SEPTEMBER 2000

SHELTON-KITSAP TRANSMISSION LINE REBUILD

Preliminary Environmental Assessment
DOE/EA-1342

BONNEVILLE
POWER ADMINISTRATION

Shelton-Kitsap Transmission Line Rebuild

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

Name of Proposed Project: Shelton-Kitsap Transmission Line Rebuild

Abstract: BPA proposes to upgrade an existing 115-kilovolt (kV) transmission line that runs between its Shelton and Kitsap Substations, a distance of about 31 miles. The existing line would be rebuilt to a 230-kV double-circuit line. One of the two circuits would be operated at 115 kV and the other at 230 kV. The 230-kV circuit would be routed around the Kitsap Substation and tie into a Puget Sound Energy line. Wood poles would be replaced with taller steel poles. New conductors (wires) would be strung.

In addition to the Proposed Action, BPA is considering the No Action Alternative. In the No Action Alternative, BPA would not upgrade or rebuild the line. The existing line would remain in operation.

The preliminary environmental assessment determined that the Proposed Action would have no significant environmental impacts.

For additional information, contact:

Dawn Boorse, Environmental Project Lead
Bonneville Power Administration
P.O. Box 3621 – KECN - 4
Portland, OR 97208-3621
Telephone: 503-230-5678
Email: drboorse@bpa.gov

To submit comments, write or call:

Bonneville Power Administration
Communications KC-7
P.O. Box 12999
Portland, OR 97212
Telephone: 1-800-622-4519
Email: comment@bpa.gov

This document is available at the BPA Environment, Fish and Wildlife Home Page: www.efw.bpa.gov. Click on *environmental analysis*, and then on Environmental Projects. For a printed copy of this document, call 1-800-622-4520 and ask for the document by name, and leave your complete mailing address.

For additional information on Department of Energy activities under the National Environmental Policy Act (NEPA), please contact Carol Borgstrom, Director, Office of NEPA Oversight, EH-25, U.S. Department of Energy, 1000 Independence Avenue S.W., Washington, D.C. 20585; 800-472-2756.

Table of Contents

List of Tables and Figures

1.0 Need for and Purpose of Action

1.1 Introduction

The Bonneville Power Administration's (BPA) existing Shelton-Kitsap No. 2 115-kilovolt (kV) transmission line is approximately 31 miles in length (see Figure 1-1), and is located in Mason and Kitsap counties in Washington State. In addition to this 115-kV line, there are two existing 230-kV transmission lines in the corridor between BPA's Shelton Substation and its Kitsap Substation.

1.2 Underlying Need for Action

Transmission planning studies have shown that if one of the two existing 230-kV transmission lines to the Kitsap Substation or one of the two existing 230/115-kV transformers at Kitsap is out of service, the remaining facilities serving electrical loads on the Kitsap Peninsula could experience thermal loading beyond their rated capabilities. Thermal overloading of transmission facilities could result in failure or damage of equipment as well as violation of National Electrical Safety Code standards. These outage conditions may also cause system voltages to drop below acceptable levels and eventually lead to voltage collapse resulting in loss of load. BPA needs to correct and improve these conditions on its Shelton-Kitsap 115-kV line.

1.3 Purposes

In satisfying the underlying need, BPA wants to achieve the following purposes:

- minimize environmental impacts;
- minimize costs; and
- improve transmission system capability and reliability.

SHELTON-KITSAP
Transmission Rebuild

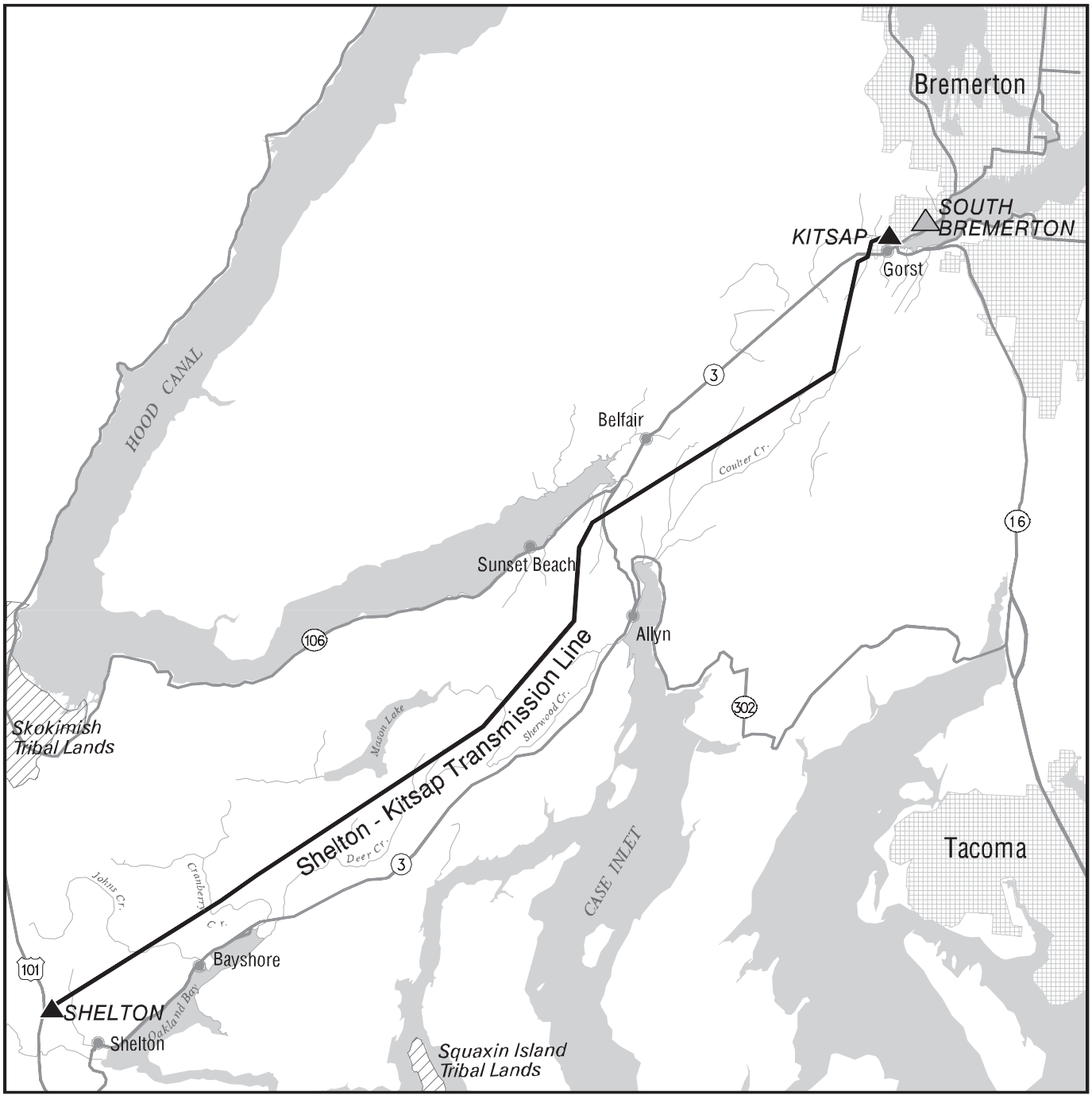

Figure 1-1

2.0 Proposed Action and Alternatives

2.1 Proposed Action

To improve system capability and reliability, BPA is proposing a joint project with Puget Sound Energy (PSE) to rebuild BPA's existing Shelton-Kitsap No. 2 115-kV transmission line (approximately 31 miles in length – see Figure 1-1) as a double circuit 230-kV line in the existing right-of-way (ROW). One circuit would replace the existing 115-kV line and would initially be operated at 115 kV. The other circuit would be a new circuit operated at 230 kV.

The new 230-kV circuit would be routed around BPA's Kitsap Substation and would interconnect with PSE's existing Kitsap-South Bremerton No. 3 line. The Kitsap-South Bremerton No. 3 line (constructed for 230 kV but currently operating at 115 kV) would be re-energized at 230 kV and terminated at a new 230/115-kV transformer at the South Bremerton Substation.

2.2 No Action Alternative

The No Action Alternative would be to continue with the current Dispatcher Standing Operating Order, which defines actions to be taken under peak load normal system and outage conditions to mitigate potential overload and low voltage conditions. BPA currently has an agreement with the U.S. Navy, whereby BPA, in an emergency, and for a very short duration, could connect the Navy's backup generators to BPA's transmission system while the problem was being repaired. This has worked in the past, however since the agreement was put into place the region's electrical load has grown such that even with the generators, the electrical system is inadequate to supply the needed electricity. In addition, if the Navy needs the generators for their own emergency purposes they may cease support to BPA at any time. BPA's agreement with the Navy to use its generators expires in 2001 and will not be extended for the long term. Outages will occur if BPA experiences problems on the system without the rebuild.

2.3 Comparison of Alternatives

Table 2.3-1 compares the Proposed Action and the No Action Alternative based on the purposes of the project described in Section 1.3.

Table 2.3-1. Predicted Performance Summary

Purposes	Proposed Action	No Action
Minimize environmental impacts.	Most impacts are minor, short-term, and/or can be mitigated.	Impacts could be similar to the Proposed Action if thermal overloading causes the existing system to fail and need replacing.
Minimize costs.	More expensive in the near term, but is less expensive in long term in order to achieve prevention of system outages.	More expensive in the long term if reliability is compromised.
Improve transmission system capability and reliability.	Upgrading the existing system will prevent potential thermal overloading, voltage collapse, and loss of load on the existing system.	If improvements are not made to the existing system, the result could be power outages. BPA's agreement with the Navy to use its generators in an emergency expires in 2001 and will not be extended for the long term.

3.0 Affected Environment and Environmental Impacts

3.1 Summary of Impacts

Table 3.1-1 summarizes potential environmental impacts of the Proposed Action, organized in accordance with affected environmental resources.

Table 3.1-1. Summary of Potential Impacts of Proposed Action

Resource	Potential Impacts
Land Use	Short-term, construction-related impacts such as noise, dust, traffic disruption, erosion, and possible growth of noxious weeds. Approximately 0.5 acre of forested woodland would be cleared near the south side of the BPA Kitsap Substation on BPA property.
Socioeconomics	Minor and temporary increases in the use of local motels/hotels, recreational parks, and campgrounds by construction workers. Short-term increases in local employment and spending in the local economy.
Visual Resources	Short-term and minor visual impacts from construction activities in certain locations along ROW. Change in visual appearance from existing No. 2 line. However, the rebuild is within an existing transmission line corridor, so the visual change is considered minor.
Soils and Geology	Short-term increases in erosion accompanying access road improvements, pole assembly and erecting, and clearing to provide access to work areas. Long-term erosion rates would be expected to return to pre-construction rates.
Vegetation, Wildlife and Fish	Potential increase in weedy, non-native vegetation in the ROW, primarily Scots broom and Himalayan blackberry, from ground surface and vegetation disturbance during construction. Removal of approximately 0.5 acre of young hardwood forest habitat on BPA property just south of the BPA Kitsap Substation, with accompanying loss of shade on the small non-fish-bearing stream at the site. Physical disruption of aquatic habitats (if contractor chooses to construct a bridge over Sherwood Creek). Degraded water quality from possible chemical spills and sediment from erosion during construction.

Resource	Potential Impacts
Wetlands and Floodplains	Possible fill of about 420 square feet of a wetland at structure 1/2, requiring U.S. Army Corps of Engineers permit. Possible fill in a wetland at structure 15/2, if contractor chooses to construct a Sherwood Creek bridge. Possible increased flooding from stream channel alteration, and short-term increased erosion at Sherwood Creek (if contractor chooses to build a bridge).
Water Quality	Short-term disruption of fish and benthic habitats from possible in-stream construction at Sherwood Creek (if contractor chooses to construct a bridge). Degraded water quality from possible chemical spills and sediment from increased erosion during construction along the ROW.
Cultural Resources	No impacts expected.
Public Health and Safety	No impacts expected.
Noise and Radio/ Television Interference	Possible (and correctable) minor interference with radio/television reception. Short-term increases in noise during construction.

3.2 Land Use

3.2.1 Affected Environment

The proposed project would upgrade the existing BPA 31-mile, 115-kV Shelton-Kitsap No. 2 transmission line. The right-of-way (ROW) for this transmission line is approximately 100 feet wide, and is located within a predominantly 250-foot-wide transmission corridor that also contains two 230-kV transmission lines (BPA's Shelton-Kitsap No. 4 and Olympia-Kitsap No. 3 transmission lines) for the majority of the corridor.

