Summary

Introduction

This Environmental Impact Statement (EIS) discloses the potential impacts associated with construction and operation of the proposed Grand Coulee – Bell 500-kV Transmission Line Project. Bonneville Power Administration (BPA) would construct a new 500-kilovolt (kV) transmission line that would replace a single-circuit 115-kV transmission line in an existing corridor that has multiple transmission lines for most of the project's length. The transmission line would extend between the Grand Coulee 500-kV Switchyard and Bell Substation near Spokane, a distance of 84 miles (see Figure S-1). Detailed information about the project and its environmental impacts is provided in the main body of this document (Chapters 1, 2, and 3).

This chapter summarizes information about the proposed project's:

- purpose and need;
- alternatives; and
- affected environment, impacts, and mitigating measures.

Need for Action

BPA, a federal agency, is responsible for marketing and transmitting electrical power to utility and certain industrial customers in the Pacific Northwest. BPA owns and operates over 15,000 miles of transmission lines that it uses to market and transmit power from the federal hydropower system in the Northwest. BPA also transmits power that it purchases and markets from other generation sources in the region, as required by statute.

BPA enters into contracts to deliver power where it is needed. These obligations include long-term firm transmission agreements with entities that generate power and with utilities that provide electricity for homes, businesses, and farms in the Northwest. BPA has a statutory obligation to ensure that there is sufficient capacity in its transmission system to serve its customers, and to ensure that the system is safe and reliable. Among many other requirements, the Federal Columbia River Transmission System Act directs BPA to transmit electric power from Federal and non-federal generating sources [16 U.S.C. §838b(a)], and to construct additional transmission lines necessary for maintaining the electrical stability and reliability of the transmission system [§ 838b(d)].

As a result of a problem that exists in eastern Washington on BPA's transmission system, BPA needs to take action to ensure that it can meet its statutory and contractual obligations to deliver power to where it is needed.

Summary

As part of its transmission system, BPA owns and operates several transmission lines in eastern Washington that move electricity from generation sources in northeastern Washington, northern Idaho, and Montana to load centers to the west. The portion of the system west of Spokane, Washington, that transfers power from east to west is called the "West of Hatwai" transmission path.

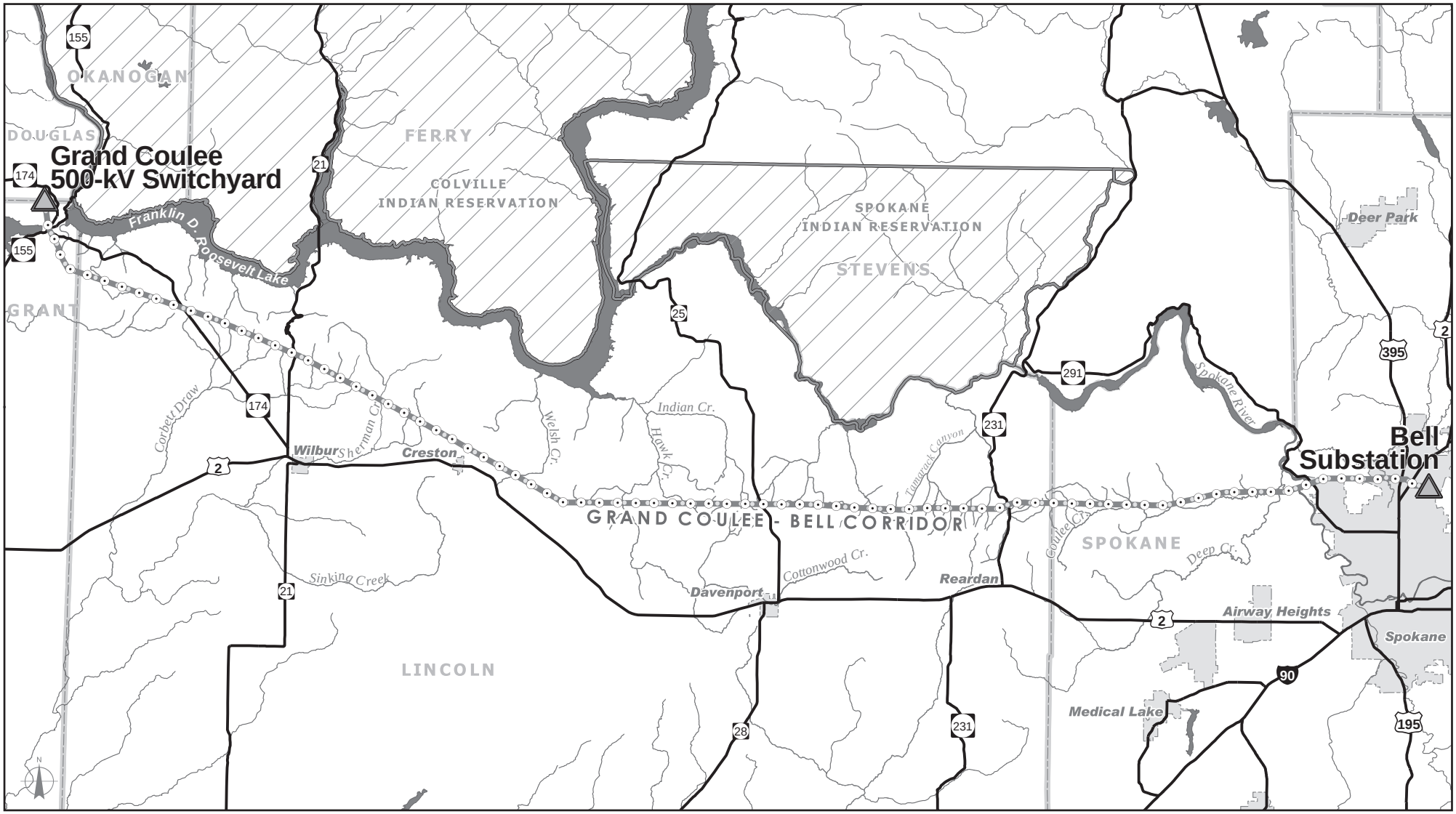
Since the mid-1990s, the West of Hatwai transmission path has grown increasingly constrained. To date, BPA has been able to manage operation of the path through all available operating practices, including short-term remedial actions, and customer needs have been met while maintaining the reliability of the path. However, in early 2001, the problem was made worse when two of BPA's large direct service industries (DSI) customers located east of the transmission path closed their facilities. These customers were aluminum smelters that were served by generation sources in Montana. The closure of these smelters meant that the electricity that would have supplied the smelters now flows west across the West of Hatwai transmission path. Because the path does not have the capacity to handle this excess energy, all of this energy must compete for space with other users of the path, which creates severe transmission congestion. Under these conditions, the system is at risk of overloads and violation of industry safety and reliability standards.

The problem is particularly acute in the early spring and summer months because of the large amount of power generated by dams east of the path. The amount of power that needs to move through this area during these months at times could exceed the carrying capacity of the existing transmission lines. Operations in summer 2001 showed that using all available operating practices to mitigate the capacity limitations of the West of Hatwai transmission path is insufficient as a long-term solution to ensure the flow of power while maintaining system reliability.

The problems that occurred in 2001 showed that the risk for future generation curtailments is already too high, and that the problem must be solved on a long-term basis as soon as possible. If additional capacity is not added, BPA will run a significant risk that it will not be able to continue to meet its contractual obligations to deliver power and still maintain reliability standards that minimize risks to public safety and to equipment. Action thus is needed to comply with BPA's Congressional mandates to provide adequate transmission capacity and to maintain electrical system stability and reliability, as well as to continue to fulfill its contractual obligations. 2004 is the earliest possible date that a long-term solution could be implemented considering time needed for environmental review, design, and construction.

