Chapter 4 — Environmental Consequences

In this Chapter:

- **Specific impacts from alternatives**
- **Recommended mitigation**
- **Cumulative impacts**

➡ For Your Information

Please review Chapter 2, Alternatives, for a full description of the alternatives.

Refer to Map 2, Alternatives, to review locations of the line segments and alternatives.

This chapter discusses the potential environmental impacts of the Agency Preferred Alternative (Alternative 2), other construction alternatives (Alternatives 1, 3, and 1A), and the No Action Alternative. Each alternative is composed of line segments discussed in Chapter 2, *Alternatives*, Section 2.1, *Segments*. Existing resources along each line segment are discussed in Chapter 3, *Affected Environment*. As in Chapter 3, this chapter discusses resources associated with the natural environment first and then the human environment. Impacts are discussed by alternative with reference to segments and the fiber optic line. A few resources (e.g., Air Quality) discuss the project as a whole because, for that resource, the impacts are the same for each alternative.

Impacts from the fiber optic line between Vantage and Midway, which is common to all alternatives, are included in the discussion of the transmission line for the Preferred Alternative. Also included with transmission line impacts in the Preferred Alternative are impacts from the fiber optic line between Midway and Wautoma. Impacts from the fiber optic line construction along the Vantage-Columbia line and the loop at Wautoma Substation are discussed separately.

To analyze potential impacts for construction, operation, and maintenance activities, resource specialists have analyzed actions using a scale with four impact levels: high, moderate, low, and no impact. Because definitions of these impact levels vary with each resource, explanations are provided with each of the resource discussions.

Specialists have considered the direct and indirect impacts of the alternatives over the short and long term. Direct impacts are caused by and occur at the same time and place as construction, operation, and maintenance activities. Indirect impacts are caused by the same activities but occur later in time or are farther removed in distance. However, these impacts are still reasonably foreseeable.

Impact discussions include recommended ***mitigation*** that could reduce both the direct, indirect, and ***cumulative impacts*** of the proposed alternatives. The level of detail for the impact discussions of

Mitigation *describes measures that could be taken to lessen the impacts predicted for each resource. These measures may include reducing or minimizing a specific impact, avoiding it completely, or rectifying or compensating for the impact.*

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

each resource depends on that resource's character and the significance of the issue. Additional detail for some resources is included in the appendices.

Construction of the alternatives would be typical of other BPA transmission line projects (for details, see Appendix C, *Construction Procedures*). General construction steps are summarized and information on structure site activities is given in the boxes below.

Construction Steps

Typical transmission line construction steps include:

- improving or constructing access roads
- clearing ROW
- preparing structure sites
- excavating and installing structure footings
- delivering structures to the sites (steel, insulators, conductors, and other miscellaneous equipment)
- assembling and erecting structures
- stringing and tensioning conductor, ground wire, and fiber optic cable
- installing counterpoise

Structure Site Activities

All vegetation would be removed from structure sites. Sites would be graded, if needed, to provide a level work area. An average area of about 100 ft by 150 ft would be disturbed at each structure site.

Each leg of a tower has a footing. Footings for suspension towers generally occupy an area of about 6 ft by 6 ft, to a depth of 12 ft. Footings at angle points would be larger and deeper, about 15 ft by 15 ft and 16 ft deep.

4.1 Water Resources, Soils, and Geology

For Your Information

For related water quality effects, see separate discussions under Sections 4.2, Floodplains and Wetlands; 4.4, Wildlife; and 4.5, Fish Resources.

Impacts to water, soils, and geology are interrelated and discussed as a group in this section.

4.1.1 Impact Levels

A **high** impact would occur where:

- a water body that supports sensitive fish, waterfowl, and animal habitat, or human uses such as drinking water would be extensively altered so as to affect its uses or integrity.
- the possibility of oil spills from substation equipment reaching groundwater would be high, such as in shallow groundwater areas, highly permeable soils, and where no secondary spill containment or protective measures are used.
- water quality would be degraded below state or federal agency standards and site conditions would be so unfavorable that major reclamation, special designs, or special maintenance practices would be required.

- road or facility construction or clearing would be required on sites that are prone to mass movement or have very high susceptibility to erosion.
- soil properties would be so unfavorable or difficult that standard mitigation measures, including revegetation, would be ineffective.
- long-term impacts associated with accelerated erosion, sedimentation, or disruption of unstable slopes would occur.

A **moderate** impact would occur where:

- water quality degrades below state or federal standards, but can be partially mitigated to lessen impacts. Site conditions require special planning and design.
- construction and clearing takes place near a water body on erodible soils that have moderate revegetation potential.
- new roads would be constructed across a stream or where existing stream crossings are inadequate and would require rebuilding.
- impacts would continue to occur until disturbed areas are reclaimed and sediment is no longer transported to surface waters.
- soil properties and site features are such that mitigation measures would be effective in controlling erosion and sedimentation within acceptable levels.
- impacts would be primarily short-term, with an increase in normal erosion rates for a few years following soil disturbance until erosion and drainage controls become effective.
- there would be little possibility of oils or other pollutants affecting groundwater because their level is deep, soils are relatively non-porous, and facilities have some minor spill protective measures.

A **low** impact would occur where:

- impacts to water quality could be easily mitigated to state or federal standards with common mitigation measures.
- there would be little or no possibility of oil or other pollutants affecting groundwater because their level is deep, soils are relatively non-porous, and facilities have good oil spill containment protective measures.
- structures or access roads near water bodies would be in stable soils on gentle terrain, with little or no clearing.
- structures would be away from water banks and little or no sediments would reach the water.

- there would be no construction or major reconstruction of roads.
- road and facility construction and clearing would be required on soils with low to moderate erosion hazard, and the potential for successful mitigation would be good using standard erosion and runoff control practices.
- erosion levels would be held near normal during and following construction.

No impact would occur where water quality and soils would remain unchanged.

4.1.2 Impacts Common to Construction Alternatives

Impacts to soils and geology are generally based on a site's susceptibility to long-term degradation. The following factors can increase a site's susceptibility:

- being prone to erosion and mass movement.
- having soils that are susceptible to compaction.
- having steep slopes.
- undergoing extensive clearing and access road construction.
- disturbing the soil surface and subsurface and removing vegetation increases the risk of soil erosion and mass movement, and may change soil productivity.

➡ For Your Information

Turbidity *is a reduction in the clarity of water from suspended materials such as clay, mud, organic material, or other materials.*

There are several general impacts of concern relating to hydrology and water quality:

- Runoff can increase sedimentation and water ***turbidity***.
- Road improvements and vehicular traffic at stream crossings can increase turbidity and alter stream channels.
- When agriculture soils are disturbed, nutrients leached from the soil or transported on soil particles can stimulate the growth of undesirable aquatic vegetation.
- Clearing streamside vegetation can increase a stream's exposure to sunlight, possibly raising water temperature.

Direct impacts would be caused by access road construction and improvements, maintenance activities, ROW clearing, and site preparation for structures and other facilities such as pulling and reeling sites and fiber optic installation. Canals and creek crossings, including one shoreline of the State (Naneum Creek) crossing, would use existing bridges fords and culverts, or would have new fords or culverts installed in coordination with U.S. Fish and Wildlife Service (USFWS), Corps of Engineers (COE), and appropriate state agencies. New crossings would disturb the soil surface; increase erosion, runoff, and sedimentation in nearby watercourses; impair soil productivity; and remove land from production. The amount of soil exposed by project construction has been calculated using the best available information. Table 4.1-1, *Area of Ground Disturbance*, summarizes the area of ground disturbance, and Table 4.1-2, *Access Road Distances*, summarizes the length of new access roads and improvements to existing access roads.

For Your Information

Section 303(d) streams, *as defined by the Federal Clean Water Act, are water quality limited streams that fall short of state surface water quality standards and are not expected to improve within the next four years.*

It is not anticipated that impacts to ***303(d) streams*** would alter those parameters for which they are listed, as described in Section 3.1.2.1, *Water Quality*. In addition, impacts to aquifers are not anticipated, provided that the proposed project would comply with local ordinances and laws and state and federal water quality programs that prevent degradation of the quality of aquifers and do not jeopardize their usability as a drinking water source.

Table 4.1-1
Area of Ground Disturbance

	Preferred (2) (acres)	Alternative 1 (acres)	Alternative 3 (acres)	Alternative 1A (acres)	M-C Fiber** Route (acres)
Access Roads	84.55	118.55	295.75	156.05	-
Reeling sites	6.00	4.50	5.00	5.00	4.25
Substation	17.10	-	17.10	-	-
Towers	125.00	119.90	114.70	139.60	-
Total	232.65	242.95	432.05	300.65	4.25

*Sickler-Schultz Option 2 would add 0.85 acres to the alternative chosen.
**Midway-Columbia Fiber
Table has been updated for the FEIS.

Assumptions used to determine ground disturbance are found in Appendix C, Construction Procedures.

Table 4.1-2
Access Road Distances

	Preferred (2) (miles)	Alternative 1 (miles)	Alternative 3 (miles)	Alternative 1A (miles)
New Construction	18.0	22.6	95.2	43.4
Improvements to Existing	56.3	87.6	98.3	69.8
Total Length	74.3	110.2	193.5	113.2

Table has been updated for the FEIS.

➡ Reminder

Rill erosion *is mild water erosion caused by overland flow producing very small and numerous channels.*

Gully erosion *is rapid erosion, usually in brief time periods, that creates a narrow channel that may exceed 100 ft. in depth.*

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

Some of the new access roads for the proposed project would be in steeply sloped terrain, which would increase soil exposure. Following construction, implementation of optimum erosion controls and revegetation of disturbed sites (cut and fill slopes and structure sites) would reduce the amount of soil exposure by about 60-70 percent. Impacts would be greatest in local sensitive areas susceptible to ***rill*** and ***gully*** erosion, and areas of unstable soil and rock. Short-term impacts during and following construction would be most intense. The intensity of long-term impacts would be directly proportional to the success of revegetation, and erosion and runoff control efforts. With implementation of ***Best Management Practices*** (BMPs), sedimentation could be reduced to acceptable levels and would not cause degradation of water quality below the Washington Department of Ecology (WDOE) standards. Impacts to water and soils are summarized in Table 4.1-3, *Impacts to Water and Soil Resources*.

Table 4.1-3
Impacts to Water and Soil Resources

Alternative	Actions	Impacts to Soil	Impacts to Water Resources
Preferred (2)	Construction of structures and access roads, use of fords or culverts at stream crossings, removal of structures, crossing of areas with 25-50% slopes and construction of fiber optic route.	Low to moderate erosion and loss of productive soils. Some increased runoff and sedimentation.	Short-term moderate sedimentation and increased runoff, short-term turbidity. Water bodies: Caribou, Coleman, Cooke Canyon, Naneum, Cave, Parke, Schnebly, Wilson, Columbia River[1,2,5], Johnson, Middle Canyon and various drainages. New Crossings: 5 fords and 2 culverts. Existing Crossings: 17 upgraded, 1 culvert replacement and 2 ford replacements.
1	Construction of structures and access roads, use of fords or culverts at stream crossings, removal of structures, construction of fiber optic route, crossing of areas with 25-50% slopes, crossing adjacent to Saddle Mountain Lake	Low to moderate erosion and loss of productive soils. Some increased runoff and sedimentation.	Short-term moderate sedimentation and increased runoff, short-term turbidity. Water bodies: Caribou, Coleman, Cooke Canyon, Naneum, Cave, Parke, Schnebly, Wilson, Columbia River[1,2,5], Johnson, Middle Canyon, Lower Crab [1,2,3,4], Nunnally Lake, Saddle Mountain Wasteway, various canals and various drainages
3	Construction of structures and access roads, use of fords or culverts at stream crossings, removal of structures, construction of fiber optic route, crossing of areas with 25-50% slopes or greater.	Moderate erosion, increased runoff. Loss of productive soils.	Moderate sedimentation, short-term turbidity, increased runoff. Water bodies: Caribou, Coleman, Cooke Canyon, Naneum, Cave, Parke, Schnebly, Wilson, Alkali, Cold, Hanson, Johnson, Middle Canyon, Corral, various canals and drainages
1A	Improvements to existing access roads only, use of ford or culvert at Cold Creek crossing, crossing, construction of fiber optic route, areas with 25 to 45% slopes, double-circuit in agricultural lands	Low erosion, loss of productive soils	Short-term low sedimentation Water bodies: Cold Creek (intermittent at crossing during summer months), Caribou, Coleman, Cooke Canyon, Naneum, Cave, Parke, Schnebly, Wilson, Lower Crab Ck.[1,2,3,4], Columbia River[1,2,5], various canals, Mattawa Drain[2]: Nunnally Lake, Saddle Mountain Wasteway, various canals and drainages
No Action	Ongoing maintenance	None to low, localized soil disruption	Continued vehicle and machinery use and vegetation management practices.

303(d) listings for: 1-pH, 2-Temperature, 3-PCB, 4-DDE, 5-Dissolved gas, 6-DO, 7-Fecal Coliform
Table has been updated for the FEIS.

Increased sediment in streams is expected from the construction of an alternative. The volume of peak flow and the amount of sediment

entering streams would depend on site-specific conditions. Mitigation measures proposed for construction of the line would help reduce the chance of large amounts of sediment entering streams. The new line would be constructed to prevent interference with ongoing farm conservation efforts to control erosion and maintain water quality. Although minor, localized increases in erosion, runoff, and sedimentation are expected from construction and maintenance. These increases would have a low impact on the area's soil resources and water quality, and would not impair the current beneficial use of any water body.

Controlling vegetation in the proximity of surface waters (such as creeks, rivers, lakes and wetlands) has the potential to affect the water quality and could indirectly affect groundwater aquifers. To minimize impacts to waters and soils, BPA uses the procedures developed in the Transmission System Vegetation Management Program DOE/EIS-0285. This program provides maintenance crews direction for how to manage vegetation on BPA rights-of-way and facilities. It also puts steps in place for ensuring environmental compliance on site-specific vegetation control projects. The program provides specific buffer widths that vary based on herbicide toxicities (defined for each herbicide used by BPA, by concentration, characteristics, and type of application used near water bodies, agriculture irrigation, domestic/public drinking water wells, water intakes/spring developments and sole source aquifers). BPA would follow the Transmission System Vegetation Management Program as part of vegetation maintenance policy to minimize impacts to water quality and vegetation. It is anticipated that there would be low to no impact on water quality from the use of herbicides to control vegetation near water bodies.

4.1.3 No Action Alternative

The impacts currently associated with ongoing maintenance activities for the existing transmission line, substations, and ROW would continue. These impacts include localized soil disturbance and potential sedimentation due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. In addition, vehicle and machinery use, and vegetation management practices could contribute minor amounts of pollutants (e.g., fuel, oil, grease, rubber particulate, woody debris) that could be transported to streams.

4.1.4 Recommended Mitigation

Standard mitigation would use measures best suited to each individual location, in order to reduce erosion and runoff and stabilize disturbed areas during and after construction. The following

measures, used alone or in combination, would minimize soil disturbance and the effects of increased erosion and surface runoff created by access road improvements and transmission line construction:

- Properly space and size culverts; use crossdrains, water bars, rolling the grade, and armoring of ditches; drain inlets and outlets.
- Coordinate all culvert and ford installations with the COE and other appropriate state agencies.
- Preserve existing vegetation where possible, and stabilize disturbed portions of the site. As soon as practicable, stabilization measures would be started where construction activities have temporarily or permanently ceased.
- Seed disturbed sites at the appropriate times to minimize the invasion of non-native species using a native herbaceous seed mixture suited to the site. Work with BLM, BOR, USDOA, and USFWS to determine appropriate seed mixture, planting times, and methods.
- Use vegetative buffers and sediment barriers to prevent sediment from moving off site and into water bodies.
- Discuss with farm operators ***sub soiling*** to restore soil productivity and monetary compensation.
- Design and construct all fords and bridges to minimize bank erosion.
- Schedule maintenance operations during periods when precipitation and runoff possibilities are at a minimum, in order to reduce the risk of erosion, sedimentation, and soil compaction.
- Design substation facilities to meet regional seismic criteria.
- If needed to stabilize the roadbed, consider ***full-bench road construction*** and hauling excess sidecast material on slopes exceeding 55 percent. Prior to construction, suitable waste areas should be located where excess materials can be deposited and stabilized.
- Use the BMPs that would prevent further impairment of water quality limited drainages.
- Avoid riparian areas, drainage ways, canals, and other water bodies. When these areas cannot be avoided, apply sediment reduction practices in order to prevent degradation of riparian or stream quality.
- Restrict road construction to the minimum needed and obliterate roads in agricultural land.

For Your Information

Compaction affects soil productivity, reduces infiltration capacity, and increases runoff and erosion. Sub soiling, normal farming, cultivation and cropping, and freeze-thaw cycles restore soils to their pre-construction condition.

***Sub soiling** is plowing or turning up the layer of soil beneath the topsoil.*

***Full-bench road construction** is cutting into the hillside to accommodate the whole road prism.*

- Avoid or mitigate water quality and fish habitat degradation. Design and maintain roads so that drainage from the road surface does not directly enter live streams, ponds, lakes, or impoundments. Direct water off of roads into vegetated areas, or control it through other sediment-reduction practices. Restrict road construction to areas that are physically suitable, based on watershed resource characteristics. Design stream crossings to avoid adverse impacts to stream hydraulics and deterioration of stream bank and bed characteristics.
- Avoid the discharge of solid materials, including building materials, into US waters. Off-site tracking of sediment and the generation of dust shall be minimized. Vegetative buffers would be left along stream courses to minimize erosion and bank instability.
- Prepare a stormwater pollution prevention plan (as required under the National Pollution Discharge Elimination System General Permit).
- Near all water bodies, set crossing structures as far back from stream banks as possible. Avoid refueling and/or mixing hazardous materials where accidental spills could enter surface or groundwater.
- Herbicide use to control vegetation near waterways will be used in accordance with the Transmission System Vegetation Management Program (USDOE, 2000), to limit impacts to water quality.
- Design the project to comply with state and federal water quality programs, in order to prevent degradation of the quality of aquifers and not jeopardize their usability as a drinking water source.

4.1.5 Cumulative Impacts

Current and future agriculture, YTC activities, and other land development activities in the watersheds crossed might increase peak flows and introduce sediment into streams. Increased sediment in streams is expected from construction of the project in addition to agricultural and other land disturbing activities. The volume of peak flow and the amount of sediment entering streams would depend on site-specific conditions. Implementing mitigation measures proposed for construction of the line would help reduce the chance of large amounts of sediment entering streams. This project would be constructed to prevent interfering with ongoing farm conservation efforts to control erosion and maintain water quality. Although minor, localized increases in erosion, runoff, and sedimentation are expected from construction and maintenance, these increases would have a

low impact on the area's soil resources and water quality and would not impair the current beneficial use of any water body.