The proposed upgraded transmission line begins at the Shelton Substation in the City of Shelton. It proceeds to the northeast, roughly paralleling Washington State Route (SR) 3 to the north. Near the intersection of SR-3 and SR-302, the ROW crosses SR-3 and parallels the highway to the south. The transmission line is tapped into the Benson and Belfair Substations at miles 13 and 21, respectively (Shelton Substation is at mile 0). The transmission line ends at the Kitsap Substation (within mile 32), in the unincorporated community of Gorst. The first 24 miles of the line are in Mason County and the last 7 miles are in Kitsap County.

At the Shelton end of the corridor (between the Shelton Substation, at mile 0, and mile 3), the corridor is approximately 600 feet wide and contains six transmission lines. Beyond mile 3, the corridor narrows to (and remains) approximately 250 feet wide and contains the three transmission lines described in the first paragraph.

Near the Kitsap end of the corridor, at approximately mile 30, one of the 230-kV lines (Olympia-Kitsap No. 3) separates from the main corridor and travels in its own 100-foot-wide ROW. At approximately mile 31, Olympia-Kitsap No. 3 rejoins the main corridor. At this point, the Shelton-Kitsap No. 2 transmission line travels in its own 100-foot-wide ROW for the remainder of the distance to the Kitsap Substation, at mile 32.

Land uses in the vicinity of the proposed project include urban residential and commercial land in areas near the Shelton and Kitsap Substations. Land uses along the remainder of the ROW are mostly pastureland, rural-residential (such as Belfair), and private forestland (used for timber production). Residents in the vicinity of the Belfair Substation (between miles 20 and 22) use the ROW maintenance road for access to their homes. There are approximately 43 residential units within 500 feet of the ROW. Other structures and public facilities in the vicinity of the ROW include a retirement/elderly care home, a ball field and associated parking lot, a church, a dance hall, and a public park.

All work for the proposed project would occur within BPA's existing ROW and substation property. Approximately 0.5 acre on the south side of the BPA Kitsap Substation, within existing BPA property, would be cleared of trees and converted to ROW. No additional ROW or property would need to be purchased.

The entire existing BPA ROW is a legal easement on private land; however, portions of the ROW also cross or are adjacent to municipal, county, state, and federal lands (e.g., the cities of Shelton and Bremerton, Kitsap County and Mason County roads, SR-3 ROW, and U.S. Navy property).

3.2.2 Potential Impacts of the Proposed Action

3.2.2.1 Short-term (Construction) Impacts

Potential short-term, construction-related impacts for the proposed project include noise, dust, traffic disruption, erosion, and possible growth of noxious weeds. A minor amount (approximately 0.5 acre) of young forested woodland would be cleared near the south side of the BPA Kitsap Substation on BPA property. With the best management practices and mitigation measures discussed in this environmental assessment (EA), these impacts are considered to be minor.

3.2.2.2 Long-term (Operation/Maintenance) Impacts

Because the proposed project involves upgrading an existing transmission line, operation and maintenance impacts would be minor and consistent with current practices.

3.2.3 Potential Impacts of the No Action Alternative

The No Action Alternative assumes that no replacement transmission facilities (poles, conductors, and other electrical equipment) would be installed between the Shelton and Kitsap Substations to upgrade the Shelton-Kitsap No. 2 transmission line. Impacts associated with maintenance of the existing line would continue.

3.2.4 Cumulative Impacts

Because the proposed project involves upgrading an existing transmission line, cumulative impacts to land uses would be minimal. Approximately 0.5 acre of land within the BPA property on the south side of the BPA Kitsap Substation would be converted from woodland to ROW. No future expansions or additions to the existing corridor are contemplated at this time. Should additions or expansions be planned in the future, appropriate evaluation of potential cumulative land use impacts would be required at that time.

Consultations with local municipalities have indicated that there are no recent or foreseeable developments or projects in the vicinity of the ROW that would contribute to cumulative impacts associated with the proposed project (McSimms and Robinson, September 6, 2000).

3.2.5 Mitigation for the Proposed Action

No land use mitigation measures are required for the Proposed Action.

3.3 Socioeconomics

3.3.1 Affected Environment

3.3.1.1 Population and Demographics

The population of Kitsap County was 147,152 in 1980 and rose to 189,731 in 1990, and to 229,700 in 1999. The population of Mason County was 31,184 in 1980 and grew to 38,341 as of 1990, and to 48,600 as of 1999. The average annual growth rate over this period was 2.3 percent for Kitsap County and 3.0 percent for Mason County. This is considered a relatively high growth rate, and was higher than the overall growth rate for the State of Washington of 2.0 percent during this same time period (U.S. Bureau of the Census 1992; OFM 1999a).

With regard to ethnic distribution in the region of the proposed project, Caucasians predominated among ethnic groups in Kitsap and Mason counties as of 1998. Caucasians composed close to 90 percent of the population in each of these areas. Asian and Pacific Islanders were the second most predominant ethnic groups in Kitsap County, composing close to 6 percent of the population. African Americans represented the third most predominant ethnic group in Kitsap County at slightly over 3 percent of the population. Native Americans accounted for nearly 2 percent of the population (OFM 1999b).

For Mason County, Native Americans were the second most predominant ethnic group in 1998, composing 4 percent of the population, while Asian and Pacific Islanders represented close to 2 percent, and African Americans accounted for nearly 1.5 percent of the population (OFM 1999b).

Regarding gender and age distribution for the region, in 1998, males outnumbered females in Kitsap and Mason counties by nearly 6 percent and 8 percent, respectively. This is in contrast to the state, where females outnumbered males by nearly 1 percent. Approximately 10 percent and 16 percent of the populations of Kitsap and Mason counties was 65 years of age or older in 1998, respectively, compared to approximately 11 percent of the state's population (OFM 1999b).

3.3.1.2 Housing

In 1990, Kitsap County's vacancy rate of 6.4 percent was lower than the rate of 7.9 percent for the State of Washington. Conversely, Mason County's vacancy rate of 34.7 percent was considerably higher than the state's. The higher vacancy rate for Mason County likely reflects a higher proportion of seasonal, recreational, or occasional housing use (U.S. Bureau of the Census 1992).

The 1990 mean household sizes for Kitsap County and Mason County were 2.65 and 2.52, respectively, compared to 2.53 persons for the State of Washington (U.S. Bureau of the Census 1992).

The median value of owner-occupied dwellings in Kitsap and Mason counties in 1990 was $89,100 and $70,100, respectively, compared to the overall state median value of $93,400. The considerably lower median value for Mason County likely reflects the predominantly rural population in this county (U.S. Bureau of the Census 1992).

3.3.1.3 Employment, Economy, and Income

The largest employment sectors for Kitsap and Mason counties in 1997 were services, retail trade, and government. Kitsap County's services, government, and retail trade sectors employed 28,987 workers, 42,702 workers, and 20,255 workers, respectively. These sectors represented 26 percent, 38 percent, and 18 percent of the total workforce, respectively (BEA 1999a).

Mason County in 1997 had 4,034 workers in the services sector, 3,546 workers in the government sector, and 3,113 workers in the retail trade sector. These three sectors represented 23 percent, 20 percent, and 18 percent of the total workforce, respectively (BEA 1999a).

The above 1997 employment sector distributions for Kitsap and Mason counties were similar to the State of Washington. Within the state, services employed 966,499 workers, government employed 528,821 workers, and retail trade employed 572,224 workers. These sectors represented 29 percent, 16 percent, and 17 percent of the total workforce, respectively (BEA 1999a).

Regarding annual earnings by industry sector, in 1998 the greatest annual earnings for Kitsap County were government ($1.6 billion), services ($630 million), and retail trade ($318 million). Mason County's industry sectors with the greatest annual earnings were government ($106 million), manufacturing ($81 million), and services ($71 million). Similar statistics within the State of Washington included the services sector ($30 billion), the manufacturing sector ($18 billion), and the government sectors ($17.6 billion) (BEA 1999b).

With respect to income and unemployment, the median household income for Kitsap County in 1995 ($40,622) was higher than the state ($34,015), although the county had a lower per capita income ($20,006) than the state ($23,677). The same was true for Mason County, with a median household income of $34,387 and a per capita income of $16,884 (BEA 1999b; U.S. Bureau of the Census 1999a and 1999b).

The unemployment rate for the State of Washington in 1996 was 6.5 percent, compared to 6.8 percent for Kitsap County and 8.4 percent for Mason County. The percentage of the population below the poverty level in 1993 for the State of Washington was 12.0 percent. In comparison to the state, Kitsap County had a lower percentage of its population below the poverty level, at 9.5 percent. Mason County had 13.4 percent its population below the poverty level, representing a greater proportion than the state (BEA 1999b; U.S. Bureau of the Census 1999a and 1999b).

3.3.2 Potential Impacts of the Proposed Action

3.3.2.1 Short-term (Construction) Impacts

Construction activities would involve upgrading the existing transmission line through replacing poles, removing the old conductor wires, and stringing new conductor wires. Transmission line construction requires skilled labor and equipment that are unique; therefore, the prime contractor for the project would likely come from outside the local area (e.g., from the Seattle or Portland areas). Construction workers would earn wages averaging between $30 and $75 per hour.

Depending on where the transmission line workers reside, and whether construction would involve a five- or six-day workweek, the construction crews would typically stay in the area until the project is completed. Construction workers would either stay in temporary housing (motels/hotels) or bring their own accommodations (camper/trailer) and stay in recreational vehicle (RV) parks or campgrounds. Because of the large number of RV parks, campgrounds, and motels in the Shelton, Belfair, and Bremerton areas (21), the limited number of workers, and the short duration of the construction project, impacts on the commercial lodging industry in the area would be minor. Overall, the short-term construction impacts would be considered beneficial to the local economy. The proposed project would create a minor increase in employment and spending in the local economy over the short term.

3.3.2.2 Long-term (Operation/Maintenance) Impacts

The proposed project would not create any long-term impacts on the region's population because the project would not induce growth and should not cause in-migration. Thus, there would be no long-term impacts on housing. Operation and maintenance of the line would continue to be under the purview of BPA. Normal maintenance would involve brush clearing by a BPA contractor, ordinarily performed every five years in areas west of the Cascade Range. This employment impact would be low because it would not contribute to a significant increase of employment in either county.

3.3.3 Potential Impacts of the No Action Alternative

The No Action Alternative assumes that no replacement transmission facilities would be installed. Not replacing these facilities would likely result in more outages for BPA customers and potentially increased maintenance costs (in both time and materials) to keep the existing line in operation.

3.3.4 Cumulative Impacts

Because the proposed project would occur within an existing ROW (except for an approximately 0.5-acre parcel of forested woodland on BPA property on the south side of the BPA Kitsap Substation), cumulative impacts on the population or economy of the region would be minimal. No future expansions or additions to the existing corridor are contemplated at this time. Should additions or expansions be planned in the future, appropriate evaluation of potential cumulative socioeconomic impacts would be required at that time.

3.3.5 Mitigation for the Proposed Action

No mitigation measures are needed with regard to the socioeconomic impacts of the project.

3.4 Visual Resources

This section evaluates the potential visual impacts associated with the Proposed Action. Potential visual impacts include temporary and long-term visual changes introduced by rebuilding the Shelton-Kitsap No. 2 transmission line. Construction activities with potential visual impacts include removal and placement of poles and the stringing of conductor wires. The potential long-term visual impacts would result from a change in the visual appearance of the transmission line through the replacement of the existing wooden "H-Frame" structures presently supporting the 115-kV line with taller single tubular steel poles and larger diameter conductor wire.

The methodology used to assess visual resources and visual impacts of the Proposed Action generally conforms to the Visual Management System developed by the U.S. Forest Service, and the Visual Resource Inventory developed by the Bureau of Land Management. Topography, vegetation (size and shape), and developed land uses were reviewed using U.S. Geological Survey quadrangle maps, aerial photos, photographs, and project maps. Field reconnaissance was conducted to determine the general visibility of the existing transmission line (and proposed rebuild) from sensitive viewpoints (e.g., residences, travel routes, parks, and public areas).

Potential visual impacts resulting from the Proposed Action were evaluated by assessing the visual quality of the project area, viewer sensitivity, the degree of visual changes from the existing environment, and the visibility of changes from the sensitive viewpoints.

Visual quality in the project area was assessed using the following descriptions:

- Urban – The landscape is common to urban areas and urban fringes. Human elements are prevalent and landscape modifications exist.

- Rural – The landscape exhibits reasonably attractive natural and human-made features/patterns, although they are not visually distinctive or unusual within the region. The landscape integrity of the area provides some positive visual experiences.

