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

## 3.1 INTRODUCTION

This chapter evaluates the potential impacts of the proposal and the no action alternative 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. For example, the introduction of noxious weeds following the removal of vegetation that results in lower quality habitat for wildlife would be an indirect impact. If the affected environment for a specific natural or other resource extends beyond the general limits of the existing corridor, it is noted under the specific resource.

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

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

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

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~~ 13 acres (for new roads, brushing of existing roads, danger tree removal, and tree clearing in realignment areas) and<br>– Withdrawal of approximately 10 acres from timber production.<br>– 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.<br>– Soil compaction by heavy equipment during construction and tree removal.<br>– 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.<br>– About ~~3.1~~ 5 acres of forest permanently removed for new road construction, about ~~1~~ 5 acres removed for realignment areas, and 2 acres for danger tree removal.<br>– About 0.2 acre vegetation permanently removed for structures bases.<br>– Up to one acre of vegetation removed during brushing of existing roads as part of road improvements.<br>– 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 ROW and cutting of tall-growing vegetation within the ROW. |
| Fish and Wildlife | – Localized and temporary disruption of fish and wildlife from construction noise.<br>– Potential effects on fish and prey organisms from increases in stream turbidity and temperature due to construction activity and tree removal near streams.<br>– ~~Six~~ Seven acres of existing or potential forest in realignment areas remain shrub dominated; about ~~3.1~~ 6 acres of forest habitat removed for new and improved access roads and 0.2 acres for structure bases permanently removed.<br>– 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.<br>– Moderate indirect impacts on marbled murrelets resulting from some degradation of remaining habitat in three areas where some tree trimming and tree removal is proposed at the edge of habitat areas. | 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. |

| Environmental Resource | Proposed Action | No Action Alternative |
|---|---|---|
| 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.<br>– Minor effects on ground water quality from small reduction in infiltration capacity.<br>– 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. |
| Wetlands | – Temporary and low level of impacts to wetlands from removing 9 structures in wetlands and 20 structures near wetlands.<br>– Temporary and moderate impacts to wetlands from installing 2 new structures in wetlands and 19 structures near wetlands, including ~~0.43~~ 0.30 acres of temporary fill.<br>– Minor permanent impacts to wetlands from depositing ~~0.08~~ 0.018 acres of fill for a ford ~~roads~~ and the two structures in wetlands.<br>– 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.<br>– Minor effects from deposition of up to 100 cubic yards of fill in floodplains for structure construction.<br>– 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.<br>– 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.<br>– Short-term beneficial impact on employment and local sales tax revenues during construction.<br>– Low potential for trespass and vandalism to homes and businesses.<br>– 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. |

| Environmental Resource | Proposed Action | No Action Alternative |
|---|---|---|
| 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.<br>– Low potential for nuisance shocks.<br>– 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, 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 the 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.

**Figure 3-1. Land Use**

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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).

**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 Consequences—Proposed Action*

**Forestry**

For all construction, including access roads and realignment areas and danger tree removal, the proposed project would require cutting trees on approximately ~~6~~ 13 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. Widening 1,300 feet of the existing easement from 50 feet wide to 70 feet wide to accommodate swing in the conductor will be a low impact because of the minimal restrictions and the rural nature of the area restricted.

**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 Section 3.5.3, **Fish and Wildlife**). During these periods, vehicles would 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, including tree removal activities near one residence south of North River Road.

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, **Land Use**). 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. Operation and maintenance activities would have a low impact on land use because they would not disrupt

the flow of traffic and would have very little impact on forestry, recreational use, or residents. Thus, the unavoidable impacts remaining after mitigation are expected to be low to moderate.

### *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 known 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 and a proposed culvert and bridge replacement project could receive funding in the near future. 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. The removal of trees within and adjacent to the ROW would result in low to moderate impacts due to the small area affected by tree removal.