GRAND COULEE - BELL 500-kV TRANSMISSION LINE PROJECT

LOCATION MAP



Map Location

Grand Coulee-Bell Corridor

Mile Marker

Substation or Switchyard

Major Road

COUNTY BOUNDARY

Indian Reservation

City or Town

0 2 4 8 12 16 Miles

0 3 6 12 18 Kilometers

SCALE 1:485,000

Data Source: U.S.G.S Digital Line Graphs,
Bonneville Power Administration Regional GIS Database.

FIGURE S-1

Purposes

The purposes identified below have been used to evaluate the reasonableness of a wide range of potential project alternatives. BPA decision-makers will consider how well the alternatives evaluated in this EIS meet these purposes when making a decision among them. The alternative selected should:

- Maintain transmission system reliability to industry standards;
- Comply with BPA's statutory obligations;
- Continue to meet BPA's contractual obligations;
- Minimize environmental impacts;
- Minimize costs; and
- Allow BPA to solve its transmission capacity problem by no later than fall 2004.

Cooperating Agencies

BPA is the lead federal agency on this project and supervises the preparation of the EIS. The proposed project crosses land managed by the U.S. Department of Interior, Bureau of Reclamation (BOR) at Grand Coulee Dam, and the western end of the proposed line terminates at BOR's Grand Coulee Switchyard. BOR thus has agreed to cooperate in the EIS process.

Proposed Action and Alternatives

BPA developed alternatives based on its knowledge of the system and potential environmental impacts, on public input from an earlier National Environmental Policy Act (NEPA) process begun in the mid-1990s, on results of scoping for this Environmental Impact Statement (EIS), and on input from an industry technical committee that reviewed improvements to BPA's entire transmission system.

BPA's proposal to construct an 84-mile, 500-kilovolt (kV) transmission line between the Grand Coulee 500-kV Switchyard and Bell Substation, in Mead just north of Spokane, considers two construction alternatives: the Agency Proposed Action and the Alternative. Both construction alternatives remove an existing transmission line and replace it with a new line on existing right-of-way for most of its length. Additional right-of-way would be needed in the first 3.5 miles out of the Grand Coulee Switchyard. In addition to the transmission line, new equipment would be installed at the substations at each end of the new line and at other facilities.

BPA is also considering the No Action Alternative. NEPA requires Federal agencies to analyze the consequences of taking no action, in this case, continuing to operate the transmission system under present conditions.

Agency Proposed Action

The proposed action involves removing an existing 115-kV transmission line (Grand Coulee – Bell No. 1 line) and replacing it with a 500-kV transmission line. BPA would construct a single-circuit 500-kV transmission line over most of the route between the end points or terminations. A double-circuit transmission line would be constructed for short distances (slightly less than one mile) where the right-of-way is constrained. The Agency Proposed Action would cost about $152 million (2002 dollars).

The new transmission line would be located primarily in an existing BPA corridor. The existing corridor, over most of its length, has five transmission lines on four sets of structures. To make room for the new transmission line, BPA would remove its Grand Coulee-Bell No. 1 115-kV wood pole transmission line and replace it with the 500-kV line on new lattice steel towers.

Towers

A new single-circuit tower design for the lattice steel towers would be used for the project. The typical height of the towers would be 125 to 150 feet although the height of each tower would vary with location and surrounding landforms. In most cases, the towers would be placed adjacent to existing double-circuit 230-kV steel towers in the corridor. The double-circuit 500-kV towers to be used for the short sections where the corridor is constrained would typically be 175 feet tall.

About five structures per mile would be used to match the spans of the existing 230-kV steel towers in the right-of-way. About 420 towers would be needed.

Conductors

Wires called conductors carry the electrical current in a transmission line. Three sets of conductors make up a circuit. For a single-circuit 500-kV transmission line, there would be three sets of conductors and for a double-circuit line there would be six sets of conductors. Each set of conductors consists of three conductor wires referred to as conductor bundles.

Conductors are attached to the tower using glass, porcelain, or fiberglass insulators that prevent the electricity in the conductors from moving to other conductors, the tower and the ground. Transmission towers elevate conductors to provide safety within the right-of-way for people and vehicles. One or two smaller wires, called overhead ground wires, are attached to the top of transmission towers to protect the transmission line against lightning damage. BPA could use fiber optic cable as the overhead ground wire or fiber optic cable attached elsewhere on the tower to also provide a communication link.

Line Termination Facilities

At Bell Substation, BPA would expand the existing fenced yard by about 11.7 acres to make room for new line termination facilities and other equipment. The expansion would include three bays with six circuit breakers, one group of series capacitors, a new control house, and associated equipment. Existing BPA property would be used. The Grand Coulee Switchyard would not need to be expanded because there is space within the existing fenced yard to accommodate a new bay with two circuit breakers, a shunt reactor and breaker, and associated equipment.

115-kV System and Tap Point/Substation Changes

Removing the Grand Coulee-Bell No. 1 115-kV line would entail removing structures and conductors over the 84-mile route with some line reconfiguration. In addition, customers currently tap off of both of BPA's existing 115-kV lines at four locations. Making room for the new 500-kV line by removing the Grand Coulee – Bell No. 1 115-kV line would make electrical changes necessary along the right-of-way at the four tap points on the remaining No. 2 115-kV line. Electrical changes at tap points at Wagner Lake Substation, Creston Substation, Larene Substation, and Springhill Substation would be necessary.

Construction

Construction is scheduled to begin in January 2003 and to be complete by November 2004. BPA would follow existing practices for removing and replacing the transmission line. Temporary staging areas would be needed along or near the proposed transmission line for construction crews to store materials and trucks. Access to tower sites for construction and maintenance would need to be provided at several locations along the corridor. Access work, which would take place principally within the right-of-way, would consist of making improvements to existing roads, constructing new roads, and constructing spurs to individual tower sites. A total of about 24 miles of new permanent access roads or road improvements would be needed.

Most new permanent access roads would be constructed in rangeland areas. Only a limited amount of permanent access road construction would be allowed in cultivated or fallow agricultural fields. Any temporary roads constructed in cropland would be removed and the ground would be restored to its original contour when the line is completed. Rights, usually easements, for access roads would be acquired from property owners as necessary. After the line is built, access roads would also be used for line maintenance.

Selective cutting of trees and tall brush may occur in the existing right-of-way to accommodate construction and provide for conductor clearance. Trees would be cut outside of the right-of-way that are identified as "danger trees" or trees that, because of their height and condition, may pose a threat to the adjacent line. At structure sites, trees and brush would be cut and removed within a one-half-acre area, and a portion of the site would be graded to provide a relatively level

work surface. Woody debris and other vegetation would either be left or would be taken off-site. Burning would not be used to dispose of woody debris.

Steel towers are anchored to the ground with footings. Typically, a hole is excavated, steel plates or a grid of crossbeams is placed in the hole, and the hole is filled up with the original excavated material. Towers are either assembled at the tower site and lifted into place by a large crane, or assembled at a staging area and set in place by a large helicopter. The towers are bolted to the footings after they are set in place. After transmission towers are in place, conductors are strung from tower to tower through pulleys on the towers. Tensioning sites of about 1 acre would be needed every 2.5 miles.

Vegetation Management

After construction, maintenance crews would be responsible for managing vegetation. No tall-growing vegetation would be allowed to grow inside the right-of-way except for vegetation in deep canyons where it will not interfere with the much higher conductor. BPA would develop maintenance criteria consistent with its Transmission System Vegetation Management Program.