4.2 Floodplains and Wetlands

4.2.1 Impact Levels

Impacts would be considered **high** where:

- a wetland area would be destroyed by permanently filling all or most of it or by altering wetland hydrology.
- a wetland area would be destroyed that serves as habitat for a rare plant or animal species, or that is considered a rare wetland type.
- one or more significant wetland functions would be destroyed, such as the ability to provide wildlife habitat, improve water quality, detain water during peak flows, recharge groundwater, trap sediment, serve as a recreational use, or provide an aesthetically pleasing landscape.

For Your Information

Scrub-shrub wetlands *are wetlands that are dominated by low, woody vegetation.*

- wetland vegetation cover type(s) would be permanently affected through altering soils or hydrology, such as converting a ***scrub-shrub wetland*** to an open-water area.
- all or most of the native wetland vegetation would be replaced with weedy, non-native species.
- the connectivity of a wetland to other wetlands, surface waterways, or sub-surface water features would be destroyed.

*A **buffer area** is a strip of vegetation surrounding a stream or wetland that provides habitat for wildlife, reduces or traps sediments, and slows runoff velocity.*

- a wetland ***buffer area*** would be destroyed, resulting in impaired wetland functions, such as the ability to provide wildlife habitat.
- The amount of flood storage in a floodplain would be significantly decreased, or the course of flood waters would be greatly altered.

Impacts would be considered **moderate** where:

- a portion of a wetland area would be filled such that the majority of the wetland would still able to function as a wetland.
- a rare or unique wetland type would be degraded.
- one or more significant wetland functions would be degraded or impaired.

Reminder

Riparian *refers to vegetated areas surrounding streams, rivers, lakes, or wetlands.*

- the diversity of native plant species within a wetland would be significantly decreased.
- native trees in ***riparian*** areas would be removed.
- a native wetland plant community would be degraded through the introduction of weedy, non-native species.

- hydrology would be altered such that a wetland would decrease in size, or the vegetation cover type would be partially altered.
- the connectivity of a wetland to other waters would be diminished.
- a wetland buffer area would be partially destroyed or degraded, resulting in impaired wetland functions.
- the amount of flood storage in a floodplain would be moderately decreased.

Impacts would be considered **low** where:

- a wetland would be temporarily filled or wetland hydrology, soils, or vegetation would be altered. This would be followed by restoring the area to its former condition or enhancing the area.
- a wetland function or value would be temporarily disrupted or partially diminished.
- the amount of flood storage in a floodplain would slightly decrease (e.g., due to erecting a structure in a floodplain).

No impact would occur where:

- direct impacts to wetlands or buffers would be avoided.
- wetland hydrology, vegetation, or soils would not be affected by nearby activities.
- the functions of a wetland area would not be affected by nearby activities.
- direct impacts to floodplains would be avoided.

4.2.2 Impacts Common to Construction Alternatives

Floodplains within the study area may be directly impacted by the placement of structures in several locations. It is not expected that constructing access roads to these structures would significantly impact floodplains, because this construction would not alter the amount of flood storage or the course that flood waters would take.

Most of the wetlands within the study area are not extensive, and would be spanned by structures placed in upland areas adjacent to wetlands. Roads and culvert crossings would be designed to minimize impacts to wetland areas.

The ongoing maintenance of transmission lines and access roads could impact wetlands in several ways. Some trees may need to be removed for safety reasons. Because trees are uncommon along riparian areas in shrub-steppe communities, they serve an important function as nesting and perching habitat for birds. For this reason,

Reminder

Noxious weeds *are particularly troublesome weeds designated by Washington State law. The list of noxious weed species is divided into three classes (A, B, and C) within each county, based on the state of invasion.*

removing trees is considered a moderate level of impact. Roads serve as a corridor for invasion by some weed species that tend to grow in wet areas. If ***noxious weeds*** were introduced into riparian or wetland areas as a result of project activities, this would be a moderate level of impact. Spraying of weeds along roads may affect wetland water quality, a low level of impact. Road maintenance and grading may increase sedimentation into wetlands, a low level of impact.

4.2.3 Preferred Alternative (Alternative 2)

The Preferred Alternative, comprised of Segments A, Option B_{SOUTH}, D, and the fiber route from Vantage to Columbia, was field surveyed for wetlands in summer 2002. A total of six wetlands were identified along Segment A. No wetlands were found along segments B_{SOUTH} and the Vantage Columbia fiber route. One wetland associated with Lower Crab Creek was identified on Segment D. The field survey determined that all other NWI identified features in Section 3.2 are not wetlands.

4.2.3.1 Segment A

The field survey identified 6 wetlands along Segment A. Wetlands associated with the Nanuem/Wilson Creek crossing would have moderate impacts from construction of one structure. One would have a low impact from an existing road to be reconstructed. One wetland would be avoided resulting in no impacts. Some trees would be removed from Cooke Creek resulting in a moderate impact (See Table 4.2-1, *Segment A Impacts to Wetlands*.)

The Sickler-Schultz Reroute also crosses an emergent wetland associated with Naneum Creek and a forested wetland associated with Wilson Creek. Under Option 1 of the Sickler-Schultz Reroute, trees would be removed from the Wilson Creek wetland resulting in a moderate impact.

One structure and a new access road would be constructed within the 100-year floodplain of Naneum/Wilson creek, slightly decreasing the amount of flood storage, which would be a low level of impact. The floodplain of Cooke Creek would be avoided resulting in no impact to the 100-year floodplain.

Table 4.2-1
Segment A Impacts to Wetlands

Feature	Classification	Township, Range, Section	Potential Impacts (Level of Impact)
Naneum Creek (Sickler-Shultz Reroute, Options 1 & 2)	Emergent wetland	T19N, R19E, Sec 20	No impacts
Wilson Creek (Sickler-Shultz Reroute Option 1)	Forested wetland	T19N, R19E, Sec 20	Four trees would be removed. (Moderate Impact)
Wilson Creek (Sickler-Shultz Reroute Option 2)	Forested wetland	T19N, R19E, Sec 20	No impacts
Naneum/Wilson Creek, associated wetland, and man made swale	Palustrine, scrub-shrub and emergent wetland, seasonally flooded	T19N, R19E, Sec 20, 21	New transmission structure partially within associated wetland, tower and road within floodplain (Moderate Impact)
Ephemeral drainage and wetland	Riverine (seep), intermittent, seasonally flooded, & Palustrine emergent wetland, seasonally flooded	T19N, R19E, Sec 35	Existing access road to be reconstructed, existing culvert to remain (Low Impact)
Cooke Creek associated wetland	Palustrine, forested wetland, seasonally flooded	T18N, R20E, Sec 6	Access road will avoid creek and associated wetland, floodplain would be avoided, transmission line spans creek and associated wetland, 25-30 cottonwood trees would be removed (Moderate Impact)
Caribou Creek associated wetland	Palustrine, scrub-shrub wetland, seasonally to permanently flooded	T18N, R20E, Sec 8	Access road will avoid creek and associated wetland (No Impact)

Table has been updated for the FEIS.

4.2.3.2 Segment B

The Preferred Alternative would follow Option B_{SOUTH} of Segment B.

Option B_{SOUTH} - The transmission line would span the floodplain of the Columbia River resulting in no impact to the 100-year floodplain on segment B. No wetlands were found during a wetland field survey. Therefore, no impact would occur to wetlands along Segment B_{SOUTH}.

Option B_{NORTH} – Option B_{NORTH} would span all wetlands and riparian areas. Two narrow wetlands associated with creeks are located along Segment B_{NORTH}. Although structures would be placed outside riparian areas, these creeks may be traversed by an access road, which would be a moderate level of impact. Structures would not be placed within the Columbia River floodplain, resulting in no impact. (See Table 4.2-2, *Option B_{NORTH} Impacts to NWI Mapped Wetlands*.

Table 4.2-2
Option B_{NORTH} Impacts to NWI Mapped Wetlands

Feature	Classification	Township, Range, Section	Potential Impacts (Level of Impact)
Unnamed creek	palustrine, emergent wetland, persistent vegetation, temporarily flooded	T16N, R22E, Sec 15	Possible Access Road Crossing (Moderate)
Unnamed creek	riverine, seasonally flooded	T16N, R22E, Sec 23	Possible Access Road Crossing (Moderate)

Table has been updated for the FEIS.

4.2.3.3 Segment D

Structures along Segment D would avoid all wetlands and riparian areas (See Table 4.2-3, *Segment D Impacts to Wetlands*.) The transmission line would span the floodplain of the Columbia River and Lower Crab Creek. A new access road with two 9-foot arch culverts would cross Dry Creek and its 100-year floodplain, which would be a high impact.

The proposed Wautoma Substation will be built above the floodplain, therefore no impacts to the floodplain from the substation would occur.

Table 4.2-3
Segment D Impacts to Wetlands

Feature	Classification	Township, Range, Section	Potential Impacts (Level of Impact)
Lower Crab Creek	Palustrine emergent wetland, persistent vegetation, seasonally to permanently flooded	T15N, R23E, Sec 2	No road crossing (No Impact)

Table has been updated for the FEIS.

Reminder

Segment A would have a moderate impact to wetlands and no impact to floodplains, Segment B would have no impact to wetlands or floodplains.

4.2.4 Alternative 1

Impacts to wetlands along Segments A and B_{SOUTH} would be the same as described under the Preferred Alternative (See Section 4.2.3.1, *Segment A* and Section 4.2.3.2 *Segment B)*. Segment E did not

receive field verification for wetlands. If Alternative 1 were chosen, wetland surveys would be completed on Segment E to verify the presence of wetlands and impacts.

4.2.4.1 Segment E

No structures along Segment E would be constructed within a wetland or riparian area. There may be trees in riparian areas that would need to be removed for safety, a moderate level of impact. Floodplain impacts will be minimized by designing and placing road crossings to maintain existing channel properties and floodplain function.

In the valley agricultural areas, the proposed line would cross four irrigation ditches that have NWI designations. Structures would be situated to avoid these ditches, although they may be crossed by access roads, a moderate level of impact. (See Table 4.2-4, *Segment E Impacts to NWI Mapped Wetlands*.)

Table 4.2-4
Segment E Impacts to NWI Mapped Wetlands

Feature	Classification	Township, Range, Section	Potential Impacts (Level of Impact)
Wetland	palustrine, emergent, persistent vegetation, seasonally flooded	T16N, R23E, Sec 35	No Impact
Wetland	palustrine, emergent, persistent vegetation, seasonally flooded	T16N, R23E, Sec 35	No Impact
Wetland fed by outflow channel from Nunnally Lake	lacustrine, littoral, unconsolidated bottom, permanently flooded and diked/impounded	T16N, R23E, Sec 35	No Impact
Lower Crab Creek	palustrine, emergent wetland, with persistent vegetation, seasonally to permanently flooded	T15N, R23E, Sec 2	No Road Crossing (No Impact) Possible Tree Removal (Moderate)
Irrigation ditch	riverine, artificially flooded, seasonally flooded, excavated	T15N, R24E, Sec 25	Possible Access Road Crossing (Moderate)
Irrigation ditch	riverine, excavated	T15N, R25E, Sec 31	Possible Access Road Crossing Moderate)
Irrigation Ditch	palustrine, open water, semi-permanently flooded, excavated	T15N, R25E, Sec 11	Possible Access Road Crossing (Moderate)
Irrigation Ditch	riverine, artificially flooded, seasonally flooded, excavated	T14N-R26E-11	Possible Access Road Crossing (Moderate)
Saddle Mountain Lake	riverine, semipermanently flooded	T14N, R26E, Secs. 20 & 29	No Impact
Columbia River	palustrine, emergent, with persistent vegetation, seasonally flooded	T14N-R26E-29 & 28	No Impact

Table has been updated for the FEIS.

Reminder

Segment A would have a moderate impact to wetlands and no impacts to floodplains.

4.2.5 Alternative 3

Impacts to wetlands along Segment A would be the same as described under the Preferred Alternative. (See Section 4.2.3.1, *Segment A*.) Segment C did not receive field verification for wetlands. If Alternative 3 were chosen, wetland surveys would be completed on Segment C to verify the presence of wetlands and impacts.

4.2.5.1 Segment C

Structures along Segment C would avoid all wetlands and riparian areas. The NWI depicts 12 narrow wetlands associated with streams. Access roads may need to be constructed across most of these streams, a moderate level of impact. (See Table 4.2-5, *Segment C Impacts to NWI Mapped Wetlands*.) A new access road with two 9-foot arch culverts would cross Dry Creek and its 100-year floodplain, which would be a high impact. The proposed Wautoma Substation would be built above the floodplain, therefore no impacts to the floodplain from the substation would occur.

Table 4.2-5
Segment C Impacts to NWI Mapped Wetlands

Feature	Classification	Township, Range, Section	Potential Impacts (Level of Impact)
Johnson Creek	palustrine, emergent wetland, with persistent vegetation, seasonally flooded	T16N, R22E, Sec 20	Possible Access Road Crossing (Moderate)
Hanson Creek	palustrine, emergent wetland, with persistent vegetation, seasonally flooded	T15N, R22E, Sec 8	Possible Access Road Crossing (Moderate)
Cottonwood Creek	riverine, seasonally flooded, mapped to the east of the proposed line; palustrine, emergent wetland, with persistent vegetation, seasonally flooded, mapped to the west	T15N, R22E, Sec 21	Possible Access Road Crossing (Moderate)
Unnamed creek	riverine, seasonally flooded (includes two forks of the creek)	T15N, R22E, Sec 28	Possible Access Road Crossing (Moderate)
Creek in Alkali Canyon	palustrine, emergent wetland, with persistent vegetation, seasonally flooded	T14N, R22E, Sec 3	Possible Access Road Crossing (Moderate)
Creek in Corral Canyon	palustrine, scrub-shrub wetland, with broadleaf deciduous vegetation, temporarily flooded	T14N, R22E, Sec 15	Possible Access Road Crossing (Moderate)
Tributary to creek in Corral Canyon	palustrine, emergent wetland, with persistent vegetation, seasonally flooded	T14N, R22E, Sec 14	Possible Access Road Crossing (Moderate)
Tributary to creek in Corral Canyon	riverine, seasonally flooded	T14N, R22E, Sec 23	Possible Access Road Crossing (Moderate)
Creek in Sourdough Canyon	riverine, seasonally flooded	T14N, R22E, Sec 25	Possible Access Road Crossing (Moderate)
Cold Creek	riverine, seasonally flooded	T13N, R23E, Sec 20	Possible Access Road Crossing (Moderate)
Tributary to Cold Creek	riverine, seasonally flooded	T13N, R23E, Sec 35	Possible Access Road Crossing (Moderate)
Dry Creek	riverine, seasonally flooded	T12N, R24E, Sec 20	No impact

Table has been updated for the FEIS.

Reminder

Segment A would have a moderate impact to wetlands and no impact to floodplains, Segment B would have no impact to wetlands or floodplains.

4.2.6 Alternative 1A

Impacts to wetlands along Segments A and B_{SOUTH} would be the same as described under the Preferred Alternative (See Section 4.2.3.1, *Segment A* and Section 4.2.3.2 *Segment B)*. Segment F did not receive field verification for wetlands. If Alternative 1A were chosen, wetland surveys would be completed on Segment F to verify the presence of wetlands and impacts.

4.2.6.1 Segment F

Structures along Segment F would avoid all wetlands and riparian areas. There are nine features depicted on the NWI maps. Access roads may need to be constructed across two of these streams, a moderate level of impact. Some of the trees that line the edge of Nunnally Lake might need to be removed, a moderate level of impact. Floodplain impacts will be minimized by designing and placing road crossings to maintain existing channel properties and floodplain function.

Roads and structures would avoid two emergent wetland areas north of Lower Crab Creek. The wetlands along Lower Crab Creek would be spanned, but there may be trees in the riparian area that would be removed or topped, a moderate level of impact.

In the valley agricultural areas, an access road would cross an irrigation ditch that has a NWI designation and possibly a wetland, a moderate impact. (See Table 4.2-6, *Segment F Impacts to NWI Mapped Wetlands*.)

Table 4.2-6
Segment F Impacts to NWI Mapped Wetlands

Feature	Classification	Township, Range, Section	Potential Impacts (Level of Impact)
Nunnally Lake	lacustrine, limnetic, open water/unknown bottom, permanently flooded	T16N, R23E, Sec 25-36	No Road Crossing (No Impact) Possible Tree Removal (Moderate)
Wetland	palustrine scrub-shrub wetland/emergent wetland with persistent vegetation, seasonally flooded	T16N, R23E, Sec 36	No Impact
Wetland	palustrine, emergent wetland with persistent vegetation, seasonally flooded	T16N, R23E, Sec 36	No Impact
Wetland north of Lower Crab Creek	palustrine, emergent wetland with persistent vegetation, seasonally flooded	T16N, R23E, Sec 36	No Impact
Lower Crab Creek	riverine, lower perennial, open water, permanently flooded	T16N, R23E, Sec 36	No Road Crossing (No Impact) Possible Tree Removal (Moderate)

Reminder

Mapped wetlands are shown on Map 5, Wetlands/Plant Associations.

Feature	Classification	Township, Range, Section	Potential Impacts (Level of Impact)
Irrigation Ditch	palustrine, open water, semi-permanently flooded, excavated	T15N, R26E, Secs. 21 and 28	Possible Access Road Crossing (Moderate)
Wetland	palustrine, emergent wetland	T14N, R26E, Secs. 16 and 21	Possible Access Road Crossing (Moderate)
Saddle Mountain Lake	palustrine, emergent, with persistent vegetation, seasonally flooded	T14N, R26E, Secs. 20 and 29	No Impact
Columbia River	riverine	Secs. 29 and 28	No Impact

Table has been updated for the FEIS.

4.2.7 No Action Alternative

Current levels of disturbance to wetlands and floodplains would continue under this alternative. The impacts currently associated with ongoing maintenance activities for the existing transmission line, substations, and ROW would continue. These impacts include localized soil disturbance and potential sedimentation due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. In addition, vehicle and machinery use, and vegetation management practices could contribute minor amounts of pollutants (e.g., fuel, oil, grease, rubber particulate, woody debris) that could be transported to wetlands.

4.2.8 Recommended Mitigation

Before and during construction, the following procedures and construction practices would be adopted to ensure that designated wetland and riparian areas are not impacted:

- Wetlands would be mapped, along with buffer areas to avoid direct and indirect impacts.
- Workers would receive instruction in construction practices that avoid or minimize wetland impacts.
- Workers would be informed of which areas are restricted and must not be impacted.
- Restricted wetland and riparian areas would be mapped.
- The boundaries of restricted areas, such as protected wetland and riparian areas, would be flagged by a wetland scientist prior to construction, using designated flagging to ensure that workers do not unintentionally enter restricted wetland areas.
- Wetland impacts from road crossings would be minimized through proper culvert design, timing, and methods of installation.
- Indirect impacts to wetlands and waterways from sedimentation and erosion would be minimized, by erecting silt fences or other appropriate sediment control devices around areas where soil

would be disturbed when construction is to occur near a wetland or waterbody.