Because most existing structures would be cut 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 and 3.5 miles of roads would be improved. The new roads would convert approximately ~~4.8~~ 5.0

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

**Operation and Maintenance**

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

### *3.3.3 Mitigation*

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~~ the ground surface rather than cut 2 feet below the ground surface, to minimize soil disturbance.
- Structures and new roads will be located as far as possible from nearby streams and wetlands.
- Culverts, cross-drains, and water bars will be spaced and sized properly.
- To minimize erosion, sedimentation, and soil compaction as much work as possible will be conducted during the dry season, when stream flow, rainfall, and runoff are low.
- In disturbed areas, mechanical barriers to erosion, as specified in the Storm Water 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, a culvert replacement, and a bridge replacement. 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~~ five acres of forest. The removal of trees within and adjacent to the ROW in some areas between Structures 118 to 125 would result in low to moderate impacts on approximately 2 acres due to clearing and crushing of vegetation and soil compaction.

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~~ 3.3 acres of forest land to bare road surfaces, and an additional 1.7 acres of new roads within the ROW would convert non-forested areas to bare road surfaces, and 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, **Vegetation**), 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 and implement a noxious-weed control plan to minimize the introduction and broadcast of weed seeds, which will be submitted to the county weed control boards specialists for recommendations.
- Revegetate disturbed areas with 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~~ 5 acres and temporarily remove vegetation in up to ~~1~~ 2 acres. 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, along Highway 101, would permanently remove approximately ~~1~~ 5 acres 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 conducted vegetation management activities within the ROW in the spring and summer of 2003. The work involved 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 was done under the guidance of BPA's Vegetation Management EIS (BPA 2000) and site-specific Supplement Analysis (SA-159, 2003).

Impacts on vegetation of rebuilding the transmission line would be quite modest compared with the impacts of commercial logging on adjacent property and of BPA's 2002 danger tree removal 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 (the closest nest is approximately 1 mile from 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. Three of these stands were subsequently logged by private timber companies. Of ~~those twenty~~ the remaining seventeen 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 (see 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~~ five 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. To the north, five danger trees cut from 50 to 110 feet from the edge of a wetland along a tributary of Joe Creek would not be expected to impact EFH because the 50 foot vegetative buffer next to the wetland would not be disturbed.

A group of trees would be removed within 50 feet of a fish-bearing tributary to the Little North River. These trees would be left as snags and the tops felled into waterways to provide large woody debris, ~~if~~ because 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 to moderate. 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~~ 7 acres ~~of the 6 acres~~ within two realignment areas would be cleared of trees; the other realignment area was recently logged and has only tree seedlings. The portion within the 50-foot wide easement of the realignment 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, **Fish and Wildlife**.

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 after the nesting season. In another area, a clump of red alder trees and a hemlock with two 16" diameter trunks 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. Four red alders at the edge of a potential habitat stand would be removed to widen a curve in the road.

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.

Impacts to listed species could occur from some operation and maintenance activities. Noise impacts from occasional on the ground (vehicle) surveys of the line during operation and maintenance of the proposed project would be low. Noise impacts from helicopter use would be a moderate impact. Three times a year, generally in March, July, and October, a helicopter would fly the line to look for any problems or repair needs and vehicles would visit portions of the line. The July flight would impact marbled murrelet during the early breeding season and all flights could disturb spotted owl or eagles using the project area.

### *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~~ cut at the ground surface rather than cut 2 feet below the ground surface, to minimize soil disturbance.
- Removal of forest habitat will be limited to those trees that would interfere with transmission lines or those cut to create access roads.
- Existing structures located within 50-feet of fish-bearing streams will be cut off at ground level to minimize ground disturbance.
- Disturbed areas will be revegetated with native seed.
- Tensioning sites will 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 will be carried out within 75 yards of the boundary of **occupied marbled murrelet habitat** until after September 15.
- Instream work and other roadwork adjacent to **occupied marbled murrelet habitat** will 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 the Joe Creek crossing will be felled into the stream to provide large woody debris, if approved by WSDOT, the landowner.