- Unique – The landscape exhibits distinctive and memorable visual features (e.g., landform, rock outcrops, streams/rivers, scenic vistas).

Viewer sensitivity in the project area was assessed using a combination of viewer type, exposure (number of viewers and view frequency), and viewer awareness/sensitivity to visual changes. Indoor workers in the project area were considered to have low visual sensitivity, since their activities typically limit awareness/sensitivity to the visual setting immediately outside the workplace. Highway and local travelers crossing or coming into proximity with the transmission corridor were considered to have moderate visual sensitivity.

Residential and recreational viewers, as well as viewers congregating in public gathering places, were considered to have comparatively higher visual sensitivity.

3.4.1 Affected Environment

The Proposed Action (rebuilding the existing 31-mile-long Shelton-Kitsap 115-kV transmission line) would take place within an approximately 250-foot-wide electrical transmission corridor that has existed since the 1940s. For the majority of its length (mile 3 to mile 30), the existing corridor also contains two 230-kV transmission lines supported on steel lattice towers.

Between mile 1 and mile 3 (at the Shelton Substation end) the corridor widens to approximately 600 feet and contains six transmission lines. Between approximately mile 30 and mile 31 (at the Kitsap Substation end) one of the existing 230-kV lines travels within a separate corridor, approximately 100 feet wide, to the east of the main corridor. At mile 31, the separate 230-kV line rejoins the main corridor, while the Shelton-Kitsap 115-kV line splits off and travels in its own approximately 100-foot-wide corridor into the Kitsap Substation.

Except for the urban areas of Shelton and Gorst at each end of the 31-mile transmission line, the existing corridor travels through predominantly flat and relatively undeveloped pastureland and interspersed forested patches, with occasional drainage courses. Rural development occurs intermittently along the corridor as single isolated units and in communities such as Belfair.

The visual quality at each end of the corridor in the vicinity of Shelton and Gorst is considered urban, whereas the visual quality over the remainder of the corridor is considered rural. No unique/distinctive visual areas occur along the existing corridor. Since the transmission corridor has existed since the 1940s, it has been a part of the viewscape in the project area for nearly three generations.

3.4.2 Potential Impacts of the Proposed Action

The greatest visual exposure to the Proposed Action along the existing electrical transmission corridor would be from the residences located intermittently along the corridor; the senior citizen residence/care center located between structures 2/2 and 2/3 **(see note below explaining structure numbering system)**; the park located between structures 32/1 and 32/2; the church parking lot located near structure 31/5; and the dance hall parking lot located between structures 31/7 and 32/1, all in proximity to the existing Shelton-Kitsap No. 2 line.

The visual impact from the Proposed Action to these potential viewers is considered low to moderate and non-significant, based on the following:

- the proposed rebuild would occur within an established electrical transmission line corridor that is in proximity to these potential viewers,

who thus already have decreased sensitivity to the visual components associated with the Proposed Action;

- the construction activities associated with the rebuild would be of limited duration and would be widely spaced;

- although different in appearance from the existing No. 2 line, the rebuild would be generally similar to existing power lines within the corridor, and would not constitute a marked visual change to the viewscape; and

- views of the rebuilt line would blend in with or be partially screened by trees, landscaping, and buildings along the route.

There are 15 areas along the existing corridor (between structures 2/1 and 32/1) where travelers could be visually exposed to the transmission line either from roads crossing under or coming into proximity with the ROW. The potential visual impact to these travelers is considered low and non-significant, for the same reasons as stated above. In addition, the duration of exposure of these viewers would be limited as they passed under or in proximity to the line, and their attention would be diverted by the activity of driving.

For the remainder of the existing corridor and the No. 2 line there would be minimal potential visual impacts because there is limited exposure to potential viewers, and the line crosses areas that are visually less sensitive.

Note: *Typically, within a BPA corridor, each structure supporting a transmission line is identified using a two-part numbering system, separated by a "slash" (/). The first part of the numbering system refers to the particular mile along the corridor (from the arbitrary beginning of the corridor) within which the structure is located. In the case of the Shelton-Kitsap Corridor, the Shelton Substation is the beginning of the corridor (designated mile 0), and the Kitsap Substation is the end of the corridor (within mile 32). The second part of the two-part numbering system refers to the specific sequence where a structure occurs within each mile of the corridor. The quantity of support structures occurring within each mile of a corridor varies depending on the spacing required between structures to safely support the transmission line. In the case of the Shelton-Kitsap No. 2 Line, the quantity of support structures within each mile predominantly ranges between six and eight. For example, therefore, using this two-part numbering system to identify structures along the Shelton-Kitsap corridor, structure 3/6 would refer to the sixth support structure located within mile 3 of the corridor.*

3.4.3 Potential Impacts of the No Action Alternative

No visual impacts are expected to occur beyond those already incurred from the existing line.

3.4.4 Cumulative Impacts

The Proposed Action would rebuild an existing transmission line within an established electrical transmission corridor. No cumulative visual impacts are expected since the Proposed Action replaces an existing line, and no future expansion or additions to the existing corridor are contemplated at this time. Should additions or expansions be planned in the future, appropriate evaluation of cumulative visual impacts would be required at that time.

3.4.5 Mitigation for the Proposed Action

No visual impact mitigation is required for the Proposed Action.

3.5 Soils and Geology

3.5.1 Affected Environment

The Shelton-Kitsap No. 2 ROW is located in the west-central portion of Washington State within the Puget Sound lowland. The Puget Sound lowland extends from British Columbia to just south of Olympia, Washington and is bounded on the west by the Olympic Mountains and on the east by the Cascade Mountains. The lowland was formed during the Pleistocene Epoch when ice from British Columbia was pushed south several different times. The most recent lobe of ice to occupy the Puget Lowland, the Vashon Stade of the Frasier Glaciation, disappeared from the project area about 14,000 years ago. The project area is underlain almost entirely by sedimentary deposits associated with the Vashon Stade.

As the ice of the Vashon Stade pushed southward, meltwater streams deposited great quantities of silt, sand, and gravel in front of the ice sheet as advance outwash. In general, advance outwash coarsens upward from silts and clays deposited in pro-glacial lakes to sand and gravel as the ice glacier front advanced. As the ice approached and overrode the advance outwash, some of the silt, sand, and gravel was scraped off and incorporated into the basal portion of the ice sheet in a heterogeneous mixture known as till. This material was smeared over the landscape and then left behind when the ice retreated as an undulating stratum that caps and truncates the advance outwash in many places. As the ice retreated, rock and sand debris from the ice was deposited by meltwater on top of the till as recessional outwash. During and following ice retreat, local topographic lows in the landscape became lakes and wetlands where clay, silt and peat were deposited. Streams also dissected the broad drift plain, cutting down through the recessional outwash and till to expose the underlying advance outwash sand and gravel and depositing alluvium (soil deposited by water) locally within their floodplains.

The existing topography along the ROW is characterized by linear, gently undulating ridges and swales. Wetlands or lakes sometimes occupy the

topographic lows where runoff and shallow groundwater collects. Occasional steep ravines drain the upland topography into surrounding lakes or into Puget Sound. Elevations range from near sea level at the Kitsap Substation to about 400 feet maximum.

In general, extensive exposures of outwash soils are mapped in the vicinity of the Shelton and Kitsap Substations. A broad deposit of recessional outwash surrounds the Shelton Substation and extends about 4.5 miles northwest of the substation along the ROW. Extensive deposits of recessional outwash are also present in the Gorst Creek area near the Kitsap Substation. Recessional outwash is exposed in Johns Creek, Cranberry Creek, Gorst Creek, and portions of Coulter Creek. Advance outwash is exposed in the drainage ravines of Deer Creek, Sherwood Creek, and Parish Creek. Elsewhere, the ROW is predominantly underlain by till with local deposits of recent alluvium and peat (Molenaar and Noble 1970, Sceva 1957).

3.5.2 Potential Impacts of the Proposed Action

Potential impacts from the Proposed Action are primarily increased erosion associated with required road improvements, pole assembly and erecting, and clearing to provide access to work areas. These impacts would potentially be the greatest at work sites during and immediately following construction activities. Increased sediment production would continue at diminishing rates until the disturbed sites are revegetated or otherwise stabilized. In the long term, erosion rates in these areas could be expected to return to pre-construction rates.

The potential for erosion and slope stability impacts is greatest where the ROW is underlain by sandy recessional or advance outwash. Those portions of the ROW underlain predominantly by outwash deposits include from the Shelton Substation to about structure 5/7, from structure 21/3 to 21/7, and from structure 30/7 to the Kitsap Substation (see Section 3.4.2 for explanation of structure numbering system). Short spans where the ROW crosses or comes near tributaries to Johns Creek, Cranberry Creek, Deer Creek, Sherwood Creek, Coulter Creek, Parish Creek, and Gorst Creek are also underlain by outwash soils.

Most of the remainder of the ROW is underlain by till. These soils would not be as susceptible to erosion or slope stability impacts as outwash.

Some of the slopes within the drainage ravines of the streams named above may qualify as landslide hazard areas, erosion hazard areas, or areas of concern under the critical areas ordinance for Mason and Kitsap counties. Special permits for grading and clearing activities may be required in these areas.

3.5.3 Potential Impacts of the No Action Alternative

Because no clearing, grading, or road maintenance would occur, there would be no impacts to soils and geology other than those already incurred from the existing power line.

3.5.4 Cumulative Impacts

There are no other ongoing, planned, or proposed actions relative to the Shelton-Kitsap No. 2 transmission ROW that would affect soils and geology. Therefore, the cumulative impacts are the same as impacts of the Proposed Action. Minor increases in erosion and runoff are expected during construction. This would occur generally within very limited areas where construction activities take place, or where access improvements are required. However, with proper mitigation (see Section 3.5.5) these increases would have a negligible impact on soil and geology (and would not significantly impair water quality).

3.5.5 Mitigation for the Proposed Action

Minimizing vegetation removal and soil disturbance at required road improvements, staging areas, and pole assembly and erection sites would help mitigate impacts from construction. The following practices will be employed to minimize possible impacts to the environment.

- Cut and fill slopes will be designed with attention to slope stability issues. All planned cuts and fills will be evaluated by a qualified professional prior to construction.

- Roadway drainage systems will be designed to control and disperse runoff (for example, using outsloping roads, water bars and ditches) to prevent erosion or slope stability problems.

- Erosion control measures such as silt fencing, straw mulch, straw bale check dams, reseeding disturbed areas, and other stabilization measures will be judiciously used.

3.6 Vegetation, Wildlife and Fish

3.6.1 Affected Environment

3.6.1.1 Vegetation

The proposed project is located in nonforest habitats within an existing electrical transmission ROW. Habitats adjoining the ROW include young and mature hardwood, mixed and conifer forests, and urban to rural residential lands.

The prevalent habitat within the ROW is continuous Scots broom cover. Other cover types within the ROW include shrubs, such as salal and evergreen huckleberry, open water, emergent wetlands, scrub-shrub wetlands dominated by willows and Douglas spiraea, and heavily disturbed, frequently mowed weedy vegetation.

The prevalent habitat adjacent to the ROW is mature mixed forest dominated by Douglas-fir, bigleaf maple and red alder. Other common forest types along the ROW include young to mature Douglas-fir plantations, young hardwood forest dominated by red alder, and young to mature forested wetlands dominated by red alder, black cottonwood, western red cedar, and western hemlock.

The streams crossing the ROW provide aquatic habitat. Although some of the wetland and terrestrial habitats have value to wildlife, all are common in the Kitsap Peninsula and neighboring areas.

3.6.1.2 Wildlife

Wildlife in the project area includes a variety of birds (robins, sparrows, red-tailed hawk, quail, and osprey) and mammals (black-tailed deer, raccoon, Shelton pocket gopher and gray squirrel).

Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) identified the bald eagle, a federally listed species, as possibly occurring in the project area (USFWS 2000). According to Washington Department of Fish and Wildlife's Priority Habitats and Species database, no bald eagle nests are located within 800 meters of where construction would occur along the ROW. This distance is the typical distance at which impacts to nest sites are evaluated, as mandated by the Pacific States Bald Eagle Recovery Plan (USFWS 1986).

3.6.1.3 Fish

Numerous streams cross the ROW, representing both fish-bearing and non-fish-bearing waters. The largest streams, Cranberry and Sherwood Creeks, have a maximum wetted width of 30 to 40 feet with cobble beds and a gradient of around 1 percent. Such streams potentially provide spawning and rearing habitat for a variety of fish species, including various trout and salmon species as well as nongame species such as sculpins and lampreys. Smaller streams are in many cases seasonal, and some are connected with wetlands.

