the conductor. It is likely that individual structures have been replaced, because dismantled structure sections are located around the grounds of the Raymond Substation.

The existing transmission line has some historic importance to BPA and to the local Historical Society because of its age, design, and historical context. While not the earliest electrical distribution system in the area, it greatly facilitated the spread of electrification to residential areas in the rural communities of Raymond and Cosmopolis. Although the line is important in

BPA history, the structures themselves do not have the integrity to meet any of the criteria to be eligible for National Register of Historic Places listing.

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 National Register of Historic Places (NRHP). Historic properties also include artifacts or remains within historic sites and properties of traditional and cultural importance to Tribes.

BPA is currently involved in the Section 106 process for the proposed action. As a result, the impact definitions in Appendix A reflect the definitions of "adverse effect" in the Section 106 regulations, the process to determine effects, and what is done if there are potential adverse effects.

The investigations uncovered no archaeological materials in shovel test probes or on the ground surface, suggesting that no archaeological resources are located within the project area. Based on this evidence, it has been concluded that significant archaeological resources are unlikely to be located within the area of the proposed Rebuild Project. No archaeological resource impacts are anticipated. Because the transmission line does not meet NRHP eligibility criteria, there would be no adverse historic impact.

The transmission line is the only historical resource identified during the investigations of the area. The proposed project would result in the complete replacement of all remaining original structures. Any historical significance of the existing transmission line route would not be affected or obscured because the proposed project would preserve the route and maintain the original alignment within the existing ROW, although individual structure locations may be changed slightly. The new line would also maintain the function of the original line, serving as a link between Raymond and Cosmopolis.

Because the local historical society and BPA are interested in the historical significance of the transmission line, features of the line would be documented, as described in 3.12.3 **Mitigation**.

3.12.3 Mitigation

The following mitigation will be pursued if the project is implemented:

- Research will be conducted to document the history and significance of the existing transmission line and presented to the Pacific County Historical Society.
- The Pacific County Historical Society will be offered one of the existing transmission line structures for display at its new museum site.
- In the event that archaeological material is encountered during project construction, the BPA archaeologist would immediately be notified and work would be halted in the vicinity of the finds; BPA would immediately notify the Washington SHPO.

3.12.4 Unavoidable Impacts Remaining After Mitigation

Implementation of the proposed action would have no adverse affects on known 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 could already have affected archaeological resources if any were present. As noted above, the danger tree project and other BPA projects in the area were not expected to affect cultural resources. Therefore, the proposed Rebuild Project 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, aircraft obstructions, the effects of electric and magnetic fields related to transmission facilities, and construction activities. A more detailed discussion is provided in Appendix C.

Transmission lines, like all electric devices and equipment, produce ***electric and magnetic fields (EMF)***. 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. The proposed 115-kV line would easily meet BPA and National Electric Safety Code (NESC) requirements.

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.

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 fire during refueling of hot equipment such as trackhoes and bulldozers that cannot be taken off site for refueling. Connection of conductors may be accomplished using implosion fittings, which could be a source of injury to construction personnel. In addition, there are potential safety issues with more traffic on the highways and roads in the project area during construction. The level of potential impacts during construction is expected to be low because standard construction safety procedures would make the risk of injury very low.

Operation and Maintenance.

Electrical Safety. Power lines, like electrical wiring, can cause serious electric shocks if certain precautions are not taken. The 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 line would easily meet the BPA electric-field guidelines at the edge of the ROW. 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. For the proposed 115-kV line, the distance where interference could occur under worst-case conditions would be reduced to about 40 feet from the centerline. Short-term magnetic-field impacts are expected to be low.

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.

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 line with the fields from the existing line (the No Action Alternative). Peak electric field levels are expected to be comparable but slightly less than under existing conditions. The peak values would be present only at locations directly under the line, near mid-span, where the conductors are at the minimum clearance. Peak magnetic field levels are expected to be less than the existing line. Lateral profiles of the maximum electric and magnetic field levels near the proposed and existing lines are provided in Appendix C. 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 very 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 mitigating measures will help minimize potential health and safety risks if the project is implemented:

- Before starting construction, the contractor would prepare and maintain a safety plan in compliance with Washington requirements. The plan would be kept on-site and would 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 on a monthly basis 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 (COTR) 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 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 and traffic on Highway 101 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/maintenance.

3.13.6 Environmental Consequences—No Action Alternative

Electric and magnetic field levels in the project area are the same or slightly higher than for the proposed line. No difference in public health and safety impacts would be expected between the proposed and No Action Alternatives, except that the safety risks associated with construction activities would be avoided.

3.14 NOISE

3.14.1 Affected Environment

Noise is commonly defined as unwanted sound that disrupts normal human activities or diminishes the quality of the human environment. Sources of noise associated with electrical transmission systems include construction and maintenance equipment, transmission line corona, and electrical transformer "hum." Corona-generated noise, characterized as a hissing, crackling sound, is generally only of concern for transmission lines with voltages of 230 kV or greater.

Environmental noise, including transmission line noise, is usually measured in ***decibels*** on the A-weighted scale (***dBA***). This scale measures sound in approximately the same way the human ear responds. Noise levels and, in particular, corona-generated noise vary over time. To account for fluctuating sound levels, environmental noise is typically described with terms that incorporate statistical concepts. ***Exceedence levels (L levels)*** refer to the A-weighted sound level that is exceeded for a specified percentage of the time during a specified period. Thus, L_{50} refers to a particular sound level that is exceeded 50 percent of the time. The ***equivalent sound level (L_{eq})*** is generally accepted as the average sound level.

Along the corridor of the proposed 115-kV transmission line, existing noise levels vary with the proximity to Highway 101 and other noise-generating activities. Most of the transmission line corridor is in rural, undeveloped areas. 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") as well as land use of the noise source. Nighttime noise limits in residential neighborhoods are 50 dBA, in commercial areas 55 dBA, and in industrial areas 60 dBA. Transmission lines are classified as industrial sources for purposes of establishing allowable noise levels at receiving property. BPA has established a design criterion for corona-generated audible noise from transmission lines of 50 dBA for the L_{50} (foul weather) at the edge of the ROW. Washington has interpreted this criterion to meet its noise regulations.

3.14.2 Environmental Consequences—Proposed Action

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

Impacts During Construction. Construction activities create noise that is short term and typically does not cause any serious disturbances to residents. Sources of noise associated with construction of the proposed project include:

- construction of access roads and structure foundations
- removal of existing structures and erection of new structures
- use of helicopters for stringing of conductors
- potential use of implosive couplers for conductor splicing.

Access roads and foundations at each structure site would be installed using conventional construction equipment (see Chapter 2). The overall noise caused by the conventional equipment involved in construction is estimated to be 89 dB L_{eq} at a reference distance of 50 feet (see Table B-10 in Appendix B). Noise produced by construction equipment would decrease with distance at a rate of about 6 dB per doubling of distance from the site. Based on that assumed attenuation rate, the estimated construction noise levels at various distances from the construction site are shown in Table A-11. In addition, a helicopter could be used to string the conductors. The helicopter would be at a given location for only a few moments.

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 residences along the ROW. There are an estimated 24 residences within 400 feet of the ROW and another 11 within 400 to 800 feet. Overall, for those residents that would be affected, the level of impact would be moderate.

Impacts During Operation and Maintenance. Noise impacts during operation and maintenance of the proposed project would be negligible. About every three months, a helicopter would fly the line to look for any problems or repair needs and vehicles would visit portions of the line. When and if repairs are needed, field vehicles would be used to access the trouble spots and then conduct repairs.

The proposed line would decrease the corona-generated foul weather audible noise level at the edge of the ROW compared to the existing line (Table 3-5). Audible noise levels were calculated for average voltage and average conductor heights for foul-weather conditions.

The proposed project would improve audible noise levels compared to existing conditions. At the edge of the ROW, the foul-weather L_{50} audible noise level would decrease by about 12 dBA compared to the existing line. This would be perceived as reducing the noise level by about a factor of two. The calculated *median* level (L_{50}) during foul weather at the edge of the proposed ROW is 19 dBA. The calculated *maximum* level (L_5) during foul weather at the edge of the ROW is 22 dBA. These levels are comparable to ambient levels in rural areas. During fair weather, there would be no corona on the line. The 19-dBA level for the proposed line would meet the BPA design criterion and, hence, the Washington Administrative Code limits for transmission lines.

Noise levels would remain the same at the existing Raymond and Cosmopolis substations because no transformers are being added.

Table 3-5. Predicted Foul-Weather Audible Noise Levels at Edge of Right-of-Way for Proposed Project and Existing 115-kV Line

AN Level	Rebuilt Line	Existing Line
L_{50}, dBA	19	31
L_5, dBA	22	34

In summary, the overall level of impact from **audible noise** is low. Impacts would increase temporarily in residential areas where noise from construction could be heard. The noise from the proposed line during foul weather would be lower than for the existing line.

Corona on transmission line conductors can also generate ***electromagnetic noise*** in the frequency bands used for radio and television signals. The noise can cause radio and television interference. In certain circumstances, corona-generated ***electromagnetic interference (EMI)*** can also affect communications systems and other sensitive receivers. Interference with electromagnetic signals by corona-generated noise is generally associated with lines operating at voltages of 345 kV or higher. This is especially true of interference with television signals.

Predicted EMI levels for the proposed 115-kV transmission line would be well below those considered unacceptable. No impacts of corona-generated interference on radio, television, or other reception are anticipated.

3.14.3 Mitigation

To reduce the potential for temporary, adverse noise impacts during construction, the following measures would be incorporated into contract specifications.

- 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.
- If radio or television interference occurs, measures will be taken to restore the reception to a quality as good or better than before the interference.

3.14.4 Unavoidable Impacts Remaining After Mitigation

Construction-related noise impacts would not be completely mitigated.

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 and traffic on Highway 101. Once the new line is built, however, corona-generated noise would be less than the existing line, thus slightly reducing cumulative noise impacts near the project.

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.

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 Environmental Assessment (EA) is being 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.

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 asked the USFWS to identify the listed and proposed species that are either known to occur or have the potential to occur in the project area. The USFWS responded on February 20, 2002 that the bald eagle, bull trout, marbled murrelet, and northern spotted owl, all threatened species, should be addressed. BPA requested an update the species list on December 23, 2002; no changes had been made. BPA checked the NOAA Fisheries website and determined there are no species administered by NOAA Fisheries in the project area.

BPA is consulting with the USFWS on the potential effects of the project on the identified threatened species. A Biological Evaluation (BE) was prepared addressing potential effects to the four listed species. The BE was submitted to USFWS in January 2003, requesting their concurrence with BPA's determination of effect to the four listed species. The BE concluded

that implementation of the proposed Federal action will have the following effects on listed species, as explained below and in Section 3.5 **Fish and Wildlife**:

- **no effect** on bull trout,
- **may affect, but is not likely to adversely affect** bald eagles,
- **may adversely affect** marbled murrelets, and
- **may affect, but is not likely to adversely affect** northern spotted owls.

Bull trout. No bull trout are expected to be in the project area and therefore no bull trout habitat will be adversely affected. The only documented population of bull trout in proximity to the proposed project area is in the Grays Harbor/Chehalis River, and the only fish-bearing tributary to the Chehalis River that crosses the proposed project area is Mill Creek. However, all bull trout are blocked from the part of the creek in the proposed project area by a dam approximately 2.5 miles downstream. Any increase in sedimentation and turbidity would not be detectable 2.5 miles downstream from the project area, because standard erosion control measures would be implemented as part of the project SWPP Plan. Because construction activities and operation and maintenance are not expected to affect the behavior or habitat of bull trout, the proposed project will have no effect on bull trout.