- The five danger trees cut within 50 to 110 feet of the Joe Creek tributary (between Structures 92 to 94) will be cut as snags but the tops will not be felled toward the creek to avoid damaging the remaining trees in the riparian buffer.
- The riparian area within 50 feet of Joe Creek will be replanted with native, low-growing shrubs, if planting spots can be created safely.
- Any trees felled within 50 feet of the Little North River tributary between structures 123 and 124 ~~and tributaries~~ will be cut as snags and the tops 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~~ 3.3 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 | *21 (suspension |
| | | | *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 | |

| 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) |
|---|---|---|---|
| *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 in this area and also along the tributary to the Little North River, 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 and implemented, 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,~~ ground surface rather than excavated 2 feet below the surface, 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 permanent or temporary road constructed for access to the site.
- 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 the Joe Creek crossing where riparian trees will be cut as snags and the tops felled into the creek will be replanted with native, low-growing shrubs, assuming planting spots are present and can be safely accessed within the woody debris felled into this area.
- A Spill Prevention Control and Countermeasure (SPCC) Plan will be developed and implemented 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 location of existing and proposed structures in relation to wetland buffers is described in Table B-11 in Appendix B.

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 | **Moved to Upland Site** | | 67 (suspension) |

| 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) |
|---|---|---|---|
| 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~~ less than 15 cubic yards, or approximately 25 square feet per structure.

Work on structures that are *near* wetlands could temporarily disturb them resulting in low impacts; 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 a wetland associated with stream~~s~~ would result from ~~depositing fill associated with culvert installation or replacement and~~ installing a ford in an existing access road. Permanent impacts to wetlands from the deposition of fill would occur in the following location 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.~~[Deleted because there are no wetlands adjacent to this stream]
- 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 (ACOE) to obtain a permit for any fill placed in wetlands and comply with any required mitigation identified by the ACOE.
- An environmental specialist will meet with contractors and inspectors in the field to visit wetlands and waterways near or within construction areas to go over avoidance and mitigation measures and any permit requirements.
- Wetland boundaries in the vicinity of construction areas will be flagged or staked so wetlands and streams can be avoided.
- When working next to wetlands (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 permanent or temporary road constructed for access to the site.
- Tensioning sites will not be located within 50 feet of wetlands.
- Machinery will be refueled and stored at least 200 feet from wetlands and waterways and inspected regularly for leaks.
- Mitigation measures required by 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~~ 0.30 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 an access road improvement would result in permanent fill in wetlands (~~0.08~~ 0.018 acres), a minor amount.

### *3.7.5 Cumulative Impacts*

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

Past, present, and future 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 (ACOE) 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~~ 0.018 acres of permanent fill and ~~0.43~~ 0.30 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**

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

### *3.8.4 Unavoidable Impacts Remaining After Mitigation*

Construction activity in or near floodplains 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 clearly 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-lustrous 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 resulting from transmission line operation, maintenance, and construction activities after construction.

### *3.9.4 Unavoidable Impacts Remaining After Mitigation*

Construction activities would be visible, resulting in 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. Therefore unavoidable impacts, after mitigation, would be low to moderate.

### *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~~ April to November 2004 ~~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*

If the project is implemented, the following mitigation will be used to minimize impacts to air quality:

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

### *3.10.4 Unavoidable Impacts Remaining After Mitigation*

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

### *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 2004 ~~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~~ $7 million (~~2002~~ 2003 dollars) for the proposed project. An estimated 5 to 10 percent of total project costs 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. 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, and 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 consulted with the SHPO under 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. In a letter dated December 27, 2003, the SHPO office

concurred that no historic properties would be affected by the project as proposed and that the transmission line does not appear to be eligible to the National Register of Historic Places.

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 was 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 will immediately be notified and work will be halted in the vicinity of the finds; BPA will 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.

**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. 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.

**Impacts During 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 will prepare and maintain a safety plan in compliance with Washington requirements. The plan will be kept on-site and will detail

how to manage hazardous materials such as fuel, and how to respond to emergency situations.

- During construction, the contractors will hold crew safety meetings at the start of each workday to review potential safety issues and concerns.
- BPA will meet with the contractor 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
- tree removal activities
- 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. Three times a year, generally in March, July, and October, 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 ROW 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 that is caused by BPA's transmission line, 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. However, implementation of the mitigation measures identified in Section 3.14.3 would ensure that impacts would remain low to moderate.

### *3.14.5 Cumulative Impacts*

Construction noise from the proposed project would temporarily add to noise from other activities in the area, such as logging 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.