Threatened and Endangered Species

Based on information supplied by the Washington State Department of Fish and Wildlife, the creeks in the project area have the potential to contain anadromous fishes. Chinook salmon (federally listed threatened species) occupy Gorst Creek in the project area, and occur in Coulter, Sherwood, and Deer Creeks

downstream of the project area. Coho salmon (federal candidate species) occur in Gorst, Sherwood, Cranberry and Johns Creeks within the project area, and occur downstream of the project area in all streams draining the project area (Streamnet 2000; Fraser, September 1, 2000; Shirato, September 6, 2000).

3.6.2 Potential Impacts of the Proposed Action

3.6.2.1 Vegetation

Ground surface and vegetation disturbance during construction of the rebuild could increase the presence of weedy, non-native vegetation in the ROW, primarily Scots broom and Himalayan blackberry. Removal of a small portion of the young hardwood forest on BPA property just to the south of the BPA Kitsap Substation, associated with rerouting the line around the south side of the station, would permanently alter the habitat from a forest to nonforest type. Currently the forest vegetation in this area is dominated by common native species, and the nonforest vegetation is dominated by non-native and/or weedy species. With the use of the mitigation measures listed later in this section, the impacts to these vegetation types are considered low and non-significant.

No potential impacts on special status plant species have been identified.

3.6.2.2 Wildlife

Removal of some of the young hardwood forest on BPA property (approximately 0.5 acre) on the south side of the BPA Kitsap Substation would result in permanent loss of forest habitat, and the value of the remaining habitat for general wildlife species would be lower. The potential accompanying loss of shade for the small non-fish-bearing stream flowing through the area could reduce the use of the stream by amphibians and aquatic invertebrates. With the mitigation proposed, these impacts would be low to moderate and non-significant.

3.6.2.3 Fish

Potential adverse impacts to fish that may occur with the proposed project include the following:

- physical disruption of aquatic habitats and associated organisms from bridge construction activities within or close to the Sherwood Creek stream channel (should the contractor choose to construct a bridge over Sherwood Creek; **see note at the end of this section regarding the construction contractor's option to build a bridge**);

- degraded water quality as a result of chemical spills from leaky construction/maintenance equipment operating in or near water, or from increased sediment from ground and vegetation disturbance;

- minor (probably undetectable) increase in water temperatures in the small non-fish-bearing stream flowing through the area southeast of the BPA Kitsap Substation from the loss of shade accompanying removal of some of the young hardwood forest; and

- increased erosion, dust and disturbance of habitat from greater use of the improved access road network by local four-wheel drive, all-terrain vehicle and dirt bike recreationists.

With the mitigation measures proposed for this project, these potential impacts to fish are considered low and non-significant.

Note: *The construction contractor would have the option of constructing a bridge over Sherwood Creek to facilitate vehicular access along the ROW for construction and maintenance. If the contractor chooses to construct the bridge, the contractor would be responsible for complying with all relevant regulations and procedures, and obtaining all necessary permits and approvals associated with the bridge construction. Because BPA considers the construction of a bridge over Sherwood Creek (should the contractor choose to construct one) to be an action connected to the Proposed Action, the potential impacts associated with this activity have been evaluated in this EA, and appropriate mitigation measures identified.*

3.6.2.4 Threatened and Endangered Species

According to Washington Department of Fish and Wildlife Priority Habitats and Species data, no bald eagle nests are located within 800 meters of where construction would occur along the ROW. This distance is the typical distance at which impacts to nest sites are evaluated, as mandated by the Pacific States Bald Eagle Recovery Plan (USFWS 1986).

A biological assessment is being prepared to evaluate the potential to adversely affect the bald eagle, chinook salmon, and coho salmon. The biological assessment will be submitted to the NMFS and the USFWS for concurrence with BPA's determination of effect on federally listed and candidate species under Section 7 of the Endangered Species Act. BPA will employ best management practices, as well as the mitigation measures identified in this EA, to reduce the potential for erosion and sedimentation, as well as the introduction of harmful chemicals in all creeks and drainage courses associated with these species.

Based on a review of the habitat requirements and use and the latest federal threatened and endangered species lists, and in consideration of the mitigation measures proposed in this EA, it is BPA's opinion that the Proposed Action may affect but is not likely to adversely affect any of the listed or candidate species that may be present in the project area.

3.6.3 Potential Impacts of the No Action Alternative

The No Action Alternative would continue vegetation maintenance and clearing to maintain the ROW. BPA standard management practices, which are defined in the Vegetation Management Environmental Impact Statement, would be applied to avoid or minimize potential impacts to vegetation, wildlife, and fish.

3.6.4 Cumulative Impacts

There are no other ongoing or planned activities along the ROW that would generate cumulative impacts to fish and wildlife. Should additions or expansions in the ROW or adjacent corridor be planned in the future, appropriate evaluation of potential cumulative fish and wildlife impacts would be required at that time.

3.6.5 Mitigation for the Proposed Action

- To reduce disturbance to soils and vegetation, vehicle use will be restricted to access roads, and topsoil will be left in roughened condition, except in road shoulders.

- To avoid spreading noxious weeds, vehicles will be washed at established wash stations before entering the project area. Disturbed areas will be re-seeded with a native plant seed mix, fertilized, and mulched.

- To minimize erosion, disturbed ground areas will be seeded with a native plant seed mix, preferably in October or November.

- To avoid harming fish during in-water work at Sherwood Creek (if contractor elects to construct a bridge), these activities will be performed during approved periods.

- To avoid delivering fine sediment into streams and wetlands that provide fish habitat, temporary erosion control measures (e.g., silt fencing, straw bales) will be implemented in accordance with an appropriate Temporary Erosion and Sedimentation Control Plan.

- To avoid physical disturbance to salmon fry and other fish species during the rebuild project, construction vehicles will not ford the creek at any time, and alternate approaches will be used to access both sides of the creeks.

- To avoid or minimize chemical contamination of surface waters during construction, mechanized equipment will be stored and maintained at least 150 feet from any surface water (stream or wetland). Mechanized equipment will be inspected daily for leaks, and promptly repaired or replaced if leaking. The project Spill Prevention, Control, and Countermeasures Plan and spill response kit will be kept on the worksite at all times.

3.7 Wetlands and Floodplains

3.7.1 Affected Environment

3.7.1.1 Wetlands

Wetlands are transitional areas between well-drained uplands and permanently flooded aquatic habitats. Many wetlands are highly productive and support numerous complex food chains that represent valuable sources of energy to plants and animals. In addition, wetlands provide general and specialized habitat for a wide variety of aquatic and terrestrial animals. Many species depend upon wetlands for all or part of their life cycles (Mitsch and Gosselink 1993).

Wetlands along the Shelton-Kitsap No. 2 ROW were identified by Jones & Stokes using National Wetland Inventory (NWI) maps, aerial photographs of the ROW, and field observation. A total of 31 wetlands were identified within the cleared ROW. One wetland was identified at the Belfair Substation.

The 31 wetlands identified were classified into three wetland vegetation communities: palustrine aquatic bed (PAB), palustrine emergent (PEM), and palustrine scrub-shrub (PSS). Palustrine aquatic bed includes wetlands and deepwater habitats dominated by plants growing on or below the water surface for most of the growing season in most years (Cowardin et al. 1979).

Palustrine emergent wetlands are shallow freshwater wetlands. They are characterized by erect, rooted, herbaceous hydrophytes (water-loving plants). In areas with relatively stable climatic conditions, emergent wetlands maintain the same appearance perennially (Cowardin et al. 1979).

Palustrine scrub/shrub wetlands are dominated by woody vegetation less than 20 feet tall. This vegetation includes true shrubs, young trees, and trees and shrubs that are small or stunted because of environmental conditions. Scrub/shrub wetlands may represent a successional stage of a forested wetland, or may be relatively stable communities (Cowardin et al. 1979).

3.7.1.2 Floodplains

According to Federal Emergency Management Agency (FEMA) flood hazard maps, the ROW crosses the 100-year floodplains of Johns Creek, Cranberry Creek, and Sherwood Creek.

3.7.2 Potential Impacts of the Proposed Action

3.7.2.1 Wetlands

The existing ROW has been disturbed by the construction of the Shelton-Kitsap No. 2, No. 3, and No. 4 transmission lines, and by ongoing maintenance. The ROW has been previously cleared of tree vegetation for the existing

transmission line structures. In many instances, ROW construction has altered local hydrology and created wetlands in characteristically upland habitat types.

BPA may choose to construct an access road across one corner of a wetland (located at structure 1/2), filling about 420 square feet of wetland, to enable replacement pole installation and maintenance (see Section 3.4.2 for explanation of structure numbering system). The wetland was created within the last 10 years by stormwater runoff from adjacent development and supports primarily weedy vegetation. The wetland fill would be permitted by the U.S. Army Corps of Engineers, and this fill would be mitigated in accordance with permit requirements. In consideration of this mitigation, the resultant wetland impacts would be nonsignificant.

As an alternative to constructing an access road through a portion of the wetland at structure 1/2, BPA may choose to access the area by driving across the swale along the edge of the ROW next to the Mason County PUD yard. Ensuring that travel occurs along this route only during the dry season would minimize potential impacts to the swale, and any rutting caused by vehicles would be repaired.

Wetland fill would also be required in a wetland (located at structure 15/2) if the contractor chooses to construct a Sherwood Creek bridge. Several permits would be required to construct this bridge, and the permits would include numerous conditions providing mitigation. Such mitigation would reduce impacts to a nonsignificant level.

3.7.2.2 Floodplains

Floodplain Management Executive Order 11988 mandates adverse impacts to floodplains must be avoided whenever there is a practical alternative. Where no practical alternative is available, impacts must be minimized.

No work within the floodplain of Johns or Cranberry Creeks would be associated with the proposed project, and their floodplain characteristics would not be altered. Also, no transmission poles would be erected within the floodplains of Johns, Cranberry, or Sherwood Creeks, thus avoiding possible damage to poles during flood events.

The construction contractor may choose to construct a bridge over Sherwood Creek to improve access along the transmission line corridor. Potential adverse impacts to the 100-year floodplain of Sherwood Creek from construction and use of this new bridge would include:

- increased flooding resulting from alteration of the physical characteristics of the stream channel and/or the placement of bridge piers or abutments within the stream channel; and

- increased erosion of the stream banks resulting from soil compaction and ground surface and vegetation disturbance by construction equipment.

The mitigation measures described in Section 3.7.5.2 would reduce these potential impacts to less-than-significant levels.

3.7.3 Potential Impacts of the No Action Alternative

This alternative would not require any construction, clearing, or new access. No impacts to wetland resources or floodplains would occur beyond those already incurred from the existing line.

3.7.4 Cumulative Impacts

The Proposed Action would rebuild an existing transmission line within an established electrical transmission corridor. No cumulative impacts to wetlands, floodplains, or drainages along the ROW are expected since the Proposed Action replaces an existing line, and no future expansion or additions to the existing corridor are contemplated at this time. Should additions or expansions be planned in the future, appropriate evaluation of cumulative wetland and floodplain impacts would be required.

3.7.5 Mitigation for the Proposed Action

3.7.5.1 Wetlands

To avoid and minimize potential impacts to wetlands in the project area, the following mitigation measures will be implemented:

- topsoil will be immediately replaced following construction;
- silt fencing will be placed between construction areas and sensitive resources to prevent sedimentation of those resources;
- vehicles will be washed at established wash stations before entering the project area to avoid or reduce the spread of noxious weeds;
- weed-free hay bales will be used for erosion control, where appropriate; and
- all disturbed soils will be seeded immediately following completion of construction.

3.7.5.2 Floodplains

To minimize potential impacts to the Sherwood Creek floodplain, should the contractor choose to construct a bridge over the creek, the following mitigation measures are recommended:

- bridge structures should be designed so that piers are not required within the stream channel, and abutments are located outside the main stream channel;

- construction vehicles should not ford the stream channel during construction of the bridge (if a bridge is not installed, alternate approaches will be used to access each side of the creek);

- all construction and clearing debris should be removed from within the floodplain boundary;

- to avoid delivering fine sediment into the stream channel, erosion control measures, including placement of silt fences and straw bales, and other stabilization measures should be used during construction; and

- no poles should be placed within the 100-year floodplain.

The last two mitigation measures listed above will also be performed at the Johns and Cranberry Creek crossings.