- To minimize temporary impacts, avoid compacting wet soils and minimize harm to herbaceous vegetation, vehicle crossings of wetland areas would be accomplished using equipment mats that would be removed after construction.
- Herbicide use to control vegetation near waterways will be used in accordance with the Transmission System Vegetation Management Program (USDOE, 2000), to limit impacts to water quality.
- Conditions placed within the Section 404 Removal/Fill Permit would be met. (See Section 5.16, *Discharge Permits under the Clean Water Act* for permit discussion.)

Ongoing maintenance practices would be conducted with a sensitivity to the issues of wetland and riparian areas. Road grading and other disturbances to the road surface would be minimized near riparian areas. If any weeds occur along roads adjacent to wetlands and riparian areas, only herbicides approved for aquatic use would be used.

4.2.9 Cumulative Impacts

Wetlands would be impacted by any projects within the Columbia Basin that affect wetland functions and values, including the filling of wetland areas. Projects such as land development, agriculture, and pipeline development may impact wetlands in the study area. Wetland loss and floodplain impacts reduce flood storage capacity and affects water quality. As development occurs, the need for flood storage increases.

Information is available that quantifies wetland impacts in central Washington (Pers. Comm. Catherine Reed, WDOE, 2001). Between July 1, 2000 and July 1, 2001, two permits were issued in Benton, Grant, Kittitas and Yakima Counties for projects that disturbed wetlands, for a total of 0.83 acre of disturbed area. This information on the number of permitted wetland impacts may not accurately reflect wetland loss because wetland impacts can occur without regulating agencies' knowledge. Also, some people are unaware that temporarily wet areas may be ***ephemeral wetlands*** that meet wetland criteria. Many wetlands may be filled without permits.

For Your Information

Ephemeral wetlands *are wetlands that are only filled with water for a brief time during the spring.*

One of the most common types of wetland impacts in the study area are road crossings. One of the main impacts from roads crossing wetlands and waterways is the spread of weed species into previously undisturbed areas, a major problem in central Washington (Pers. Comm. Catherine Reed, WDOE, 2001).

4.3 Vegetation

4.3.1 Impact Levels

Impacts would be considered **high** where:

- the quantity or quality of a unique or ***high quality plant community*** would be significantly reduced.
- the substrate would be altered such that recovery of a unique or high quality plant community would not be likely.
- the diversity within a high quality native plant community would be significantly decreased.
- impacts would result in the taking of a federally listed, proposed, or candidate plant species.
- noxious weeds would be introduced into a high quality native plant community.
- Noxious weeds would be introduced into a rare plant population.

Impacts would be considered **moderate** where:

- native plant communities would be permanently removed through removal of plant parts and/or altering the substrate.
- the diversity within a native plant community would be decreased or the community would be degraded as a result of altering physical characteristics (e.g., increasing erosion).
- removing the native species component of a plant community where native species are a minor component.
- Native tree species in riparian areas would be removed or topped.
- the density of noxious weeds is increased in a location where they are already present.
- impacts to a federally listed, proposed, or candidate plant species would not affect the viability of local populations of that species.
- impacts to rare or ***endemic*** plant species (including federal species of concern, ***BLM*** special status species, and state listed species) could only be partially lessened by mitigation.

Reminder

high quality plant communities *are areas of native vegetation with little or no disturbance or exotic species.*

Endemic *is a naturally occurring species that is limited to a particular geographic area.*

BLM*: U.S. Bureau of Land Management*

Impacts would be considered **low** where:

- native plant communities would be temporarily disturbed or altered such that natural recovery to pre-disturbance conditions would be likely.
- the life history of native plant species would be temporarily impaired through disturbance to vegetative portions, impairing the functioning of pollinator species, or decreasing reproductive potential.
- vegetation would be permanently removed from a plant community dominated by non-native species.
- a population of rare plants would be temporarily impacted, but could be completely mitigated (as demonstrated through subsequent monitoring).
- the density of noxious weeds or other undesirable non-native species would be increased in areas where they were already present.

No impact would occur where:

- direct or indirect disturbance to native plant communities would be avoided.
- the habitats of rare or endemic plant species would be completely avoided.
- there would be no increase in the cover or distribution of weedy, non-native species.

4.3.2 Impacts Common to Construction Alternatives

4.3.2.1 Construction Impacts

Plant communities would be directly and indirectly impacted as a result of various project activities, and these impacts may be temporary or permanent. Some impacts to vegetation from construction activities would be fairly consistent among all the alternatives, such as the potential spread of weed species into disturbed areas.

➡ For Your Information

*When referring to vegetation, **aspect** is the direction a slope is facing.*

The amount of disturbance to vegetation caused by a particular activity would depend on a variety of factors, including the type of vegetation and site characteristics (e.g., soil type, slope, elevation, ***aspect***, and amount of moisture). In general, shrub-steppe plant communities are slow to recover from disturbance. Although little is known about how well they recover or how long it takes, the effects of disturbance are well documented.

Riparian areas are particularly vulnerable to disturbance. The removal of vegetation along waterways causes an increase in water temperature, increases water velocity, and decreases wildlife habitat. Disturbance of soil in or near riparian areas may lead to erosion of stream banks, which increases the deposition of sediment into waterways. In riparian areas where trees or tall growing vegetation pose a safety hazard to transmission lines, they would need to be removed (a moderate level of impact).

For Your Information

Biological crusts *are groups of living organisms that coat the soil or live just below the soil surface.*

In relatively undisturbed areas, soil disturbance decreases the soil cover provided by ***biological crusts***. Disturbance of biological crusts decreases soil fertility and increases the likelihood that an area would be invaded by non-native species. It is difficult to determine the extent of this impact, because the location and quality of biological crusts within the study area is not known. The disturbance of biological crusts in native plant communities would be a moderate level of impact.

The construction of new access roads would involve clearing the proposed road area to a width of at least 20 feet (14 feet permanent impact and 6 feet temporary impact). The construction of new access roads would create a high level of impact in areas with high quality native plant communities. A moderate level of impact would result from road construction in less pristine native plant communities. In disturbed areas or in agricultural areas, the impacts to areas adjacent to roads would be temporary, and the impact level would be low to none.

Reminder

Please refer to Chapter 2, Alternatives, for further detail on project construction activities.

The construction or replacement of structures would require the removal of vegetation. The size of the cleared area would vary depending on site characteristics, but the area that may be cleared and leveled by grading would be approximately 150 by 100 feet. During construction, heavy machinery would enter the area around structures, which would compact soils. Structures are generally built on the slopes or ridges above riparian areas. Construction of structures can decrease slope stability, which can lead to degradation of plant communities on the slope and in the riparian area. Depending on the type of plant community present, the construction of structures would create a moderate to high level of impact in all segments.

Some construction-related impacts would be temporary. Heavy machinery may enter portions of the new ROW outside the cleared area during tensioning of the conductor. Although the aboveground portion of shrubs would be broken or crushed, the roots and soils would not be disturbed, and vegetation would eventually return to pre-disturbance conditions. Depending on the type of plant

community present, the temporary impacts resulting from movement of vehicles would be a low to moderate level of impact in all segments.

Fragmentation of some plant communities, especially shrub-steppe, by construction of roads and other disturbance can lead to a loss of biodiversity and reduction in overall plant community health and quality. As plant communities become smaller and more fragmented, they become more susceptible to outside influences such as invasive weed species. They also become less able to sustain themselves because many plant species have limited seed dispersal ability so recolonization of disturbed areas may take many years or not occur at all due to competition from other species.

Rare plant species may be directly or indirectly impacted by construction activities. They can be directly impacted when the plants or their habitat are destroyed or altered such that they can no longer survive. Rare plants growing outside the construction zone may be harmed if the effects of the activities degrade their habitat. This could occur through soil erosion, decrease in slope stability, or other alterations of physical conditions that make it difficult for the species to survive. One important cause of habitat degradation is invasion by non-native species from adjacent disturbed areas. The level of impact would depend on the status of the species, and whether mitigation could be implemented to lessen the impact.

Tables 4.3-1, *Permanent Impacts to Vegetation*, and 4.3-2, *Temporary Impacts to Vegetation*, list the permanent and temporary impacts to different types of vegetation within the study area for each alternative. The Forest and Shrub-Steppe categories account for the majority of the vegetation within the study area; while vegetation associated with agricultural operations is a lesser component. Forest lands are generally composed of riparian vegetation although one small area of upland forest is present along Segment A which is common to all alternatives. Vegetation in the Range category is shrub-steppe.

Table 4.3-1
Permanent Impacts to Vegetation

	Structures, Roads, Reeling Sites, & Substation Impacts (estimated acres)			
Existing Vegetation	**Preferred (2)**	**Alternative 1**	**Alternative 3**	**Alternative 1A**
Agriculture	0.85	3.90	0.00	0.55
Forest	0.10	0.10	0.10	0.10
Shrub-Steppe	44.60	39.50	175.65	79.00
Total	**45.55**	**43.50**	**175.75**	**79.65**

Sickler- Schultz Reroute Option 2 would add 0.05 ac of permanent disturbance to shrub-steppe.
New table for the FEIS.

Reminder

Assumptions used in calculating permanent and temporary impacts are in Appendix C, Construction Procedures.

Table 4.3-2
Temporary Impacts to Vegetation

	Structures, Roads, Reeling Sites, Staging Areas & Substation Impacts (estimated acres)			
Existing Vegetation	**Preferred (2)**	**Alternative 1**	**Alternative 3**	**Alternative 1A**
Agriculture	22.10	22.05	2.00	2.80
Forest	2.10	2.95	3.25	2.10
Shrub-Steppe	161.45	174.10	251.20	215.25
Total	**185.65**	**199.10**	**256.45**	**220.15**

Sickler- Schultz Reroute Option 2 would add 0.80 ac of temporary disturbance to shrub-steppe.
New table for the FEIS.

4.3.2.2 Operations and Maintenance Impacts

Access roads would need to be maintained and repaired. Maintenance vehicles traveling on access roads may contribute to the spread of weed species. Please refer to the following *Weed Invasion Impacts* (Section 4.3.2.3) for further detail. Maintenance vehicles may also need to travel off of established access roads. Because these impacts would occur in areas already impacted by construction activities, the level of impact would be low to moderate.

4.3.2.3 Weed Invasion Impacts

After disturbance, bare land would likely be invaded by non-native species. Seeds may be blown in, transported in by animals or water, or introduced inadvertently on the clothing, equipment, or vehicles of construction or maintenance workers. Because non-native species usually lack the soil-binding characteristics of native species, cover by non-native species may result in increased erosion. This type of degradation over time can decrease the soil's ability to support a healthy native plant community (YTC Management Plan). Disturbed plant communities generally show a reduction in native plant species cover, particularly bunchgrasses and forbs (Franklin, 1973).

Some of the non-native species that invade disturbed land would be noxious weed species. An increase in weed species, principally cheatgrass and diffuse knapweed, can be expected during the growing season following any ground disturbance within the study area (Pers. Comm. D. Stout and M. Sackschewsky, 2001).

Reminder

*A **forb** is an herbaceous plant that is not a grass*

Cheatgrass is a strong competitor that rapidly colonizes disturbed sites and once established, it outcompetes other grasses and ***forbs***. It has invaded much of the study area and would increase in density with any disturbance. Diffuse knapweed is already present in all project segments. The spread of this aggressive species is of great concern because it quickly occupies disturbed sites and tends to outcompete desirable native species. This species also moves from disturbed sites into adjacent undisturbed areas. This type of invasion can be a major threat to sensitive species habitat. Because of their poor soil-holding capabilities, knapweed species such as diffuse knapweed contribute to soil erosion (YTC Management Plan).

The use of access roads for ongoing maintenance increases the probability of weed invasion. Roads are known to contribute to the spread of noxious weeds by forming a corridor for weed and weed seed dispersal. Weeds are dispersed when parts of weeds or the entire plant break off and get stuck to the undercarriages of vehicles. Weeds get dragged into new areas, and if the plant has formed seed heads, the seeds are dispersed as the vehicle travels. Because access roads cross riparian areas, weed seeds may fall into riparian areas, be dispersed by water, and begin to grow in the moist soil. Wetlands and riparian areas are particularly susceptible to invasion by non-native species.

Introducing noxious weeds into a high quality native plant community is a high level of impact. The introduction of noxious weeds or undesirable non-native species into areas where they are already present, as in much of the study area, is a low level of impact.

4.3.3 Preferred Alternative (Alternative 2)

The preferred alternative includes Segments A, Segment B (Option B_{SOUTH}), Segment D and the fiber optic line. A rare plant survey was done that characterized plant communities. Table 4.3-3, *Impacts to Vegetation on Preferred Alternative*, describes the project's expected impacts to the Agriculture, Forest, and Shrub-Steppe vegetation types listed in Table 4.3-1, *Permanent Impacts to Vegetation*, and Table 4.3-2, *Temporary Impacts to Vegetation*. As described in Section 3.4.1 the shrub-steppe category was broken into four sub-categories to better characterize impacts to specific vegetation resources.

Table 4.3-3
Impacts to Vegetation on Preferred Alternative

Vegetation Type		A (acres)	B_{SOUTH} (acres)	D (acres)	V-C* Fiber Optic Line (acres)	Total (acres)
Agricultural		0.00 –T 0.00 –P	0.00 –T 0.00 –P	20.35–T 0.85 –P	1.75 –T 0.00 --P	22.10 –T 0.85 –P
Forest		2.10 -T 0.10 -P	0.00 -T 0.00 -P	0.00 -T 0.00 -P	0.00 -T 0.00 -P	2.10 –T 0.10 –P
Shrub-Steppe	Washington Natural Heritage Program areas	0.00 -T 0.00 -P	0.00 -T 0.00 -P	2.10 -T 0.25 -P	0.25 -T 0.00 -P	2.35 –T 0.25 -P
	Moderate-High Quality Shrub Steppe	29.20 -T 9.95 -P	31.70 -T 6.35 -P	26.00 -T 5.55 -P	0.50 -T 0.00 -P	87.40 –T 21.85 -P
	Low Quality Shrub Steppe	8.10 -T 2.05 -P	0.00 -T 0.00 -P	22.75 -T 11.75 -P	1.50 -T 0.00 -P	32.35 –T 13.80 –P
	Lithosol Areas	39.35 -T 8.70 -P	0.00 -T 0.00 -P	0.00 -T 0.00 -P	0.00 -T 0.00 -P	39.35 –T 8.70 -P
	Shrub-Steppe Total	76.65 -T 20.70 -P	31.70 -T 6.35 -P	50.85 -T 17.55 -P	2.25 -T 0.00 -P	161.45–T 44.60 -P
Total Vegetation		78.75 –T 20.80–P	31.70 -T 6.35 -P	71.20 -T 18.40 -P	4.00 –T 0.00 --P	185.65–T 45.55 -P

T-Temporary, P- Permanent
*V-C: Vantage-Columbia
New table for the FEIS.

Reminder

Assumptions used in calculating permanent and temporary impacts are in Appendix C, Construction Procedures.

4.3.3.1 Segment A

Segment A consists mostly of shrub-steppe vegetation with some small areas of upland and riparian forest.

Reminder

***WNHP**: Washington Natural Heritage Program*

The ***WNHP*** high quality plant community Wyoming big sagebrush/bluebunch wheatgrass, occurs along 0.2 mile of Segment A.

No access roads or towers would be placed in this area (the line would span the community) therefore there would be no impacts to the Wyoming big sagebrush/bluebunch wheatgrass WNHP community.

The moderate-high quality shrub-steppe and lithosol areas generally are in good condition with high percentages of native species and relatively low disturbance. Impacts to these areas would be moderate because diversity of the plant communities could be reduced and noxious weeds could be increased (see Section 4.3.1 for descriptions of impact levels to vegetation). With successful revegetation efforts, these impacts could be reduced to low.

The low quality shrub-steppe areas have a history of heavy disturbance and have high percentages of non-native invasive species. Impacts to these areas would generally be low, although in some areas impacts could be moderate because density of weed species could be increased and some native species could be removed where they are already a minor component.

Small amounts of riparian and upland forests would be removed for line clearance purposes, a moderate impact. No agricultural lands would be impacted. Options 1 and 2, associated with the Sickler-Schultz Reroute, would cross different areas of Wilson Creek. Both areas have similar vegetation, however, none would need to be removed since the line would span the trees with adequate electrical clearance.

➡ Reminder

Federally listed, proposed, or candidate species *are species designated or in the process of being designated under the Endangered Species Act as endangered or threatened.*

There are no known occurrences of ***federally listed, proposed, or candidate species*** along Segment A. Two species with potential habitat along Segment A are Ute ladies'-tresses and Wenatchee Mountains checker-mallow. No populations of either species were found within the proposed alignment, and because suitable wetland habitats would be avoided there would be no direct impact to these species.

Federal species of concern *are species that may be rare or declining, but are not formally listed under the ESA.*

Basalt lithosols *are soils with very high rock content.*

Two populations of Hoover's tauschia, a ***federal species of concern***, were located adjacent to the proposed ROW in ***basalt lithosols***. In addition, populations of longsepal globemallow and Suksdorf's monkey-flower were located in the immediate vicinity (within 500') of the project area. If impacts cannot be avoided, it would be a moderate impact (if impacts could only be partially lessened by mitigation) or a low impact (if more successful mitigation is implemented). No BLM special status species were located on BLM managed land on Segment A.

4.3.3.2 Segment B

The Preferred Alternative would only use Option B_{SOUTH} of Segment B. Option B_{NORTH} would not be used.

Option B_{SOUTH} – The vegetation of Option B_{SOUTH} is almost all shrub-steppe, with several small areas of riparian vegetation. The shrub-steppe vegetation along this segment is all moderate to high quality shrub-steppe. Construction impacts to this area would be moderate. There are no high quality plant communities tracked by WNHP in Option B_{SOUTH}. No agricultural lands are crossed on Segment B.

There are no known occurrences of federally listed or candidate species along Option B_{SOUTH}. The floodplain of the Columbia River is potential habitat for northern wormwood (Candidate species) and Ute ladies'-tresses (Threatened species). Surveys of the area did not locate populations of northern wormwood or Ute ladies'-tresses. Wetlands and the area immediately adjacent to the Columbia River would be avoided, thus there would be no impact to these species or their habitat.

Populations of the state Sensitive species tufted evening-primrose and desert cryptantha are located along an access road for the proposed transmission line ROW on YTC lands. If impacts to these species could not be avoided, it would constitute a moderate level of impact. Impacts could possibly be reduced to a low level with mitigation. A small occurrence of a single plant of gray cryptantha was known from the ROW area on YTC. No plants were located during searches of the area in May, 2002.

Option B_{NORTH} – The vegetation of Option B_{NORTH} is almost all shrub-steppe, with several small areas of riparian vegetation. The shrub-steppe vegetation along this segment is all moderate to high quality shrub-steppe. Construction impacts to this area would be moderate. There are no high quality plant communities tracked by WNHP in Option B_{NORTH}. No agricultural lands are crossed on Segment B.