Alternative Action

The Alternative Action would include all the components of the Preferred Action except a double-circuit line would be constructed in the Spokane area between a point about 2 miles west of the Spokane River and Bell Substation, a distance of about 9 miles. The purpose of this alternative would be to anticipate and provide for potential unknown future transmission needs without needing to find a new route out of the Bell Substation for another 500-kV line at a later date if the need should arise. Both sides of the towers would be strung with conductors and connected to operate as a single-circuit line; it would be available for a second circuit at some unknown future date.

No Action Alternative

Description of No Action

The No Action Alternative is traditionally defined as the status quo alternative. In this case, the No Action Alternative assumes the following scenario:

- BPA would not build a new transmission line to solve the problem identified in Chapter 1, nor would another entity.
- The amount of power that needs to be transferred from east to west would not diminish and probably would increase.
- Requirements to protect ESA-listed fish would not change, so dams in Montana would continue to generate power at current levels.

Impacts of the No Action Alternative

Under this alternative, BPA would continue to operate the existing West of Hatwai transmission path as it does now. Because the conditions and problems described in Chapter 1 would substantially increase the risk that this portion of the transmission system would overload, BPA would continue to implement ***remedial action schemes (RAS)*** to protect the existing system, as it has for several years. A RAS is a computer-driven set of actions to prevent an overload. If a major transmission line ***outage*** occurs, the transmission system would automatically take measures to protect itself, such as disconnecting generation or transmission. However, the amount of generation that would be dropped when one line is out of service is exceptionally large (up to 2250 MW), and the potential for dropping this amount is very high during summer. This level of reliance on RAS has the following risks: damage to generator plants when generation is disconnected suddenly, spill conditions at hydro projects that could violate Endangered Species Act requirements, higher power costs to consumers, and higher potential for blackouts.

In addition, given this scenario, even with all existing transmission lines in the Grand Coulee-Bell corridor transferring power, the congestion is so high that BPA would be unable to meet its present and future obligations in a reliable manner.

If BPA does not take action, it is theoretically possible that another entity might propose to do so. It was suggested during scoping that other entities could take action to solve the problem, and that proposals existed to do so. BPA is not aware, however, of any current proposals by other entities that address the problem as described in Chapter 1. The section entitled "Actions by Other Entities" briefly describes proposals by Avista, a utility with part ownership in the West of Hatwai path and with facilities in the area, and the problems those proposals would solve.

No Action could also result in adverse socioeconomic impacts. Reduced capacity and reliability could lead to higher energy costs for industry and consumers. This would tend to lower productivity and efficiency for industries and areas that are affected, making them less competitive with other industries and areas. The consequences of this would be lower employment and income levels than would otherwise be the case, reduced levels of economic activity, and reduced governmental tax revenues and the services they support.

The quality and reliability of electrical power has been a key to economic growth and improving industrial productivity levels. With structural economic change, particularly with the new digital economy, power quality and reliability requirements have increased markedly. To the extent that transmission capacity deficiencies reduce power reliability and quality, regional businesses and industries would be affected by costly process disruptions.

Maintenance activities would continue within the corridor under the No Action Alternative. Vegetation clearing, maintenance vehicle traffic, and human presence could adversely affect water quality, vegetation, wildlife, fish, and wetland resources.

Alternatives Considered but Eliminated from Detailed Study

BPA considered a range of alternatives to solve the problem. Alternatives that would not meet the need and purposes were eliminated from detailed study. The following alternatives did not meet the need and purposes.

Design Alternatives

Actions by Other Entities

Existing proposals by Avista to improve its system in the eastern Washington/North Idaho area would not solve the problem identified in Chapter 1.

System Improvements

BPA and Avista have implemented a number of system improvements and remedial actions to increase the power transfer capability of the system as far as is technically prudent without significant new line construction. BPA knows of no other improvements or upgrades that could be undertaken that would meet the need identified in Chapter 1.

Burying the Transmission Line

For this 500-kV line, six individual cables would have to be manufactured and installed at a total cost of 10 to 15 times the cost of an overhead design. Because of cost, BPA uses underground cable only in limited situations. While it remains an option available for special situations, because of its high cost it was eliminated from further study.

Replace Existing Grand Coulee-Bell Line with a Double-Circuit Line

As an alternative to removing one of its existing lines from the transmission corridor and constructing the Grand-Coulee-Bell 500-kV line, BPA could instead replace the existing line from the Grand Coulee Switchyard to the Bell Substation for its entire length with double-circuit towers that could accommodate two lines. This alternative would cost approximately twice as much as the proposed action and would have greater visual effects. Because this alternative would not meet the purpose of minimizing project costs and would not reduce expected environmental impacts, it was considered but eliminated from detailed study in this EIS.

Transmission Alternatives

Rerouting Lines in the Spokane Area

When locating new transmission lines, BPA tries either to replace existing lines or to use or parallel an existing transmission right-of-way. Adding a transmission line on existing right-of-way next to an existing one can cause fewer visual, land use, and ground disturbance-related impacts than a new, totally separate line, and the need for new access roads can be kept to a minimum by using existing access roads. Using an existing corridor also avoids the impact of having to clear miles of new 150-foot wide right-of-way. Following this right-of-way practice can greatly reduce costs and environmental impacts.

BPA studied the area around Spokane for possible corridor routes. Studies found no routes near Spokane for a new transmission corridor, and no suitable alternative existing utility corridor, that would accommodate the transmission towers with less environmental impact or for less cost than the proposal.

Other Transmission Line Alternatives

BPA studied a variety of transmission alternatives and alternative design options to fill the need. After study, the following alternatives were eliminated from further consideration.

1. Bell-Ashe 500-kV Line: It would be 145 miles long between Spokane and the Hanford Reservation near Richland, would require new right-of-way, would cost about $95 million more than the Grand Coulee-Bell 500-kV project, and completion would be at least 2 years later.

2. Taft-Lower Granite 500-kV Line: It would be 150 miles long between the continental divide in Montana and southeastern Washington, would require new right-of-way, would cost about $105 million more than the Grand Coulee-Bell 500-kV project, would require building a new 500-kV line from Lower Granite substation to Lower Monumental substation, and completion would be at least 2 years later.

Non-Transmission Alternatives

As possible non-transmission alternatives to the proposed action, BPA considered implementation of energy conservation and demand reduction measures to reduce demand on the transmission system, load and generation curtailment during outage conditions, generation additions, and fuel switching. An analysis to determine whether non-transmission alternatives would be viable for these projects found that implementation of non-transmission alternatives was not viable because they would not allow BPA to meet its obligations under existing contracts.

Pricing Alternatives

Alternative methods of pricing power transfers, particularly congestion pricing, were considered but eliminated from detailed study. The problem west of Spokane would not be solved because raising the price works to reduce congestion when there are competitive markets for generation or controllable demand on either side of a transmission constraint. These conditions do not exist in this area.

Affected Environment, Environmental Consequences, and Mitigation

The affected environment, potential impacts, and mitigation for the resource areas evaluated in this EIS are briefly summarized below.

Land Use

Affected Environment

- The corridor crosses four counties and two cities in eastern central Washington: Douglas, Grant, Lincoln and Spokane counties and the cities of Grand Coulee and Spokane.
- Approximately one-half of the corridor passes through agricultural land, which mainly consists of dryland wheat and other grain crops.
- The corridor crosses open range and scablands in portions of Grant and Douglas counties, and in central Lincoln County. Rangelands constitute approximately one-third of the corridor.
- Developed land within rural and urban portions of the corridor includes single and multi-family residences, commercial and industrial businesses and related lands. Most developed land is in the Spokane area.
- Recreational areas traversed by the corridor include North Dam Park within the City of Grand Coulee and Riverside State Park in rural Spokane County.