Bald eagle. No known bald eagle nests or activity areas are in the project area. Six nests have been identified approximately 1 mile from the nearest structures within the corridor. The proposed line would cross few areas that bald eagles use and would run primarily through forest. No known roosting trees will be removed. However, bald eagles may be present, because there are several places where home ranges could overlap the project area.

Construction-related noise, including helicopter use, could cause bald eagles to temporarily avoid the vicinity of active construction areas. Since much of the proposed project is adjacent to Highway 101, any bald eagles in the vicinity would likely be accustomed to higher ambient noise levels because the highway is heavily used by logging vehicles and other heavy equipment. Restricting use of helicopters until after September 15 would avoid potential noise during periods when eagles are most sensitive to disturbance (February 1 to mid-April). Because most construction would be completed by October 31, impacts to eagles that use the area during the November 15 to March 15 wintering period would be limited.

Because the proposed project involves replacing an existing transmission line with a similar kind of line, the potential impact from collisions with the transmission line would be similar to existing conditions. Since eagle collisions with the existing line have not been documented in the past, and there no documented nesting or wintering areas within a mile of the transmission line, it is unlikely that the presence of the new line would create increased potential for adverse effects from collisions.

Because bald eagles may temporarily avoid construction areas, the project **may affect, but is not likely to adversely affect** bald eagles.

Marbled murrelet. There are 2 known occupied marbled murrelet stands immediately adjacent to the ROW and 18 other potential habitat stands, some immediately adjacent to the ROW and others within ¼ mile of the ROW. Because surveys to detect marbled murrelets were not

completed in the 18 potential habitat stands, it was assumed for the purposes of the BE that they are occupied. There are no designated critical habitat units in or adjacent to the proposed project area, and the closest unit is located approximately 3.5 miles south of the Raymond Substation.

There would be direct effects to some marbled murrelet habitat resulting from tree removal in or directly adjacent to known habitat. Four red alders would be removed at the edge of a potential habitat stand, but these trees are not suitable nesting trees. The trees would not be removed until after the core breeding season (August 5), limiting potential effects. Due to the high ambient noise levels along Highway 101, the low quality habitat, and the habitat's accessibility to predators, removal of these trees would not adversely affect the quality of the remaining habitat.

About 50 trees, all red alder except for one hemlock, would be removed at the edge of one other potential habitat stand, immediately adjacent to Highway 101. Removal of these trees may increase the amount of insolation to potential nesting trees (which could overheat chicks) and allow access for predators; however, because marbled murrelets are notoriously clumsy fliers, it could also be beneficial by allowing marbled murrelets easier access to this potential habitat. The trees would not be removed until after September 15; therefore, there would be no effect on marbled murrelets during the 2003 breeding season. Removal of these trees would not likely significantly affect the quality of the remaining marbled murrelet habitat.

Some tree limbs would be removed at an occupied marbled murrelet stand because they hang into the existing ROW where the new conductor would be located. The nest trees would not be removed—only the portion of the limb that extends into the ROW. The loss of limbs and the increased exposure of the remaining habitat areas to sunlight would not be expected to adversely affect the quality of the remaining habitat. Effects will be limited because the work would be done after September 15.

Road improvements would be conducted immediately adjacent to an occupied marbled murrelet stand during the late breeding season, in order to conduct instream work during the instream work period. This site is in a state park and experiences high ambient noise levels from heavy summer use. Therefore, road work is not likely to significantly adversely affect any nesting marbled murrelets in the adjacent habitat.

Noise restrictions would be implemented during the breeding season to further minimize the impact of noise on nesting marbled murrelets. No structures would be removed or erected within 75 yards of documented occupied habitat polygons until after September 15 (end of breeding season). Work within 0.25 miles of all known or potential marbled murrelet habitat would be prohibited each day for a period from 2 hours before sunset until 2 hours after sunrise. Helicopters would not be used until after September 15 (end of the breeding season) in all areas. Even with these restrictions and the high ambient noise generated by Highway 101, **the project may adversely affect marbled murrelets**.

Northern Spotted Owl. The proposed project will not destroy nesting habitat because no large trees suitable for nesting would be removed; however, some trees suitable for perching may be cut. The proposed project would briefly increase noise at the project site, possibly causing owls to temporarily avoid areas in the vicinity of active construction. Although construction would

not be timed to avoid periods of nesting activities (March 1 through September 30), there is no designated critical habitat within the action area. Any northern spotted owls in the vicinity would likely be accustomed to higher ambient noise levels due to the proximity of Highway 101 and would be less affected by construction noise. Helicopter use would be restricted until after September 15, thus avoiding the critical nesting and fledging period. Overall northern spotted owl habitat conditions will be maintained in the project area, and the project will not significantly degrade habitat. Therefore, the proposed projects **may affect, but is not likely to adversely affect** northern spotted owls or their habitat.

State-Listed Species on State Lands. BPA addresses potential impacts to state-listed and sensitive species on state land. The project corridor crosses a parcel owned by the Washington DNR that includes the Butte Creek Picnic Area. The Washington Natural Heritage Program and the state botanist reported no known state-listed rare plants in this parcel; nor were any encountered during field surveys by a BPA environmental specialist who surveyed the site in April and July, 2002, or by MCS Environmental on September 4 and 5, 2002.

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 impact to moderate impacts on fish and wildlife.

BPA is coordinating with the WDFW Area Habitat Biologist concerning all actions with the potential to affect fish and wildlife. In the summer of 2002, the WDFW habitat biologist, and a road engineer and an environmental specialist from BPA, visited sites where instream work would be done. The WDFW biologist will participate in approval of all instream work through the state's Hydraulic Project Approval process. The WDFW biologist will be sent the BE (see Section 4.2) and the Essential Fish Habitat Assessment (see Section 4.3.1) in late January or early February 2003 for review and comment.

4.3.2 Essential Fish Habitat

Public Law 104-297, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Under Section 305(b)(4) of the act, BPA is required to consult with NOAA Fisheries for actions that adversely affect Essential Fish Habitat; NOAA Fisheries in turn is required to provide Essential Fish Habitat conservation and enhancement recommendations.

Both chinook and coho salmon, which are administered under the amended Magnuson-Stevens Fishery Conservation and Management Act, are found in the vicinity of the proposed project. Essential Fish Habitat for these species may be found in Butte, Elkhorn, Lower Salmon, and Joe

creeks, the North and Little North rivers, and other unnamed tributaries that cross or flow adjacent to the project corridor. Because this project has the potential to adversely affect Essential Fish Habitat, an assessment of Essential Fish Habitat will be submitted to NOAA Fisheries in late January or early February 2003.

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, 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 sections 3.5 and 4.2, 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, an agency of the U.S. Department of Energy, is cooperating with the department in developing a memorandum of understanding with the USFWS to comply with this mandate.

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.

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.); and
- Executive Order 13007 Indian Sacred Sites.

Four cultural resources investigations of the project area were conducted in 2002. The investigations consisted of background research and archaeological field studies that included pedestrian surveys at locations that would be disturbed. Shovel test pit excavations were completed at sites with the potential to contain archeological resources. The Washington State Office of Archeology and Historic Preservation (OAHP) and eight Tribes were provided the methodology for each of these surveys and given an opportunity to comment. No comments on methodology were received.

Based on the survey findings, significant archaeological resources were not found and are unlikely to be located within the project area for the proposed rebuild project (see Section 3**.**12, **Cultural Resources**). On December 18, 2002, BPA submitted the cultural resources report on the Rebuild Project to OAHP requesting concurrence with the determination that no historic properties would be affected. BPA received concurrence from OAHP on December 27, 2002. The report was submitted to the eight Tribes with an interest in the project on January 6, 2003. The Quinault Nation responded on January 14, 2003 that they concur with BPA's determination. Tribes that have no responded by February 2003 will be contacted in early February to determine if they concur.

4.5 STATE, AREAWIDE, AND LOCAL PLAN AND PROGRAM CONSISTENCY

BPA, as a federal agency is not required to comply with the requirements associated with obtaining state and local land-use approvals or permits because Congress has not waived federal

supremacy over these areas. Furthermore, as a federal agency, BPA only obtains those state and local permits for which Congress has clearly and unambiguously waived sovereign immunity. However, BPA would, to the maximum extent practical, strive to meet or exceed the substantive standards and policies of the following environmental regulations.

4.5.1 Land Use Planning Framework

Land use plans and policies guide development within Pacific County, Grays Harbor County, and the City of Cosmopolis.

- Pacific County's Comprehensive Land Use Plan was adopted in October 1998, and the Land Development/Use Ordinance, December 2001. Within Pacific County, the corridor is zoned as rural residential land. The County's code does not specifically address utility corridors.
- Grays Harbor County's Comprehensive Zoning Ordinance was adopted in December 2001. The County has a Comprehensive Plan that does not include the project area. The County anticipates completing this section of the Comprehensive Plan sometime in 2003. Within Grays Harbor County, the corridor is designated General Development by a land use map. The zoning is General Development 5 District (G-5). This zone allows dams, electrical power plants, flowage areas, transmission lines, and substations together with necessary accessory buildings.
- The City of Cosmopolis has a Comprehensive Plan that was revised in 2002, and a zoning code that was revised in 2001. The Cosmopolis Substation is located on land designated and zoned Mixed-Use (MU). The City's Comprehensive Plan and Zoning do not specifically address utility corridors.

The proposed project would be consistent with these land use plans and zoning ordinances.

4.5.2 Washington Growth Management Act

This 1990 Act requires that most counties and cities in Washington adopt comprehensive plans, including "a utilities element consisting of the general location, proposed location, and capacity of all existing and proposed utilities, including, but not limited to, electrical lines, telecommunication lines, and natural gas lines." The 1991 and subsequent amendments to the Act added more planning requirements. None of the jurisdictions noted above have adopted comprehensive plans under the Growth Management Act.

4.5.3 Washington Shoreline Management Act

The State's Shoreline Management Act (Chapter 90.58 RCW) identifies "Shorelines of the State" and "Shorelines of Statewide Significance" that would be spanned by the proposed project. The right-of-way crosses the following streams designated "shorelines of the state" (WAC 173-18): the Little North River, Lower Salmon Creek, and North River in Grays Harbor County; Elkhorn Creek and Smith Creek in Pacific County. Some structures will need to be placed within 200 feet of the shores of Smith, Elkhorn, and Lower Salmon creeks and the Little North River and thus would fall under the jurisdiction of the Shoreline Management Act.

BPA would take the following measures, where practicable, to assure consistency with the counties' Shoreline Master Plans:

- Structures near Shorelines of the State would be placed in an existing corridor.
- Structures would not be in water bodies.
- In one portion of the line, structures would be moved away from the banks of the Little North River to minimize impacts.
- In shoreline areas, disturbed land would be restored as closely as possible to pre-project forms and reseeded with native species.
- Erosion control measures would be implemented to protect the 200-foot shoreline area.

Other mitigation measures that would protect Shorelines are listed in Section 3.6 **Water Quality** and Section 3.5 **Fish and Wildlife**.

4.5.4 Critical Areas Ordinances

The Growth Management Act (GMA) requires that all local jurisdictions designate and protect critical areas, which are defined as wetlands, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas. Pacific County and the City of Cosmopolis have adopted ordinances and plans protecting critical areas, but Grays Harbor County has not. In most cases, the proposed action would be consistent with the provisions of these ordinances and plans because BPA would avoid critical areas and critical area buffers to the maximum extent possible. BPA will submit a detailed project description to Pacific County, Grays Harbor County and the City of Cosmopolis in February 2003, and request comments on the proposal.