Potential habitat for northern wormwood (a candidate species) and Ute ladies'-tresses (a Threatened species) occurs in the floodplain of the Columbia River. Because structures would be placed well outside the habitat area for this species, there would be no impacts. There is no potential habitat for other federally listed, proposed, or candidate species.

Occurrences of the federal species of concern Columbia milk-vetch and the state sensitive species tufted evening-primrose are known to occur in the immediate vicinity (within 500') of the project area. If impacts could not be avoided, a moderate level of impact would

occur if full mitigation could not be implemented. Impacts could be reduced to a low level if mitigation is successful.

In general impacts to Option B_{NORTH} would be very similar to those described to Option B_{SOUTH}, because the vegetation communities are similar.

4.3.3.3 Segment D

The vegetation of Segment D is roughly evenly divided between agricultural lands, low quality shrub-steppe and moderate-high quality shrub-steppe.

No impacts to native plant communities are expected in agricultural lands because only small remnants of native vegetation remain.

No impacts to riparian plant communities are expected because no access roads or towers would be built within riparian areas.

Impacts to moderate-high quality shrub-steppe would be moderate because the density of noxious weeds could be increased and the diversity of native vegetation could be reduced. With successful revegetation, this impact could be reduced to low. Impacts to low quality shrub-steppe would be low to moderate.

The WNHP high quality plant community bitterbrush/Indian ricegrass occurs along 0.8 mile of Segment D. Permanent impacts to this community caused by removing vegetation for structures or roads would be a high level of impact. Degradation of this community through a decrease in diversity, degradation of the physical environment, or an increase in non-native species would be a high level of impact.

A known occurrence of Umtanum desert buckwheat, a federal candidate species, is located near Segment D on part of Umtanum ridge. The proposed project passes near the population, although the nearest individuals of the population are over 750 feet east of the centerline of the project. The nearest individuals are approximately 35 feet from an existing access road, which will be improved for the project. Mitigation measures would be implemented to reduce the potential for impacts on the Umtanum desert buckwheat occurrence.

Wetlands are potential habitat for Ute ladies'-tresses (federally threatened species). The floodplain of the Columbia River is habitat for northern wormwood (candidate species) and Ute ladies'-tresses. Rare plant surveys of the area did not locate populations of Ute-ladies' tresses or northern wormwood. Wetlands and the area

immediately adjacent to the Columbia River would be avoided, and there would be no impact to these species.

Portions of populations of three federal species of concern occur within the proposed ROW along Segment D: Columbia milk-vetch, gray cryptantha, and Hoover's desert parsley. One other federal species of concern, persistent sepal yellowcress occurs within the immediate vicinity of Segment D. In addition, portions of a population of the state sensitive species Piper's daisy and tufted evening-primrose occur within the proposed ROW. If impacts to these species cannot be avoided, it would constitute a moderate level of impact. Impacts could be potentially reduced to a low level through mitigation.

Approximately 3 miles of BLM-managed land is located within Segment D. Portions of two occurrences of the BLM special status species gray cryptantha and Hoover's desert-parsley occur within the ROW of the proposed project. In addition, an occurrence of Nuttall's sandwort is located in the immediate vicinity (within 500') of the project area. If impacts to these species cannot be avoided, it would be a moderate level of impact. Impacts could be reduced to a low level if successful mitigation is implemented. Mitigation could include placement of structures and roads to avoid populations, timing restrictions, or transplantation, if feasible.

In the area of the new Wautoma Substation, all vegetation would be permanently removed from an area 850 by 500 feet in size. Because this area is grassland dominated by non-native species with no occurrences of rare species, building the substation would be a low level of impact to vegetation.

Impacts to shrub-steppe and grassland communities along Segment D would be moderate to low.

4.3.3.4 Fiber Optic Line

Native vegetation along the Vantage Columbia fiber optic line includes shrub-steppe and small amounts of riparian vegetation. Large areas of orchards and other agricultural areas are crossed as well. There are no high quality plant communities tracked by WNHP along the fiber optic line. Impacts to shrub-steppe plant communities would be low to none because existing access roads would be use to install the fiber optic cable and most of them are already heavily disturbed. The riparian areas crossed by the project are generally composed of a mix of introduced and native species, because they were formed recently as a result of the Columbia Basin irrigation project and do not have high value. Impacts to these areas would be low to none since no construction would occur within them.

Since the fiber optic line will be located on an existing transmission line and existing access roads will be used for installation, no formal rare plant surveys were needed. A field reconnaissance of the fiber optic line documented several rare plant species, including the state sensitive species Geyer's milk-vetch, gray cryptantha, and beaked spike-rush. No impacts to these species would occur.

There are no known occurrences of federally listed or candidate species along the fiber optic line. The wetlands in the vicinity of the Vantage Substation and in the Quincy Lake Wildlife Area have potential habitat for Ute ladies'-tresses (Threatened species). Reconnaissance of these areas did not locate populations of Ute ladies'-tresses. Disturbance of wetlands in these areas would be avoided, thus there would be no impact to this species or its habitat.

The fiber optic loop near the proposed Wautoma Substation would be attached to existing towers and would have only temporary disturbances to agricultural and shrub-steppe lands from three reeling sites. No permanent impacts to shrub-steppe or sensitive species would occur.

4.3.4 Alternative 1

Reminder

Impacts to vegetation from Segment A include:

- *No impact to T&E species*
- *Moderate to low impact to shrub-steppe and grassland communities*
- *High impact to Wyoming big sagebrush/bluebunch wheatgrass plant community*

Impacts to vegetation along Segments A and B and the fiber optic line would be the same as described for the Preferred Alternative. (See Section 4.3.3.1, *Segment A*.)

4.3.4.1 Segment E

Vegetation within Segment E that would be impacted is mostly shrub-steppe and agricultural lands, with some riparian areas. Impacts to shrub-steppe communities would be moderate because the density of noxious weeds could be increased and the diversity of native vegetation could be reduced. With successful revegetation, these impacts could be reduced to low.

The WNHP tracked high quality plant community bitterbrush/Indian ricegrass shrubland is found along a 2.8-mile stretch of Segment E. Permanent impacts caused by removing vegetation for structures or roads would result in a high impact. Degradation of the community through a decrease in diversity, degradation of the physical environment, or an increase in non-native species would have a moderate impact.

There are no documented occurrences of federally listed species along Segment E, however, wetlands along Lower Crab Creek and in the valley are potential habitat for Ute ladies'-tresses and the Columbia River floodplain is habitat for northern wormwood and Ute

ladies'-tresses. Because wetlands and the area immediately adjacent to the Columbia River would be avoided, there would be no impact to these species.

There are 4.9 miles of BLM managed land within Segment E, across the Saddle Mountains. No BLM special status species have been identified in the proposed alignment of Segment E. BLM special status species with the potential to occur in this area include gray cryptantha, Wanapum crazyweed, Geyer's milk-vetch, bristle-flowered collomia, blue cup, Nuttall's sandwort, Piper's daisy, Canadian St. John's wort, tufted evening-primrose, and the lichen species *Texosporium sancti-jacobi*. If impacts to BLM special status species could not be avoided, it would be a moderate level of impact. Impacts could be partially lessened by mitigation.

Occurrences of two federal species of concern: Hoover's desert-parsley and gray cryptantha and the state sensitive species Suksdorf's monkey-flower are known to occur in the immediate vicinity (within 500') of the project area. If impacts to these species could not be avoided, this would constitute a moderate level of impact. Impacts could be reduced to a low level with mitigation.

4.3.5 Alternative 3

Impacts to Segment A and the fiber optic line would be the same as described for the Preferred Alternative. (See Section 4.3.3.1, *Segment A.*)

4.3.5.1 Segment C

Native vegetation along Segment C that would be impacted is almost entirely shrub-steppe, with some limited riparian vegetation. Impacts to shrub-steppe and grassland plant communities would be moderate to low. Impact to riparian areas would be moderate. There are no high quality plant communities tracked by WNHP in Segment C.

There are no known occurrences of federally listed or candidate species along Segment C. Some structures might be located on basalt cliffs within Segment C, which could provide habitat for basalt daisy (federal candidate species). If basalt daisy is present and habitat areas could not be avoided, this would be a moderate to high level of impact, depending on whether mitigation can be implemented.

Columbia milk-vetch, a federal species of concern occurs in the immediate vicinity (within 500 feet) of the Segment C route. This species could be impacted by construction activities. If this species could not be avoided, it would constitute a moderate level of impact

if full mitigation could not be implemented, or a low level if fully mitigated.

A small amount of BLM managed land (less than 0.25 mile) is located within Segment C. There are several known occurrences of BLM special status species within the general area of the proposed ROW. Impacts to BLM special status species would be a moderate level of impact if the impacts could only be partially lessened by mitigation or a low level if successful mitigation is implemented.

Impacts at the new Wautoma Substation would be the same as discussed in the Preferred Alternative (Section 4.3.3.3).

Reminder

Impacts to vegetation along Segments A and B include:

- *No impact to T&E species*
- *Moderate to low impact to shrub-steppe and grassland communities*
- *High impact to Wyoming big sagebrush/bluebunch wheatgrass plant community*

4.3.6 Alternative 1A

Impacts to vegetation along Segment A and the fiber optic line would be the same as described for the Preferred Alternative. (See Section 4.3.3.1, *Segment A*), and impacts to Segment B (Option B_{NORTH}) would be the same as described for Alternative 1. (See Section 4.3.4.1, *Segment B.*)

4.3.6.1 Segment F

Vegetation within Segment F that would be impacted is almost all shrub-steppe with some agricultural land. Impacts to shrub-steppe communities would be moderate because of the risk of introducing non-native vegetation and reducing the diversity of the native vegetation.

As in Segment D, a bitterbrush/Indian ricegrass shrubland, a high quality plant community tracked by WNHP, occurs along 0.8 mile of Segment F. Impacts would be high to moderate, as discussed in Segment D.

There are no known occurrences of federally listed or candidate species along Segment F. Similar to Segments D and E, wetlands along Lower Crab Creek and in the valley are potential habitat for Ute ladies'-tresses, and the Columbia River floodplain is habitat for northern wormwood and Ute ladies'-tresses. Because wetlands and the area immediately adjacent to the Columbia River would be avoided, there would be no impact to these species.

The federal species of concern Hoover's desert parsley and the state threatened species dwarf evening-primrose, occur in the vicinity of the proposed line. The lichen species *Texosporium sancti-jacobi* (federal species of concern) could also occur in this area. If impacts to these species could not be avoided, it would constitute a moderate

level of impact. Impacts could be reduced to a low level with mitigation.

There are 12.8 miles of BLM managed land within Segment F, along the south slope of the Saddle Mountains. Known occurrences of the BLM special status species, Hoover's desert-parsley and dwarf evening primrose are in the immediate vicinity (within 500 feet) of Segment F and could be impacted by project activities. Other BLM special status species with the potential to occur in this area include gray cryptantha, Wanapum crazyweed, Geyer's milk-vetch, bristle-flowered collomia, blue cup, Nuttall's sandwort, Piper's daisy, Canadian St. John's wort, tufted evening-primrose, and the lichen species *Texosporium sancti-jacobi*. If impacts to BLM special status species could not be avoided, it would be a moderate level of impact. Impacts could be partially lessened by mitigation.

4.3.7 No Action Alternative

The impacts currently associated with ongoing maintenance activities for the existing transmission line, substations, and ROW would continue. These impacts include localized soil disturbance due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. No new impacts to vegetation are expected as a result of this alternative.

4.3.8 Recommended Mitigation

4.3.8.1 Site-Specific Surveys

To determine whether rare species occur along the Preferred Alternative (A, B_{SOUTH} and D), a rare plant survey was undertaken. Rare plant surveys were initiated in August 2001 and occurred between April and July in 2002. A professional botanist skilled at identifying plants in the Columbia Basin was retained to conduct rare plant surveys during the correct time of year to identify the species with the potential to occur in each area. The survey was sufficiently detailed to ensure that if rare species were present, they were likely to be found. When rare plant species were found, the boundaries of the occurrence were accurately mapped on aerial photographs and located by **GPS** so they could be accurately depicted on project maps. For a complete discussion of the rare plant survey and methodology. (See Appendix F, *Rare Plant Survey for the Preferred Alternative*.)

Reminder

***GPS**: Global Positioning Systems*

4.3.8.2 Native Plant Communities

Impacts to native plant communities would be minimized during construction by implementing the following practices:

- Construction activities would be restricted to the area needed to work effectively including streams and designated access roads. Construction crews would be instructed to restrict vehicles to designated areas.
- Designated areas would be used to store equipment and supplies. The contractor would follow state and federal regulations to protect plant communities.
- In areas identified by the project botanist where populations of state or federal listed sensitive species occur, topsoil would be stockpiled when the footings of structures are put in place or an area for placement of a structure is graded. After construction, the topsoil would be replaced on the surface of the soil and the surface would be restored to the former grade, where possible.
- After construction, disturbed areas not needed for ongoing access or maintenance would be reseeded.
- Construction specifications would designate which species are appropriate for reseeding in certain areas. Inquiries have been made to determine which commercially available native seed has been used with some success, and recommended strategies would be followed.
- Continue to coordinate with state and federal agencies on providing cumulative mitigation for permanent impacts to shrub-steppe habitat.

4.3.8.3 Rare Species

Rare plant species habitat would be avoided if possible and unavoidable impacts would be minimized as much as possible. Structures and roads would be placed to avoid impacting rare species occurrences if possible. Impacts to rare species would be minimized during construction and subsequent maintenance, by implementing the following practices:

- Boundaries of rare species populations that may be impacted would be flagged in the field with an appropriate buffer, to ensure they are not impacted during construction.
- If impacts are temporary, it may be sufficient to restrict the time of year that various activities take place. Many plants in the study area flower and fruit very early in the spring, then remain dormant under the ground for much of the year. The underground parts may not be disturbed during dormancy by certain types of minimal activities, such as driving through an area.
- Information on rare plant species occurrences would be given to BPA maintenance personnel to be considered during the planning

and implementation of future maintenance activities. The location of rare plant occurrences would be placed on BPA maps and documents so that maintenance personnel are aware of their location. A written description of restrictions, precautions, or special procedures within rare plant habitat would be attached to maps and documents for that area.

- On state and federal land where rare plants are known to occur, the procedures used to control weeds would be restricted to those that minimize harm to rare plant species. The decision on the best actions to take to control weeds would be made on a case-by-case basis with consultation with the respective state or federal land manager.

To minimize the potential for impacts to the Umtanum desert buckwheat, the following measures would be implemented:

- Construction fencing would be installed along the access road closest to the population to discourage travel through the population.
- At least three permanent signs between the access road and the population of Umtanum Desert buckwheat would be placed which say "Sensitive Ecological Area. Please Do Not Enter."
- Approximately 1500 feet of three-strand fencing would be installed and maintained along the access road near Midway Substation to prevent unauthorized access to the Hanford Monument.
- A tubular style gate would be installed on the access road intersection near Midway Substation. This gate would be locked at all times with a security chain.
- A tubular style gate would be installed on the access road at the southern border of Hanford Monument lands. This gate would be locked at all times with a security chain.
- Construction activities on the Hanford Monument land south of the Columbia River would take place primarily in winter or early spring when fire danger is lowest. Construction at other times would follow fire control measures. (See Section 4.11.5, *Fire*).
- Construction would slow down during extremely wet conditions when vehicle or equipment travel would create ruts greater than four inches deep.
- Additional plant surveys will be conducted in spring 2003 on all identified disturbance areas including road ROW, reeling stations, tower assembly areas, tower footing locations and staging areas within the Hanford Monument

- Weed management on access roads and other mitigation measures mentioned above on Hanford Monument would be coordinated with Monument staff to minimize effects to Umtanum Wild Buckwheat and other rare plant species.
- A vehicle wash station will be placed at the entrance to Umtanum Ridge to remove weed seeds from vehicles and equipment.

4.3.8.4 Minimize the Introduction and Spread of Weeds

Throughout the project, efforts would be made to minimize the introduction or spread of weeds, by implementing the following activities and practices. These activities and practices would be included in a Weed Management Plan for this project:

- To determine the extent of the weed problems along the Preferred Alternative, a pre-construction weed survey was undertaken to document current conditions.
- Some weed control and eradication activities may occur prior to construction in selected areas if construction would exacerbate an existing weed problem.
- After construction, the seeding of disturbed areas with Hanford- or Columbia Basin-derived native seed mix would help decrease weed invasion by providing competition for space.
- A post construction weed survey would be done so that pre- and post-construction weed distributions can be compared. If weed problems exist or are increasing over pre-construction conditions, BPA would cooperate with county weed boards or federal land management agencies to eradicate or control any species that invade disturbed areas.
- To control weeds, BPA would use the procedures outlined in the BPA's *Transmission System Vegetation Management Program Record of Decision* (August 2000) to address weed problems in subsequent maintenance activities.
- Off-road travel would be minimized such as that necessary for turning equipment and vehicles around or parking and staging equipment. In these areas, construction crews would be instructed to crush vegetation in place to accomplish vehicle turnaround, rather than clearing it with equipment. This would help avoid soil compaction, reduce the area requiring revegetation, and reduce the potential for noxious weed spread.
- Mitigation measures would be required to ensure equipment used on the project does not introduce or spread invasive species seeds on- or off-site.

Reminder

This document is available for review on the Web at: http://www.efw.bpa.gov/cgi-bin/PSA/NEPA/SUMMARIES/VegetationManagement_EIS0285.

- Because weeds can be spread by vehicles, BPA would restrict access to the newly constructed access roads where possible, by using gates.
- Vehicles will be inspected for noxious weeds prior to entering the Columbia National Wildlife Refuge and, if any are found, will be removed prior to entry.

4.3.9 Cumulative Impacts

Reminder

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

DNR*: Washington State Department of Natural Resources*

The loss of shrub-steppe may result from a myriad of projects within the Columbia Basin that involve clearing land and converting it to other uses. The loss of shrub-steppe in Washington State attributable to agriculture has been estimated at 60 percent (Dobler, 1992, Columbia Basin Ecosystem Management Project, EOE-RL, 1996). Due to the high value of some agricultural lands in the study area, the loss of shrub-steppe has accelerated. Within the study area, the ***DNR*** 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 (Andelman and Stock, 1994).

Impacts to rare plant species on federal lands may occur due to land use such as grazing or training exercises, but it likely that federal agencies will prioritize the protection of rare species habitats. Much of the rare plant species habitat managed by federal agencies within the study area is relatively inaccessible. Environmental documents produced by these agencies address the needs of rare plant species and staff members are assigned to deal with rare plant issues.

Rare plant species in private areas receive little to no protection under federal and state rare and endangered species legislation and regulations. Rare species may be impacted by a variety of land uses typical of private lands, including farming, ranching and development.