Environmental Consequences

- New transmission line along 3.5 miles of right-of-way where none now exists; remainder of project would be in existing transmission line corridor or BPA property.
- Approximately 24 acres would be needed on a permanent basis for tower sites.

- Approximately 40 acres would be needed temporarily for staging areas and conductor pulling/tensioning sites.
- Approximately 22 acres would be needed for new permanent access roads and road spurs; mostly in rangeland.
- Approximately 52 acres would be needed for access road improvements.
- Approximately 12 acres of agricultural land would be removed from production permanently (about 4 acres of prime farm land); net loss would be about 3.3 acres.
- Up to 765 acres of cropland would be removed from production for one or two seasons.
- Potential interference with farming activities during construction and operation.
- Potential interference with recreational use at North Dam Park.
- Temporary disturbances to recreational use at Riverside State Park and nearby residential uses in the Spokane area.
- Commercial activities (recreational vehicle parking) in corridor near U.S. Highway 2 may be incompatible; change in land use may occur.
- Potential disruption of traffic during construction.
- Potential for spread of noxious weeds by ground disturbance and vehicles.
- Consistent with land use plans and zoning; double-circuit towers exceed height restrictions in City of Spokane and Spokane County.
- Land use impact would be low to moderate.

Cumulative Impacts

- Because the proposed action is the rebuild of an existing transmission line in the corridor with three other lines, cumulatively, the impacts represent a relatively small increment of change. Land use compatibility issues would likely be minor.
- There are no other known plans or proposed projects that would remove agricultural lands from production in Lincoln, Douglas or Grant counties that would result in adverse cumulative impacts.

Summary

- Increased activity/use within Riverside State Park and other open spaces could lead to a greater level of compatibility impacts with users.

- Increased development activity and human presence over time would contribute to cumulative impacts such as associated traffic congestion, potential land use compatibility conflicts, and other impacts of proximity to transmission lines.

Mitigation

- Provide schedule of construction activities to all landowners along the corridor that could be affected by construction.

- Coordinate with the City of Grand Coulee to site towers within North Dam Park.

- Place certified weed-free gravel on existing roads within North Dam Park to reduce the spread of noxious weeds.

- Pre-treat areas of high weed concentrations in North Dam Park during plant emergence to reduce weed spread.

- Use Best Management Practices to limit erosion and the spread of noxious weeds.

- Plan and schedule construction activities, when practical, to minimize temporary disturbance, displacement of crops, and interference with farming activities.

- Restore compacted soil in cropland.

- Compensate farmers for crop damage.

- Place new towers adjacent to existing towers, where practical, to enhance maneuverability of farm equipment.

- Revegetate disturbed areas with native species.

- Coordinate with Riverside State Park officials to locate access roads to minimize disturbance to vegetation.

- Use weed-free materials during construction.

Noise

Affected Environment

- Along the corridor of the proposed 500-kV transmission line, existing noise levels vary with the proximity to existing transmission lines and the proximity to other noise-generating activities.

- In the more developed areas, traffic and noise associated with human activity would be major contributors to background noise.

Environmental Consequences

- Residents at distances up to 400 to 600 feet from construction activity could experience noise levels that exceed Washington noise standards.

- Small increase in audible noise levels at the edge of the right-of-way during operation; median noise levels would be within standards.

- Noise impact levels would be low to moderate.

- Potential radio and television interference.

Cumulative Impacts

- Future increases in traffic and human activity related to population and economic development would increase background noise levels. This would most likely occur in the Spokane area and to a lesser extent in the Grand Coulee area.

Mitigation

- Provide sound-control devices no less effective than those provided on original equipment.

- Provide muffled exhaust on all construction equipment and vehicles.

- Limit construction activities to daytime hours.

- No noise-generating construction activity will be conducted within 1,000 feet of a residence between 10:00 p.m. and 7:00 a.m.

- Notify landowners directly impacted along the corridor prior to construction activities.

Summary

- Restore radio or television reception to a quality as good or better than before if interference.

Public Health/Safety

Affected Environment

- Potential hazards along the corridor include fire (both natural and human-caused), existing overhead transmission line crossings, and natural gas pipeline crossings.

- Transmission lines, like all electric devices and equipment, produce electric fields and magnetic fields (EMF). Electric and magnetic fields are found around all electrical wiring, including household wiring and common electrical appliances.

- All BPA lines are designed and constructed in accordance with the National Electrical Safety Code. NESC standards specify the minimum allowable distances between the lines and the ground or other objects.

- There are no national (United States) guidelines or standards for electric fields from transmission lines except for the 5-milliampere criterion for maximum permissible shock current from vehicles. Washington has no electric-field limit. BPA designs new transmission lines to meet its electric-field guideline of 9-kV/m maximum on the right-of-way and 5-kV/m maximum at the edge of the right-of-way.

Environmental Consequences

- Potential risk of fire and injury associated with use of equipment during construction, and traffic safety issues.

- Potential incidence of electric field-induced nuisance shocks.

- Potential for health effects from magnetic fields in residential and business areas would be minor due to sparse population or field levels that would decrease or would not change from the current condition (except for 0.6-mile section where a slight increase would be expected outside of the right-of-way). The overall level of impacts would be low except for the short section of the line that crosses a commercial area, where the level would be moderate to high.

Cumulative Impacts

- The proposed project would contribute a small increase in the overall risk of fire and injury to the public that could occur during construction and operation/maintenance.

- Incidences of nuisance shocks could occur infrequently under the proposed line.

Mitigation

- Prior to starting construction, contractor would prepare and maintain a safety plan in compliance with Washington requirements. This plan would be kept on-site and would detail how to manage hazardous materials such as fuel, and how to respond to emergency situations.

- During construction, the contractors would also hold crew safety meetings at the start of each workday to go over potential safety issues and concerns.

- At the end of each workday, the contractor and subcontractors will secure the site to protect equipment and the general public.

- Employees would be trained, as necessary, in tower climbing, cardiopulmonary resuscitation, first aid, rescue techniques, and safety equipment inspection.

- Assure that the contractor complies with State regulations regarding on-site fire equipment.

- To minimize the risk of fire, fuel all highway-authorized vehicles off-site. Fueling of construction equipment that was transported to the site via truck and is not highway authorized would be done in accordance with regulated construction practices and state and local laws. Helicopters would be fueled and housed at local airfields or at staging areas.

- Helicopter pilots and contractor take into account public safety during flights. For example, flight paths could be established for transport of project components in order to avoid flying over populated areas or near schools (Helicopter Association 1993).

- Provide notice to public of construction activities, including blasting.

- Take appropriate safety measures for blasting consistent with state and local codes and regulations. Remove all explosives from the work site at the end of the workday.

- If implosion fittings are used to connect the conductors, install in such a way as to minimize potential health and safety risks.

- Operation and maintenance vehicles would carry fire suppression equipment including (but not limited to) shovels and fire extinguishers.

- Stay on established access roads during routine operation and maintenance activities.

Summary

- Keep roads watered.
- Keep vegetation cleared according to BPA standards to avoid contact with transmission lines.
- Submit final tower locations and heights to the Federal Aviation Administration for review and potential marking and lighting requirements.
- Construct and operate the new transmission line to meet or exceed the National Electrical Safety Code.
- During construction, follow BPA specifications for grounding fences and other objects on and near the proposed right-of-way.
- Burning would not be allowed for clearing.