4.5.5 Washington Administrative Code

The proposed rebuild of the transmission line roughly follows Highway 101, sections of which are considered to have scenic value. The following provisions of the Washington Administrative Code are relevant to the proposed project.

WAC 468-34-280 Overhead Power and Communication Lines. This section of the WAC recommends that longitudinal installations of power lines (on public rights-of-way) be of single-pole construction, and that joint-use single pole construction is generally desirable and should be used whenever feasible. The proposed project's design calls for the rebuilt line to be supported by modular steel pole structures; thus it is consistent with this section of the WAC.

WAC 468-34-290 and 468-34-300 Vertical Clearance and Location. These sections require that vertical clearances for overhead power lines conform to the National Electric Safety Code and/or the clearances identified in the WAC, whichever are greater. The minimum clearances specified for 115-kV transmission lines are 32 feet above the groundline, including roadways. The code also specifies that utility lines be located as near as practicable to the edge of the right-of-way while still maintaining a reasonably uniform alignment. The proposed project would conform to the minimum clearances, as required by the National Electric Safety, and is located as close to the right-of-way edge as practicable.

WAC 468-34-330 Scenic Enhancements. The Washington Department of Transportation has designated portions of Highway 101 in the vicinity of the proposed project as BX. The BX classification covers Highway 101 between Mile Posts 66.2 to 70.9 and 77.0 to 78.5. A number of structures are within this classification near the roadway. According to this section of the WAC:

(1) …Aerial facilities may be allowed (in this zone) if found acceptable to the department based on design and/or location which will not detract from scenic values typical of those found in Class A and B.

(2) Special exceptions may be made where one or more of the following conditions exist:

Power lines of voltage in excess of 35-kV, special design should be incorporated to minimize the visual impact of the facility.

Other utility locations are not available, are unusually difficult and unreasonably costly, or are more desirable from the standpoint of visual quality.

The placing of the utility underground is not technically feasible or is unreasonably costly.

The impact of the required under grounding adversely affects the utility consumer rates or the long-term economics of the utility.

The proposed project is a rebuild of an existing 115-kV line, which is in excess of 35-kV. The existing lattice steel box structures will be replaced with modular steel poles that will be oxidized to blend more readily with the landscape. The conductors would be non-reflective to reduce light and glare from the transmission line in sunlit conditions. Undergrounding the transmission line is not feasible, due mainly to the cost of construction and the cost and difficulties of maintaining an underground line. BPA therefore conforms to the requirements of WAC 468-34-330, or meets the special exceptions.

4.5.6 Transportation Permits

The construction contractor and transmission line facilities manufacturers would consult with WSDOT and with City and County public works departments to secure necessary permits for the transportation of large loads on the roadways. BPA engineers and surveyors have consulted with WSDOT concerning activities within the Highway 101 control zone.

4.6 WASHINGTON FOREST PRACTICES ACT

The Washington Forest Practices Act (FPA) and Forest Practices Rules and Regulations are the state's principal means of regulating activities on non-federal forestlands. The FPA rules and regulations are administered by DNR. The Forest Practices Act does not apply to federal agencies on non-federal land, therefore BPA would not obtain a FPA permit from the state. BPA will attempt to comply with the FPA where possible and would incorporate many of the BMPs described in the FPA into its proposal. In addition, as required under the FPA, BPA will consult

with WDFW to protect critical habitats including riparian areas, wetlands, and habitat for the spotted owl and marbled murrelet.

4.7 COASTAL ZONE MANAGEMENT ACT CONSISTENCY

As an agency of the federal government, BPA follows the guidelines of the Coastal Zone Management Act of 1972 (CZMA) (16 U.S.C. Sections 1451-1464) and would ensure that projects are, to the maximum extent practicable, consistent with the enforceable policies of the state management programs. Because the proposed project is within Washington's Coastal Zone, which includes both Pacific and Grays Harbor counties, BPA is subject to the coordination and consistency requirements of the Act. The State of Washington has an approved Coastal Zone Management Program, which is implemented by the state Department of Ecology (WDOE). The CZMA requires that "each federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs" (16 U.S.C. 1456c(1)(A)). These policies include 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 will submit a consistency statement to DOE in February 2003, including a detailed project description, and request its concurrence.

4.8 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. Water trucks would be used to minimize fugitive dust during project construction.

There would be very little burning of cleared material, if any, due to the small amount of land where tree removal would take place. Vehicles used during construction of the proposed project would be maintained so as to minimize emissions.

4.9 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. BPA will publish a notice of floodplain/wetlands involvement for this project in the Federal Register.

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.

The Notice of Floodplain and Wetlands Involvement for the Rebuild Project was published in the Federal Register on January 14, 2003 (Volume 68, Number 9, page 1828-1829). This notice described potential impacts to floodplains and wetlands. 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**).

Wetlands. Numerous wetlands are found in the project area, but only a limited number would be impacted by activities in or near them. Twenty existing structures are within 50 feet of wetlands; of those, nine are in wetlands. Nineteen of the proposed structures would be within 50 feet of wetlands, only two of which would be in wetlands. 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. A total of approximately 0.43 acres of wetland would be temporarily filled and 0.08 acres of wetland would be permanently filled. Permanent impacts would result from two structures that would be constructed in wetlands, and a ford within a stream with adjacent wetlands. Temporary impacts would result from temporary access roads. 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.

Floodplains. Floodplains of Lower Salmon Creek, the North River, and the Little North River are near or 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. Six existing structures within or on the boundaries of floodplains would be removed; two of these structures would be relocated outside the floodplain. 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. The amount of sediment deposited in floodplains would not change existing flood storage capacity or alter the course of floodwaters. Improvements to existing roads are expected have a low to moderate impact on floodplain functions because only limited road improvements are planned near floodplains. 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.

4.10 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.

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. WDOE would review the project Joint Aquatic Resource Permit, which will be submitted in early February 2003, for compliance.

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; it will address stabilization practices, structural practices, stormwater management, and other controls (see Section 3.6, **Water Quality**).

Section 404. Authorization from the Corps of Engineers 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. Impacts to wetlands are described in Section 3.7. A wetland determination and delineation located, described, and mapped all wetlands within the project area. Project engineers attempted to avoid wetlands by moving proposed structures and access roads to uplands.

For all unavoidable impacts to wetlands, BPA will apply for a Section 404 permit from the Corps in early February 2003. Impacts are anticipated to be approximately 0.43 acres of temporarily filled wetland and 0.08 acres of permanently filled wetland. Some fill for temporary access roads to structures in wetlands will be removed and the areas restored. Several Nationwide Permits (33 CFR 330) may apply to different wetland impacts. If the project activities are covered under an existing Nationwide Permit, all conditions of the permit would be followed.

4.11 GLOBAL WARMING

Gasses 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 50 acres, which could release up to 50 tons of carbon dioxide to the atmosphere primarily through decay. Some slash materials might be burnt, releasing additional carbon into the atmosphere. However, because most disturbed areas would be revegetated, the project's contribution to global warming would be temporary and negligible.

4.12 HAZARDOUS MATERIALS

Several pollution control acts apply to this project. The Spill Prevention Control and Countermeasures Act, Title III of the Superfund Amendments and Reauthorization Act, and the Resource Conservation and Recovery Program 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 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.

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 that the contractor 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.

4.13 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**.

4.14 RESOURCE CONSERVATION AND RECOVERY ACT

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 project. These materials would be disposed of according to state law and RCRA.

4.15 NOISE

The Federal Noise Control Act of 1972 (42 USC 4901) requires that federal entities, such as BPA, comply with state and local noise requirements. Environmental noise limits relevant to this proposed project are regulated by WDOE's Maximum Environmental Noise Levels (WAC 1 73-60), which establish limits on levels and duration of noise. Allowable maximum sound levels depend on the land use of the noise source and receiving property.

Nighttime noise limitations in residential neighborhoods are 50 dBA, in commercial areas 55 dBA, and in industrial areas 60 dBA (WAC 1 73-60-040-2b). BPA designs to a nighttime residential level of 50 dBA. Noise from electrical substations is exempt (WAC 1 73-60-050-2a). BPA imposes its own 50-dBA limit at substation boundaries. Sound created by the installation or repair of essential utility services are exempt from the sound level limits during daytime hours (WAC 1 73-60-050-le).

The proposed action would operate at or below existing state nighttime noise limits for residential property, commercial areas, and industrial areas (see Section 3.14, **Noise**). The facilities would be designed to meet these limits for the worst case, that is, at night, at the edge of the right-of-way, during rainy weather. During fair weather, noise levels are typically 25 dBA or less. Noise also decreases with distance from the right-of-way.

4.16 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.

4.17 REQUIREMENTS NOT APPLICABLE TO THIS PROJECT

4.17.1 Permits for Structures in Navigable Waters

The project would not involve construction, removal, or rehabilitation of any structures in navigable waters.

4.17.2 Permits for Right-of-way on Public Lands

The proposed project would not cross land administered by another federal agency; therefore, no permits for right-of-way on such lands would be required.

4.17.3 Safe Drinking Water Act

No drinking water systems are affected by the project, and no pollutants are expected to reach drinking water supplies.

4.17.4 Energy Conservation at Federal Facilities

Energy conservation practices are not relevant because no federal buildings would be constructed.

4.17.5 Recreation Resources

BPA used the Wild and Scenic River inventory of listed and proposed rivers (16 USC Sec. 1273 (b)) qualifying for Wild, Scenic, or Recreation River to evaluate recreational resources and impacts. The corridor will not cross any listed segments.

The Northwest Power Planning Council's Protected Area Amendments to the Pacific Northwest Electric Power Planning Council Designation Act of 1980 are not applicable to the project.

No designated wilderness or other areas of national environmental concern are found on or around the right-of-way.

4.17.6 Farmland Protection Policy Act

The Farmland Protection Policy Act (7 USC 4201 et seq.) directs federal agencies to identify and quantify adverse impacts of Federal programs on farmlands. The Act's purpose is to minimize the number of federal programs that contribute to the unnecessary and irreversible conversion of agricultural land to non-agricultural uses. The proposed project would not remove any farmland from production.

4.17.7 Notice to the Federal Aviation Administration

As part of transmission line design, BPA seeks to comply with Federal Aviation Administration (FAA) procedures. Final locations, structures, and structure heights would not be submitted to FAA for the project because no structures are taller than 200 feet above ground, and they are located outside the prescribed distances of airports listed in the FAA airport directory.

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Chapter 5
Persons and Agencies Consulted

Federal
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
National Oceanic and Atmospheric Administration: NOAA Fisheries

State
Washington Department of Ecology
Washington Department of Fish and Wildlife
Washington Department of Health
Washington Department of Natural Resources
Washington Department of Revenue
Washington Department of Transportation, Olympic Region and Southwest Region
Washington Office of Archaeological and Historic Preservation

Tribes
Confederated Tribes of Chehalis
Cowlitz Indian Tribe
Nisqually Indian Tribe
Puyallup Tribe
Quinault Indian Nation
Shoalwater Bay Tribe
Skokomish Indian Tribe
Squaxin Island Tribe

Local Government and Utilities
County of Grays Harbor, Board of Commissioners
County of Grays Harbor, Noxious Weed Control Board
County of Grays Harbor, Department of Planning
Grays Harbor County PUD No. 1
Pacific County Department of Community Development
Pacific County, Noxious Weed Control Board
Pacific County PUD No. 1

Landowners
Associates Financial Services
Bascom Pacific LLC / Forest Systems LLC
Capitol Pistol Club Inc
Champion Pacific Timberlands Inc
Chehalis Valley Timber Inc
City of Cosmopolis
County of Grays Harbor
County of Pacific Department of Public Works
Forest Northwest
Fruit Growers Supply
Grays Harbor PUD No 1
John Hancock Mutual Life Ins. Co.
Mid Valley Resources
Pacific County PUD No.2

Port Blakely Tree Farm
Qwest Corporation
Rainier Mineral
Rainier Timber Company
Skarperud Timber Company
State of Washington
State of Washington DNR
State of Washington Department of Transportation
USHUD
Weyerhaeuser Company
Weyerhaeuser Timberlands Co.
Willapa Harbor Gun Club
W T Timber LLC

Chapter 6
Glossary and Acronyms

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 road use, that are part of the background noise level.