The project could contribute to the spread of weeds in the study area because of ground disturbance. The invasion by weeds is considered one of the biggest threats to biodiversity in the study area (TNC, 1999). Continued invasion by weed species could accelerate as development occurs and as new weed species invade the area.

County planning staff were contacted to determine if any land use developments were currently planned or underway near the preferred alternative that would disturb significant areas of shrub-steppe and could contribute cumulatively to shrub-steppe habitat loss. Aside from individual residential and other small private development, the counties identified no projects near the proposed project.

4.4 Wildlife

4.4.1 Impact Levels

Reminder

*A **take** is to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct.*

*To **harm** is to injure directly or cause significant habitat modification or degradation that results in death or injury to a species.*

High impacts would occur when an action creates a significant adverse change in wildlife habitat, populations, or individuals. High impacts may result from actions that:

- cause the ***take*** of a federally listed or proposed threatened or endangered wildlife species.
- cause a significant reduction in the population, habitat or viability of a federal or state listed wildlife species of concern or sensitive wildlife species, which would result in trends towards endangerment or the need for federal listing.
- cause a significant long-term (more than two years) reduction in the quantity or quality of habitat critical to the survival of local populations of common wildlife species.
- ***harm*** or kill a significant number of individuals of a common wildlife species.

Moderate impacts would occur when an action creates a moderate adverse change in wildlife habitat, populations or individuals. Moderate impacts may result from actions that:

- create an effect on federally listed or proposed threatened or endangered wildlife species that could be partially mitigated.
- cause a reduction in the population, habitat or viability of a federal or state listed wildlife species of concern or sensitive wildlife species, without resulting in trends towards endangerment or the need for federal listing.
- harm or kill a small number of individuals of a common wildlife species.

Low impacts would occur when an action creates a minor adverse change in wildlife habitat, populations or individuals. Low impacts may result from actions that:

- create an effect on federally listed or proposed threatened or endangered wildlife species that could be largely or completely mitigated (i.e., seasonal restrictions on construction activities) or are temporary and benign (i.e., temporary disturbance by construction noise).
- cause a minor short-term (less than two years) reduction in the quantity or quality of the habitat of a federal or state listed wildlife species of concern or sensitive wildlife species, without resulting

in trends towards endangerment and/or the need for federal listing.

- cause a significant short-term (less than two years) reduction in the quantity or quality of habitat critical to the survival of local populations of common wildlife species.

Minimal impacts would occur when an action creates a temporary or minor adverse change in wildlife habitat or individuals. Minimal impacts may result from actions that:

- cause a temporary (less than two weeks) disturbance or displacement of a federal or state listed wildlife species of concern or sensitive wildlife species.
- cause a short-term (less than one year) disturbance or displacement of a common wildlife species.

No impacts would occur when an action has no effect or fewer impacts than the minimal impact level on wildlife habitat, populations or individuals.

4.4.2 Impacts Common to Construction Alternatives

The construction, operation, and maintenance of the proposed transmission line would impact wildlife populations residing in or near the proposed study area. The extent of impact would depend on the species, habitat requirements, and availability of suitable habitat in and around the construction and ROW area. Construction impacts can be generally categorized as short-term disturbances related to construction and its associated noise, dust, and human intrusion. Impacts from operation and maintenance of the project are categorized as long-term impacts, and can include impacts from physical habitat changes, harm to individual animals from the existence of the structures, or ongoing disturbance from periodic maintenance activities.

4.4.2.1 Impacts to Riparian, Open Water, and Wetland Species

Species associated with riparian areas, open water, and wetlands that could be adversely affected by the proposed project can be broken into four broad categories, including: 1) waterfowl, 2) perching and cavity-nesting birds such as bald eagles, osprey, herons and woodpeckers, 3) bats, 4) mammals such as mice, raccoons, weasels, coyote, deer and elk, and 5) herpetofauna (reptiles and amphibians). These species could be found along the streams and associated wetlands of all segments, and in and along the Columbia River and on Saddle Mountain Lake. Impacts to these five categories of species associated with these areas are described below.

1) Waterfowl and other birds closely associated with water (including ducks, geese, cormorants, terns, gulls and pelicans) could be affected by the proposed project where it crosses the Columbia River, Crab Creek, and Saddle Mountain Lake. Some of these species may also be present in some of the smaller streams and wetlands of the project area. Short-term impacts to these species would be limited to disturbance from noise and human presence during construction (a low impact, or high impact if nesting waterfowl were present) and some limited nesting and cover habitat removal (moderate impact) from riparian vegetation clearing. Long-term impacts to waterfowl from the operation of the transmission line system would be moderate, due to the presence of the transmission line, which creates an additional obstacle across their preferred habitat that these species may collide with, leading to injury or death. (See Section 4.4.2.3.)

2) Perching and cavity-nesting birds use large trees that are generally only found within the study area along riparian corridors. Ospreys and bald eagles are highly dependent on larger trees for roosting, perching, and nesting. Herons may use these trees for roosting and perching and prefer large trees for nesting. Cavity-nesting birds such as woodpeckers, owls, and smaller birds like chickadees use these trees for nesting and foraging. Short-term impacts include general construction disturbance from noise and human presence (low-moderate impact to these species) and clearing of riparian vegetation that could directly disturb or remove habitat for these species, a high impact. Long-term impacts could include the permanent reduction in large tree habitat (high impact) and an increased risk of collision with transmission line towers, conductors, or overhead ground wires (moderate impact).

3) Bat species are present along the route in all areas but may concentrate along water courses and the shrub-steppe interface with riparian areas because these areas generally contain more insects, a primary prey item for bats. Few studies have been done about the impact to bats from transmission line or construction practices. Project construction could impact bats through the clearing of larger riparian vegetation that bats use as roosting areas; however, general construction-related disturbance would have no effect on bats. Tree felling could directly injure or kill bats that are roosting (moderate-high impact). Long-term impacts to bats would be from a reduction in suitable roosting habitat if large riparian trees are removed and the increased hazard of bats colliding with structures, conductors, or overhead ground wires. Little information is available on the effect that these structures and their associated EMF has on bat echolocation and avoidance. Absent relevant information, it should be assumed that risks to bats from transmission line presence will be similar to those for waterfowl and other bird species (moderate).

4) Small mammals such as mice, voles, gophers, raccoon, skunk, and others may often live their entire lives in and around riparian and stream areas. Larger mammals such as coyotes, mule deer, and elk may use streams only at certain times of the day or year for forage, cover, or water. All of these species are mobile and not entirely dependent on riparian vegetation for survival. Short-term impacts from construction noise and disturbance would have a low impact to these species, because they could quickly move away from the area. Long-term impacts from removal of riparian vegetation would be low because only a portion of these species' habitat would be removed and they could relocate into adjoining suitable habitat.

5) Reptiles and amphibians (herpetofauna) that inhabit open water, wetland, or riparian habitats could include such species as spotted frogs, leopard frogs, Woodhouse's toads, salamanders, rattlesnakes, and other snake species. Short-term impacts to these species could include general disturbance from construction noise and human presence (low impact) or mechanical crushing from construction equipment (high impact). Because construction would not occur in most open water and wetland areas, these species are not expected to be more than minimally impacted. Removal of riparian vegetation could remove some habitat components for theses species, but will not completely remove it in the cleared areas.

Although the riparian, wetland, and open water habitats along the different line segments are used by a large number of species and are considered unique habitat types in the region, the overall impacts to various species associated with these areas would generally be moderate to low. Towers would be placed outside of these sensitive areas and existing access road crossings would be used in most cases. Some clearing of riparian vegetation would take place for line clearance purposes, but would be limited to taller trees that lie within the ROW. Also, mitigation measures would be implemented (See Section 4.4.10) that would help reduce the potential for adverse impacts to species associated with open water, wetland, and riparian areas.

4.4.2.2 Construction Impacts to Shrub-Steppe Species

By far the greatest impacts to wildlife species from the proposed alternatives would be construction in shrub-steppe habitat. The majority of the project is within this habitat type. Species associated with shrub-steppe habitat that could be adversely affected by the proposed project can be broken into five broad categories, including: 1) migratory birds and raptors such as hawks and eagles, 2) sagebrush-dependent birds, such as sage grouse, sage sparrow, and sage thrasher, 3) medium and large mammals, 4) small burrowing species

such as rabbits and ground squirrels (also includes burrowing owls), and 5) herpetofauna (reptiles and amphibians). These species could be found along all of the project alternatives.

1) Raptors and migratory birds that could be adversely affected by the proposed project include eagles, hawks, falcons, songbirds, bluebirds, and other species. Short-term construction impacts would be limited to general disturbance from construction equipment and human presence, as these species are mobile. Long-term impacts could occur from the increased risk of collision with transmission line towers, conductors and overhead ground wires, a moderate impact. (See Section 4.4.2.3.) Some raptor species may benefit from the project because new perching sites would be established and clearing of sagebrush could make small mammal prey species more easily available.

2) Bird species dependent on sagebrush for major parts of their lifecycle include sage grouse, sage sparrow, sage thrasher, loggerhead shrike, and long-billed curlew. These species above all others could be severely affected by both short- and long-term impacts. Short-term impacts from construction noise and disturbance could be enough to drive these species from their habitual breeding and nesting areas, causing a reduction in numbers of offspring (high impact). Individual nests could be destroyed by construction equipment, also a high impact. Long-term impacts could occur from habitat fragmentation and invasion of non-native weed species (high impact). Many of these species such as sage sparrows, sage thrashers and sage grouse need large unbroken expanses of sagebrush to successfully rear offspring. Disruption of existing unbroken tracts of sagebrush can reduce available habitat, create avenues for predator species, and allow the spread of invasive species that reduce forage species and may be more susceptible to fire. Even if revegetation is successful, it would be years before the sagebrush grows back enough to mimic pre-construction conditions, so the impacts from habitat fragmentation will continue for some time after construction is complete. In areas of degraded shrub-steppe vegetation (e.g., vegetation infested with weed species), clearing would constitute a moderate or low impact to these species, because the habitat is already degraded. Clearing in areas previously cleared or severely disturbed (such as agricultural lands) would result in minimal impacts to these species. The presence of the project may increase the risk of collision for these species (moderate impact), although most of the alignments follow existing transmission lines so the risk would not be as high in these areas as in areas where a new line placed where none previously existed nearby.

3) Medium and large mammals present in shrub-steppe habitat in the project area could include, deer, elk, coyote, bighorn sheep, badger, and others. Because these species are highly mobile, short-term impacts would be limited to disturbance from noise, dust, and human intrusion (low impacts), or mechanical crushing of species that burrow such as badgers (moderate impact). Long-term impacts resulting from a reduction in browse species from conversion of native sagebrush, grasses, and forbs to invasive weed species could affect ungulates if revegetation efforts are unsuccessful. However, these impacts would generally be low, because there are large areas of suitable forage surrounding the proposed project area. Ongoing maintenance activities would slightly increase the amount of disturbance to theses species (low impact).

4) Small burrowing mammals and birds such as Washington ground squirrels, voles, kangaroo rats, pygmy rabbits, burrowing owls, and others have the highest potential for disturbance from construction because they live in burrows that could be subjected to mechanical disturbance and they are less mobile than bird or large mammal species. These species are generally limited to areas of deep soils, and consequently would not be found in all project locations. Short-term impacts would generally be high for populations that are within the construction areas. Impacts could result from mechanical disturbance or crushing of burrows; removal of sagebrush, an important source of cover and browse for these species; and general disturbance from construction equipment and human presence. Long-term impacts resulting from a reduction in browse and cover species from conversion of native sagebrush, grasses, and forbs to invasive weed species could affect these species. These impacts would generally be high, as high-quality native shrub-steppe is scarce and many of these species are rare. Some species such as ground squirrels and mice may suffer higher mortality rates because they will have less cover available to protect them from raptors or owls (moderate-high impacts). Soil compaction from heavy equipment and road construction could also impact burrowing species by reducing the amount of soft soils they could use for burrowing (moderate impact). Operation of the project and ongoing maintenance activities will not affect these species except for minor temporary disturbance from vehicles, because all activity will take place on access roads.

5) Herpetofauna present in the shrub-steppe areas include rattlesnakes, gopher snakes, nightsnakes, whipsnakes, sagebrush lizards, Western fence lizards, and others. These species are present in many habitats and are not as dependent on undisturbed shrub-steppe as some bird and mammal species. However, they are less mobile and their home ranges are small, so even localized

disturbances could have high impacts. Short-term construction-related disturbance could impact herpetofauna species from crushing or mechanical injury (moderate-high impact). Construction-related noise and human intrusion generally would not impact these species past the immediate construction area. Long-term impacts would be related to the removal of cover species such as sagebrush and the fragmentation of habitat associated with roads and cleared areas. Removal of cover creates opportunities for predators such as raptors, owls, and coyotes to more easily find these prey species. Large cleared areas such as roads could create barriers to these species' movements by eliminating sources of cover. This could limit dispersal and access to critical habitat elements for some species (moderate-high impacts).

4.4.2.3 Operation and Avian Collision Impacts

Operation of the proposed project would have the greatest impact on bird species, due to the collision threat posed by structures, transmission lines, and ground wires. Most other wildlife species would not be as significantly impacted, as the presence of the transmission lines, structures, and access roads generally does not present barriers to migration, create excessive noise, or otherwise cause major behavior changes. Some species with small home ranges or limited dispersal ability might experience a greater negative impact. The risk of electrocution to perching and migratory birds has been minimized over the years by designing towers, insulators, and conductors to account for the behavior of different bird species (especially raptors) as they perch or attempt to nest on different parts of the towers and conductors. These design changes have led to a significantly reduced risk of bird mortality from electrocution. These designs have been incorporated into all of the towers, insulators, and conductors specified for the proposed project.

Some bird species, usually waterfowl, are prone to collisions with powerlines, especially the grounding wires located at the top of the structures (Meyer, 1978, James and Haak, 1979, Beaulaurier, 1981, Beaulaurier et al., 1982, Faanes, 1987). Four main factors influence avian transmission line collisions: the current level of risk, power line configuration, amount of bird use in a particular area, and the tendency of certain bird species to collide with wires. Collisions usually occur near water or migration corridors and more often during inclement weather. Raptor species are less likely to collide with power lines, perhaps due to their excellent eyesight and tendency to not fly at dusk or in low visibility weather conditions (Olendorff and Lehman, 1986). Smaller migratory birds are at risk, but generally not as prone to collision because of their small size, their ability to quickly maneuver away from obstacles, and the fact that they often migrate

high enough above the ground to avoid transmission lines. Permanent-resident birds that fly in tight flocks, particularly those in wetland areas, may be at higher risk than other species.

4.4.3 Preferred Alternative (Alternative 2)

The Preferred Alternative would include Segment A, Segment B (Option B_{SOUTH}), Segment D and the fiber optic line.

4.4.3.1 Segment A

Along Segment A, approximately 70.25 acres of shrub-steppe would need to be temporarily cleared for construction access and approximately 20.35 acres would need to be permanently removed for structure sites and access roads. Approximately 0.20 acres of forest vegetation, including some riparian vegetation, would need to be temporarily cleared for access roads and tower locations.

Riparian vegetation removal would constitute a high impact to wildlife, since riparian areas are scarce and provide important habitat to species such as bald eagles and Lewis' woodpeckers. Options 1 and 2, associated with the Sickler-Schultz Reroute, would cross different areas of Wilson Creek. Both areas have similar vegetation and wildlife habitat. There would be no impacts to wildlife from riparian vegetation removal since both crossings would span the vegetation with adequate electrical clearance.

Nesting habitat for sagebrush obligate species such as the sage sparrow and sage thrasher would be removed (high impact), as would known nesting habitat for long-billed curlew (moderate impact). Sharp-tailed grouse have been documented in the past near the west end of Segment A and, if they still exist, would be moderately impacted by vegetation removal. Sage grouse are known to exist in the southern end of this segment, although no occurrences have been documented closer than 1 mile from the proposed ROW. Disturbance to sage grouse from vegetation removal and construction noise may result from this project (high impact).

The increase in risk to raptors, waterfowl, and passerine bird species from collision with transmission lines and structures would be low, since no major migration corridors or bodies of water are located along this segment and the alignment parallels existing transmission lines for the entire length. If the project were constructed during the winter, the potential for disturbing roosting bald eagles (threatened species) would be high near the Wilson and Naneum Creek crossings (high impact).

Wintering deer and elk might be temporarily disturbed by the construction noise and activity (minimal impact). The increase in potential habitat for perching raptors may cause an increase in predation risk for shrub-steppe dependent animals, a moderate impact.

4.4.3.2 Segment B

The Preferred Alternative would follow Option B_{SOUTH} of Segment B. Option B_{NORTH} would not be used for this alternative.

Along Segment B (Option B_{SOUTH}), approximately 31.7 acres of shrub-steppe would need to be temporarily cleared for construction access and approximately 6.35 acres would need to be permanently removed for structure sites and access roads. No riparian vegetation would need to be cleared.

If the new line was constructed during the winter, the potential for disturbing roosting bald eagles (threatened species) would be moderate near the Columbia River crossing (moderate impact). In the upland areas, wintering deer and elk might be disturbed by construction activity (minimal impact). Sage grouse are known to exist near the western end of this segment and might be impacted (high impact). Nightsnakes have been observed near the proposed ROW and might be impacted (low impact). Near the Columbia River, waterfowl, pelicans, and other birds using the area as a migration corridor might be at increased risk of collision with the transmission line spanning the river (moderate impact).

Impacts to Option B_{NORTH} would be essentially the same as those described for Option B_{SOUTH} above, should that option be used.

4.4.3.3 Segment D

Segment D has the most varied terrain, and thus the most diverse group of habitats of all the proposed segments. Approximately 49.45 acres of shrub-steppe habitat would need to be temporarily cleared for construction access and approximately 17.35 acres would be permanently removed for structure sites and access roads. Segment D crosses Lower Crab Creek and the Columbia River, which are both migration corridors for birds and areas of high waterfowl concentrations. The risk of avian collisions would be increased in these areas, although the proposed line would be located adjacent to an existing line (moderate impact). The Saddle Mountains have documented occurrences of nesting prairie falcons and golden eagles that could be disturbed by construction activities (low impact). Other species in the Saddle Mountains include the striped whipsnake, chukar, passerine bird species, and a variety of small mammals.

Impacts to these species would be moderate, due to the removal of shrub-steppe and dwarf shrub-steppe plant communities.

Segment D crosses the Wahluke Slope over mostly agricultural lands, with no native shrub-steppe habitat present. Construction and operation of the project in this section of the proposed segment would have no impact on species that depend on shrub-steppe habitat and would have minimal to no impact on other wildlife species.