3.8 Water Quality

3.8.1 Affected Environment

Mason and Kitsap counties have a mild climate influenced by the Pacific Ocean. Temperatures range from an average of 40 to 60 degrees Fahrenheit and winds are moderate. The average annual precipitation ranges from 50 to 100 inches. December is the wettest month, while July is the driest.

The BPA Shelton-Kitsap No. 2 ROW traverses the Puget Sound Watershed and the Puget-Willamette Lowland Aquifer System. The Puget-Willamette Lowland Aquifer System is comprised of unconsolidated sand and gravel aquifers. Groundwater in the project area has relatively high concentrations of dissolved solids because of dissolution of aquifer minerals and mixing with seawater (USGS 2000).

Groundwater is used for all domestic, agricultural and industrial uses. In 1990, groundwater withdrawal in the Puget-Willamette Lowland Aquifer was approximately 160 million gallons per day (USGS 2000). There are no U.S. Environmental Protection Agency (EPA) designated sole source aquifers crossed by the proposed BPA Shelton-Kitsap No. 2 transmission line in Mason or Kitsap counties (USGS 2000).

Twenty drainages are traversed by the BPA Shelton-Kitsap No. 2 ROW. Of these streams, seven are perennial (Johns Creek, Cranberry Creek, Deer Creek, Sherwood Creek, Coulter Creek, Gorst Creek, and Parish Creek). These streams

were identified by examining United States Geological Survey 7.5-minute topographic maps and aerial photographs.

Data regarding the presence of sediment in these waters are not available. However, Gorst Creek has been documented to contain high levels of fecal coliform bacteria (EPA 2000).

3.8.2 Potential Impacts of the Proposed Action

Potential impacts to water quality from the Proposed Action are expected to be minor. The greatest potential impact on surface waters may result from suspension of sediments caused by in-stream construction at Sherwood Creek (if the contractor elects to construct a bridge) or by erosion of disturbed streambanks and ROWs. The extent of any impacts would depend on sediment loads, flow velocity, turbulence, streambank and streambed composition, sediment particle size, and the duration of disturbances.

Construction may cause temporary emigration of fish populations from the immediate area, and fish movements and migrations upstream or downstream may be temporarily disrupted by construction activities (Satterlund and Adams 1992). However, it is likely that the temporary relocation or disrupted movement would have only a minor effect on fish populations because construction activities are short term.

Overall, the impact of construction on benthic macroinvertebrates and fish would be short term because instream conditions and suspended sediment concentrations would return to background levels soon after instream construction has been completed.

Although construction activities associated with bridge-building at Sherwood Creek (if chosen by the construction contractor) or near other streams could increase turbidity for a short time and for a short distance downstream, this effect can be minimized by scheduling stream crossing activities during approved low-flow periods.

Hazardous materials associated with the project would be limited to substances associated with construction equipment. This includes gasoline, diesel fuels, and hydraulic fluids. Unmanaged operations in or near water could result in potential contamination of drainages, soils, wetlands, and other environmentally sensitive areas. This potential contamination could be minimized with proper management practices and construction procedures.

Construction and operation of the rebuilt BPA Shelton-Kitsap No. 2 transmission line are not expected to affect groundwater quality. Shallow aquifers could experience minor disturbance from changes in overland water flow and recharge caused by clearing and grading along the proposed ROW. Near-surface soil compaction caused by heavy construction vehicles could reduce the soils'

ability to absorb water. These minor impacts would be temporary and would have a minor and non-significant effect on groundwater.

3.8.3 Potential Impacts of the No Action Alternative

No impacts to water quality are expected to occur beyond those already occurring from the existing line.

3.8.4 Cumulative Impacts

Past actions that have removed vegetation in the area include the original transmission line installation and maintenance. The upgrading of the transmission line would be conducted in an existing groomed ROW.

Approximately 0.5 acre of upland forest on BPA property on the south side of the BPA Kitsap Substation would be cut in order to tie into the PSE system. Because of the small amount of tree removal required for this tie-in, and the periodic grooming of the ROW, the vegetation removal associated with this project is considered a minor impact. There are no other ongoing, planned, or proposed projects that would alter the quality of the surface and groundwater within the ROW. If future projects are undertaken, potential cumulative water quality impacts would be addressed at that time.

3.8.5 Mitigation for the Proposed Action

To minimize the potential temporary impacts described above, the following mitigation measures will be implemented:

- instream work at Sherwood Creek (if contractor builds a bridge) will occur during approved periods;
- vehicles will be restricted to access roads, structure sites, and reeling-pulling sites only;
- silt fencing and weed-free hay bales will be installed for erosion control between construction areas and sensitive resources;
- topsoil in wetlands will be immediately replaced following construction;
- contours will be returned to preconstruction conditions;
- subsurface backfill material will be compacted;
- topsoil will be left in roughened condition, except in road shoulders; and
- all disturbed soils will be seeded immediately following completion of construction.

3.9 Cultural Resources

3.9.1 Affected Environment

Human occupation of the peninsulas, waterways, and tributary systems of southwestern Puget Sound extends back at least 12,000 years B.P. (before present). As the last Pleistocene glaciers retreated north of the freshly carved Puget Trough, the post-glacial environment was inhabited by hunter-fisher-gatherers. Exploring and discovering the abundant natural resources found across the landscape, hunter-fisher-gatherers from the Paleo-Indian Period are usually associated with big-game hunting and an uniquely handcrafted projectile point, called Clovis.

From the period of the earliest inhabitants through the time of European contact, hunters-fishers-gatherers exploited the proposed project area's natural resources with increasing intensity as demographics demanded or as the natural resources allowed. Archaeological evidence stemming from the last 12,000 years of human occupation in the vicinity of the proposed project amounts to six previously recorded shell middens scattered between Sinclair Inlet and Hood Canal and two petroglyphs located in the intertidal zone of North Bay.

These shell middens and two petroglyphs are neither within the proposed project ROW nor within the area of potential effect. Therefore, these sites would not be impacted by the proposed transmission line upgrade.

Ethnographic groups in the project vicinity at the time of European contact included Suquamish, Squaxin, and Twana. These groups of people undoubtedly shared hunting and gathering areas on the uplands separating the permanent villages of the three groups. The Twana were concentrated along the shores of Hood Canal to the north and the Skokomish River to the west (Elmendorf 1960). To the east, the Squaxin occupied a single village on Case Inlet. The Suquamish people traditionally lived in an area extending from Point Everett in the north along the eastern shore of Puget Sound to the present site of Seattle. Their main food source was salmon along with clams and other shellfish. The Suquamish people gathered fruit and berries and made cloth and blankets from woven dog hair and cedar bark. Ethnographic evidence does not indicate any villages or place names associated with Native Americans in the vicinity of the project area (Elmendorf 1960, Lane 1972). A wide array of flora and fauna were available to the ethnographic groups living between Hood Canal, Oakland Bay and the southwestern shores of the Puget Sound.

In historic times, the treaties of Medicine Creek (1854), Point No Point (1855), and Point Elliot (1855) established the Squaxin Island, Skokomish Indian, and Port Madison reservations, respectively. The Medicine Creek Treaty, irrespective of traditional territorial alignment, combined the groups of southern Puget Sound (the Steh-chass, T'Peeksin, Squi-aitl, and Sa-heh-wamish) on the Squaxin Island reservation. Similarly, the Point No Point Treaty assigned the

three bands of Twanas to the Skokomish Reservation. Western Heritage in preparing its final Environmental Impact Statement for the John's Prairie Site, succinctly stated:

> Subsistence patterns of the Squaxin people were similar to those of neighboring tribes. The land and water areas they traditionally used were covered with forests and abounded with salmon. They constructed their dwellings and built their canoes from giant cedars, picked berries in the thickets, dug roots in the meadows, and hunted deer and other game in the woodlands. They fished for salmon in fresh-water streams and marine bays, and gathered shellfish such as clam and oysters found on the tidal flats that fronted their villages (Western Heritage 1994).

Two historic items of note were identified during archival research. First, a General Land Office map from 1856 indicated the present location of the Shelton Substation was part of the original Donation Land Claim belonging to David Shelton (structures 1/1-1/4) (see Section 3.4.2 for explanation of structure numbering). Mr. Shelton took an active part in civic affairs of Shelton, being the first mayor of the town, school superintendent, and also a member of the first state legislative assembly. Second, a General Land Office map from 1872 illustrated a road/trail heading north from the Oakland Town site that eventually connects with the Seaback Trail north of Hood Canal between structures 22/7-23/2. No historical deposits or artifacts associated with either the Shelton Donation Land Claim or historic Oakland Road were identified during fieldwork.

3.9.2 Potential Impacts of the Proposed Action

A few portions of the ROW were not accessible, and therefore, not surveyed. On the portions that were surveyed, no cultural resources were observed. Also, the archival literature search and cultural resource inventory did not identify any previously recorded archaeological sites, historic structures, or ethnographic place names within or near the immediate vicinity of the ROW. Based on available information and the field survey, the proposed project is not expected to have adverse effects on cultural resources.

Consultation letters were mailed to three Native American tribes that presently claim ancestral and treaty rights over the proposed project area. These tribes were Squaxin Island Tribe, Suquamish Tribe, and Skokomish Tribe. Information was requested from the tribes on Traditional Cultural Properties within the affected area or any other pertinent information. The Squaxin Island Tribe, through consultation, has mentioned two areas of cultural sensitivity in the project vicinity that are of concern to the tribe. Further consultation is in progress regarding these areas.

The results of archival research, the documentation of tribal consultations, and the appropriate sections of this EA will be sent to the Washington State Historic

Preservation Office for concurrence with BPA's findings regarding cultural resources under Section 106 of the National Historic Preservation Act.

3.9.3 Potential Impacts of the No Action Alternative

No impacts from the No Action Alternative are expected.

3.9.4 Cumulative Impacts

The Proposed Action would rebuild an existing transmission line within an established electrical transmission corridor. No cumulative cultural resources impacts are expected since the Proposed Action replaces an existing line, and no future expansion or additions to the existing corridor are contemplated at this time. Should additions or expansions be planned in the future, appropriate evaluation of cumulative cultural resources impacts would be required at that time.

3.9.5 Mitigation for the Proposed Action

No known archaeological sites or historic structures were identified during archival research or the fieldwork phase of this project. In the unlikely event that archaeological or historic deposits are uncovered during construction, work in the immediate area will be halted, and BPA will consult with the Washington State Historic Preservation Officer and a qualified archaeologist.

3.10 Public Health and Safety

3.10.1 Affected Environment

3.10.1.1 Safety Precautions

Power lines, like electrical wiring, can cause serious electric shocks if certain precautions are not taken. These precautions include building the lines to minimize the shock hazard. All BPA lines are designed and constructed in accordance with the National Electrical Safety Code. The Code specifies the minimum allowable distances between the lines and the ground or other objects. These requirements basically determine the edge of the ROW and the height of the line (i.e., the closest point that houses, other buildings, and vehicles are allowed to the line, to limit electric field effects to acceptable levels).

People must also take certain precautions when working or playing near power lines. It is extremely important that a person not bring anything, such as a TV antenna or irrigation pipe, too close to the lines. BPA provides a free booklet that describes safety precautions entitled Living and Working Around High Voltage Power Lines.

Power lines can also induce voltage into objects near the lines. This effect can lead to nuisance shock if a voltage is induced on something like wire fencing that is on wood posts and, therefore, insulated from ground. Usually, this becomes a problem only with lines of voltages above 230 kV, so it is extremely unlikely to occur from this project. Should problems develop with either high- or low-voltage lines, they can be corrected by simple grounding techniques.

3.10.1.2 Exposure to Electric and Magnetic Fields

Everything electrical, including power lines, household wiring and appliances, produces electric and magnetic fields (EMF). Movement of electrons in a wire (current) produces magnetic fields and electrical pressure (voltage) produces electric fields. Both fields are reduced in strength with increasing distance.

General Exposure to Electric Fields

Average domestic electric fields are highly variable and typically range from 0.005 kilovolt per meter (kV/m) to 0.02 kV/m (Bracken 1998). Electric fields near household appliances are usually less than 0.1 kV/m at 1 foot (DOE 1995). Electric fields at the edge of a typical 115-kV ROW are 0.5 kV/m (DOE 1995). Though electric fields are stronger near power lines than in typical residential settings, they are easily weakened by vehicles, trees, and buildings.

General Exposure to Magnetic Fields

Magnetic fields from power lines fluctuate with changing loads; the greater the load, the greater the EMF. Transmission line magnetic field strength also depends on the number of lines, line design, and line configuration (relative phasing of the conductors). A typical 115-kV line can be associated with a 6.5 milligauss (mG) magnetic field at the edge of the ROW (DOE 1995).