APE – Area of Potential Effects, as used in Section 106 of the National Historic Preservation Act is the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties.

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.

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.

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.

Chronic – Of long duration or frequent occurrence.

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.

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.

Double outage – Simultaneous loss of two transmission lines that are on the same right-of-way, on the same structure, or are separated by 1,200 feet or less.

Drain dips – Dips in secondary roads to reduce road surface and fill slope erosion by intercepting storm and seasonal runoff and diverting it to a safe disposal area.

Drift – A collective term for all the rock, sand, and clay that is transported and deposited by a glacier either as till or outwash.

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 – A grant of certain rights to the use of a piece of land BPA acquires easements for many of its transmission facilities, includes the right to enter the right-of-way to build, maintain, and repair the facilities, and for the use, improvement, or construction of access roads. Permission for these activities are included in the negotiation process for acquiring easements over private land.

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.

Forested Wetland – A wetland with a tree canopy

Generation – The power that is produced through some type of power plant.

Glacial outwash – Materials deposited by glacial meltwaters.

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

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.

Low-income population– Low-income population means any readily identifiable group of low-income persons who live in geographic proximity who would be affected by the Proposed Action, policy or activity. Low-income is generally defined as a household income at or below the US Department of Health and Human Services poverty guidelines. The guidelines establish poverty thresholds on an annual basis; the poverty threshold for 2001 was $11,559 for a 2-person household in the contiguous United States. However, other thresholds may be used as appropriate.

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

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

Minority population – Minority population means any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans who will be similarly affected by a proposed program, policy or activity. A minority population is considered to be present if the minority population percentage of the affected area is greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (census tracts are generally considered appropriate). Guidance from the U.S. Council on Environmental Quality (CEQ) states that "minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis" (CEQ, 1998).

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 – National Historic Preservation Act.

Non-specular – 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.

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

OAHP - Office of Archeology and Historic Preservation.

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.

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.

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.

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."

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.

THPO – Tribal Historic Preservation Officer is the tribal official appointed by the tribe's chief governing authority or designated by ordinance or preservation program who has assumed the responsibilities of the State Historic Preservation Officer for purposes of Section 106 compliance on tribal lands in accordance with National Historic Preservation Act regulations

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

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

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.

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.

Chapter 7
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RAYMOND – COSMOPOLIS TRANSMISSION LINE REBUILD PROJECT

Responsible Agency: U.S. Department of Energy, Bonneville Power Administration (BPA)

Name of Proposed Project: Raymond – Cosmopolis Transmission Line Rebuild Project

Abstract: BPA proposes to rebuild the existing 18.3-mile Raymond – Cosmopolis 115-kV transmission line between the Raymond and Cosmopolis substations in Pacific and Grays Harbor counties. The project involves removing the existing lattice steel structures and conductors and replacing them with single-pole tubular steel structures and conductors with a higher current capacity, and adding fiber optic cable.

BPA is also considering the No Action Alternative. The No Action Alternative assumes that BPA would not rebuild the transmission line and would continue to operate the existing line. If BPA does not take action to rebuild the transmission line, the capacity and reliability of the system between Raymond and Cosmopolis would not be improved.

For additional information, contact:

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To receive additional copies of this document, call BPA's document request line at 1-800-622-4520. You may access the summary of this document on BPA's web site at http://www.bpa.gov; look for environmental analysis, Active Projects or www.transmission.bpa.gov/projects.

For information on DOE National Environmental Policy Act (NEPA) activities, please contact:

Carol Borgstrom, Director, Office of NEPA Policy and Compliance, EH-42, U.S. Department of Energy, 1000 Independence Avenue SW, Washington D.C. 20585, 1-800-472-2756; or visit the DOE NEPA web site at www.eh.doe.gov/nepa.

APPENDIX A

Impact Level Definitions

Impact Definitions—Land Use (see Section 3.2.2)

There would be a **High Impact** when project activities result in:

- Displacement of several residences.
- Substantial permanent reduction in timber land base (>0.5% of county's timber land base).
- Permanent interference with recreational activities.
- Frequent interference with traffic during project operations and maintenance.
- Impacts cannot be mitigated.

There would be a **Moderate Impact** when project activities result in:

- Frequent interference with residential or recreational use during construction and intermittently during operation and maintenance.
- Moderate reduction in timber land base (0.1 to 0.5% of county's timber land base).
- Frequent interference with traffic, generally due to slowing or delays, during construction.
- Impacts may be partially mitigated.

There would be a **Low Impact** when project activities result in:

- Nuisance impacts on residential or recreational use, such as noise and dust associated with construction and operation/maintenance (no direct interference).
- Small reduction in timber land base (<0.1% of county's timber land base).
- Infrequent and temporary interference with traffic during construction, operation, and maintenance.
- Impacts may be mostly mitigated.

There would be **No Impact** when land use is unaffected.

Impact Definitions—Geology and Soils (see Section 3.3.2)

There would be a **High Impact** when:

- Widespread clearing, grading, excavation, and compaction of soils leads to long-term accelerated erosion and increases in stormwater runoff.
- Erosion occurs through landslides or sloughing of large volumes of material, and slopes become severely eroded with multiple gullies carrying sediments into streams and/or wetlands.
- Impacts on soils cannot be mitigated.

There would be a **Moderate Impact** when:

- Limited grading, clearing, excavation, and compaction of soils leads to temporary increases in stormwater runoff.
- Erosion is limited to erosion via shallow channels at a few sites, but most sediment is intercepted before reaching streams and wetlands.
- Impacts can be partially mitigated.

There would be a **Low Impact** when:

- Clearing, grading, excavation, and compaction of soils are minimal and lead to little or no stormwater runoff.
- Erosion of slopes is limited to minor ***sheet erosion*** and occasional small channels; erosion and sedimentation levels would remain near present levels during and following construction.
- Impacts can be substantially mitigated.

There would be **No Impact** when there is no clearing, compaction, or other disturbance of soils.

Impact Definitions—Vegetation (see Section 3.4.2)

There would be a **High Impact** when**:**

- Clearing and grading permanently remove large stands of mature or maturing native forest.
- One or more Class A or Class B noxious weeds are introduced from outside of the area and become established as a result of the project.
- One or more populations of federal species of concern within the project area or state-listed or sensitive species on state-owned lands within the project area suffer losses that put at risk the viability of the species.
- Impacts cannot be mitigated.

There would be a **Moderate Impact** when**:**

- Native, maturing but not old-growth, forested plant communities are permanently removed.
- One or more Class C noxious weeds are introduced from outside of the area and become established as a result of the project.
- One or more populations of federal species of concern within the project area or state-listed or sensitive species on state-owned lands within the project area suffer damage that do not affect the viability of the species but may put local populations at risk.
- Impacts can be partially mitigated.

There would be a **Low Impact** when**:**

- Vegetation is temporarily damaged or cleared but rapid recovery to pre-disturbance conditions is likely.
- Some Class C noxious weeds already established in the vicinity may colonize disturbed sites but would not change the character of the pre-disturbance plant community.
- Any rare plant habitat in the project area is minimally damaged but would recover quickly, and no rare plant individuals are harmed.
- Impacts can be substantially mitigated.

There would be **No Impact** when vegetation would remain undisturbed, and no weeds would be spread or introduced.

Impact Definitions—Fish and Wildlife (see Section 3.5.2)

There would be a **High Impact** when:

- Project activities cause long-term declines in the quality or quantity of existing fish or wildlife habitat within or near the ROW.
- Fish or wildlife mortality or injury contributes to the need for federal listing of a species.
- Project activities cause long-term or continued intermittent destruction of local populations of prey species.
- ESA-listed species are killed, injured, or permanently disturbed.
- Impacts on fish or wildlife species cannot be mitigated.

There would be a **Moderate Impact** when:

- Project activities cause short-term declines in the quality or quantity of existing fish or wildlife habitat within or near the ROW.
- Fish or animal mortality or injury occurs without causing a risk of endangering the population or contributing to the need for federal listing.
- Project activities cause short-term destruction of local populations of prey species.
- An ESA-listed species is indirectly and temporarily disturbed.
- Impacts on fish or wildlife species can be partially mitigated.

There would be a **Low Impact** when:

- Project activities cause short-term degradation in the quality or quantity of existing fish or wildlife habitat located within or near the ROW.
- Fish or animals suffer temporary disturbance not resulting in injury or death.
- Project activities indirectly cause short-term reduction of local populations of prey species.
- No ESA-listed species is disturbed.
- Impacts on fish or wildlife species can be mostly mitigated.

There would be **No Impact** when there is no degradation of existing habitat, disturbance, injury, or death of any species of fish or wildlife.

Impact Definitions—Water Quality (see Section 3.6.2)

There would be a **High Impact** when:

- A water body that supports fish, wildlife habitat, or human uses would be extensively altered, in and beyond the project area, so as to affect its uses or integrity.
- State or federal ***chronic*** ambient water quality criteria (***AWQC***) probably would be exceeded for weeks or longer in a large portion of the water body.
- Mitigation could not reduce any impacts.

There would be a **Moderate Impact** when:

- A water body that supports fish, wildlife habitat, or human uses would be altered only locally (within the project area) so as to affect its uses or integrity.
- There is a possible short-term alteration of water quality, such as exceeding federal or state AWQC, that is confined to the local project area.
- Impacts could be partially mitigated.

There would be a **Low Impact** when:

- A water body that supports fish, wildlife habitat, or human uses would be slightly altered only locally (part of the project area) so as to affect its uses or integrity.
- Normal background water quality parameters would be altered without exceeding federal or state AWQC.
- Impacts could be mostly mitigated.

There would be **No Impact** when surface water and groundwater are unaffected by construction activities or operation and maintenance of the transmission line.

Impact Definitions—Wetlands (see Section 3.7.2)

There would be a **High Impact** when:

- Disturbance of wetland hydrology, wetland vegetation, or wetland soils is extensive.
- Wetland functions are permanently lost or impaired beyond recovery.
- Waterways are permanently rerouted or severely degraded due to the placement of fill in stream channels.
- Mitigation cannot compensate for impacts.

There would be a **Moderate Impact** when:

- Disturbance of wetland hydrology, vegetation, or soils is slight (small portions of wetlands are permanently filled) or temporary (as from temporary road fill).
- Wetland functions would be modestly impaired.
- Waterways are partially filled due to the installation or replacement of culverts or fords, or due to road widening, resulting in a temporary loss of functions or habitat.
- Recovery of vegetation and wetland functions requires restoration and monitoring, but is achieved largely within several years after seeding and planting; or impacts are mitigated by off-site mitigation.

There would be a **Low Impact** when:

- Disturbance of wetlands is temporary and affects only small patches of wetland vegetation that may be crushed or cut and small areas of wetland soils that may be compacted.
- Wetland functions are temporarily and slightly impaired.
- Waterway function or habitat is temporarily degraded from adjacent activities but no fill material is placed in stream channels.

- Recovery from impacts occurs naturally, without the need for restoration activities; impacts can be mitigated except for brief loss or impairment of some wetland functions.