The southern third of Segment D crosses the Columbia River and climbs over Umtanum Ridge. On the steep north face of Umtanum Ridge, nesting prairie falcons and other raptor species have been documented. Swainson's hawks, loggerhead shrikes, and burrowing owls have all been documented nesting near or on the proposed ROW south of Umtanum Ridge. Clearing in this area would cause high impacts to burrowing owls and moderate impacts to other shrub-steppe-dependent species, because existing shrub-steppe vegetation is considerably disturbed. In addition, the southern end of the proposed line crosses the Cold Creek wildlife migration corridor, which is one of the most important bird migration corridors in Washington and an important corridor for wildlife migrating between the YTC and the Hanford Site. Disturbance to this area has the potential to disrupt the migration patterns of these species and increase the hazard of avian collisions with transmission lines and structures, although because the new transmission line would parallel existing transmission lines, impacts would be less than if a new line were installed separate from existing lines (moderate impact).

4.4.3.4 Fiber Optic Line

The proposed fiber optic line would follow an existing transmission line and would not require that new structures be built. There would be several pulling and reeling areas along the alignment where vehicles and equipment would need to be temporarily parked and some ground disturbance would be required. However, these areas would be limited to agricultural areas or roads where existing disturbance has occurred. Therefore, no native shrub-steppe or other vegetation would be removed as part of the fiber optic line installation. Disturbance would be limited to temporary noise and human presence from work at tower sites and vehicular travel along access roads. No impacts to wildlife species existing in shrub-steppe would be expected.

Where the fiber optic alignment crosses canyons or wetland and lake areas, bird strikes are a concern. Five areas along the fiber optic line have been identified as being at risk for bird strikes: Crab Creek,

Sand Hollow Canyon, the lakes and wetland complex north of I-90, the Quincy Lakes Wildlife Refuge, Lynch Coulee and Moses Coulee. Spiral bird strike diverters would be placed along the fiber optic line in these locations to make the fiber optic line more visible to passing birds and reduce the chance of collision. Since the fiber optic line would be placed on an existing structure that birds are currently accustomed to, the potential impacts are only moderate to low, as opposed to high for an entirely new structure. The application of bird strike diverters in appropriate areas reduces the potential impact to birds from moderate to low.

The fiber optic loop near the proposed Wautoma Substation would be attached to existing towers and would have only temporary disturbances to agricultural and shrub-steppe lands from three reeling sites. No permanent impacts to shrub-steppe or wildlife species would occur from vegetation disturbance, however, the risk of bird strikes would increase. With the addition of bird strike diverters in the area over Yakima Ridge, the risks to birds would be low.

➡ Reminder

Impacts to wildlife would be moderate to high along Segments A and B.

4.4.4 Alternative 1

Alternative 1 would include Segment A, Segment B (Option B_{SOUTH}), Segment E, and the fiber optic line between the Vantage and Columbia Substations.

Impacts to wildlife and wildlife habitat along Segments A, B, and the fiber optic line between Vantage and Columbia Substations would be the same as described for the Preferred Alternative. (See Section 4.4.3.1, *Segment A* and Section 4.4.3.2, *Segment B*).

4.4.4.1 Segment E

Along Segment E, approximately 63.50 acres of shrub-steppe would need to be temporarily cleared for construction access and approximately 12.45 acres would need to be permanently removed for structure sites and access roads. Approximately 0.85 acres of forest vegetation, including some riparian vegetation, would need to be temporarily cleared for access roads and tower locations.

Segment E crosses Lower Crab Creek and the Columbia River, which are both migration corridors for birds and areas of high waterfowl concentrations. The risk of avian collisions would be increased in these areas, although the proposed line would be located adjacent to an existing line (moderate impact). The Saddle Mountains have documented occurrences of nesting prairie falcons and golden eagles that could be disturbed by construction activities (low impact). Other species in the Saddle Mountains include the striped whipsnake, chukar, passerine bird species, and a variety of small mammals.

Impacts to these species would be moderate, due to the removal of shrub-steppe and dwarf shrub-steppe plant communities. The upper edge of the Wahluke Slope, just below the Saddle Mountain crest where the line heads southeast, has not been converted to agriculture and remains shrub-steppe. Construction in this area would cause a high impact to shrub-steppe-dependent species in this area such as sage thrashers and sage sparrows. The line crosses the remainder of the Wahluke Slope over mostly agricultural lands that have little native shrub-steppe habitat present. Construction and operation of a new line in this section of the proposed segment would have no impact on species that depend on shrub-steppe habitat, and minimal to no impact on other wildlife species. The project may have a low positive impact for raptor species due to an increase in nesting, perching, and roosting habitat.

The shrub-steppe habitat in the Hanford Site is relatively undisturbed, although some areas of invasive species are present due to past grazing practices. A herd of mule deer, uncommon in the central shrub-steppe region, is present in this area and may be temporarily disturbed by construction activity (low impact). Shrub-steppe-dependent species such as the sage sparrow would be disturbed by construction and habitat removal during clearing (high impact). Burrowing owls have been documented near the proposed line and may be impacted by clearing and construction (moderate impact). Raptors (including Swainson's hawks) are present. A new line might have a low positive impact for raptors, because the towers are the tallest structures within many miles and make excellent perching habitat. However, the additional habitat available for perching raptors could increase the predation risk for small shrub-steppe dependent species such as sage sparrows, sage thrashers, mice, and voles, a moderate impact.

A large wetland complex called Saddle Mountain Wasteway, just west of Segment E, is home to great numbers of waterfowl, great blue herons, and other wetland species. The new line would cross a channel and the associated wetland complex leading east from the lake. Woodhouse's toads have been documented in large numbers within this area and might be impacted (low impact). The proposed line would avoid the riparian area (minimal impact to riparian species), but increase the collision hazard for waterfowl and other bird species (moderate impact). The crossing over the Columbia River into the Hanford Substation would also increase the collision hazard for waterfowl and other bird species using the migration corridor (moderate impact).

4.4.5 Alternative 3

Reminder

Impacts to wildlife would be moderate along Segment A.

Alternative 3 would include Segment A, C, and the fiber optic line.

Impacts to wildlife and wildlife habitat along Segment A and the fiber optic line would be the same as described for the Preferred Alternative. (See Section 4.4.3.1, *Segment A)*.

4.4.5.1 Segment C

Along Segment C, approximately 171.05 acres of shrub-steppe would need to be temporarily cleared for construction access and approximately 154.95 acres would need to be permanently removed for structure sites and access roads. Approximately 1.15 acres of forest vegetation, including some riparian vegetation, would need to be temporarily cleared for access roads and tower locations.

Sage grouse, burrowing owls, wintering bald eagles, and loggerhead shrike are all known to be present near the proposed ROW, and could be impacted by construction of the new line (high impact). The southern end of the segment crosses Cold Creek, which one of the most important bird migration corridors in Washington. The southern portion is also an important area for deer, elk, coyote, jackrabbit, and other species migrating between the YTC and the Hanford Site. Disturbance to this area could disrupt the migration patterns of these species, and increase the hazard of avian collisions with transmission lines and structures (moderate impact).

4.4.6 Alternative 1A

Reminder

Impacts to wildlife would be moderate along Segment A and moderate to high along Segment B.

Alternative 1A would include Segment A, Segment B (Option B_{SOUTH}), Segment F, and the fiber optic line between Vantage and Columbia Substations.

Impacts to wildlife and wildlife habitat along Segment A and Segment B (Option B_{SOUTH}) would be the same as described for the Preferred Alternative. (See Section 4.4.3.1, *Segment A* and Section 4.4.3.2, *Segment B_{SOUTH}*).

4.4.6.1 Segment F

Along Segment F, approximately 104.65 acres of shrub-steppe would need to be temporarily cleared for construction access and approximately 51.95 acres would need to be permanently removed for structure sites and access roads. No riparian vegetation would need to be temporarily cleared for access roads and tower locations.

Impact levels in the area between the Vantage Substation and the crest of the Saddle Mountains would be similar to those described for

Segments D and E. Below the crest of the Saddle Mountains, the area is relatively undisturbed, with the exception of historical grazing and some motorized recreation activities. A historical sage grouse sighting was made near the study area, and a possible historical (pre-1978) Washington ground squirrel colony was located in the general vicinity of the proposed ROW. The top of the Saddle Mountains is a historic sage grouse corridor. If either of these species are still present, construction and clearing of the project would cause a high impact to them.

From the Saddle Mountains, Segment F cuts south across the Wahluke Slope. This section of the Wahluke Slope is not used for agriculture and is relatively undisturbed shrub-steppe habitat. Swainson's hawks are known to nest along this section and might be positively impacted by construction and operation of the project because new perch sites would be created by the towers. Other shrub-steppe-dependent species such as sage sparrows and sage thrashers would be impacted by removal of shrub-steppe vegetation during structure placement and road clearing (high impact).

After crossing Highway 24, Segment F enters the Hanford Site. The impacts to wildlife in this area would be similar to those impacts associated with Segment E.

4.4.7 No Action Alternative

The No Action Alternative would not change any existing conditions, and therefore would have no impact on any wildlife species. The impacts currently associated with ongoing maintenance activities for the existing transmission line, substations, and ROW would continue. These impacts include localized disturbance to wildlife and habitat due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. No new impacts to wildlife and wildlife habitat are expected as a result of this alternative.

4.4.8 Threatened and Endangered Species

This section describes the impacts that the proposed project would have on the seven wildlife species that are either federally listed or proposed for listing: the grizzly bear, the gray wolf, the Canada lynx, the pygmy rabbit, the bald eagle, the northern spotted owl, and the marbled murrelet. A Biological Assessment has been prepared separately, and determination of the effects for each of these species is presented in that document. The effects determinations are presented in Table 4.4-1, *Threatened and Endangered Wildlife Species Effect Determination*. USFWS concurred with the findings on November 4, 2002.

Table 4.4-1
Threatened and Endangered Wildlife Species
Effect Determinations

Listed Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
Grizzly Bear *(Ursus arctos horribilis)* Threatened	No effect	Would not result in destruction or adverse modification of critical habitat	No documented populations within or near project area.
Gray Wolf *(Canis lupus)* Endangered	No effect	Critical habitat not designated	No documented populations or suitable habitat within or near project area.
Canada Lynx *(Lynx canadensis)* Threatened	No effect	Would not result in destruction or adverse modification of critical habitat	No documented populations or suitable habitat within or near project area.
Bald Eagle *(Haliaeetus leucocephalus)* Threatened	May affect, not likely to adversely affect	Critical habitat not designated	No documented nest sites near project area; wintering sites exist along Wilson/Naneum Creek and other crossings. Construction timing restrictions to be used.
Northern Spotted Owl *(Strix occidentalis caurina)* Threatened	No effect	Would not result in destruction or adverse modification of critical habitat	No documented populations or suitable habitat within or near project area.
Marbled Murrelet *(Brachyramphus marmoratus marmoratus)* Threatened	No effect	Would not result in destruction or adverse modification of critical habitat	No documented populations or suitable habitat within or near project area.

New Table for the FEIS.

Table 4.4-2
Proposed Listed Wildlife Species Effect Determinations

Proposed Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
Wildlife Species			
Pygmy Rabbit *(Brachylagus idahoensis)* Proposed Endangered	No effect	Critical habitat not designated	No documented populations within or near project area, limited suitable habitat exists within project area.

New Table for the FEIS.

The grizzly bear, gray wolf, Canada lynx, northern spotted owl and marbled murrelet are not known to currently exist in the project area, so the proposed project will not impact these species.

4.4.8.1 Bald Eagle

Bald eagles are not known to nest within the study area. Wintering bald eagles are present in the area north of Ellensburg near Wilson and Naneum Creeks, in the YTC near Hanson and Alkali Canyon Creeks, and near the Columbia River crossings at Vantage, Midway and the Hanford Site. Construction near known bald eagle roost sites might disturb wintering bald eagles (high impact). In areas away from roost sites, the disturbance of bald eagles from construction will result in a minimal impact. Some eagle habitat would be removed. With mitigation (construction timing restrictions), the proposed project would have a moderate impact on bald eagles.

4.4.8.2 Pygmy Rabbit

There have been no confirmed sightings of pygmy rabbits within the project area. The nearest recorded sighting was made in 1979 in the Rattlesnake Slope area of the Hanford Reservation, south of the proposed Wautoma substation (WDFW, 1995). The nearest existing population (and the only currently known population in Washington) is well northeast of the proposed project in Douglas County (WDFW, 1995, 66 FR 59734-59749). Surveys of the YTC in the mid 1990s did not find populations of pygmy rabbits (ENSR, 1995). Construction through known pygmy rabbit populations or disturbance to ones nearby would be a high impact because they are extremely rare and sagebrush, a primary habitat component, would be removed.

4.4.9 Special Status Species

Table 4.4-3, *Impacts to Special Status Species*, lists state and federal special status species that may be present within each segment of the proposed study area and indicates the possible impact the project may have on them. The following sections describe potential impacts to two federal candidate species, the sage grouse and the Washington ground squirrel.

Table 4.4-3
Impacts to Special Status Species

Species Name	Federal Status	State Status	Possible Presence by Line Segment	Documented Occurrence Type	Potential Impact	Mitigated Impact
Species Not Present in Project Area						
Birds						
Northern Spotted Owl	FT	SE	NONE	N	N	N
Marbled murrelet	FT	ST	NONE	N	N	N
Ash-throated flycatcher	FSC	SM	NONE	N	N	N
Mammals						
Gray wolf	FE	SE	NONE	N	N	N
Canada lynx	FT	ST	NONE	N	N	N
Grizzly bear	FT	SE	NONE	N	N	N
Pacific fisher	FSC	SE	NONE	N	N	N
Wolverine	FSC	SC	NONE	N	N	N
Western gray squirrel	FSC	ST	NONE	N	N	N
Potholes meadow vole	FSC		NONE	N	N	N
Herpetofauna						
Cascades frog	FSC		NONE	N	N	N
Larch Mountain salamander	FSC	SS	NONE	N	N	N
Red-legged frog	FSC		NONE	N	N	N
Tailed frog	FSC	SM	NONE	N	N	N
Insects						
Mardon skipper	FC	SE	NONE	N	N	N
Riparian, Open Water and Wetland Species						
Waterfowl (Collision Risk from Infrastructure))						
Aleutian Canada goose	DM	ST	B, D, E, F	M	M	M
Harlequin duck	FSC		B, D, E, F	P	M	M
Common loon		SS	B, D, E, F	M	M	M
Black tern	FSC	SM	B, D, E, F	M	M	M
Caspian tern		SM	B, D, E, F	M	M	M
Forster's tern		SM	B, D, E, F	M	M	M
American white pelican		SE	B, D, E, F	M	M	M
Perching and Cavity-nesting Birds (Habitat Removal from Clearing)						
Bald eagle	FT	ST	ALL SEGMENTS	W	H	M
Osprey		SM	B, D, E, F	B	L	L
Great blue heron		SM	B, D, E, F	B	M	M
Black-crowned night heron		SM	B, D, E, F	B	M	M
Lewis' woodpecker		SC	A, C, D, E, F	B	M	M
Olive sided flycatcher	FSC		ALL SEGMENTS	P	M	M
Little willow flycatcher	FSC		ALL SEGMENTS	P	M	M
Bats (Collision Risk from Infrastructure, Habitat Removal from Clearing)						
Pacific western big-eared bat	FSC	SC	ALL SEGMENTS	P	M	M
Long-eared myotis	FSC	SM	ALL SEGMENTS	P	M	M
Long-legged myotis	FSC	SM	ALL SEGMENTS	P	M	M
Fringed myotis	FSC	SM	ALL SEGMENTS	P	M	M
Western small-footed myotis	FSC	SM	ALL SEGMENTS	P	M	M
Yuma myotis	FSC		ALL SEGMENTS	P	M	M
Pallid bat		SM	ALL SEGMENTS	P	M	M
Herpetofauna (Habitat Removal from Construction and Clearing)						
Northern leopard frog	FSC	SE	D, E, F	P	Mn	Mn
Spotted frog	FC	SE	ALL SEGMENTS	P	Mn	Mn
Woodhouse's toad		SM	E, F	B	Mn	Mn
Shrub-Steppe Species						
Raptors and Migratory Birds (Collision Risk from Infrastructure)						
Northern goshawk	FSC	SC	ALL SEGMENTS	M	M	M
Golden eagle		SC	B, C, D, E, F	B	M	M
Ferruginous hawk	FSC	ST	ALL SEGMENTS	B	M	M
Swainson's hawk		SM	ALL SEGMENTS	B	M	M
Prairie falcon		SM	ALL SEGMENTS	B	M	M
Peregrine falcon	FSC	SE	C, D, E, F	B	M	M
Turkey vulture		SM	B, D, E, F	B	M	M
Western bluebird	FSC	SM	ALL SEGMENTS	B	M	M

Species Name	Federal Status	State Status	Possible Presence by Line Segment	Documented Occurrence Type	Potential Impact	Mitigated Impact
Sagebrush-Dependent Birds (General Disturbance, Habitat Fragmentation and Removal from Construction)						
Sage sparrow		SC	ALL SEGMENTS	B	H	H
Sage thrasher		SC	ALL SEGMENTS	B	H	H
Long-billed curlew	FSC	SM	A, C, E, F	B	H	H
Western sage grouse	FSC	ST	A, C, F	B	H	H
Loggerhead shrike	FSC	SC	ALL SEGMENTS	B	H	H
Grasshopper sparrow	FSC	SM	C	B	H	H
Sharp-tailed grouse	FSC	ST	NONE	H	H	H
Mammals (General Disturbance)						
California bighorn sheep	FSC		B, D, E, F	P	L	L
White-tailed jackrabbit		SC	ALL SEGMENTS	B	M	M
Small Burrowing Species (General Disturbance, Habitat Fragmentation and Removal from Construction)						
Burrowing owl	FSC	SC	C, D, E, F	B	H	M
Washington ground squirrel	FC	SC	D, E, F	H	H	M-N
Pygmy rabbit	FSC	SE	D, E, F	H	H	M-N
Ord's kangaroo rat		SM	B, D, E, F	P	H	M
Northern grasshopper mouse		SM	ALL SEGMENTS	P	H	M
Sagebrush vole		SM	ALL SEGMENTS	P	H	M
Merriam's shrew		SC	ALL SEGMENTS	B	H	M
Herpetofauna (Habitat Fragmentation and Removal from Construction)						
Sagebrush lizard	FSC		ALL SEGMENTS	B	H	M
Nightsnake		SM	B, D, E, F	P	H	M
Striped whipsnake		SC	ALL SEGMENTS	B	H	M
Insects (Habitat Removal from Construction)						
Persius' duskywing		SM	E	P	Mn	Mn

Federal Status
FE = Endangered
FT = Threatened
FC = Candidate
D = Delisted
FSC = Species of Concern
H = Historically Present, Not Currently Present

State Status
SE = Endangered
ST = Threatened
SS = Sensitive
SC = Candidate
SM = Monitor

Documented Occurrence Type
P = Present (general presence)
B = Breeding
M = Migrant
W = Winter Resident
N = Not Present

Table has been updated for the FEIS.