Visual Resources

Affected Environment

- The project area encompasses a variety of landscape settings ranging from the Roosevelt Lake reservoir and the rugged basalt outcrops near Grand Coulee to agricultural, rangeland and scrubland over most of the route, to urban environments near and in Spokane.
- At the west end of the corridor near the Columbia River, terrain is rugged, with large basalt outcrops, steep slopes and canyons. The area is scenic because the landscape is vast and encompasses a variety of landscape features of differing form, color, and texture, including the Grand Coulee Dam and Lake Roosevelt.
- The setting in the eastern part of the study area is more urban and varied. It includes the scenic Spokane River and adjacent park land; residential, commercial, and institutional areas east of the Spokane River; and an industrial landscape near Bell Substation.

Environmental Consequences

- Temporary viewscape changes during construction.
- Low to high visual impacts due to change in views for residents in the Grand Coulee and Spokane areas, and for users at North Dam Park and Riverside State Park.

- Moderate to high impacts to viewers of line where it crosses the Spokane River.
- Moderate to high impacts to residents of housing developments east of Nine Mile Road and in other areas between there and Bell Substation.
- Potentially high impact for viewshed from archaeological site near Grand Coulee.

Cumulative Impacts

- The rough texture and dark brown color of the existing wood pole structures are natural looking, smaller, weather to a lighter color, and tend to blend into the surrounding landscape better over time.
- The proposed project would increase the number of steel structures within the corridor in relation to what exists today, leading to greater combined visual impacts associated with the corridor's transmission lines.
- Greater residential development could occur in the vicinity of the line that would contribute to greater cumulative impacts over time.
- The greatest cumulative impact would be in the urban Spokane area where residents, recreational uses and scenic views would be affected.

Mitigation

- Use tower steel that has been treated to reduce reflectivity.
- Use non-specular conductors.
- Use non-luminous insulators (i.e., non-ceramic insulators or porcelain).
- Plant vegetative screens, do selective clearing/tree topping at Riverside State Park and other selected sites.
- Use existing topography and vegetation when ever possible to limit views of lines and structures.
- Locate construction staging areas out of site of potential viewers as much as possible.
- Require contractors to maintain a clean construction site.
- Maintain permanent access roads.

Air Quality

Affected Environment

- The Grand Coulee-Bell Corridor project area has an arid to semiarid climate.
- Most winds in eastern Washington are from the north during the fall and winter, and from the south and southwest during spring and summer.
- Portions of the Spokane area have been designated as non-attainment areas for particulate matter less than 10 microns in diameter (PM-10) and for carbon monoxide because the area has exceeded National Ambient Air Quality Standards for these pollutants on a persistent basis.
- The corridor passes through about 6 miles of the non-attainment area for each of these pollutants.

Environmental Consequences

- Short-term increase in pollutant levels during construction.

Cumulative Impacts

- Eastern Washington, including the Spokane area, experiences air quality pollution problems from particulates associated with burning of grass seed fields, dust from farm fields, and wildfires. The proposed action would contribute to these prevailing problems on a short-term basis during construction.

Mitigation

- Use water trucks to control dust during construction.
- Use low sulfur fuel for on-road diesel vehicles.
- Lop and scatter, pile, mulch, chip, or take woody debris and other vegetation off-site.

Cultural Resources

Affected Environment

Cultural Resources

- A 1994 survey identified 29 prehistoric sites.
- Seven historic cultural sites were identified in a 1994 study in or near the corridor.
- A 2002 survey identified five additional prehistoric sites located within the project area or immediate vicinity of the project, but determined that most of the previously recorded sites were considered not to be cultural in origin.
- Six previous archaeological investigations were conducted in the vicinity of the Bell Substation; no recorded archaeological sites were located in the project area of potential effect.
- A 2002 survey of the substation expansion area and vicinity resulted in the identification of two historic-period cultural resources; one is within the substation expansion area.
- No evidence for historical cemeteries was observed in the surveyed area.

Environmental Consequences

- Unless avoided by construction activities, potential for direct disturbance effects of several prehistoric and historic sites (low to high impact levels). Four of the archaeological sites are considered to have traditional cultural property values.
- Unless avoided, possible disturbance (moderate effect) of two archaeological sites by dismantling of the existing 115-kV line in the Grand Coulee area.
- High potential effect on historic site at Bell Substation.

Cumulative Impacts

- Any disturbance of sites would contribute to overall degradation of cultural resources that accompanies development. On the other hand, information learned from the identified sites contributes to greater knowledge of prehistoric and historic culture.
- The construction alternatives would improve access to sites and could increase the potential for impacts to them.

Summary

Mitigation

- Position tower locations to provide avoidance of cultural resources.
- Locate new access roads to avoid cultural resources.
- Limit road improvements to the existing roadbed when in close proximity to known cultural resource sites.
- Avoid cultural resource sites when dismantling the portion of the 115-kV line in the Grand Coulee area.
- Mitigate impacts for sites that are eligible for NRHP listing and cannot be avoided.
- Halt work if cultural resources are discovered during construction activities and engage cultural resource specialists to evaluate the discoveries.

Socioeconomics

Affected Environment

- Except for the Spokane area, the study area is sparsely populated.
- Farming is the principal economic activity in the rural counties; Spokane County's economy is diversified.
- The four-county area lags the state in per capita income levels.
- Disproportionate low-income and minority populations are not present based on average statistics for the four-county area.

Environmental Consequences

- Minimal impact on housing to meet construction worker needs.
- Beneficial impact on employment, personal income, and local sales tax revenues.
- Small amount of foregone agricultural production.
- Low potential for trespass and vandalism of homes and businesses.
- Low potential for long-term adverse impacts on property values.

- No disproportionate impacts on low-income or minority populations.

Cumulative Impacts

- Some cultivated areas within the project area would be temporarily taken out of agricultural production. The amount is negligible compared to the decreases in cultivated land over the last 10 years. There are no known plans or programs that would reduce the agricultural land base to which the project would cumulatively contribute.

- Other than normal economic growth in the Spokane area, there are no other known plans or proposed projects in the area that would result in adverse cumulative socioeconomic impacts. Project employment and income impacts would represent a very small fraction of regional employment and income levels now and in the future.

Mitigation

- Compensate landowners at fair market value for any new land rights required for easements for new right-of-way or for access roads.

- Compensate farmers for crop damage.

- Correct soil compaction or compensate landowners.

- Site towers to maintain efficient crop patterns and minimize adverse impacts to farming activities.

Soils and Geology

Affected Environment

- The corridor for the proposed transmission line is within the northern boundary of the Columbia River Plateau, a broad rolling basalt plateau that slopes gently to the southwest. Topography is gently rolling to moderately hilly; elevations generally range from 985 to 1,970 feet above mean sea level. Landforms include uplands covered by loess (wind-deposited sediment), channeled scablands, canyons, and river terraces.

- Channeled scablands are unique geologic features that are found primarily within the western half of the corridor and within scattered areas in the eastern half of the corridor. These areas consist of numerous dry, deeply cut channels in Columbia River basalt and typically contain shallow, stony soils.

- Soils along the project corridor have formed primarily in loess, glacial outwash,

colluvium, alluvium, and weathered granite. Four general categories of soils occur within the corridor: deep silt loam soils, shallow rocky soils, deep sandy soils, and soils found in deep canyons.

- Approximately 50 percent of the corridor has a low erosion susceptibility, 41 percent a moderate erosion susceptibility, and 7 percent a high erosion susceptibility, which is usually associated with the steep slopes of canyons.

Environmental Consequences

- Disturbance of the ground surface and subsurface and removal of vegetation during existing structure removal, construction area clearing, new access road construction, existing access road improvements, and structure site preparation increase the risk of soil erosion and mass movement, and may change soil productivity and physical characteristics.