There would be **No Impact** when wetlands or directly adjacent uplands are not altered or disturbed, although transmission lines may span or run adjacent to wetlands.

Impact Definitions—Floodplains (see Section 3.8.2)

There would be a **High Impact** when:

- Activities within floodplains result in long-term alteration of floodplain functions, such as significantly decreasing flood-storage capacity over a large area in the floodplain or altering the course of flood waters.
- Activities adjacent to floodplains result in deposition of a large amount of sediment into the floodplain, significantly decreasing flood storage.
- Activities within floodplains result in a significant loss of natural resources, such as long-term or permanent removal of a large area of riparian vegetation or destruction of wildlife habitat or off-channel habitat for salmonids.
- Impacts on floodplains cannot be mitigated.

There would be a **Moderate Impact** when:

- Activities within floodplains result in long-term alteration of floodplain functions but only minimally decrease flood-storage capacity within the floodplain and do not alter the course of floodwaters.
- Activities adjacent to floodplains result in the deposition of a small amount of sediment into the floodplain, only minimally decreasing flood storage.
- Activities within floodplains result in minimal loss of natural resources within the floodplain, such as short-term losses or long-term or permanent removal of only a small area of riparian vegetation, with little destruction of wildlife habitat or off-channel habitat for salmonids.
- Impacts can be partially mitigated.

There would be a **Low Impact** when:

- Activities within floodplains result in short-term, localized alteration of floodplain functions but only minimally or temporarily decrease flood-storage capacity and do not alter the course of floodwaters.
- Activities within floodplains result in minimal loss of natural resources, such as short-term loss of only small areas of riparian vegetation, with little or no destruction of wildlife habitat or off-channel habitat for salmonids.
- Activities adjacent to floodplains result in deposition of incidental amounts of sediment into the floodplain, not decreasing flood storage.
- Impacts can be mostly mitigated.

There would be **No Impact** when project activities would not take place in or near floodplains, or floodplains are spanned by transmission lines but not otherwise affected.

Impact Definitions—Visual (see Section 3.9.2)

There would be a **High Impact** when:

- A large number of additional people (compared to existing conditions), highly sensitive to their surroundings, would see the transmission line in the foreground and middle ground on a permanent basis, and the line would dominate views.
- Scarring and/or erosion from new or improved access roads or clearing would be evident and potentially severe and/or extensive over a long time period.
- Views of an officially recognized scenic or recreational resource would be adversely affected for a large number of people on a permanent basis.
- Impacts cannot be mitigated.

There would be a **Moderate Impact** when:

- The line would be visible to large numbers of additional people but it would not be a dominant element in the landscape because views would be partially screened, large segments of the line would be visible but only for a short time, and/or most views would be in the middle or background.
- Scarring and/or erosion from access roads or clearing would be evident and not severe or extensive over a long time period.
- The line would conflict with prevailing land patterns but be visible to few people or for short periods.
- Impacts may be partially mitigated.

There would be a **Low Impact** when:

- Few additional viewers would see the line because it would be isolated, screened, or seen at a distance; existing conditions (transmission lines) have already established impacts.
- Access road scars and clearing would not substantially detract from the setting.
- Views would be short-lived and no visually sensitive resource would be affected.
- Impacts may be mostly mitigated.

- There would be **No Impact** when the existing visual setting would not change or the project would result in improved visual impacts because the proposed pole structures would be more aesthetically appealing than the existing structures.

Impact Definitions—Air Quality (see Section 3.10.2)

There would be a **High Impact** when project activities result in:

- A widespread reduction in air quality that could pose a probable risk to human health and safety, and would violate an established air quality standard.
- Impacts cannot be mitigated.

There would be a **Moderate Impact** when project activities result in:

- A localized reduction in air quality on a temporary basis that could create a possible but unlikely risk to human health and safety, and would not violate an air quality standard.

- Impacts may be partially mitigated.

There would be a **Low Impact** when project activities result in:

- Minor increases in emissions of pollutants would occur on a temporary basis, air quality would not be perceptibly affected, effects would be confined to the immediate vicinity of the project, and health and safety risks would be unlikely.
- Impacts may be mostly mitigated.

There would be **No Impact** when no increases in emissions of pollutants would occur during construction or operation/maintenance.

Impact Definitions—Socioeconomics (see Section 3.11.2)

A **High Impact** would result from one or more of the following conditions:

- Regional reduction of the quality or quantity of social or economic resources.
- Significant reduction of long-term economic productivity.
- Consumption of significant amounts of non-renewable resources.
- Disproportionately high impacts on low-income or minority populations.
- Impacts could not be mitigated.
-

A **Moderate Impact** would result from one or more of the following conditions:

- Local reduction of the quality or quantity of social or economic resources.
- Marginal reduction of long-term economic productivity.
- Consumption of moderate amounts of non-renewable resources.
- Potential impacts on minority or low-income populations would be moderate or less or would not be disproportionate.
- Impacts would be mostly mitigated.

A **Low Impact** would result from one or more of the following conditions:

- Reduction of the quality or quantity of social or economic resources within the site of the proposed project.
- Any reduction in economic productivity would be short-term.
- Consumption of negligible amounts of non-renewable resources.
- Potential impacts on minority or low-income populations would be unlikely.
- Impacts would not require mitigation.
-

No Impacts would occur when there is no perceptible change in socioeconomic conditions or disproportionate impacts on low-income or minority populations.

Impact Definitions—Cultural Resources (see Section 3.12.2)

There would be a **High Impact** when:

- Activities related to the construction, operation, or maintenance of the proposed project adversely affect a historic resource eligible for listing in the NRHP by directly or indirectly altering any of the characteristics of the resource in a manner that would diminish the integrity of the property's location, design, setting,

materials, workmanship, feeling, or association and adverse effects cannot be mitigated.

There would be **Moderate to Low impacts** when:

- NRHP-eligible historic resources are adversely affected, but impacts would be reduced through avoiding, minimizing, and mitigating for adverse impacts through the Section 106 process of the NHPA.

There would be **No Adverse Impact** when known historic resources would not be affected directly or indirectly by construction, operation, or maintenance of the proposed project or; if present, the project is modified to ensure there would be no adverse effects to cultural resources, and the SHPO and any participating THPO agree there would be no adverse effect.

Impact Definitions—Health and Safety (see Section 3.13.2 and Appendix C)

- A **High Impact** would occur if the new line poses a significant new health or safety risk, or precludes the use of the ROW or nearby areas for pre-existing activities.
- A **Moderate Impact** would occur if the new line poses a new health or safety risk, or alters pre-existing activities on or near the ROW.
- A **Low Impact** would occur if the new line poses a new health or safety risk, but it would not produce a change in activities on or near the ROW.

Impact Definitions—Noise (see Section 3.14.2)

- A **High Impact** would occur if noise levels from construction or operation of the new line exceed existing state standards.
- A **Moderate Impact** would occur if residents are present and nuisance noise levels from construction or operation of the new line exceed ambient noise levels during a portion of the time.
- A **Low Impact** would occur if any contribution of the new line on ambient noise levels would not be easily perceived by nearby residents.

APPENDIX B

Data Tables

Table B-1: Plants Observed in Project Vicinity

Common Name	Scientific Name	Native?	Noxious Weed Class
Trees			
Bigleaf maple	*Acer macrophyllum*	✓	
Cascara	*Frangula purshiana (=Rhamnus purshiana)*	✓	
Douglas-fir	*Pseudotsuga menziesii*	✓	
Pacific yew	*Taxus brevifolia*	✓	
Red alder	*Alnus rubra*	✓	
Sitka spruce	*Picea sitchensis*	✓	
Western hemlock	*Tsuga heterophylla*	✓	
Western redcedar	*Thuja plicata*	✓	
Shrubs			
Douglas' spirea	*Spiraea douglasii*	✓	
Evergreen blackberry	*Rubus laciniatus*		
Fool's huckleberry	*Menziesia ferruginea*	✓	
Himalayan blackberry	*Rubus discolor*		
Indian plum	*Oemleria cerasiformis*	✓	
Ninebark	*Physocarpus capitatus*	✓	
Ocean-spray	*Holodiscus discolor*	✓	
Oregongrape	*Berberis nervosa*	✓	
Red elderberry	*Sambucus racemosa*	✓	
Red huckleberry	*Vaccinium parvifolium*	✓	
Salal	*Gaultheria shallon*	✓	
Salmonberry	*Rubus spectabilis*	✓	
Scot's broom	*Cytisus scoparius*		B[a]
Sitka willow	*Salix sitchensis*	✓	
Thimbleberry	*Rubus parviflorus*	✓	
Trailing or Pacific blackberry	*Rubus ursinus*	✓	
Vine maple	*Acer circinatum*	✓	
Willow	*Salix sp.*	✓	
Herbs			
Angled bittercress	*Cardamine angulata*	✓	
Bentgrasses	*Agrostis* spp.		
Bigroot (wild cucumber)	*Marah oreganus*	✓	
Boltonia	*Boltonia asteroides*		
Bracken fern	*Pteridium aquilinum*	✓	
Birdsfoot-trefoil	*Lotus corniculatus*		
Bull thistle	*Cirsium vulgare*		C

Table B-1: Plants Observed in Project Vicinity (cont.)

Common Name	Scientific Name	Native?	Noxious Weed Class
Herbs (cont.)			
Canada thistle	*Cirsium arvense*		C
Cleavers (bedstraw)	*Galium aparine*	✓	
Columbia brome	*Bromus vulgaris*	✓	
Common cat-tail	*Typha latifolia*	✓	
Common horsetail	*Equisetum arvensis*	✓	
Common plantain	*Plantago major*		
Common St. John's-wort	*Hypericum perforatum*		C
Sow thistle	*Sonchus oleraceus*		
Common tansy	*Tanacetum vulgare*		C
Common velvetgrass	*Holcus lanatus*		
Cooley's hedgenettle	*Stachys cooleyae*	✓	
Cow-parsnip	*Heracleum lanatum*	✓	
Creeping buttercup	*Ranunculus repens*		
Curly dock	*Rumex crispus*		
Deer fern	*Blechnum spicant*	✓	
Diffuse knapweed	*Centaurea diffusa*		B[b]
Elk-moss	*Lycopodium clavatum*	✓	
English Plantain	*Plantago lanceolata*		
False lily-of-the-valley	*Maianthemum dilatatum*	✓	
Fireweed	*Epilobium angustifolium*	✓	
Foamflower	*Tiarella trifoliata*	✓	
Foxglove	*Digitalis purpurea*		
Giant horsetail	*Equisetum telmateia*	✓	
Hairy cat's-ear	*Hypochaeris radicata*		B[a]
Hairy willow-herb	*Epilobium ciliatum*	✓	
Inside-out flower	*Vancouveria hexandra*	✓	
Japanese knotweed	*Polygonum cuspidatum*		B[a]
Kentucky bluegrass	*Poa pratensis*		
Lady fern	*Athyrium filix-femina*	✓	
Large-leaf avens	*Geum macrophyllum*	✓	
Mountain sweet-cicely	*Osmorhiza chilensis*	✓	
Oxeye daisy	*Leucanthemum vulgare (=Chrysanthemum leucanthemum)*		B[a]
Pearly everlasting	*Anaphalis margaritacea*	✓	
Pig-a-back plant	*Tolmiea menziesii*	✓	
Pioneer violet	*Viola glabella*	✓	
Red fescue	*Festuca rubra*	✓	
Reed canarygrass	*Phalaris arundinacea*		C

Table B-1: Plants Observed in Project Vicinity (cont.)