A large study (Zaffanella 1993) concluded that magnetic fields in residences exceeded 0.6 mG in half of the 996 homes studied. This study also found that power lines produced the largest average fields, residential grounding systems produced the highest overall fields, and appliances produced the highest localized fields. For example, the median field found near microwave ovens was 36.9 mG at a distance of 10.5 inches and 2.1 mG at 46 inches. This illustrates that magnetic fields close to appliances are often stronger than those beneath power lines. However, appliance-generated fields drop off much more rapidly with distance than those from power lines.

The same researchers recently completed a large study of daily personal magnetic field exposures in the U.S. (Zaffanella and Kalton 1998). This study concluded that the average 24-hour EMF exposure for the randomly selected participants was 1.2 mG.

Table 3.10-1 provides typical electric and magnetic field strengths for some BPA transmission lines.

Table 3.10-1. Typical Electric and Magnetic Field Strengths from BPA Transmission Lines

Transmission Lines	Electric Fields (kV/m[1])	Magnetic Field (mG[2])	
		Maximum[3]	Average[4]
115-kV			
Maximum on right-of-way	1.0	63	28
Edge of right-of-way	0.5	14	7
61 m (200 ft.) from center	0.01	1	0.4
230-kV			
Maximum on right-of-way	2.0	118	58
Edge of right-of-way	1.5	40	20
61 m (200 ft.) from center	0.05	4	2
500-kV			
Maximum on right-of-way	7.0	183	87
Edge of right-of-way	3.0	62	30
61 m (200 ft.) from center	0.3	7	3

1. kV/m=kilovolt per meter
2. mG=milligauss
3. Under annual peak load conditions (occur less than 1% of the time)
4. Under annual average loading conditions

Note: Information on magnetic fields obtained from BPA study to characterize nearly 400 transmission lines in the Pacific Northwest.

3.10.1.3 Regulations

There are no national standards for low level electric or magnetic fields, however six states have established electric field standards for transmission lines. Only New York and Florida have established magnetic field standards. The State of Washington has not set a standard for either.

BPA has set a maximum allowable electric field of 5 kV/m at the edge of BPA's ROWs and at road crossings. Additionally, BPA has set maximum allowable electric field strengths of 3.5 kV/m and 2.5 kV/m at shopping center parking lots and commercial/ industrial lots respectively. These levels are set to eliminate nuisance shocks.

3.10.1.4 Health Effects

Electrical Fields

Alternating current electric fields such as those emitted from power lines can create induced electric currents in people. However, these effects are typically

associated with high voltage lines (230 kV or higher) and are generally considered a nuisance. Electric fields are not associated with cancer.

Magnetic Fields

Numerous studies have been conducted over the last 30 years in an effort to determine whether EMF is carcinogenic or has other detrimental effects on health. Recently two different groups of scientists reviewed all existing EMF research to determine what conclusions if any could be drawn about EMF and human health. The National Academy of Sciences (NAS) reviewed EMF research completed by 1995 for the National Research Council. The National Institute of Environmental Health Sciences (NIEHS) reviewed EMF research completed by 1998 as part of the Electric and Magnetic Fields Energy Research and Public Information Program. This program is referred to as the Department of Energy's (DOE) RAPID Program. The RAPID Program was authorized by the U.S. Congress in the 1992 Energy Policy Act (PL102-486, Section 2118) and was administered and funded by DOE in 1999.

The NAS committee concluded that: "The data at different biological complexities taken in total do not provide convincing evidence that electric and magnetic fields experienced in residential environments are carcinogenic." (NRC 1997:198). The committee also identified weakness in the research and suggested that more research is needed.

The NIEHS concluded that while EMF exposure "cannot be recognized as entirely safe" the evidence for risk of cancer and other diseases was "weak" and the probability that EMF exposure is a health hazard is "small" and "…insufficient to warrant aggressive regulatory concerns". NIEHS found a lack of consistent positive findings in animal or mechanistic studies but statistical studies looking at the incidence of disease in a population (epidemiology) raised concerns over childhood leukemia and adult chronic lymphocytic leukemia from occupational exposure. Because everyone is exposed to EMF and because the epidemiological studies showed areas of concern, the NIEHS recommended continued research and passive regulatory action to reduce EMF exposure.

Magnetic Field Analysis and Exposure Assessments. Because the state of the scientific evidence relating to EMF has not yet established a cause-and-effect relationship between electric or magnetic fields and adverse health effects, we are unable to predict specific health risks, or specific potential levels of disease, related to exposure to EMF. We are, however, able to conduct *exposure assessments* of magnetic fields from transmission lines. Exposure assessments are estimates of the field levels to which people are potentially exposed. An EMF exposure assessment is done by first estimating what future EMF levels would be without the new project. This analysis serves as a baseline measurement. Engineers then estimate the possible change in field levels assuming the proposed project is in place. An increase in public exposure is defined as a situation where field levels with the new project will increase and buildings exist nearby.

3.10.2 Potential Impacts of the Proposed Action

Double-circuit transmission lines, such as those proposed for this project, provide a unique opportunity to reduce or minimize magnetic fields through "field cancellation" techniques. If the electrical phase conductors on the transmission lines are properly arranged, the magnetic fields produced by the individual conductors tend to partially cancel each other. The resulting magnetic field levels then decrease more quickly with distance, compared to single circuit lines. These techniques will be used on this project. Therefore, this project is not anticipated to increase magnetic fields on either side of the corridor.

Because the project would use low EMF line configuration, it is not expected to increase EMF on either side of the corridor. Therefore, the Proposed Action would meet BPA's electric field standards.

Fires on or near the ROW can jeopardize safe and reliable operation of transmission lines. Besides physical damage from heat and flames, smoke and hot gases from a fire can cause arcing between lines, between lines and a structure, or between lines and the ground. Such occurrences can pose a threat to the safety of personnel in the vicinity (such as firefighters) and can result in line outages.

To prevent fires and other hazards, safe clearances are maintained between the tops of trees and the existing lines in the ROW. Electricity can arc from the conductor to a treetop. Generally, trees are not allowed to grow over 20 feet high on the ROW. Trees that need to be cleared from the ROW or that could cause an arc are removed. BPA also prohibits storage of flammable materials on ROWs.

Transmission structures may be struck by lightning. Because the structures are electrically grounded, the current from the lightning strike passes directly into the ground with minimal risk of starting a fire.

3.10.3 Potential Impacts of the No Action Alternative

No impacts are expected to occur to public health and safety beyond those already incurred from the existing line.

3.10.4 Cumulative Impacts

The proposed project would upgrade an existing transmission line within an established ROW. Although not planned at present, BPA and other utilities could consider constructing additional transmission lines parallel to the existing lines. Expanding the ROW and adding another transmission line in the future could change magnetic field exposures. New exposure assessments would need to be done at that time to determine the exact change in magnetic field exposures.

3.10.5 Mitigation for the Proposed Action

Mitigation actions to protect public health and safety include:

- The proposed project will be designed to meet BPA's electric field standards.
- Safe clearances will be maintained between trees and transmission lines to prevent fires and other hazards.
- All hardware will be bonded to minimize risks, including fire.

3.11 Noise and Radio/Television Interference

3.11.1 Affected Environment

3.11.1.1 Radio and Television Interference

Corona is a phenomenon where high electric field strength on conductors, insulators, and hardware imparts sufficient energy to charged particles to cause ionization (molecular breakdown) of the air. Corona can interfere with radio and television reception by generating a high-frequency noise called electromagnetic interference. This interference is the static sometimes heard over an automobile radio when driving beneath high-voltage lines. It is usually associated with higher voltage lines (345 kV and above). Corona activity also produces audible noise.

3.11.1.2 Audible Noise

Noise produced by transmission line corona is a hissing, popping, or crackling sound. It is primarily associated with lines of 345 kV and above. A 120-Hertz (Hz) "hum" is also occasionally superimposed on the corona-generated noise. The sound level depends on the ambient noise level, conductor and structure geometry, operating voltage and the weather. Audible noise from transmission lines increases in wet weather.

3.11.2 Potential Impacts of the Proposed Action

Federal Communications Commission (FCC) regulations require that incidental radiation devices (such as transmission lines) be operated so that radio and television reception will not be seriously degraded or repeatedly interrupted. Further, FCC regulations require that the operators of these devices mitigate such interference. Overall, BPA receives very few radio interference (RI) or television interference (TVI) complaints. None are anticipated for this project. Complaints are satisfactorily corrected. As a result of these factors, RI/TVI impacts would be minimal.

Noise impacts associated with the proposed project would be generated from construction activities and from the operation of the transmission facilities. Construction noise is short term and typically does not result in any serious disturbances to residents.

The Noise Control Act of 1972 gives the states the responsibility for noise control. Currently, noise levels associated with the existing ROW are below noise standards. Noise is not expected to increase for the Proposed Action because all lines would be less than 345 kV.

3.11.3 Potential Impacts of the No Action Alternative

No additional noise impacts and radio/television interference are expected beyond those minimal effects already incurred from the existing line.

3.11.4 Cumulative Impacts

The proposed project would upgrade an existing transmission line within an established ROW. BPA and other utilities could consider constructing any necessary future transmission lines parallel to the existing lines. Expanding the ROW and adding another transmission line could change magnetic field exposures. Additional noise and radio and television interference could occur, and appropriate analysis of potential impacts would be addressed if any additional lines were proposed.

3.11.5 Mitigation for the Proposed Action

Following are mitigation actions for noise and radio/television interference:

- The proposed project will be designed to meet BPA's electric field standards.
- Any TV/radio interference problems caused by the proposed project will be rectified.

4.0 Environmental Consultation, Review, and Permit Requirements

4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4321 et seq.), requires preparation of an environmental impact statement (EIS) for major federal actions significantly affecting the quality of the human environment. While the proposed project is not considered a major federal action, BPA is preparing this environmental assessment (EA) to determine if the Proposed Action would create any significant environmental impacts. If significant impacts were to occur, an EIS would be warranted. If no significant environmental impacts are identified, BPA would prepare a finding of no significant impact before making a decision to proceed with the project. If a decision is made to build the facility, BPA would protect, restore, and enhance the environment, where possible.

4.2 Threatened and Endangered Species

See Section 3.6 for a list of sensitive species in the project area and for a discussion of potential impacts to these species, and relevant mitigation measures.

4.3 Fish and Wildlife Conservation

The Fish and Wildlife Conservation Act of 1980 (16 USC 2901 et seq.) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife species and their habitats. In addition, the Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires federal agencies undertaking projects affecting water resources to consult with the U.S. Fish and Wildlife Service and the state agency responsible for fish and wildlife resources (Washington Department of Fish and Wildlife). The analysis in Section 3.6 indicates that the Proposed Action and mitigation would have low impacts to fish and wildlife.

4.4 Cultural and Historical Resources

See Section 3.9, Cultural Resources.

4.5 State, Areawide, and Local Plan and Program Consistency

It is BPA's intent to be consistent to the maximum extent practicable with the State of Washington, areawide, and local plans and programs described below. However, it may not be possible for BPA to ensure consistency if there are

overriding federal laws, such as the National Electrical Safety Code, or where BPA is prevented from complying with local law because of the Federal Supremacy Clause of the U.S. Constitution.

4.5.1 Memorandum of Agreement (between BPA and Ecology) on State and Local Government Review of BPA Projects in the State of Washington (1990)

The agreement requires that BPA provide full opportunity for state and local entities to review BPA activities for consistency with state and local environmental standards. Local governments may review BPA activities and make recommendations concerning consistency to the Washington State Department of Ecology (Ecology). To this end, BPA and Ecology agree to cooperate fully in the review process and seek active and meaningful participation by local governments.

BPA has prepared this preliminary EA and is making it available for public and agency review for a period of 30 days. Comments received will be used in preparation of the final EA.

4.5.2 Washington State Law

4.5.2.1 State Growth Management Act

The proposed project complies with the State Growth Management Act. The proposed BPA transmission line upgrade between the Shelton and Kitsap Substations would be a joint venture with Puget Sound Energy. The proposed project would prevent potential thermal overloading and low voltage problems for outage conditions.

4.5.2.2 Washington Administrative Code

The following provisions of the Washington Administrative Code (WAC) are applicable to the proposed project.

WAC 468-34-280, Overhead Power and Communication Lines, recommends that longitudinal installations of power lines (on public ROWs) be of single-pole construction, and that joint-use single-pole construction is generally desirable and should be used whenever feasible.

The proposed project design calls for upgrading the existing 115-kV transmission line supported on wooden "H-Frame" structures to two 230-kV lines supported on single tubular steel poles. As proposed, the project is consistent with WAC 468-34-280.