- Soils at conductor tensioning sites and staging areas will be compacted during construction, thereby affecting soil productivity, reducing infiltration capacity, and increasing runoff and erosion.

- In areas along the corridor where loess soils have developed as a result of wind deposition, removal of vegetation at construction sites would likely increase the rate of wind erosion.

- The level of impacts would range from low to high.

Cumulative Impacts

- Agricultural practices can be a major contributor to soil erosion and increased sedimentation of streams. On slopes over 7 percent, it is estimated that cultivated soils have lost over 6 inches of topsoil over a 90-year period (U.S. Department of Agriculture, Soil Conservation Service, October 1981).

- Interference with existing or planned conservation measures could result in increased or continued erosion and subsequent sedimentation.

- Where practical, new transmission towers will be aligned with existing steel towers, thus interference with farm conservation efforts is not expected.

- It is expected that these increases in erosion, runoff, and sedimentation would contribute minimally to the area's ongoing soil loss and sedimentation of drainages.

Mitigation

- Properly spaced and sized culverts, cross-drains, and water bars will be used. Contractors will armor ditches and drain inlets and outlets where needed for erosion control.
- Avoid construction on steep, unstable slopes if possible.
- All excavated material not reused would be deposited in an upland area and stabilized. No used material would be deposited in environmentally sensitive areas such as streams, riparian areas, wetlands, or floodplains.
- Apply erosion control measures such as silt fence, straw mulch, straw wattles, straw bale check dams, other soil stabilizers, and reseeding disturbed areas as required (prepare a Stormwater Pollution Prevention Plan).
- Regularly inspect and maintain project facilities, including the access roads, to ensure erosion levels remain the same or less than current conditions.
- Where agricultural and rangeland soils are compacted, assistance would be provided to farmers and ranchers for subsoiling to restore soil productivity.

Water Quality

Affected Environment

Surface Water

- The corridor crosses 34 perennial streams and 55 ephemeral streams. An east-to-west trending ridge spans most of the project area, creating two separate drainages. Streams on the north side of the ridge flow to the north into the Columbia or Spokane rivers. Drainage south of the ridge follows broad, shallow scabland channels from northeast to southwest before eventually reaching Crab Creek and the Columbia River.
- No surface water quality problems are reported in the perennial and ephemeral streams that cross the corridor except for Sherman Creek, Deep Creek, and the Spokane River.

Groundwater

- Groundwater quality is generally good to excellent throughout the area. Groundwater is the major water source for public water supplies, irrigation, and industrial uses for most of the area.

Summary

- Basalts of the Columbia River group are the most important groundwater aquifers west of the Spokane River. The aquifers are chiefly permeable zones lying between the top and bottom of successive basalt lava flows. Intermittent stream channels of the scablands recharge groundwater to the aquifers. Regional movement of groundwater in the aquifers is generally to the southwest.

- The Environmental Protection Agency (EPA) has proposed the Eastern Columbia Plateau Aquifer System as a sole source aquifer.

- The Spokane Valley-Rathdrum Prairie aquifer is the major source of domestic water for Spokane County residents. EPA designated this aquifer a sole source aquifer.

Environmental Consequences

Surface Water

- Surface water quality could be impacted in the vicinity of perennial and ephemeral streams due to erosion, increased runoff, and sedimentation associated with construction of new access roads, access road improvements, and construction of spur roads to new tower sites. The potential for impacts would depend on the timing of construction, the presence or absence of water in the stream, the weather conditions, local topography, the erosion potential of soils, and the effectiveness of standard control practices implemented during construction to minimize soil erosion. The likelihood that water quality would be adversely impacted in these streams is low.

- Culvert placement and the installation of new culverts could cause temporary increased erosion and degradation of water quality due to increased turbidity.

- Potential contamination of surface water resources during project construction could result from accidental spills or leaks of petroleum products used by construction equipment.

- The removal of vegetation at construction sites has the potential to increase wind and water erosion rates and surface water temperature. Erosion rates would most likely return to their current level following construction if plants become reestablished at these sites, naturally, or through revegetation. The potential for water temperature to be impacted is low as not all of the riparian vegetation would be removed within the corridor and the width of the riparian vegetation that is within the corridor is only a small fraction of the total length of the streams that cross the corridor.

- Potential impacts to surface waters from routine maintenance activities are expected to be low.

Groundwater

- Construction activities generally would not be expected to directly or indirectly impact groundwater aquifers (no to low impact level).

- Potential spills or leaks of petroleum products used by construction equipment would likely be of insufficient volume to present risk to groundwater resources. Potential impacts to groundwater from construction activities are expected to be low.

- The removal of the 115-kV conductor and poles, clearing of vegetation at tower construction sites, and the assembly of new towers may result in localized soil compaction, thereby reducing infiltration capacity and increasing surface runoff to streams.

- Routine operation and maintenance of the transmission line is not expected to impact groundwater quality.

Cumulative Impacts

- Agricultural practices can be a major contributor to soil erosion and increased sedimentation of streams. The U.S. Department of Agriculture's Conservation Compliance Program for Highly Erodible Land was instituted to promote soil conservation practices among farm operators.

- Interference with farm conservation efforts is not expected compared to existing conditions. It is expected that soil erosion and sedimentation increases would contribute minimally to the area's ongoing soil loss and sedimentation of drainages, thus resulting in minimal impacts to water quality.

Mitigation

- Culverts will be properly sized and spaced and BPA would work with the Washington State Department of Fish and Wildlife (WDFW) to comply with hydraulic permit requirements

- No solid materials, including building materials, would be discharged into waters of the United States unless authorized by a Section 404 permit of the Clean Water Act.

- Off-site tracking of sediment and dust generation shall be minimized.

- Vegetative buffers would be left along stream courses to minimize erosion and bank instability, where possible.

Summary

- Schedule construction during periods when precipitation and runoff are at a minimum, when practical.
- All excavated material not reused would be deposited in an upland area and stabilized. No used material would be deposited in environmentally sensitive areas such as streams, riparian areas, wetlands, and floodplains.
- Avoid construction within designated wetland and wetlands buffers to protect potential groundwater recharge areas.
- Locate structures, new roads, and staging areas so as to avoid waters of the U.S. Limit disturbance to the minimum necessary when working in or next to water bodies.
- Avoid mechanized land clearing within stream channels and riparian areas to avoid soil compaction from heavy machinery, destruction of live plants, and potential alteration of surface water patterns to reduce groundwater turbidity risk.
- Apply erosion control measures such as silt fence, straw mulch, straw wattles, straw bale check dams, other soil stabilizers, and reseeding disturbed areas as required (prepare a Stormwater Pollution Prevention Plan).
- Regularly inspect and maintain project facilities, including the access roads, to ensure erosion levels remain the same or less than current conditions.
- Avoid refueling and/or mixing hazardous materials where accidental spills could enter surface or groundwater.
- Use existing road systems, where possible, to access tower locations and for the clearing of the transmission line alignment.
- Avoid construction on steep, unstable slopes if possible.

Wetlands

Affected Environment

- A total of 43 wetlands were identified within the project corridor. Most wetlands within the corridor are emergent, seasonally flooded, isolated, depressional wetlands that are flooded by precipitation and/or snowmelt.

- Some wetlands in the corridor are locally important because they function as a source of water in an arid environment, providing valuable habitat for waterfowl and resident and migrating birds.

- Most of the wetlands in the corridor are in excellent condition and vegetated primarily with native species.

Environmental Consequences

- Construction of new towers, the removal of existing structures, new access road construction, and access road maintenance would avoid wetlands and are not expected to result in direct impacts (filling) to wetlands; low to moderate impacts to several wetlands located within 100 feet of access roads or towers could occur.