4.4.9.1 Washington Ground Squirrel

The Washington ground squirrel is a federal candidate for listing and a state species of concern. Much of the study area is located west of the Columbia River, outside of the Washington ground squirrels' known historical range. One historical occurrence (pre-1978) was noted near Segment F in the Saddle Mountains (Betts, 1990). The nearest known existing population is approximately 5 miles east of Segment F north of the Saddle Mountain crest (Nature Conservancy, 2001). Suitable Washington ground squirrel habitat may exist within the study area east of the Columbia River, especially near Lower Crab Creek (Hill, 2001) and the Wahluke Slope (Nature Conservancy 2001). Surveys of suitable habitat did not find any populations of Washington ground squirrels. Construction of a new line and access roads on the preferred alternative would have low or no impact on any Washington ground squirrel colonies that might exist near the study area because no colonies have been observed. On other alternatives, if construction were to occur in or near populations of

Washington ground squirrel, impacts would be high. If no populations are present, impacts would be low to none.

4.4.9.2 Sage Grouse

The sage grouse is a candidate for federal listing. WDFW lists the sage grouse as threatened. In Washington, sage grouse have historically ranged from the Columbia River, north to Oroville, west to the foothills of the Cascades, and east to the Spokane River. Within the study area, they are known to exist within each of the six drainages in the YTC that are crossed by sections of Segments A, B, and C. Sage grouse are known to nest in the Alkali Canyon and Corral Canyon drainages. A historical ***lek*** in the Johnson Creek drainage has not been used since 1987. Most of the core sage grouse habitat in the YTC is west of the proposed route. The Cold Creek drainage provides important breeding, nesting, and year-round use areas. Construction of Segments A and B would cause a low-moderate impact to sage grouse. Construction of Segment C would cause a high impact to sage grouse because part of this segment passes through occupied core sage grouse habitat that would be altered by construction activities. Construction of Segments D, E, and F would cause a low to moderate impact to sage grouse because it would disturb habitat that could act as dispersal areas for birds from the YTC should the population increase and expand. Birds flying through these areas could also collide with the transmission lines. The addition of transmission towers could increase the amount of Golden eagle or other raptor perching areas, leading to increased risk of predation on sage grouse on all segments.

Reminder

*A **lek** is an open area where sage grouse gather in the spring to perform courtship dances.*

4.4.10 Recommended Mitigation

To reduce the impacts to wildlife associated with the construction, operation, and maintenance of the proposed project, a number of project-wide mitigation measures would be implemented.

4.4.10.1 Big Game Disturbance

- Construction on Segments A, E, or F would be coordinated with WDFW during extreme winter weather or unusually heavy snow accumulations, when big game species are less mobile and more vulnerable to disturbance to ensure that construction activities would not significantly interfere with big game wintering.
- New or existing roads may be gated and signed to prevent human encroachment into big game wintering areas or significant migration corridors.

4.4.10.2 Avian Collision Mitigation

- Where possible, new structures would be lined up with existing structures to minimize vertical separation between sets of transmission lines.
- Appropriate line markers would be installed in high-risk areas, such as crossings of the Columbia River, Lower Crab Creek, the Cold Creek migration corridor, high ridge crossings such as the Saddle Mountains, Umtanum Ridge and Yakima Ridge and on Hanford Reach National Monument lands. Spiral markers will be used on the overhead ground wires and/or fiber optic line in high risk areas, because these are the parts of the transmission line structure most often struck by birds (conductors are generally big enough to be seen). Spiral markers strung along these wires make them more visible to passing birds and easier to avoid.

4.4.10.3 Raptor Disturbance Mitigation

- Project construction would be timed to avoid critical nesting periods in known raptor nest locations, as determined by USFWS and WDFW.
- Project construction would be timed to avoid disturbing wintering bald eagles in areas of suitable winter habitat. Known eagle wintering locations include Wilson and Naneum Creeks. Construction in these areas would be avoided from November 1 through April 1.

4.4.10.4 Shrub-Steppe Habitat Loss Mitigation

- To minimize the impacts to shrub-steppe, a Priority Habitat, the construction activities would be confined to designated construction work areas.
- Vegetation for temporary vehicle travel or equipment storage would not be cleared outside of designated construction areas; crushing is preferable to removal.
- When possible, use of access roads would be avoided in steep terrain during unusually wet or muddy conditions.
- Noxious weed spread would be prevented by inspecting for and removing noxious weeds from vehicles prior to entry into the project area, revegetating disturbed areas using native seed mix at appropriate planting times as indicated by USFWS, BLM, BOR, and YTC, and selectively applying herbicide as needed.
- Fire fighting equipment would be carried in all vehicles and seasonal fire restrictions on construction would be observed. Vehicles would be parked in areas free from dry grass or other vegetation.

4.4.10.5 Wildlife Disturbance Mitigation

- New or existing roads may be gated and signed at appropriate locations to prevent human encroachment into areas containing significant wildlife populations or relatively undisturbed wildlife habitat.
- Construction, operation and maintenance activities would be timed to avoid entry into sensitive wildlife habitats during critical breeding or nesting periods (as determined by USFWS and WDFW).
- Vegetation removal would be limited to only the amount required to safely construct new access roads. Riparian vegetation would be removed only where absolutely necessary for line clearance purposes. Large trees may be left where they are felled so as not to remove sources of large woody debris. Small trees and shrubs would be left along stream channels to provide continued stream shading.

Potential impacts to sage grouse would be mitigated by implementing the following measures:

- Existing access roads would be used where possible. Spur roads would lead to new tower locations, rather than an entirely new road along the new ROW.
- Off-road travel would be minimized such as that necessary for turning equipment and vehicles around or parking and staging equipment. In these areas, construction crews would be instructed to crush vegetation in place to accomplish vehicle turnaround, rather than clearing it with equipment. This would help avoid soil compaction, reduce the area requiring revegetation, and reduce the potential for noxious weed spread.
- Disturbed areas would be revegetated using native seed mixes appropriate to the area (seed mixes would be developed specifically for locations in the YTC, the Saddle Mountains, and Umtanum Ridge).
- Line markers would be placed on each span in the YTC to alert low-flying aircraft to the presence of transmission lines. These markers would also allow sage grouse to better see the overhead ground wire and avoid impacting them. Line markers would also be placed on the overhead ground wire on Hanford Reach National Monument lands, which in the project area, may serve as a potential dispersal corridor for sage grouse and other birds and mammals moving between the monument and the YTC.

- Other specific mitigation measures for removal of shrub-steppe vegetation are being developed in coordination with staff of the Hanford Reach National Monument.

4.4.11 Cumulative Impacts

The proposed project could potentially impact the existing environmental conditions of current concern in eastern Washington, especially from the loss/fragmentation of native shrub-steppe plant and dependent wildlife communities.

The shrub-steppe habitat type has been significantly reduced from historical levels in Washington, and much of the remaining habitat is heavily disturbed by grazing, fire, or other land uses. It is generally recognized that preserving large, unbroken tracts of high quality shrub-steppe vegetation is important for maintaining populations of shrub-steppe dependent species such as sage grouse, sage sparrow, Washington ground squirrel and others (Johnson and O'Neil, 2001). WDFW has declared the shrub-steppe habitat type as a Priority Habitat.

Construction of structures and access roads through shrub-steppe vegetation would increase the existing levels of habitat fragmentation and reduce the amount of shrub-steppe vegetation available for wildlife habitat. Over time, native shrub-steppe vegetation may recolonize the disturbed areas. However, construction of the proposed project would increase the potential for the linear spread of noxious weeds into previously undisturbed areas. The presence of noxious weeds makes the recolonization of disturbed areas with native vegetation extremely difficult, and generally leads to a long-term reduction in quality wildlife habitat.

4.5 Fish Resources

4.5.1 Impact Levels

Reminder

*A **take** is to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct.*

*To **harm** is to injure directly, or cause significant habitat modification or degradation that results in death or injury to a species.*

High impacts to fish would occur when an action creates a significant adverse change in fish habitat, populations or individuals. High impacts might result from actions that:

- cause the ***take*** of a federally listed or proposed threatened, endangered fish species.
- cause a significant long-term (more than two years) adverse effect on the populations, habitat and/or viability of a federal or state listed fish species of concern or sensitive species, which would result in trends towards endangerment and/or the need for federal listing.
- ***harm*** or kill a significant number of individuals of a common fish species at the local (stream reach or small watershed) level.

Moderate impacts to fish would occur when an action creates a moderate adverse change in fish habitat, populations or individuals. Moderate impacts might result from actions that:

- without causing a take, cause a temporary (less than two months) reduction in the quantity or quality of localized (stream reach or small watershed) aquatic resources or habitats at a time when federally listed threatened, endangered, or proposed fish species are **not likely** to be present (i.e., during non-spawning or rearing times).
- cause a short-term (up to two years) localized (stream reach or small watershed) reduction in population, habitat and/or viability of a federal or state listed fish species of concern or sensitive species, without causing a trend towards endangerment and the need for federal listing.
- harm or kill a small number of individuals of a common fish species at the local (stream reach or small watershed) level.

Low impacts to fish would occur when an action creates a minor or temporary adverse change in habitat, populations, or individuals. Low impacts might result from actions that:

- cause a temporary (less than two months) localized (stream reach or small watershed) reduction in the quantity or quality of aquatic resources or habitats of state listed fish species of concern or sensitive species, without causing a trend towards endangerment and the need for federal listing.

- cause a short-term (up to two years) disturbance or displacement of common fish species at the local (stream reach or small watershed) level.

No impacts to fish would occur when an action has no effect or fewer impacts than the low impact level on fish habitat, populations or individuals.

4.5.2 Impacts Common to Construction Alternatives

The construction, operation and maintenance of the proposed transmission line will impact fish populations that reside in or near the study area. The extent of impact would depend on the fish species, its distribution, its habitat requirements, and the availability of suitable habitat in and around the construction and study area. (See Table 4.5-1, *Water Crossings and Fish Presence*.)

Table 4.5-1
Water Crossings and Fish Presence

Line Segment	Preferred (2)	Alternative 1	Alternative 3	Alternative 1A	V-C Fiber
Intermittent Drainages[1]	44	41	68	38	2
Canals and Drains[2]	9	4	0	1	8
Lakes	1	2	1	2	6
Perennial Streams	11	11	20	11	2
Fish Bearing Streams[3]	10	11	17	11	2

1 Intermittent drainages were determined from USGS 7.5 minute quad maps. These drainages may be seasonally intermittent or only contain water during storm events. It is assumed that these drainages do not contain fish.

2 Canals and drains were determined from USGS 7.5 minute quad maps. Although fish may be periodically observed, it is assumed that canals and drains do not contain fish.

3 Perennial streams that are known to contain fish. Where the ROW crosses the intermittent headwaters of a perennial stream that is known to contain fish, it is assumed that fish are present and could be affected by the project.

Table has been updated for the FEIS.

4.5.2.1 Construction Impacts

Short-term construction disturbances, depending on the time of year and the location, could impact various fish species by causing sedimentation, habitat and/or individual fish disturbance, or the release of hazardous materials into a waterway. The following would be potential short-term impacts:

- Damage to fish or fish habitat could occur from construction sediments entering streams.
- Soil from roads, cleared areas, excavations, stockpiles or other construction sources could enter streams and cause an increase in ***sediment load*** and/or ***sediment deposition*** in spawning gravels.
- Concrete washing or dumping could allow concrete waste to enter streams and cause an increase in sediment load.

For Your Information

Sediment load *is the amount of sediment moved by stream.*

Sediment deposition *is sediment deposited on a streambank or streambed.*

- Other construction materials (metal parts, insulators, wire ends, bolts, etc.) could enter streams and cause changes in flow or other unknown effects.
- Mechanical disturbance of fish habitat could occur from equipment operating in, crossing, or passing streams.
- Streambank compaction or sloughing could reduce the streambank's ability to support vegetation, or cause sediment input or increased runoff.
- Heavy equipment moving across a stream (or repeated travel by light equipment) could cause substrate disturbance, including sediment release or substrate compaction.
- Riparian vegetation destruction or removal (this would be incidental only; planned vegetation removal for new ROW and roads is a long-term impact) could cause a loss of fish habitat (cover), loss of stream shading, removal of large woody debris sources, and reduction could occur in ***buffer*** capacity.
- Disturbance of individual fish from equipment operating in or near streams.
- Vibration or shock from equipment operating in or near streams could drive fish to less suitable habitat or to areas where predation is more likely. In marginal conditions such as extreme low flows and high water temperatures, stress from repeated disturbance could cause death.
- Mechanical injury or death could occur from equipment crossing or operating in streams, especially to fish that live in or on the bottom of the stream (such as sculpins).
- Injury or death of fish or their prey could result from hazardous materials spills.
- Petroleum fuel products, hydraulic oil, and other hazardous materials typically associated with construction activities could enter the stream, causing fish kills, aquatic invertebrate kills, and death or injury to a number of other species that fish depend on for food. Spills may also create pollution "barriers" to fish migration between stream reaches.

➡ For Your Information

*A **buffer** is the ability of streamside riparian vegetation to protect the stream against sediment or other pollutant input.*

Depending on the location and the fish species present, short-term impacts could range from low to high. Short-term disturbances such as those listed above would constitute a high or medium impact on most species. However, since most of the project construction will occur away from streams and include mitigation (such as construction timing restrictions and spill prevention and erosion measures), short-term construction-related disturbances should result in low or no impacts to all fish species.

4.5.2.2 Operation and Maintenance Impacts

Long-term impacts resulting from ongoing operation and maintenance would result mostly from habitat alteration due to clearing of riparian vegetation, changes in runoff and infiltration patterns (from upland vegetation clearing), sedimentation from cleared areas, and maintenance access across streams.

Since the new transmission line would span narrow riparian areas or be located upslope of stream channels, little or no riparian vegetation would be removed. Where access roads are required to cross streams, riparian vegetation may be removed. Since riparian areas are extremely important in providing stream shading and cover for fish, and are a source of large woody debris in streams, any clearing of stream-side riparian vegetation would likely cause moderate to high impacts to fish species, should they be present.

The area cleared for structure construction and access roads in upland areas could change runoff and infiltration patterns to the extent that flow regimes in creeks would be altered, especially in smaller drainages. A decrease in groundcover from vegetation removal can cause an increase in sheet flow during storm events, with correspondingly less infiltration. This can cause higher flood flows in creeks and reduce the amount of infiltrated water that can support base flows. Higher flood flows cause more erosion and deposition of fine materials, which may affect fish habitats or cause physical damage to fish through gill abrasion. Lower base flows, in areas where base flows are already low, may cause streams to dry up in some places or result in warmer water temperatures, which can cause harm or be lethal to fish.

Clearing for roads and structure sites increases the risk of sediment input due to the erosion of soil that is normally stabilized by vegetative cover. Sedimentation of streams can cause a degradation of spawning areas, by filling the ***interstitial spaces*** in spawning gravels. This reduces the flow of oxygenated water necessary for egg and ***alevin*** survival.

Creating new vehicle access across streams can cause bank compaction, repeated sediment disturbance, disturbance or physical damage to fish (if present), a conduit for sediment input, and the possible release of automotive wastes such as fuel or hydraulic oil into a stream. Stream crossings of intermittent and ephemeral drainages would be accomplished by constructing fords where possible. Ford construction would involve removing a portion of the streambed below grade, then backfilling it with crushed rock or other suitable rocky material to the original streambed level. Ford approaches would be stabilized with crushed rock to reduce erosion and provide an all weather surface. Drainages that are too incised or steep to ford

➡ For Your Information

*The **interstitial spaces** refer to the spaces or openings in substrates that provide cover and habitat for bottom-dwelling plants and animals.*

*An **alevin** is a recently hatched juvenile fish still residing in the gravel of a stream.*

may be fitted with culverts or bridges to provide water and debris passage.

Perennial streams would be crossed using existing crossings, where possible. In areas where adequate crossings or alternative routes do not currently exist, bridges or culverts would be used to maintain fish passage and stream flows, while providing vehicle access. Approaches to crossings would be stabilized with crushed rock to reduce erosion and provide an all weather surface. Access roads would experience intense use during construction, but long-term use should not increase much over current threshold levels once construction is complete.

Operation of the proposed project would be limited to energizing the conductors. Normal operation of the project would have no impact on fish species. (See Appendix J Addendum for more information about potential effects of EMF on various species.)

Maintenance of the project might include periodic vehicle and foot inspections, helicopter surveys, tower and line repair, ROW clearing, and other disturbances. Depending on the time of year and location, maintenance activities could impact fish species or habitat. Periodic ROW clearing will be mostly limited to riparian areas, where the impact might be high. Maintenance impacts will be similar to those impacts related to short-term construction (Section 4.5.2.1, *Construction Impacts*).

4.5.3 Preferred Alternative (Alternative 2)

The Preferred Alternative would include Segment A, Segment B (Option B_{SOUTH}), Segment D, and the fiber optic line.

4.5.3.1 Segment A

Reminder

Fish bearing waterbodies are shown on Map 6, Fisheries.

Segment A would cross 28 intermittent drainages and 9 perennial streams, six of which are known to be fish bearing. Wilson Creek, Naneum Creek, Schnebly Creek, Coleman Creek, Cooke Creek, Caribou Creek, and Parke Creek are all known to contain fish, although Schnebly and Parke Creeks are intermittent near the project area and probably do not contain fish where the project would cross them. Cave Canyon Creek does not contain fish.

Both Wilson Creek and Naneum Creek are in steep canyons. Structures would be placed high up and well away from both streams. Access would be through existing county and access roads. Since no new construction would occur near the streams, no impacts to fish are expected. The increase in traffic along the existing roads would be insignificant. Options 1 and 2, associated with the Sickler-Schultz Reroute, would cross different areas of Wilson Creek. However, both

areas have similar vegetation and fish habitat and towers would be placed away from the creek and no vegetation would be removed.

Schnebly Creek would have an existing double culvert that would need to be replaced. This would involve work below the ordinary high water mark; however, work could be done when the creek is dry and few if any impacts to fish would be expected. Coleman Creek has an existing access from county and access roads, and the structures would be constructed high up and away from the creek edges. No impacts to fish are expected.

Cooke Creek, near its proposed crossing, has several channels and lies in a wide floodplain that is mostly pasture. Structures would be located on either side of the creek and the existing bridge across Cooke Creek would be used for access. Removal of riparian vegetation would be required for overhead clearance. This could create a moderate impact to rainbow trout, cutthroat trout, and brook trout. With mitigation (See Section 4.5.10, *Recommended Mitigation*), this impact would be reduced to low.

Caribou Creek and Parke Creek both have access from either side of the creek, eliminating the need for new crossings. Structures would be located well away from the creek. No impacts to fish are expected.

Middle Canyon Creek would be crossed in its headwaters, where conditions are unsuitable for fish survival.

4.5.3.2 Segment B

The Preferred Alternative would only use Option B_{SOUTH} of Segment B. Option B_{NORTH} would not be used. Segment B (Option B_{SOUTH}) would cross six intermittent drainages, one fish-bearing perennial stream (Johnson Creek), and the Columbia River, which is also fish bearing.