WAC 468-34-290 and 468-34-300, Vertical Clearances and Location, require that vertical clearances for overhead power lines conform to the National Electric

Safety Code and/or the clearances identified in the WAC, whichever are greater. The minimum clearances specified for 230-kV transmission lines are 23 feet above the ground line, including roadways. The code also specifies that utility lines be located as near as practicable to the ROW edge while still maintaining a reasonable uniform alignment.

As proposed, the project would conform to the minimum clearances as required by the National Electric Safety Code, and would be located close to the ROW edge except where the ROW boundary is irregular in shape. At that location, the line would maintain a uniform alignment.

4.5.3 Kitsap County Plans and Ordinances

Kitsap County's Comprehensive Plan contains the following policies that are applicable to the proposed project:

- Encourage utility providers to make additions to and improvements of facilities that provide adequate capacity for future planned growth. Provide utility providers with annual updates of population, employment and development projects.

- Recognize that utilities must be provided consistent with applicable rules, regulations, tariffs and prudent utilities practice. Strive to coordinate and cooperate with other jurisdictions in the implementation of multi-jurisdictional utility facility additions and improvements.

- Encourage utilities to use new and improved technology to enhance the quality of their product when these changes are cost effective and are consistent with the provider's public service obligations. Encourage utilities to protect the performance, integrity, reliability and stability of the utility system.

- Minimize environmental impact of utilities by developing guidelines to evaluate the visual impacts antennas and towers have on view corridors, vistas and adjacent properties on a case-by-case basis (Kitsap County 1998).

The proposed project would upgrade an existing transmission line to provide adequate and more reliable electrical service to customers. Additionally, for the majority of the project the established ROW contains two other existing transmission lines. Assessment of the potential for visual impacts of the proposed project is contained in Section 3.4, Visual Resources. Therefore, the proposed project would conform to Kitsap County policies to the maximum extent practicable.

Within Kitsap County, the proposed project would be primarily located within the Interim Rural Forest zone. Portions of the transmission line upgrade, near the

community of Gorst, would be in Rural Residential and Urban Reserve zones. Within these zoning districts, the Kitsap County Zoning Code 430.020, *Provisions Applying to Special Uses – Uses,* applies:

> The erection, construction, alteration, or maintenance by a public utility or municipality, other governmental agencies, or approved privately owned public utilities of underground, overhead electrical, gas, steam, or water transmission or distribution systems, collection, communication, supply or disposal system, including poles, towers, wires, mains, drains, sewers, pipes, conduits, cables, fire alarm boxes, police call boxes, traffic signals, hydrants, and other similar equipment and accessories in connection therewith, but not including buildings, shall be permitted in any zone, provided that any permanent above-ground structures not located within a right-of-way or easement, shall be subject to the review of the Director.
>
> Utility transmission and distribution lines, poles may exceed the height limits otherwise provided for in this Ordinance. Water towers, which exceed thirty-five (35) feet in height, solid waste collection, transfer and/or handling sites, in any zone shall be subject to a Conditional Use Permit.

Because the proposed project would involve upgrading an existing transmission line within an established ROW, it would conform to Kitsap County zoning codes to the maximum extent practicable.

4.5.4 Mason County Plans and Ordinances

Mason County's Comprehensive Plan contains the following policies that are applicable to the proposed project:

- Services and utilities should be supplied as well and as economically as possible.
- The physical elements of services should disturb the landscape as little as possible.
- Mason County should encourage the joint use of utility corridors where feasible.
- Mason County should encourage system design practices intended to minimize the number and duration of interruptions to customer service (Mason County 1998).

Within Mason County, the proposed project would primarily be located within the Rural Area zoning districts of unincorporated portions of the county. Portions of the line would cross through Urban Growth Areas near the City of Shelton and

the community of Belfair. In the vicinity of the rural Mission/Benson community, the proposed project crosses Long Term Commercial Forest zoning districts.

The proposed project would upgrade an existing transmission line to provide more reliable electrical service to customers. Additionally, for the majority of the project the ROW contains two other transmission lines. Therefore, the proposed project would conform to Mason County policies to the maximum extent practicable.

4.5.5 City of Shelton Plans and Ordinances

Within the City of Shelton, the proposed project would be located within existing Utility Corridor zoning districts. Policies applicable to the proposed project within Chapter I, *Land Use Element,* of the City of Shelton Comprehensive Plan include:

- Site essential public facilities in a manner consistent with County-wide Planning Policies and City policies. (CWPP 4.0)

- The City will not preclude the siting of essential public facilities; however, it shall enforce its Comprehensive Plan and development regulations to ensure reasonable compatibility with other land uses (City of Shelton 1995).

The proposed project would upgrade an existing transmission line within an established utility ROW to provide more reliable electrical service to customers. Therefore, the proposed project would conform to City of Shelton policies to the maximum extent practicable.

4.6 Coastal Zone Management Consistency

The State of Washington has an approved Coastal Zone Management Program (CZMP), which is implemented by Ecology. BPA, as an agency of the federal government, is subject to the Coastal Zone Management Act (CZMA) (16 U.S.C. Section 1451-1464). BPA is subject to the coordination and consistency requirements of the CZMA as required by Ecology for all projects within Washington's coastal zone. Because the proposed transmission rebuild project is in Mason and Kitsap counties and the two counties are within the coastal zone, BPA is subject to the requirements of the CZMA with respect to the Proposed Action.

The CZMA requires that "each federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs." (16 U.S.C. Section 1456 (c) (1) (A)). These policies include the

Shoreline Management Act, state air and water quality requirements, and the State Environmental Policy Act (SEPA).

Once it completes its environmental review under NEPA, and by conforming to the requirements outlined in the Memorandum of Agreement on state and local government review of BPA projects in the State of Washington, BPA anticipates being able to conclude that this action would be consistent to the maximum extent practicable with Washington's CZMP. BPA would seek concurrence from Ecology in making this determination.

4.7 Floodplains and Wetlands Protection

The Department of Energy mandates that impacts to floodplains and wetlands be assessed, and alternatives for protection of these resources be evaluated. Regulations are provided through 10 CFR 1022.12, and Federal Executive Orders 11988 (Protection of Wetlands) and 11990 (Protection of Floodplains). A notice of floodplains and wetlands disturbance will be published in the Federal Register. A discussion on wetlands, wetland effects, floodplains, and floodplain effects is provided in Section 3.7.

Section 401 of the Clean Water Act regulates water quality, including water quality associated with wetlands. Permits to conduct an activity that discharges into waters of the United States are granted only after the state verifies that existing water quality would not be degraded. Ecology would review permits necessary for compliance with state water quality standards.

Section 404 of the Clean Water Act regulates all dredged and fill materials that are discharged into waters of the United States, including wetlands. Construction of the Shelton-Kitsap No. 2 transmission rebuild project would be located outside wetland boundaries, stream channels, and floodplains where possible. Compliance would be verified and enforced with field surveys. The Corps of Engineers would review permits necessary for the compliance with discharge of dredged and fill materials.

Section 10 of the Rivers and Harbors Act regulates all work done in or structures placed below the ordinary high water mark of navigable waters of the United States. As discussed in Section 3.7, no work would be done within navigable waters.

The Safe Drinking Water Act (42 U.S.C. Section 300f et seq.) protects the quality of public drinking water and its source. As discussed in Section 3.8, there are no sole source aquifers within the project area and the project would not adversely affect any surface waters.

See Section 4.14 for additional discussion of these regulations as they relate to pollution control.

4.8 Farmland Protection Policy Act

The Farmland Protection Policy Act (7 U.S.C. 4201 et seq.) directs federal agencies to identify and quantify adverse impacts of federal programs on farmlands. The Act's purpose is to minimize the number of federal programs that contribute to the unnecessary and irreversible conversion of agricultural land to non-agricultural uses.

Since the proposed project would occur within an existing transmission line ROW, no designated prime, unique, or other farmland of statewide importance would be converted under the Proposed Action. Evaluation of the project according to criteria set forth in the Act indicates the Proposed Action would be in compliance with the Act and would have little or no impact on area farmlands.

4.9 Global Warming

The proposed project would clear approximately 0.5 acre of forestland. These trees and plants would change from collectors of carbon to emitters of carbon in the form of carbon dioxide (a greenhouse gas) as they degrade rather than grow. However, because of the amount of clearing would be relatively small, and because low-growing vegetation would regrow in cleared areas, the proposed project's contribution to global warming would be negligible.

4.10 Permits for Structures in Navigable Waters

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

4.11 Permits for Discharges into Waters of the United States

In November 1990, the U.S. Environmental Protection Agency (EPA) adopted final regulations pertaining to stormwater discharges into surface water bodies (40 CFR 122-124). The regulations require that National Pollutant Discharge Elimination System (NPDES) permits be obtained for construction activities, including clearing, grading, and excavation, that disturb 5 acres or more. Under Section 402 of the Clean Water Act, federal facilities are subject to these permitting requirements. However, BPA, as a federal agency, has received a general permit under NPDES from EPA. BPA would use best management practices to ensure that no sediments reach surface waters during the construction of the proposed project.

4.12 Permits for Rights-of-Way on Public Lands

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

4.13 Energy Conservation at Federal Facilities

Energy conservation practices are not relevant to the construction, operation, or maintenance of a transmission line.

4.14 Pollution Control at Federal Facilities

4.14.1 Clean Air Act

The proposed project is located in the Seattle/Tacoma Ozone Maintenance Area, but the project would not affect it. The proposed project would not result in emissions remaining under BPA control. No burning would take place as a result of the proposed project. Trees and slash that are cleared would not be burned. Vehicles used during the construction of the proposed project would be properly maintained so as to minimize emissions.

4.14.2 Discharge Permits under the Clean Water Act

The Clean Water Act regulates discharges into waters of the United States. The following sections of the Act potentially apply to this project.

4.14.2.1 Section 401

The Water Quality Certification program requires that states certify compliance of federal permits and licenses with state water quality standards. A federal permit to conduct an activity that results in discharges into waters of the United States, including wetlands, is issued only after the affected state certifies that existing water quality standards would not be violated if the permit were issued. For this project, Ecology would review permits for compliance with state water quality standards if permits were necessary.

4.14.2.2 Section 402

Section 402 authorizes stormwater discharges associated with industrial activities under NPDES. For Washington, the EPA has a general permit authorizing federal facilities to discharge stormwater from construction activities disturbing land of 5 acres or more into the waters of the United States, in accordance with various set conditions. BPA would comply with the appropriate conditions for this project and would prepare a Storm Water Pollution Prevention Plan if required. The plan helps ensure that erosion control measures would be

implemented and maintained during construction. It also addresses best management practices for stabilization, stormwater management, and other controls.

4.14.2.3 Section 404

Authorization from the Corps of Engineers is required in accordance with the provisions of Section 404 when dredged or fill material is discharged into waters of the United States, including wetlands. This includes excavation activities that result in the discharge of dredged material that could destroy or degrade waters of the United States.

The construction and upgrade of access roads associated with the project could potentially impact waters of the United States. New poles and other structures would be located outside wetland boundaries where possible. Field surveys have been conducted to identify wetlands and ensure compliance. If permits are necessary, authorization will be sought from the Corps and appropriate state agencies.

4.14.3 Safe Drinking Water Act

The Safe Drinking Water Act (42 U.S.C. Section 300f et seq.) is designed to protect the quality of public drinking water and its sources. BPA would comply with state and local public drinking water regulations. The proposed project would not affect any sole source aquifers or other critical aquifers, or adversely affect any surface water supplies.

4.14.4 Resource Conservation and Recovery Act

No hazardous waste products would be used, discarded or produced by this project. Solid wastes would be disposed of at an approved landfill or recycled. Merchantable timber cleared for the project would be sold. Slash remaining from clearing would be scattered on the site to degrade or would be disposed of at an approved landfill.

4.14.5 Noise Control Act

See Section 3.11, Noise and Radio/Television Interference.

4.14.6 Federal Insecticide, Fungicide, and Rodenticide Act

It is unlikely that herbicides would be used during project construction. However, herbicides might be used occasionally to maintain the ROW. Only EPA-approved herbicides would be used, selectively applied by licensed applicators according to label instructions. For more information on BPA's proposed vegetation management program, see BPA's Transmission System Vegetation Management Program Draft Environmental Impact Statement

(DOE/EIS-0285, August 1999) for a thorough discussion of compliance with pertinent standards.

4.14.7 Toxic Substances Control Act

No toxic substances would be manufactured or used on this project.