- Areas needed for access roads or tower placements, therefore no impacts are expected.

- Operation and maintenance of the transmission line could result in low to moderate impacts to wetlands due to the possible clearing of tall wetland vegetation (trees).

Cumulative Impacts

- Incremental losses and degradation of wetlands over time have depleted wetland resources.

- Some wetlands were previously impacted by construction of the existing lines (from access road construction and placement of structures in wetlands) and from agricultural activities.

- Executive Order 11990 requires Federal agencies to avoid adverse impacts to wetlands to the extent possible; BPA will span or avoid wetlands where possible.

Mitigation

- Before construction, wetlands with the potential to be impacted will be identified and flagged on the ground by a wetlands specialist.

- Avoid construction within designated wetland and wetlands buffers to protect potential groundwater recharge areas by avoiding wetland flagged areas.

- Locate structures, new roads, and staging areas so as to avoid waters of the U.S., including wetlands.

- Limit disturbance to the minimum necessary when working in or next to wetlands.

Summary

- Avoid mechanized land clearing within wetlands and riparian areas to avoid soil compaction from heavy machinery, destruction of live plants, and potential alteration of surface water patterns to reduce groundwater turbidity risk.
- Apply erosion control measures such as silt fence, straw mulch, straw wattles, straw bale check dams, other soil stabilizers, and reseeding disturbed areas as required (prepare a Stormwater Pollution Prevention Plan).
- Regularly inspect and maintain project facilities, including the access roads, to ensure erosion levels remain the same or less than current conditions.
- Avoid refueling and/or mixing hazardous materials where accidental spills could enter surface or groundwater.
- Use existing road systems, where possible, to access tower locations and for the clearing of the transmission line alignment.
- Avoid construction on steep, unstable slopes if possible.
- Place tower footings on upland areas and limit access road construction adjacent to wetlands, if possible.
- All excavated material not reused would be deposited in an upland area and stabilized.
- Where feasible, top trees instead of removing trees so roots and soil remain intact.

Vegetation

Affected Environment

- Four major vegetative communities were identified along the corridor using land use information (agricultural lands (50 percent), grass/forb and lithosol (3 percent), shrub/steppe (20 percent), and forest/deciduous shrub (25 percent). Other relatively non-vegetated areas (2 percent) in the project area include rocky outcrops, and disturbed areas such as gravel pits, open water.

- Grass/forb communities grow mainly within channelized scablands, where the topography is characterized by a series of small mounds, usually less than 50 feet in diameter, with intervening low lying areas, often lithosols.

- The shrub steppe community is found mainly on scablands common across the western portion of the corridor from the Grand Coulee Switchyard to near the town of Creston.

- The forest and deciduous shrub community typically occurs as scattered patches within agricultural areas, along drainages and in canyons.

- USFWS has identified three federally -isted threatened species, Ute Ladies'-tresses (*Spiranthes diluvialis*), Spalding's catchfly (*Silene sapldingii*), and Howellia (*Howellia aquatilis*) as having potential habitat present within the project corridor. A survey of the corridor identified potential habitat for Ute ladies'-tresses and Spalding's catchfly. Some of the wetlands within the project area are potential habitat for Ute ladies'-tresses. Potential Spalding's catchfly habitat is present within some of the forest/deciduous shrub community, as evidenced by the presence of the species it is normally associated with.

- Some weeds were noted in the project area during the summer of 2002 and a comprehensive weed survey will be conducted prior to construction. Weeds of concern within the project area include Canada thistle, common tansy, dalmation toadflax, diffuse knapweed, perennial sowthistle, and St. John's wort.

Environmental Consequences

- Tower construction would remove vegetation from immediate work areas and cause direct, short-term impacts to vegetation; the total area disturbed would be about 210 acres, about one-half of this in agricultural fields. The level of impacts would be moderate.

- New access road and spur road construction and access road maintenance would occur mainly in shrub steppe community areas that have already been disturbed by access road use and are not likely to be substantially affected by access road construction or improvement.

- Vegetation would be impacted by the operation of the transmission line. Maintenance typically involves removing tall trees that could interfere with lines, and keeping access roads open. The continued use of access roads within the project corridor could continue to cause indirect impacts such as soil compaction, damaging root structures, and dust clogging leaf surfaces. Because the maintenance activities would be almost entirely within an existing corridor that has been maintained for nearly 50 years, continued maintenance would have low to moderate impacts.

- Disturbed areas such as transmission corridors often become infested with noxious plant species. BPA would take measures to lessen the spread or introduction of noxious plants during construction. The level of impacts would be low to moderate.

- A biological assessment analyzing the effects of the project on federally-listed threatened and endangered species will be conducted pursuant to Section 7 of the Endangered Species Act.

Summary

Cumulative Impacts

- During the last century, agricultural development in the project area has had a significant impact on the amount of native plant communities within the landscape and on native plant ***biodiversity***. Due to the high value of some agricultural lands within the Columbia River Basin, the loss of shrub/steppe has accelerated. Within the area, the Department of Natural Resources continues to offer leases to state-owned lands for agricultural uses. In Washington, the continued loss of shrub/steppe in the next 50 years is projected to be high.

- Impacts to rare plant species could occur due to land use such as grazing, but it is likely that federal agencies will prioritize the protection of rare species habitats. However, rare plant species in private areas receive little to no protection under federal and state rare and endangered species legislation. Rare species would be continued to be impacted by a variety of land uses typical of private lands, including farming, ranching and development.

- Native steppe and shrub/steppe communities have declined substantially in recent years; however, such undisturbed plant communities are essentially absent from the corridor. The evidence supporting this conclusion is the presence of a diversity of native species that have persisted in the corridor despite the operation and maintenance of four transmission lines.

Mitigation

- Keep the proposed project within the existing corridor; locate staging areas and conductor tensioning sites outside of good quality native habitat areas.

- Use existing access roads, with minimal development of new roads.

- Keep additional vegetation clearing to the minimum needed to maintain safety and operational standards.

- Reseed or revegetate disturbed areas following construction.

- Conduct a pre- and post-construction noxious weed inventory to gather baseline information and determine the need for a noxious weed control plan including preventing noxious weed infestations by cleaning equipment traveling in and out of noxious weed-infested areas, using herbicide or biocontrol treatments, and reseeding disturbed areas with native species.

- If federally listed plant species are identified during the plant survey, these areas would

be avoided, if possible. A Biological Assessment, as required under the Endangered Species Act, would be produced and detailed actions to reduce or eliminate impacts on listed species would be discussed.

Fish

Affected Environment

- The corridor crosses 89 streams. The majority (55) are ephemeral non-fish-bearing streams that contain flowing water only during relatively brief periods following snow melt or rain storms. The remaining 34 streams are considered to be perennial and contain some water year-round during normal rainfall years. The corridor crosses only three creeks (Hawk Creek, Coulee Creek, and Deep Creek) and the Spokane River that contain sufficient water flow to support seasonal or year-round fisheries.

- Hawk Creek, which contains flowing water year-round, is thought to contain populations of brook and rainbow trout. Bull trout may occasionally enter the lower creek, but are prevented from moving upstream by Hawk Creek Falls.

- Coulee Creek and Deep Creek are ephemeral streams. When water is flowing in these creeks they are thought to support brook and rainbow trout.

- The Spokane River supports fish species adapted to both riverine and lacustrine environments. Salmonid species include rainbow trout, brown trout, and mountain whitefish. Other fish species may include largemouth sucker, sculpins, dace, redside shiner, and northern pikeminnow.