Common Name	Scientific Name	Native?	Noxious Weed Class
Herbs (cont.)			
Sedges	*Carex* spp.	✓	
Self-heal	*Prunella vulgaris*	✓	
Skunk cabbage	*Lysichiton americanus*	✓	
Slough sedge	*Carex obnupta*	✓	
Small-fruited bulrush	*Scirpus microcarpus*	✓	
Smooth hawksbeard	*Crepis capillaris*		
Soft rush	*Juncus effusus*	✓	
Spreading wood fern	*Dryopteris expansa*	✓	
Sweet coltsfoot	*Petasites frigidus*	✓	
Swordfern	*Polystichum munitum*	✓	
Tansy ragwort	*Senecio jacobaea*		B[c]
Twinflower	*Linnaea borealis*	✓	
Vanillaleaf	*Achlys triphylla*	✓	
Water parsley	*Oenanthe sarmentosa*	✓	
Western springbeauty	*Claytonia sibirica*	✓	
White clover	*Trifolium repens*		
White trillium	*Trillium ovatum*	✓	
Wild carrot	*Daucus carota*		B[a]
Wood sorrel	*Oxalis oregana*	✓	

[a] Class B not designated for control in either Pacific or Grays Harbor County.
[b] Class B designated for control in both Pacific and Grays Harbor County
[c] Class B not designated for control in Pacific or Grays Harbor County but selected for control by Pacific County Noxious Weed Control Board.

Table B-2: Stream Types and Fish Presence in the Project Corridor.

Stream Name	Adjacent Structures	DNR Stream Type*	WDFW Modified Stream Type	Known Fish Presence†		WDFW Priority Habitat**	Comments
				Anadromous	Resident		
Butte Creek	South of 1	1-3		Coho salmon; Winter steelhead; Cutthroat trout	Cutthroat trout		
Unnamed Trib. No. 1	4-5	*4-5* [a]					Primary trib to Butte Cr
Unnamed Trib. No. 2	5-6	5					Primary trib to Butte Cr
Butte Creek	6-7	1-3		Coho salmon			
Unnamed Trib. No. 3	7-8	5					Primary trib to Butte Cr
Unnamed Trib. No. 4	9-10	5					Primary trib to Butte Cr
Unnamed Trib. No. 5	13-14	4-5					Secondary trib to Smith Cr.
Unnamed Trib. No. 6	15-16	5					Secondary trib to Smith Cr.
Unnamed Trib. No. 7	22-23	1-3			Cutthroat trout	R	Primary trib to Smith Cr
Smith Creek	26-27	1-3		Chinook salmon, Chum salmon; Coho salmon; Cutthroat trout	Cutthroat trout	AR	
Unnamed Trib. No. 8	28-29	5					Primary trib to Smith Cr
Unnamed Channel No. 1	32-33	4					
Unnamed Channel No. 2	35A	5					
Unnamed Channel No. 3	35-36	5					
Elk Horn Creek	40-41	1-3		Chinook salmon; Coho salmon; Cutthroat trout	Cutthroat trout	AR	
Unnamed Trib. No. 9	42-43	1-3			Cutthroat trout		Primary trib to Elk Horn Cr
Unnamed Trib. 10	43-44	*1-3* [a]		*Unknown*	*Unknown*		Primary trib. to Elk Horn Cr.
Unnamed Trib. No. 11	50-51	4	1-3		Cutthroat trout		Secondary trib to Elk Horn Cr.
Unnamed Trib. No. 12	52-53	4	1-3		Cutthroat trout		Secondary trib to Elk Horn Cr.
Unnamed Trib. No. 13	56-57	5					Secondary trib to Elk Horn Cr.
Unnamed Trib. No. 14	56-57	5					Secondary trib to Elk Horn Cr.
Unnamed Trib. No. 15	62-63	4	1-3		Cutthroat trout		Primary trib to Lower Salmon Cr
Unnamed Trib. No. 16	65-66	5					Primary trib to Lower Salmon Cr
Unnamed Trib. No. 17	65-66	1-3			Cutthroat trout		Primary trib to Lower Salmon Cr

Lower Salmon Creek	65-66	1-3		Chinook salmon, Chum salmon; Coho salmon; Cutthroat trout	Cutthroat trout	AR	
Unnamed Trib. No. 18	67A-68A	1-3			Cutthroat trout		Primary trib to Lower Salmon Cr
Unnamed Trib. No. 19	72-73	1-3		Coho salmon	Cutthroat trout	R	Primary trib to Lower Salmon Cr
Lower Salmon Creek	73-74	1-3		Chinook salmon; Chum salmon; Coho; Winter Steelhead; Cutthroat trout	Cutthroat trout	AR	
Unnamed Trib. No. 20	75-76	5					Primary trib to Lower Salmon Cr
Unnamed Trib. No. 21	79-80	5					Secondary trib to Lower Salmon Cr
Unnamed Trib. No. 22	80-81	1-3		Coho salmon			Primary trib to Lower Salmon Cr
Unnamed Trib. No. 23	82-83	5					Primary trib to Lower Salmon Cr
Unnamed Trib. No. 24	84-85	5	1-3		Cutthroat trout		Secondary trib to Joe Cr
Unnamed Trib. No. 25	85-86	5	1-3		Cutthroat trout		Secondary trib to Joe Cr
Unnamed Trib. No. 26	86-87	4	1-3		Cutthroat trout		Primary trib to Joe Cr
Unnamed Trib. No. 27	87-88	1-3/5					Primary trib to Joe Cr
Unnamed Trib. 28	88-89	*4-5* [a]					
Joe Creek	90-91	1-3		Coho salmon; Cutthroat trout	Cutthroat trout	AR	
Unnamed Trib. No. 29	91-92	1-3		Coho salmon			Primary trib to Joe Cr
Unnamed Trib. No. 30	93-94	1-3					Primary trib to Joe Cr
Unnamed Trib. No. 31	93-94	5					Secondary trib to Joe Cr
Unnamed Trib. No. 32	95-96	5	1-3		Cutthroat trout		Secondary trib to Joe Cr
Unnamed Trib. No. 33	97-98	1-3			Cutthroat trout		Secondary trib to Joe Cr
Unnamed Trib. No. 34	100-101	5					Secondary trib to Joe Cr
Unnamed Trib. No. 35	102-103	5					Secondary trib to Joe Cr
Unnamed Trib. No. 36	110-111	1-3			Salmonids		Secondary trib to North River
Unnamed Trib. No. 37	111-112	4					Secondary trib to North River
Unnamed Trib. No. 38	115-116	5					Secondary trib to North River

North River	120-121	1-3		Chinook salmon; Chum salmon; Coho; Winter Steelhead; Cutthroat trout	Cutthroat trout	AR	
Unnamed Trib. No. 39	123-124	1-3		Coho salmon	Salmonids		Primary trib to Little North River
Unnamed Trib. No. 40	127-128	4	1-3		Cutthroat trout		Primary trib to Little North River
Unnamed Trib. No. 41	129-130	5					Primary trib to Little North River
Unnamed Trib. No. 42	131-132	1-3			Cutthroat trout		Primary trib to Little North River
Unnamed Trib. No. 43	133-134	1-3		Coho salmon	Cutthroat trout	AR	Primary trib to Little North River
Unnamed Trib. No. 44	136-137	4					Primary trib to Little North River
Unnamed Trib. No. 45	137-138	5					Primary trib to Little North River
Unnamed Trib. No. 46	141-142	1-3		Coho salmon	Cutthroat trout	R	Primary trib to Little North River
Little North River	141-142	1-3		Coho salmon; Cutthroat trout	Cutthroat trout; sculpin; lamprey	AR	
Unnamed Trib. No. 47	147-148	5					Secondary to Brick Cr
Unnamed Trib. No. 48	149-150	5					Secondary to Brick Cr
Unnamed Trib. No. 49	155-156	5					Primary trib to Mill Cr
Unnamed Channel No. 4	163-164	5					
Unnamed Channel No. 5	164-165	5					
Unnamed Channel No. 6	167-168	5					
* DNR Stream Typing:	1-3 are fish-bearing streams						
	4 is perennial non-fish-bearing						
	5 is intermittent non-fish-bearing						
** A = Priority Anadromous Fish							
R = Priority Resident Fish							
† = Data Sources: Washington State Natural Heritage Database; Washington State Priority Habitats and Species Database;							
Williams et al., 1975; and WDFW electroshocking and stream-typing data							
[a] Based on field survey data for essential fish habitat							

Table B-3: Fish and Wildlife Potentially Occurring in the Project Corridor (WDFW 2002c).

Common Name	Scientific Name	Listing Status	
		State	Federal
Mammals			
Beaver	*Castor canadensis*		
Bendire's Shrew	*Sorex bendirii*		
Big Brown Bat	*Eptesicus fuscus*		
Black Bear	*Ursus americanus*		
Bobcat	*Lynx rufus*		
Bushy-tailed Woodrat	*Neotoma cinerea*		
California Myotis	*Myotis californicus*		
Coast Mole	*Scapanus orarius*		
Coyote	*Canis latrans*		
Creeping Vole	*Microtus oregoni*		
Deer Mouse	*Peromyscus maniculatus*		
Douglas' Squirrel	*Tamiasciurus douglasii*		
Elk	*Cervus elaphus*		
Ermine	*Mustela erminea*		
Fisher	*Martes pennanti*	Endangered	Species of Concern*
Forest Deer Mouse	*Peromyscus keeni*		
Gapper's Red-backed Vole	*Clethrionomys gapperi*		
Hoary Bat	*Lasiurus cinereus*		
House Mouse	*Mus musculus*		
Little Brown Myotis	*Myotis lucifugus*		
Long-eared Myotis	*Myotis evotis*		
Long-legged Myotis	*Myotis volans*		
Long-tailed Vole	*Microtus longicaudus*		
Mink	*Mustela vison*		
Montane Shrew	*Sorex monticolus*		
Mountain Beaver	*Aplodontia rufa*		
Mountain Lion	*Felis concolor*		
Mule Deer	*Odocoileus hemionus*		
Muskrat	*Ondatra zibethicus*		
Northern Flying Squirrel	*Glaucomys sabrinus*		
Norway Rat	*Rattus norvegicus*		
Opossum	*Didelphis virginiana*		
Pacific Jumping Mouse	*Zapus trinotatus*		
Porcupine	*Erethizon dorsatum*		
Raccoon	*Procyon lotor*		
Red Fox	*Vulpes vulpes*		
River Otter	*Lutra canadensis*		
Shrew-mole	*Neurotrichus gibbsii*		
Silver-haired Bat	*Lasionycteris noctivagans*		
Snowshoe Hare	*Lepus americanus*		
Spotted Skunk	*Spilogale gracilis*		
Striped Skunk	*Mephitis mephitis*		
Townsend's Big-eared Bat	*Plecotus townsendii*	Candidate	
Townsend's Chipmunk	*Tamias townsendii*		
Townsend's Mole	*Scapanus townsendii*		
Trowbridge's Shrew	*Sorex trowbridgii*		
Vagrant Shrew	*Sorex vagrans*		
Yuma Myotis	*Myotis yumanensis*		