4.15 Executive Order on Environmental Justice

In February 1994, Executive Order 12898, entitled Federal Actions to Address Environmental Justice in Minority and Low-income Populations, was released to federal agencies. This order directs federal agencies to incorporate environmental justice as part of their missions. As such, federal agencies are specifically directed to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

This action has been evaluated for potential disproportionately high environmental effects on minority and low-income populations (see Section 3.3, Socioeconomics). There would not be a high human health or environmental impact on minority and low-income populations from the proposed project.

5.0 Persons and Agencies Consulted

5.1 Federal Agencies

United States Fish and Wildlife Service

5.2 State Agencies

Washington Department of Fish and Wildlife

5.3 Local Agencies

Mason County Department of Community Development

Kitsap County Department of Community Development

City of Shelton

5.4 Tribes

Squaxin Island Tribe

Suquamish Tribe

Skokomish Tribe

6.0 References

BEA. See United States Bureau of Economic Analysis.

Bracken, D. 1998. South Oregon coast reinforcement project. Draft technical report – Assessment of research regarding EMF and health.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep water habitats of the United States. (FWS/OBS-79/31.) U.S. Fish and Wildlife Service. Washington, DC.

DOE. See United States Department of Energy.

Elmendorf, W.W. 1960. The structure of Twana culture. Monographic Supplement No. 2, Research Studies, vol. 28, No. 3. Washington State University. Pullman, WA.

EPA. See United States Environmental Protection Agency.

Erlandson, J.M and M.L. Moss. 1996. Chapter 14. The Pleistocene-Holocene transition along the Pacific Coast of North America. *In* L.G. Straus, B.V. Eriksen, J.M. Erlandson, and D.R. Yesner (eds) Humans at the End of the Ice Age The Archaeology of the Pleistocene-Holocene Transition, pp. 227-302. Plenum Press. New York, NY.

Federal Emergency Management Agency. 2000. Federal Emergency Management Agency Maps: 100-Year Flood. http://www.fema.gov/msc/

Fogleman, V.M. 1990. Guide to the National Environmental Policy Act: interpretations, applications, and compliance. The Council on Environmental Quality Regulations. Westport, CT.

Fraser, J. WDFW area habitat biologist. Telephone conversation – September 1, 2000.

General Land Office. 1856. Master plat book, T.20N., R.1W. Microfilm on file, Department of Natural Resources, Public Land Survey Office. Tacoma, WA.

General Land Office. 1872. Master plat book, T.23N., R.1W. Microfilm on file, Department of Natural Resources, Public Land Survey Office. Tacoma, WA.

Gough, S. 1981. A cultural resources survey of the Bonneville Power Administration's Kitsap substation. Eastern Washington University Reports in Archaeology and History, Short Report SR-2, Cheney, WA. Prepared for Bonneville Power Administration, Portland, OR.

Hartmann, G.D. 1999. A data recovery plan for investigations at the Seshwa'p (45KP109) for the Washington State Department of Transportation's SR 3: Gorst railroad bridge to SR 304 project, Kitsap County, Washington. Archaeological and Historical Services, Eastern Washington University, Short Report DOT 98-51. Prepared for Washington State Department of Transportation, Agreement Y-5070, Task Assignment Document LH.

Holstine, C. 1994. A cultural resources survey of the Bonneville Power Administration's proposed Benson substation project, Mason County, Washington. Short Report 455 Archaeological and Historical Services, Eastern Washington University, Cheney, WA. Prepared for Bonneville Power Administration, Portland, OR.

Kitsap County. 1999. Kitsap County zoning ordinance. February 15. Download from Internet site www.wa.gov/Kitsap/. Department of Community Development. Port Orchard, WA.

Kitsap County. 1998. Kitsap County comprehensive plan. May 7. Port Orchard, WA.

Lane, B. 1972. Anthropological report on the identity, treaty status and fisheries of the Squaxin Tribe of Indians. Unpublished ms. on file Suzzallo Library, Northwest Collections, University of Washington, Seattle, WA.

Larson, L.L., L. Forsman, and J.H. Forest, Jr. 1993. Bremerton-Gorst highway corridor, Kitsap County cultural resources assessment. LAAS Technical Report #93-1--Draft. LAAS, Seattle, WA.

Mason County. 1998. Mason County comprehensive plan. August. Department of Community Development. Shelton, WA.

McSimms, Michael. Land use planner, Mason County Planning Department. Telephone conversation – September 6, 2000.

Mitsch, W.J., and J.G. Gosselink. 1993. Wetlands, 2nd Ed. Van Nostrand Reinhold, New York, NY.

Molenaar, D., and J.D. Noble. 1970. Geology and related ground-water occurrence, southwestern Mason County, Washington.

Morgan, V. 1993. 45KP109-National register of historic places registration form. United States Department of the Interior National Park Service. On file OAHP, Olympia, WA.

National Institute of Environmental Health Sciences. 1999. National Institute of Environmental Health Sciences report on health effect from exposure to power-line frequency electric and magnetic fields. Prepared in response to the 1992 Energy Policy Act (PL 102-486, Section 2118). Prepared by the NIEHS

EMF-RAPID Program Staff. National Institutes of Health Publication No. 99-4493. Research Triangle Park, NC.

National Research Council. 1997. Possible health effects to exposure to residential electric and magnetic fields. National Academy Press. Washington, DC.

Ness, A.O., and R.H. Fowler. 1951. Soil survey of Mason County, Washington. United States Department of Agriculture Soil Conservation Service in cooperation with Washington Agriculture Experimental Stations.

NIEHS. See National Institute of Environmental Health Sciences.

NRC. See National Research Council.

OFM. See Washington State Office of Financial Management.

Olendorff, R.R., A.D. Miller, and R.N. Lehman. 1981. Suggested practices for raptor protection on power lines. Edison Electric Institute prepared by Raptor Research Foundation, Inc. Raptor Research Report No. 4. St. Paul, MN.

Robinson, Kelly. Land use planner, Kitsap County Planning Department. Telephone conversation – September 6, 2000.

Satterlund, D.R., and P.W. Adams. 1992. Wildland watershed management, second edition. John Wiley & Sons, New York, NY.

Sceva, J.E. 1957. Geology and ground-water resources of Kitsap County, Washington.

Shelton, City of. 1995. Comprehensive plan. Shelton, Washington.

Shirato, Margie. WDFW area habitat biologist. Telephone conversation - September 6, 2000.

Streamnet. 2000. Download from Internet site www.streamnet.org. August 11.

United States Bureau of Economic Analysis. 1999a. Regional accounts data, local area personal income, full-time and part-time employment by industry. Download from Internet site www.bea.doc.gov/bea/regional/ reis/ca25. Washington, DC.

United States Bureau of Economic Analysis. 1999b. Regional accounts data, local area personal income, personal income by major source and earnings by industry. Download from Internet site www.bea.doc.gov/bea/ regional/reis/ca05. Washington, DC.

United States Bureau of the Census. 1999a. Model-based income and poverty estimates. Download from Internet site www.census.gov/hhes/www/saipe/estimate/cty/. Washington, DC.

United States Bureau of the Census. 1999b. USA counties general profile. Download from Internet site www.census.gov/statab/USA98/53/. Washington, DC.

United States Bureau of the Census. 1992. 1990 census of population and housing, Washington. (Summary tape file 1A.) U.S. Government Printing Office. Washington, DC.

United States Department of Energy. 1995. Questions and answers about electric and magnetic fields associated with the use of electric power, Jan. 1995. National Institute of Environmental Health Sciences and U.S. Department of Energy. DOE/EE-0040. Washington, DC.

United States Environmental Protection Agency. 2000. Watershed information, Puget Sound, Washington State. http://www.epa.gov/iwi/303d/17110019_303d.html.

United States Fish and Wildlife Service. 1986. Recovery plan for the Pacific bald eagle. Portland, OR.

United States Fish and Wildlife Service. 2000. Letter from USFWS Olympia office. May 17.

United States Geological Survey. 2000. Surf your watershed. http://www.epa.gov/surf3/hucs/17110017/ and http://www.epa.gov/surf3/hucs/17110019.

USFWS. See United States Fish and Wildlife Service.

USGS. See United States Geological Survey.

Washington State Office of Financial Management. 1999a. April 1 population of cities, towns and counties used for the allocation of state revenues. Download from Internet site www.ofm.wa.gov/pop189090/ pop189090.pdf. Olympia, WA.

Washington State Office of Financial Management. 1999b. 1998 Population estimates by age/sex/race and Hispanic origin. Download from Internet site www.ofm.wa.gov/reas9598/ reas9598toc.htm. Olympia, WA.

Western Heritage. 1994. John's Prairie site final environmental impact statement cultural resources. Western Heritage, Olympia, WA. Prepared for Manke Lumber Company Inc., Tacoma, WA.

Zaffanella, L.E. 1993. Survey of Residential Magnetic Field Sources. Vol. 1: Goals, Results and Conclusions. (EPRI TR-102759-V1, Project 3335-02) Electric Power Research Institute.

Zaffanella, L.E. and G.W. Kalton. 1998. Survey of Personal Magnetic Field Exposure Phase I: Pilot Study and Design of Phase II. EMF RAPID Program Engineering Project #6. February 1998.

7.0 Glossary

Anadromous	Refers to fish such as salmon that hatch and rear in fresh water, move to the ocean to mature, and then return to fresh water to reproduce.
Benthic macroinvertebrates	Bottom-dwelling (benthic) animals that are large enough to see with the naked eye and that do not have a backbone. Examples include aquatic insect larvae, snails, and aquatic worms.
Bonneville Power Administration (BPA)	The federal power marketing agency under the Department of Energy (DOE) responsible for marketing wholesale electric power from 30 federal dams and one federal nuclear plant throughout Washington, Oregon, Idaho and western Montana, and portions of California, Nevada, Utah and Wyoming. BPA also sells and exchanges power with utilities in Canada and California.
Circuit	A system of conductors through which an electric current is intended to flow.
Conductor	Any metallic material, usually in the form of wire, cable, or bar, suitable for carrying an electrical current.
Connected action	Within the meaning of NEPA, a connected action is an action that is enabled by the proposed action, but not one that would be a part of the action proposed by the project sponsor.
Corona	The phenomenon whereby the electric field associated with a power line cause ionization (molecular breakdown) of surrounding air, thus creating a high-frequency noise. This noise can be heard as static over an automobile radio when traveling under the power line.
Double-circuit	To place two separate electrical circuits on the same transmission structures or poles. Each circuit contains three separate conductors or bundles of conductors.

Load	The amount electric energy delivered or required at any specified point or points on a system. Load originates primarily at the energy using equipment of consumers, such as heaters, air conditioners, lights and motors. At BPA, load includes delivery to direct service industries (Note: Load is slightly larger than metered energy because of normal transmission and distribution losses in delivery from generator to consumer). Because loads are used to determine resource requirements, forecasts of electricity use are converted to loads.
Median	The middle number in a given sequence of numbers.
Midden	A prehistoric refuse concentration composed of fish and mammal bone, charcoal, ash, discolored soil, or other materials.
National Electrical Safety Code (NESC)	Written standards for the design, construction, maintenance and operation of electric supply and communication lines, equipment, and supply stations in order to safeguard persons from hazards associated with those activities.
National Environmental Policy Act (NEPA)	A 1969 federal law that requires evaluation of the environmental impact of federally funded projects and programs.
Per capita	Per person.
Petroglyph	A drawing or carving on a rock, made by prehistoric people.
Pleistocene epoch	The period from 2 million to 10,000 years ago.
Puget Sound Energy (PSE)	Puget Sound Energy is an investor-owned utility that serves customers in King and Snohomish counties.
Raptor	A bird of prey, such as a hawk, eagle, or owl.
Right-of-way (ROW)	An easement for a certain purpose over the land of another, such as a strip of land used for a road, electric transmission line ditch or pipeline. BPA usually acquires easements for its transmission lines, roads and other facilities such as guys and anchors.
Single-circuit	One electrical circuit consisting of three separate conductors or three bundles of conductors.
Stade	A time period marked by a glacial deposit.

Substation	A non-generating electrical power station that serves to transform voltages to higher or lower levels, and that serves as a delivery point to individual customers such as utilities or large industrial plants. The BPA system has more than 400 substations.
Transmission line	A high-voltage power line used to carry electric power efficiently over long distances.
Voltage	The driving force that causes a current to flow in an electric circuit. Voltage and volt are often used interchangeably.

Bonneville Power Administration

PO Box 3621 Portland, Oregon 97208-3621

DOE/BP-3329 SEPTEMBER 2000 150