- Bull trout that may occur in the Spokane River in the vicinity of the project are believed to be migrants from the Pend Oreille bull trout stock as water temperatures in the Spokane River are considered to be too high to allow the fish to successfully reproduce. Although the Pend Oreille stock is regulated under ESA, bull trout within Lake Roosevelt or its tributaries are not regulated under ESA.

Environmental Consequences

- Routine operation of the transmission line is not expected to have any impacts on fish.

- Construction could cause short-term and localized increases in turbidity and sediment in fish-bearing streams due to the erosion of exposed soils entering the streams. Increases in turbidity could result in avoidance of immediate work areas by fish. Increases in sediment during the spawning and incubation period could result in sediment deposition over spawning areas, suffocating eggs and fry. Removing riparian vegetation during construction and maintenance could increase water temperatures above those preferred by

fish, reduce vegetative cover along stream banks and reduce rates of wood recruitment into the stream. The level of impacts could range from low to high depending upon timing of construction.

Cumulative Impacts

- In the Columbia River Basin ecosystem, fish distribution and population have been reduced by loss, fragmentation, and degradation of streams. Species such as salmon and trout have declined dramatically in the region since the conversion of rivers to reservoirs.

- Erosion and sedimentation of streams and loss of riparian habitat within the study area has increased over the past 100 years due to land use practices such as grazing, agriculture, road building, land clearing, military operations, and other disturbances, contributing to stream habitat degradation.

- The planned improvements to the access road in the vicinity of Hawk Creek are expected to have long-term beneficial effects on fish populations by reducing the amount of road runoff and erosion that is currently occurring in the vicinity of this creek.

Mitigation

- Use silt fences and straw bales to separate construction activities from watercourses and drainages.

- Limit disturbance to the minimum necessary when working adjacent to fish-bearing streams.

- Avoid mechanized land clearing within riparian areas to avoid soil compaction from heavy machinery, destruction of live plants, and potential alteration of surface water patterns.

- Deposit and stabilize all excavated material not reused in an upland area. No used material would be deposited in environmentally sensitive areas such as streams, riparian areas, wetlands, and floodplains.

- Apply erosion control measures such as silt fence, straw mulch, straw wattles, straw bale check dams, or other soil stabilizers in the vicinity of fish bearing streams.

- Coordinate with the WDFW on placement or replacement of suitable-sized culverts at all drainage crossings.

- Revegetate all construction-caused, exposed soils with native plants.

- Avoid refueling and/or mixing hazardous materials where accidental spills could enter surface or groundwater.

- Avoid construction activities near fish-bearing streams during the April-June period of trout egg incubation to the extent possible.

Wildlife

Affected Environment

- The corridor passes through three major wildlife habitat communities: agricultural, steppe (grass/forb and shrub steppe vegetation communities), and pine forest. In addition, the corridor crosses distinct, localized habitat areas: riparian and riverine habitats along the Spokane River; rock outcroppings and cliff habitats between the Columbia River and Banks Lake; and areas disturbed by urban development north of Spokane.

- Agricultural habitat does not support large wildlife populations; however, it does provide cover for short periods of time while vegetation is maturing, and emerging sprigs and waste grain provide a food source.

- Steppe habitat includes grass/forb and shrub steppe vegetation communities and over 70 wildlife species use these areas.

- Forested and deciduous shrub habitat forests provide habitat for a variety of wildlife, especially the peregrine falcon, western tanager, Cassin's finch, red crossbill, wild turkey, yellow pine chipmunk, and porcupine. Pine habitats near the Spokane River riparian zone are heavily used by Northwest white-tailed deer and beavers.

- Along and near the corridor priority habitat for mule deer, northern white-tailed deer, Rocky Mountain elk, bald eagle, sharp-tailed grouse, riparian priority habitats, and Urban Natural Open Spaces are designated.

- USFWS has identified two federally-listed species as potentially occurring in the area: bald eagles, listed as threatened, and the pygmy rabbit, listed as endangered. No habitat for bald eagles exists in the corridor. Although portions of the corridor are comprised of the shrub steppe habitat preferred by pygmy rabbits, no known populations exist within the corridor.

Environmental Consequences

- Increases in noise and loss of vegetation due to construction activities could have short- and long-term impacts to wildlife within and adjacent to the transmission line corridor. Noise associated with construction activities occurring during the breeding season

(March to August) in shrub steppe, forested, and riparian habitats, where wildlife abundance and diversity is usually greatest, could have a high impact.

- The level of impacts to wildlife habitat by removing vegetation during construction would be low to high.

- Road work, including construction of spurs, new access roads, and improvements to existing access roads, would cover approximately 25.5 miles and 80 acres. About 80 percent of this loss would be in steppe habitats, mostly shrub steppe. Impacts from road work are expected to be low to high.

- Some level of ongoing waterfowl, and perhaps raptor, mortality would be expected to occur as a result of the installation of the new transmission lines. Waterfowl losses to transmission line collisions are rarely shown to be biologically significant. Any raptor collisions would not be at levels that would change local breeding populations or distributions.

Cumulative Impacts

- In the Columbia River Basin ecosystem, biodiversity has been reduced by loss and fragmentation of native habitats, especially shrub/steppe habitat and dependent wildlife communities. Species dependants on shrub/steppe habitat, such as Columbian sharp-tailed grouse and pygmy rabbits, have declined dramatically in the region since conversion of steppe to agriculture land. The proposed project would contribute marginally to the loss of habitat.

- Important vegetation corridors connecting key wildlife habitats, such as riparian zones and Urban Natural Opens Space areas, in most cases would not be substantially impacted by the project.

Mitigation

- Mark with bird flight diverters or remove the ground wire at the span crossing the Spokane River and where the line spans wetlands.

- Limit removal of large riparian trees at the Spokane River crossing.

- Limit the removal of forest habitat to only those trees that would directly interfere with transmission lines. Retain or create snags within the corridor at a density of at least 2 snags per 1 acre. This partially compensates for forest characteristics lost during tree removal.

- When possible, avoid construction activities within high-use native habitats, especially

riparian, tall sagebrush, and dense pine forest habitats, during the breeding season (March 1 to August 15).

- Gate and lock access to the corridor, especially where the corridor crosses habitats heavily used by wildlife.

- Limit vehicular travel to access roads through sensitive habitat such as shrub/steppe.

Floodplains

Affected Environment

- The corridor crosses seven drainages identified on Federal Insurance Rate Maps as 100-year floodplains (Sherman Creek, Hawk Creek, Stock Creek, Coulee Creek, Deep Creek, the Spokane River, and Country Homes Canal).

Environmental Consequences

- All floodplains would be spanned; no impacts are expected due to construction of new towers, staging areas, or tensioning sites.

- Improvements to existing access roads and construction of new access roads are expected to have no impacts on floodplains.

- Existing wood pole structures located in or adjacent to floodplains would be cut off at ground level to avoid potential impacts associated with excavation and backfilling; no impacts would be expected.

- Riparian vegetation associated with proposed new right-of-ways in floodplain areas is not expected to be substantially impacted, thus no impact to floodplains is expected from new right-of-ways.

- Operation and maintenance are expected to have no impact on floodplains.

Cumulative Impacts

- The proposed project would not contribute to cumulative impacts to floodplains.

Mitigation

- Design the project to locate roads and structures to avoid floodplains completely.

- Locate structures to minimize the potential for creating obstructions to floodwaters.

- Near floodplain areas, deposit all excavated material not reused in an upland area and stabilize it.
- Re-contour and re-vegetate disturbed areas near floodplains with native and local species.
- Remove debris from construction and clearing within and near floodplains.