Birds

American Goldfinch	*Carduelis tristis*		
American Robin	*Turdus migratorius*		
American/Northwestern Crow	*Corvus brachyrhynchos/caurinus*		
Bald Eagle	*Haliaeetus leucocephalus*	Threatened	Threatened
Band-tailed Pigeon	*Columba fasciata*		
Barn Owl	*Tyto alba*		
Barn Swallow	*Hirundo rustica*		
Barred Owl	*Strix varia*		
Bewick's Wren	*Thryomanes bewickii*		
Black-capped Chickadee	*Parus atricapillus*		
Black-headed Grosbeak	*Pheucticus melanocephalus*		
Black-throated Gray Warbler	*Dendroica nigrescens*		
Blue Grouse	*Dendragapus obscurus*		
Brown Creeper	*Certhia americana*		
Brown-headed Cowbird	*Molothrus ater*		
Bushtit	*Psaltriparus minimus*		
Cedar Waxwing	*Bombycilla cedrorum*		
Chestnut-backed Chickadee	*Parus rufescens*		
Cliff Swallow	*Hirundo pyrrhonota*		
Common Loon	*Gavia immer*	Sensitive	
Common Nighthawk	*Chordeiles minor*		
Common Raven	*Corvus corax*		
Common Yellowthroat	*Geothlypis trichas*		
Dark-eyed Junco	*Junco hyemalis*		
Downy Woodpecker	*Picoides pubescens*		
Evening Grosbeak	*Coccothraustes vespertinus*		
Golden-crowned Kinglet	*Regulus satrapa*		
Gray Jay	*Perisoreus canadensis*		
Great Horned Owl	*Bubo virginianus*		
Hairy Woodpecker	*Picoides villosus*		
Hutton's Vireo	*Vireo huttoni*		
Killdeer	*Charadrius vociferus*		
Marbled Murrelet	*Brachyramphus marmoratus*	Threatened	Threatened
Northern Flicker	*Colaptes auratus*		
Northern Pygmy-Owl	*Glaucidium gnoma*		
Northern Saw-whet Owl	*Aegolius acadicus*		
Northern Spotted Owl	*Strix occidentalis caurina*	Endangered	Threatened
Olive-sided Flycatcher	*Contopus borealis*		
Orange-crowned Warbler	*Vermivora celata*		
Pacific-slope/Cordilleran Flycatcher	*Empidonax difficilis/occidentalis*		
Pileated Woodpecker	*Dryocopus pileatus*	Candidate	
Pine Siskin	*Carduelis pinus*		
Purple Finch	*Carpodacus purpureus*		
Red Crossbill	*Loxia curvirostra*		
Red-breasted Sapsucker	*Sphyrapicus ruber*		
Red-tailed Hawk	*Buteo jamaicensis*		
Red-winged Blackbird	*Agelaius phoeniceus*		
Rock Dove	*Columba livia*		
Ruffed Grouse	*Bonasa umbellus*		
Rufous Hummingbird	*Selasphorus rufus*		
Song Sparrow	*Melospiza melodia*		
Spotted Towhee	*Pipilo maculatus*		
Swainson's Thrush	*Catharus ustulatus*		
Tree Swallow	*Tachycineta bicolor*		
Turkey Vulture	*Cathartes aura*		
Varied Thrush	*Ixoreus naevius*		
Vaux's Swift	*Chaetura vauxi*	Candidate	
Violet-green Swallow	*Tachycineta thalassina*		
Warbling Vireo	*Vireo gilvus*		
Western Screech-Owl	*Otus kennicottii*		
Western Tanager	*Piranga ludoviciana*		
White-crowned Sparrow	*Zonotrichia leucophrys*		
Wilson's Warbler	*Wilsonia pusilla*		
Winter Wren	*Troglodytes troglodytes*		
Wood Duck	*Aix sponsa*		

Reptile and Amphibians			
Bullfrog	*Rana catesbeiana*		
Columbia Torrent Salamander	*Rhyacotriton kezeri*	Candidate	
Common Garter Snake	*Thamnophis sirtalis*		Species of Concern*
Cope's Giant Salamander	*Dicamptodon copei*		
Dunn's Salamander	*Plethodon dunni*	Candidate	
Ensatina	*Ensatina eschscholtzii*		
Long-toed Salamander	*Ambystoma macrodactylum*		
Northwestern Salamander	*Ambystoma gracile*		
Pacific Giant Salamander	*Dicamptodon tenebrosus*		
Pacific Treefrog	*Hyla regilla*		
Red-legged Frog	*Rana aurora*		
Roughskin Newt	*Taricha granulosa*		
Tailed Frog	*Ascaphus truei*		
Western Redback Salamander	*Plethodon vehiculum*		
Western Toad	*Bufo boreas*	Candidate	
Fish			
Bull trout	*Salvelinus confluentus*	Candidate	Threatened
Chinook salmon	*Oncorhynchus tshawytscha*		
Chum salmon	*Oncorhynchus keta*		
Coho salmon	*Oncorhynchus kisutch*		Candidate
Coastal resident/searun cutthroat trout	*Oncorhynchus clarki clarki*		
Pacific lamprey	*Entosphenus tridentatus*		Species of Concern*
River Lamprey	*Lampetra ayresi*	Candidate	Species of Concern*
Sculpin	*Cottus sp.*		
Steelhead trout	*Oncorhynchus mykiss*		

*Species of Concern is an informal federal status that has no regulatory standing or implications.

Table B-4: Population Trends for Grays Harbor and Pacific Counties, 1980-2002

County	***1980***	***1990***	***2000***	***2002***
Grays Harbor County	66,314	64,175	67,194	68,400
Pacific County	17,237	18,882	20,984	21,000
Total, Two Counties	83,551	83,057	88,178	89,400
Percent Change	na	-0.6%	6.2%	1.4%
Percent of Total State Population	2.0%	1.7%	1.5%	1.5%
State of Washington	4,132,353	4,866,659	5,894,121	6,041,700
Percent Change	na	17.8%	21.1%	2.5%

Note: na is “not applicable.”
Sources: U.S. Bureau of Census; Washington State Office of Financial Management

Table B-5: Full and Part-time Employment in Grays Harbor and Pacific Counties, 2000

Sector	*Grays Harbor*	*Pacific*	*Two-County Total*	*Washington State*
Total full-time and part-time employment	32,520	9,544	42,064	3,560,164
Wage and salary employment	25,580	6,721	32,301	2,938,765
Proprietors' employment	6,940	2,823	9,763	621,399
Farm proprietors' employment	500	317	817	38,711
Nonfarm proprietors' employment 2/	6,440	2,506	8,946	582,688
Farm employment	604	363	967	79,886
Nonfarm employment	31,916	9,181	41,097	3,480,278
Private employment	26,653	7,309	33,962	2,933,709
Ag. services, forestry, fishing, & other 3/	1,224	961	2,185	64,508
Mining	84	41	125	5,664
Construction	1,790	388	2,178	216,748
Manufacturing	4,809	1,059	5,868	371,436
Transportation and public utilities	1,210	178	1,388	167,892
Wholesale trade	781	67	848	168,912
Retail trade	6,063	1,624	7,687	594,402
Finance, insurance, and real estate	2,079	607	2,686	272,353
Services	8,613	2,384	10,997	1,071,794
Government and government enterprises	5,263	1,872	7,135	546,569
Federal, civilian	248	75	323	69,151
Military	293	162	455	72,831
State and local	4,722	1,635	6,357	404,587
State	1,000	311	1,311	132,128
Local	3,722	1,324	5,046	272,459

Source: U.S. Bureau of Economic Analysis, Regional Economic Information System.

Table B-6: Wage and Salary Employment in Grays Harbor and Pacific Counties, 2000

Sector	*Grays Harbor County*	*Pacific County*	*Two-county Region Total*	*Washington State*
Agriculture, forestry & fishing	534	396	930	91,530
Construction & mining	1,162	228	1,390	152,790
Manufacturing	4,267	900	5,167	345,830
Transportation & public utilities	795	83	878	139,684
Wholesale trade	611	35	646	150,196
Retail trade	4,780	1,176	5,956	483,740
Finance, insurance & real estate	1,015	192	1,207	133,937
Services	5,622	1,375	6,997	747,048
Government	4,875	1,685	6,560	458,482
Total	23,661	6,070	29,731	2,703,237

Source: Washington State Employment Security Department, Labor Market & Economic Analysis Branch.

Table B-7: Income Characteristics in Grays Harbor and Pacific Counties

County/State	1980	1990	2000
Grays Harbor County			
Total personal income ($000)	$1,308,179	$1,408,531	$1,471,312
Net earnings ($000)	$910,648	$843,856	$852,682
Dividends, interest & rent ($000)	$212,758	$274,679	$272,156
Transfer payments ($000)	$184,773	$289,996	$346,474
Per capita income ($)	$19,690	$21,873	$21,908
Pacific County			
Total personal income ($000)	$324,050	$390,994	$440,091
Net earnings ($000)	$195,608	$196,437	$212,166
Dividends, interest & rent ($000)	$69,815	$100,034	$108,981
Transfer payments ($000)	$58,627	$94,523	$118,944
Per capita income ($)	$18,676	$20,621	$21,042
Two-county Region			
Total personal income ($000)	$1,632,228	$1,799,525	$1,911,403
Net earnings ($000)	$1,106,255	$1,040,293	$1,064,848
Dividends, interest & rent ($000)	$282,572	$374,713	$381,137
Transfer payments ($000)	$243,401	$384,519	$465,418
Per capita income ($)	$19,480	$21,588	$21,702
Washington State			
Total personal income ($000)	$88,377,791	$136,513,481	$184,517,693
Net earnings ($000)	$64,270,728	$93,207,248	$129,712,222
Dividends, interest & rent ($000)	$14,577,114	$27,193,915	$33,121,758
Transfer payments ($000)	$9,529,950	$16,112,319	$21,683,713
Per capita income ($)	$21,273	$27,843	$31,230

Table B-8: Race Distribution in the Two-County Region and Washington State, 2000

Race	Grays Harbor County		Pacific County	
	Number	Percent	Number	Percent
One Race	65,111	96.9%	20,392	97.2%
White	59,335	88.3%	18,998	90.5%
Black or African American	226	0.3%	42	0.2%
American Indian or Alaska Native	3,132	4.7%	513	2.4%
Asian	818	1.2%	436	2.1%
Hawaiian & Other Pacific Islander	73	0.1%	19	0.1%
Some other race	1,527	2.3%	384	1.8%
Two or more Races	2,083	3.1%	592	2.8%
Hispanic Origin (of any race)	3,258	4.8%	1,052	5.0%
Total	67,194	100.0%	20,984	100.0%

Race	Two-County Region		Washington State	
	Number	Percent	Number	Percent
One Race	85,503	97.0%	5,680,602	96.4%
White	78,333	88.8%	4,821,823	81.8%
Black or African American	268	0.3%	190,267	3.2%
American Indian or Alaska Native	3,645	4.1%	93,301	1.6%
Asian	1,254	1.4%	322,335	5.5%
Hawaiian & Other Pacific Islander	92	0.1%	23,953	0.4%
Some other race	1,911	2.2%	228,923	3.9%
Two or more Races	2,675	3.0%	213,519	3.6%
Hispanic Origin (of any race)	4,310	4.9%	441,509	7.5%
Total	88,178	100.0%	5,894,121	100.0%

Note: Some other race, refers to a "write-in" category in which respondents listed multi-racial, mixed, interracial, Hispanic or Latino. The Census Bureau estimates that 97 percent of respondents who reported as "Some other race" were Hispanic or Latino.
Source: U.S. Census Bureau.

Table B-9: Median Household Incomes of Study Area and Washington State, 2001

Geographic Area	2001 Median Household Income	Percent of Median
Grays Harbor County	$36,761	75.82%
Pacific County	$33,999	70.13%
Two-County region	$36,468	75.22%
Washington State	$48,482	100.00%

Source: Washington State Office of Financial Management. *2001 Population Trends for Washington State*.

Table B-10: Construction Noise in the Vicinity of a Representative Construction Site

Distance from Construction Site (feet)	Hourly Leq (dBA)
50	89
100	83
200	77
400	71
800	65
1600	59

Note: The following assumptions were used:
Equipment used: (1) each- grader, bulldozer, heavy truck, backhoe, Pneumatic tools, concrete pump, crane
Reference noise level: 89 dBA (L_{eq})
Distance for the reference noise level: 50 feet
Noise attenuation rate: 6 dBA/doubling of distance
This calculation does not include the effects, if any, of local shielding or atmospheric attenuation.

APPENDIX C

Health and Safety Technical Report

HEALTH AND SAFETY TECHNICAL REPORT

Prepared for Bonneville Power Administration

By Dan Bracken

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HEALTH AND SAFETY TECHNICAL REPORT

Affected Environment

Transmission facilities provide electricity for heating, lighting, and other services essential for public health and safety. These same facilities can potentially harm humans. Contact with transmission lines or any electrical line can kill or seriously injure people. Transmission structures and conductors can present an obstruction for aircraft. This technical report describes public health and safety concerns such as electrical shocks, fires, aircraft obstruction warnings, the effects of electric and magnetic fields related to transmission facilities, and construction activities.

The Federal Aviation Administration (FAA) establishes requirements for towers and other tall structures that would potentially interfere with aircraft safety. Structures taller than 200 feet may require flashing warning lights for aircraft safety. BPA submits the final locations of structures and structure heights to FAA for their review and recommendations on airway marking and lighting.

Transmission lines, like all electric devices and equipment, produce ***electric and magnetic fields (EMF)***. Voltage, the force that drives the current, is the source of the electric field. Current, the flow of electric charge in a wire, produces the magnetic field. The strength of electric and magnetic fields depends on the design of the line and on distance from the line. Field strength decreases rapidly with distance.

Electric and magnetic fields are found around any electrical wiring, including household wiring and electrical appliances and equipment. Electric fields are measured in units of volts per meter (V/m) or kilovolts per meter (thousands of volts per meter, kV/m). Throughout a home, the electric field strength from wiring and appliances is typically less than 0.01 kV/m. However, fields of 0.1 kV/m and higher can be found very close to electrical appliances.

There are no federal guidelines or standards for electric fields from transmission lines. Washington has no electric-field limit. BPA designs new transmission lines to meet its electric-field guideline of 9-kV/m maximum on the ROW and 5-kV/m maximum at the edge of the ROW. The National Electric Safety Code (NESC) specifies that the maximum permissible induced shock current from large vehicles under transmission lines with voltages above 170 kV cannot exceed 5 milliamperes (mA). This portion of the NESC does not apply to the proposed 115-kV line. Both the BPA guideline and the NESC induced current requirement are important for 500-kV lines. The proposed 115-kV line would have much lower fields than a 500-kV line and would easily meet all these requirements.

Magnetic fields are measured in units of gauss (G) or milligauss (thousandths of a gauss, mG). Average magnetic field strength in most homes (away from electrical appliances and home wiring, etc.) is less than 2 mG. Fields of tens or hundreds of milligauss are present very close to appliances carrying high current. Typical magnetic field strengths for some common electrical appliances are given in Table 1. Unlike electric fields, magnetic fields from outside power lines are not reduced in strength by trees or building material. 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.

There are no federal guidelines or standards for magnetic fields. Washington does not have magnetic field limits. BPA does not have a guideline for magnetic field exposures. Guidelines for public and occupational magnetic-field exposures are well above environmental levels and above the levels found near transmission lines. These guidelines are based on short-term stimulation, not effects of long-term exposures.

Table 1: Typical Magnetic Field Strengths
(1 foot from common appliances)

Appliance	Magnetic Fields (mG)[1]
Coffee maker	1-1.5
Electric range	4-40
Hair dryer	0.1-70
Television	0.4-20
Vacuum cleaner	20-200
Electric blanket[2]	15-100

mG = milligauss
[1] The magnetic field from appliances usually decreases to less than 1 mG at 3 to 5 feet from appliances.
[2] Values are for distance from blanket in normal use (less than 1 foot away).
Source: Miller 1974; Gauger 1985

Environmental Consequences of the 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.

Potential Impacts

Potential 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 fire during refueling of hot equipment such as trackhoes and bulldozers that cannot be taken off site for refueling. Connection of conductors may be accomplished using implosion fittings, which could be a source of injury to construction personnel. In addition, there are potential safety issues with more traffic on the highways and roads in the project area during construction. Standard construction safety procedures would make the risk of injury very low.*Potential Impacts During Operation and Maintenance*

Electrical Safety

Power lines, like electrical wiring, can cause serious electric shocks if certain precautions are not taken. These precautions include building the lines to minimize shock hazard. All BPA lines are designed and constructed in accordance with the NESC and BPA practices. The NESC specifies the minimum allowable distance between the lines and the ground or other objects. These requirements determine the edge of the ROW and the height of the line; i.e., the closest point

houses, other buildings, and vehicles are allowed to the line.

People must take precautions when working or playing near power lines. It is extremely important that a person not bring anything, such as a TV antenna, irrigation pipe, or water streams from an irrigation sprinkler too close to the lines. BPA provides a free booklet that describes safety precautions for people who line or work near transmission lines (*Living and Working Safely Around High Voltage Power Lines*). 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. Transmission lines are designed so that the electric field would be below levels where primary shocks could occur from even the largest (ungrounded) vehicles expected under the line. Fences and other metal structures on and near the ROW would be grounded during construction to limit the potential for nuisance shocks. Questions about grounding or reports of nuisance shock received under a line should be directed to BPA. Electric fields from the proposed line would be much lower than those from 230-kV and 500-kV lines. The proposed line would easily meet the BPA electric-field guidelines of 9 kV/m on the ROW and 5 kV/m at the edge of the ROW. Therefore, it is highly unlikely that the above-mentioned effects would be perceived under the line.

Short-term Effects - Magnetic Fields

Magnetic fields from transmission lines can induce currents and voltages on long conducting objects parallel to the lines. These voltages can also serve as a source of nuisance shocks. However, the effects are well understood and can be mitigated by grounding and other measures. Magnetic fields from transmission lines (and other sources) can distort the image on computer monitors. The threshold for interference depends on the type and size of monitor. Historically, this phenomenon is reported at magnetic-field levels at or above 10 mG, but some more sensitive monitors may exhibit image distortion at lower levels. For the proposed 115-kV line, the distance where interference could occur under worst-case conditions would be reduced to about 40 feet from the centerline.

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 was conducted for this project. There is little evidence that electric fields cause long-term health effects. Estimates of magnetic-field exposures have been associated with certain health effects in studies of residential and occupational populations. Research in this area is continuing to determine whether such associations might reflect a causal relationship.

Scientific reviews of the research on EMF and health have stated that there is insufficient evidence to conclude that EMF exposures lead to long-term health effects, such as adult cancer, or adverse effects on reproduction, pregnancy, or growth and development of the embryo. Based

on epidemiology studies, some uncertainty remains about the possible effect of magnetic-field exposure above 4 mG on the risk of childhood leukemia. However, as the scientific reviews also indicate, animal or cellular studies provide little support for the idea that the statistical associations reflect a causal relationship, i.e., that magnetic-field exposure increases the risk of childhood or adult cancer.

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.

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. They are not measures of risk or impacts on health. The 18-mile-long corridor in which the proposed line would be built is sparsely populated along most of its length.

BPA has predicted the annual peak electric and magnetic fields during 2004 from the proposed and existing transmission lines to compare the fields from the proposed line with the fields from the existing line. The predicted levels for electric and magnetic fields are maximum levels that would occur under maximum voltage conditions for electric fields and annual peak current conditions for magnetic fields.

Peak electric field levels are expected to be comparable but slightly less than under existing conditions. The calculated peak electric field expected on the ROW of the proposed line is 1.4 kV/m. The peak values would be present only at locations directly under the line, near mid-span, where the conductors are at the minimum clearance. The calculated peak levels are rarely reached under real-life conditions. The estimated peak electric field under the existing 115-kV line would be 1.5 V/m. The largest value expected at the edge of the ROW of the rebuilt line would be 0.6 kV/m. The estimated largest electric field at the edge of the ROW for the existing line is 0.7 kV/m. Lateral profiles of the maximum electric field levels near the proposed and existing lines are shown on Figure 1.

Peak magnetic field levels are expected to be less than under existing conditions. The peak calculated 60-Hz magnetic field expected at 3.28 feet above ground for the proposed line is 30 mG. This field is calculated for the maximum current of 224 A, with the conductors at a height of 24 feet. The maximum field would decrease for increased conductor clearance. For an average conductor height over a span of 31 feet, the maximum field would be 19 mG. The peak magnetic field during 2004 for the existing line with a clearance of 20.5 feet would be 43 mG. Lateral profiles of the maximum magnetic field levels near the proposed rebuilt line and the existing line are shown in Figure 2.

At the edge of the ROW of the proposed line, the calculated magnetic fields for maximum current load conditions are 18 and 14 mG on either side of the line. The higher fields would be on the side of the line with the lowest conductor. The calculated magnetic fields of at the edge of the ROW of the existing line are about 17 mG. Magnetic fields averaged over a year would be about one-half the estimated maximum values.

The magnetic field would fall off rapidly as distance from the line increases. At a distance of 100 feet from the centerline of the proposed line, the field would be about 2 mG for maximum current conditions. The calculated magnetic field for maximum current would be less than 10 mG at about 40 feet from the centerline.

The public health and safety impacts associated with electric and magnetic fields for the proposed action would be comparable to those from the existing line. The magnetic fields from the proposed line would be less than those from the existing line. Short-term effects, such as nuisance shocks, would be very unlikely.

Toxic and Hazardous Substances

There are no known occurrences of hazardous materials or contaminants within the transmission line corridor; no impacts are expected.

Figure 1: Maximum electric field at 3.28 ft. height from proposed and existing Raymond – Cosmopolis 115-kV transmission lines.

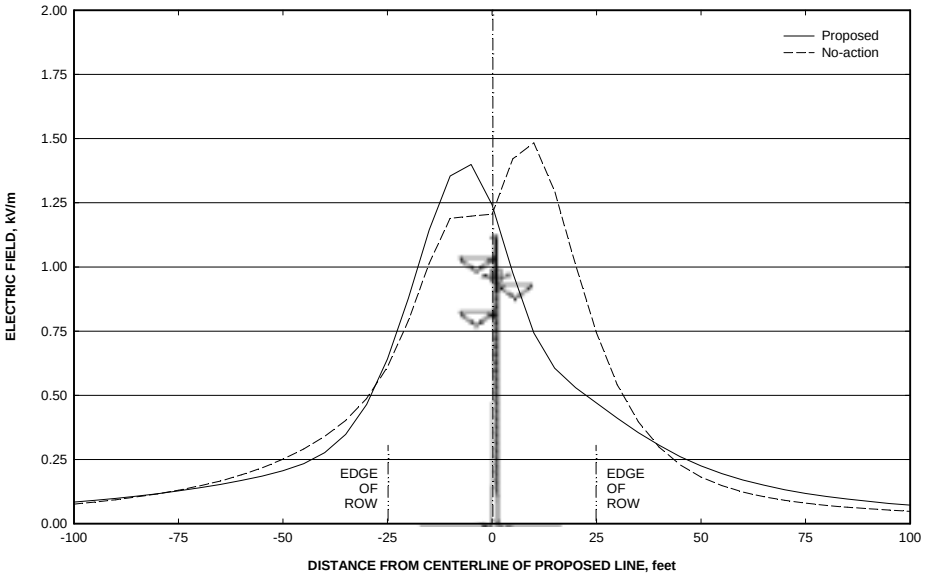

Figure 2: Maximum magnetic field at 3.28 ft. height from proposed and existing Raymond – Cosmopolis 115-kV transmission line.