Johnson Creek would be crossed on an existing improved concrete ford in an area where the stream is intermittent. Therefore, there would be no direct impacts to fish (injury, disturbance from equipment, etc.). However, in the unlikely event of a hazardous materials spill from equipment traveling across the fords, contaminants could move downstream to where fish are present. Thus, indirect impacts to fish could be high depending on the nature and quantity of the spill and the time of year it occurs. With mitigation such as construction during ***in-water work windows,*** spill control and erosion controls (See Section 4.5.10, *Recommended Mitigation*), impacts to fish in these streams should be low.

For Your Information

In-water work windows *are times of year, determined by WDFW, when instream work is least likely to harm listed species.*

The Columbia River would be crossed by a long span, with structures set well away from the banks. Since the structures and access roads would be far away from the edge of the river, sediment or other materials would not be able to reach the water. Therefore, there would be no impacts to any fish species in the Columbia River along Segment B.

Should Option B_{NORTH} of Segment B be used, it would cross five intermittent drainages, one fish-bearing perennial stream (Johnson Creek), and the Columbia River, which is also fish bearing. Impacts to fish species would be the same as those discussed above for Option B_{SOUTH}.

4.5.3.3 Segment D

Segment D crosses 11 intermittent drainages, nine canals or drains, one perennial stream, and the Columbia River. Lower Crab Creek, and the Columbia River both contain fish.

The Lower Crab Creek crossing would have structures placed over 200 feet from the stream bank. Access would be from either side, so no new crossings of Lower Crab Creek are proposed. Since no new construction will occur near Lower Crab Creek, impacts to fish (chinook salmon, steelhead, rainbow trout, brown trout and warm water fish) are expected to be low.

The proposed crossing of the Columbia River would parallel the existing transmission lines. The structures would be set over 200 feet from the edge of the river, and access would be from existing roads on either side of the river. Since no new access roads near the river would be built and there is sufficient distance from the structures to the river, no sediments spills or other materials would be able to easily enter the river. Impacts are expected to be low.

4.5.3.4 Fiber Optic Line

The proposed fiber optic component of the project would use existing access roads and would not involve any new tower construction. Several small areas would be used by equipment for cable pulling and reeling sites; however, these areas would not be located close to any streams or other waters. None of the existing towers are located close to fish-bearing streams (all are crossed by long spans). Therefore, installation of the fiber optic line would have no effect on any fish species.

4.5.4 Alternative 1

Alternative 1 would include Segment A, Segment B (Option B_{SOUTH}), Segment E, and the fiber optic line between the Vantage and Columbia Substations.

Impacts to fish resources along Segments A, B and the fiber optic line between Vantage and Columbia Substations would be the same as described for the Preferred Alternative. (See Section 4.5.3.1, *Segment A* and Section 4.5.3.2 *Segment B*.)

Reminder

Impacts to fish would be low along Segments A and B.

4.5.4.1 Segment E

Segment E crosses eight intermittent streams, four canals or drains, two lakes, one perennial stream, and the Columbia River. Both lakes, the stream, and the Columbia River contain fish. Segment E would parallel Segment D from the Vantage Substation to the top of the Saddle Mountains, then head southeast into the Hanford Site.

No Wake Lake is a private constructed lake used for water skiing. It contains warm water species of fish. Structures may be placed close to the water, but access would be from either side. The land surrounding the lake is relatively flat, which would limit the erosion potential from structure and access road construction, and limit the potential for spills to enter the lake. No impacts to fish are expected at this location.

Since Segment E would cross Lower Crab Creek near the locations where Segment D would cross, impacts would be similar for this area to those described for Segment D. Towers would be placed over 200 feet from the banks and no access road crossing would be installed.

Saddle Mountain Lake would be crossed at its eastern end, near where the overflow channel (Saddle Mountain Wasteway) exits. An existing access road crosses the wasteway and could be used for access. Structures would be placed over 200 feet from either side of the edge of the lake. Riparian vegetation is relatively low, although some trees may need to be removed for overhead access. The lake supports warm water fish only. Since no new access roads would be built, structures would be located away from the lake. No sensitive fish species are present, so impacts would be low.

The Columbia River crossing into the Hanford Site would be accessed from either side of the river. Structures would be placed well back from the edge of the river. There is very little riparian vegetation in this area and none of it would need to be cleared. Impacts to fish species in the Columbia River at this location would be low.

4.5.5 Alternative 3

Reminder

Impacts to fish would be low along Segment A.

Alternative 3 would include Segment A, Segment C, and the fiber optic line.

Impacts to fish resources along Segment A and the fiber optic line would be the same as described for the Preferred Alternative. (See Section 4.5.3.1, *Segment A*.)

4.5.5.1 Segment C

Segment C construction would cross 40 intermittent drainages and six perennial steams, five of which are fish bearing. Middle Canyon Creek, Johnson Creek, Hanson Creek, Alkali Canyon Creek, and Corral Canyon are all known to contain fish. No fish are present in Cold Creek.

Middle Canyon Creek and Johnson Creek would be crossed with fords in their headwater sections. Impacts to fish in these two creeks would be similar to those described for Segment B.

Hanson Creek and Alkali Canyon Creek both contain rainbow trout and brook trout throughout their lower and middle reaches. Both of these creeks and Corral Canyon Creek support chinook salmon in their very lowest reaches near the Columbia River. These creeks are in steep canyons, so the structures would be placed on either side of the canyons well above the creek. No impacts are expected from structure construction and placement. However, all three of these streams would need to have bridges or culverts placed in them to allow vehicular access. Impacts to fish, especially chinook salmon, from construction of these access roads and structures could be high, depending on when the construction occurs, if sediments or spills enter the creek, and if fish are present. With mitigation such as in-water work during work windows, erosion and spill control measures, and construction of structures that allow fish passage (See Section 4.5.10, *Recommended Mitigation*), impacts to rainbow trout, brook trout, and chinook salmon would be low.

4.5.6 Alternative 1A

Reminder

Impacts to fish would be low along Segments A and B.

Alternative 1A would include Segment A, Segment B (Option B_{SOUTH}), Segment F, and the fiber optic line.

Impacts to fish resources along Segments A, B, and the fiber optic line between Vantage and Columbia Substations would be the same as described for the Preferred Alternative. (See Section 4.5.3.1, *Segment A and* Section 4.5.3.2, *Segment B).*

4.5.6.1 Segment F

Segment F would cross 30 intermittent drainages, one canal, one lake, one perennial stream, and the Columbia River. Nunnally Lake, Lower Crab Creek, and the Columbia River all contain fish.

Nunnally Lake is a closed depression north of Lower Crab Creek that has been filled with water and contains rainbow trout and various warmwater fish species. It is managed as a recreational fishery. Access roads would be routed around the lake, and structures would be located on either side, over 200 feet from the edge of the lake. Since no new access roads would be constructed near the lake, structures would be placed far away from the edge, and no riparian vegetation would be removed, the impact to fish in Nunnally Lake would be low.

Segment F would cross Lower Crab Creek approximately one mile upstream of where Segment D and E cross. No access road would be construction across the creek and the towers would be placed over 200 feet away from the stream. Impacts to fish are expected to be low.

Segment F would use the same crossing of the Columbia River as described in Segment E, so impacts to fish would be similar to those described in that section.

4.5.7 No Action Alternative

The impacts currently associated with ongoing maintenance activities for the existing transmission line, substations, and ROW would continue. These impacts include localized soil disturbance and potential sedimentation of streams due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. In addition, vehicle and machinery use, and vegetation management practices could contribute minor amounts of pollutants (e.g., fuel, oil, grease, rubber particulate, woody debris) that could be transported to streams. No new impacts to fish resources are expected under the No Action Alternative.

4.5.8 Threatened and Endangered Species

Table 4.5-3, *Impacts to Fish Species*, contains listed fish species present within the study area. A discussion of the impacts to federally listed threatened, endangered, or candidate species follows. A Biological Assessment has been prepared separately, which presents effects determinations for each of these species. Table 4.5-2, *Threatened and Endangered Fish Species Effect Determinations*, summarizes determinations for listed fish species. USFWS concurred

with the findings in the BA on November 4, 2002. There were no effects to fish species listed by NMFS so they did not review the BA.

Table 4.5-2
Threatened and Endangered Fish Species Effect Determinations

Listed Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
Fish Species			
Middle Columbia River Steelhead Trout *(Oncorhynchus mykiss)* Threatened	Would not result in destruction or adverse modification of critical habitat	No effect	In-water work in (formerly) designated critical habitat. Nearest current populations >12 miles downstream. Work to be done when stream is dry.
Upper Columbia River Steelhead Trout *(Oncorhynchus mykiss)* Endangered	Would not result in destruction or adverse modification of critical habitat	No effect	No in-water work in (formerly) designated critical habitat.
Upper Columbia River Spring Run Chinook Salmon *(Oncorhynchus tshawytscha)* Endangered	Would not result in destruction or adverse modification of critical habitat	No effect	No in- water work in (formerly) designated critical habitat.
Bull Trout *(Salvelinus confluentus)* Threatened	Critical habitat not designated	No effect	No in-water work in historical or current bull trout streams.

New table for the FEIS.

➡ For Your Information

ESU *- Evolutionarily Significant Unit*

4.5.8.1 Chinook Salmon (Upper Columbia River Spring Run ESU)

Upper Columbia River chinook salmon (a federally listed endangered species) are present in the study area only in the Columbia River, where the Preferred Alternative and Alternatives 1, 3, and 1A (specifically, Segments B_{NORTH}, B_{SOUTH}, D, E, and F) cross it. The construction and operation of Segments A, and C would have no impact on Upper Columbia River chinook salmon, as they are not present in the Yakima River basin and the streams that these segments cross.

Construction of any of the three Columbia River crossings associated with the Preferred Alternative and Alternatives 1, 3, and 1A would also have no impact on Upper Columbia River chinook salmon. This is because structures would be built far enough away from the river bank and riparian areas to eliminate the potential for sediments, spills or other materials to enter the river. New structures at river crossings would parallel existing structures, which range from 200 to 1,000 feet from the edge of the river. Access to the structures would be limited to the landside of the structures and would not enter the riparian zone. Riparian vegetation removal would not be required at any of the Columbia River crossings.

4.5.8.2 Steelhead Trout (Upper and Middle Columbia River ESUs)

Middle Columbia River ESU steelhead (a federally listed threatened species) are present in the Yakima River basin, but are not known to exist in the streams along Segment A. However, these streams were formally federally designated critical habitat until Spring of 2002. Upper Columbia River ESU steelhead (a federally listed endangered species) are present in the lower reaches of two streams crossed by Segments B_{NORTH}, B_{SOUTH}, C, D, E, and F. They also exist in the Columbia River where Segments B_{NORTH}, B_{SOUTH}, D, E, and F cross it.

The streams along Segment A in the Yakima River basin might have minor impacts to water quality should construction cause sediments or other materials to enter these stream, causing a moderate impact to Middle Columbia River steelhead. However, with mitigation (See Section 4.5.10, *Recommended Mitigation*), no impacts to Middle Columbia River Steelhead would be expected.

The Columbia River crossings (described in the chinook salmon section above) would have no impact on Upper Columbia River steelhead. Crossings of Johnson Creek on Segments B_{NORTH}, B_{SOUTH}, C, and G would not directly impact Upper Columbia River steelhead, since this creek does not support steelhead where these proposed segments cross it. However, the lower reach of Johnson Creek does support steelhead, and indirect impacts could occur from sediments, spills, or other materials entering the creek, or removal of upland and riparian vegetation that might change flow regimes and increase stream temperatures. The area of Lower Crab Creek where Segments D, E, and F cross it may support steelhead; however, the construction of structures and access roads would not occur within 200 feet of Lower Crab Creek, and no riparian vegetation would be removed. Thus, with mitigation (See Section 4.5.10, *Recommended Mitigation*), no impacts to Upper Columbia River steelhead would be expected.

➡ For Your Information

DPS *- Distinct Population Segment*

4.5.8.3 Bull Trout Columbia River DPS

Bull trout (a federally listed threatened species) are not known to currently exist within any of the streams, lakes crossed by the project, except the Columbia River (O'Conner, 2002). Coleman Creek, near Ellensburg, is known to have historically contained bull trout, but none have been observed since 1970 and it is unknown whether any are still present. No historical records of bull trout are documented in any of the other proposed stream crossings. Existing bridges would be used to cross Coleman Creek and the Columbia River, and structures would be placed well away from the edges of both waterways. Since construction would occur far from Coleman Creek and the Columbia River, and no sediments, spills, or other materials would be likely to

enter these waterways, the project would have no impact on bull trout. (See Table 4.5-3, *Impacts to Fish Species*.)

Table 4.5-3
Impacts to Fish Species

Species Name	Federal Status	State Status	Possible Presence by Line Segment	Documented Occurrence Type	Potential Impact	Mitigated Impact
Chinook Salmon (Upper Columbia River Spring Run ESU)	FE	SC	B_{NORTH}, B_{SOUTH}, D, E, F, Fiber optic	P	Low	None
Steelhead Trout (Middle Columbia River ESU)	FT	SC	A	P	Low	None
Steelhead Trout (Upper Columbia River ESU)	FE	SC	B_{NORTH}, B_{SOUTH}, C, D, E, F, Fiber optic	P	Low	None
Bull Trout	FT	SC	A, B_{NORTH}, B_{SOUTH}, D, E, F	P	Low	None

FE = Endangered SC = Candidate P = Present (general presence)
FT = Threatened H = Historically Present, Not Currently Present

Table has been updated for the FEIS.

4.5.9 Special Status Species

Table 4.5-4, *Impacts to Special Status Fish Species*, lists state and federal special status species that may be present within each segment of the study area and indicates the possible impact the project may have on them.

Table 4.5-4
Impacts to Special Status Fish Species

Species Name	Federal Status	State Status	Possible Presence by Line Segment	Documented Occurrence Type	Potential Impact	Mitigated Impact
Coastal Cutthroat Trout	FP		NONE	N	None	None
Westslope Cutthroat Trout	FSC		A	P	Low	Low
Interior Redband Trout (Rainbow)	FSC		ALL SEGMENTS	P	Low	Low
Margined Sculpin	FSC		NONE	N	None	None
Pacific Lamprey	FSC		B_{NORTH}, B_{SOUTH}, D, E, F, Fiber optic	P	Low	None
River Lamprey	FSC		A	P	Low	None

Federal Status
FE = Endangered
FT = Threatened
FC = Candidate
FSC = Species of Concern
FP = Proposed Listed

State Status
SE = Endangered
ST = Threatened
SS = Sensitive
SC = Candidate
SM = Monitor

Presence
P = Present (general presence)
B = Breeding
M = Migrant
W = Winter Resident
N = Not Present
H = Historically Present, Not Currently Present

Table has been updated for the FEIS.

4.5.10 Recommended Mitigation

The following mitigation measures would be implemented in order to reduce or eliminate impacts to fish species from the construction, operation, and maintenance of the proposed project.

To minimize short- and long-term impacts to fish from structure construction:

- In-water work on Schnebly Creek would be conducted during the time when any fish species that might be present within or below the project area are least likely to be impacted (July 15 – August 31). The culvert replacement at Schnebly Creek would be done when the stream is dry, or if water is present, would utilize a pump-around diversion method during construction to minimize sediment releases downstream. This would involve the placement of temporary sand bag dams upstream and downstream of the work area and a series of pumps to move water from above the upstream dam to below the downstream dam. When the culvert is replaced and properly armored, the dams would be removed and water would be allowed to flow through the new culvert. Prior to final dewatering, any resident fish would be captured in nets and placed upstream of the upper dam. The culverts on Schnebly Creek would be constructed to meet WDFW fish passage guidelines and culvert construction

would adhere to in-water work guidelines specified in the Hydraulic Project Approval (HPA) for each crossing.

- Existing access road crossings of streams and riparian areas would be used where possible.
- If blasting, pile driving, or other action producing high-intensity vibrations or shock waves is required within 300 feet of a fish-bearing stream, it would only be conductted during the WDFW-approved work window for protection of eggs and alevins.
- Large rocks or other materials that have been blasted or otherwise introduced into a stream or wetland as a result of tower or road construction would be manually removed so as not to alter stream flow or wetland hydrology (if doing so would not result in disturbance to the channel, bank, or riparian area).
- Trees in riparian areas that must be felled for line clearance or access road purposes would be left within the riparian area or stream as downed woody debris for fish and wildlife habitat (where appropriate) with land owner approval.
- Small trees such as willows and shrubs would be left in place to provide stream shading.
- The contractor would prepare and follow a Spill Prevention Plan to ensure that any spills of hazardous or other materials are properly contained and cleaned up as soon as they happen to prevent materials from entering streams, wetlands, or riparian areas.
- All construction equipment and each active job site would be outfitted with spill containment kits.
- Equipment storage, refueling, and maintenance would not occur within 500 feet of any stream, wetland, or riparian area.
- Construction equipment would be maintained in good working order and would be inspected each day for leaks. If a leak is found, the equipment would be immediately moved to an upland location and repaired.
- Equipment and vehicles used for transport or mixing of concrete would not be rinsed within 500 feet of streams, wetlands, or riparian areas.
- Towers and roads would be located and constructed as far from streams and riparian areas as possible.

- Runoff from construction sites would be minimized by using standard erosion control Best Management Practices (BMPs).

- Drainage systems on access roads would be designed to control runoff and prevent erosion and sedimentation problems.

- Ground disturbance near streams or riparian areas would be minimized by limiting equipment travel and disturbance using "construction envelopes" (areas where equipment is not allowed are marked off with stakes and ribbon).

- If equipment or materials need to be stored temporarily near a construction area, they would be placed on the existing ground surface without removing vegetation. Crushing vegetation is preferable to removing it.

- Revegetation of disturbed sites with native vegetation appropriate to the site would occur as soon as possible after construction is complete. Vegetation would be planted only during appropriate local planting seasons as indicated by USFWS and WDFW.

4.5.11 Cumulative Impacts

The proposed action may contribute to localized, short-term, and long-term disturbance to fish resources, as a result of increased sediment input and possible hazardous materials spills. Erosion and sedimentation of streams 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. This has contributed to a reduction in the quality and availability of fish habitat in many streams. Increased access and human activity around streams during this time period has also increased the frequency of hazardous material spills entering streams. While spill events are relatively rare and generally confined to a single stream or stream reach, their effects can be devastating to fish resources.

Riparian vegetation has been significantly reduced from historical levels in Washington, and much of the remaining habitat is heavily disturbed by grazing, fire, and other land uses. Some riparian habitat would be lost as a result of the proposed project, adding cumulatively to the degradation of fish habitat.

4.6 Land Use

For Your Information

The construction, operation, and maintenance of transmission lines and substation facilities can create temporary and permanent impacts on land use. The land uses that are located within transmission line ROWs are limited to those that do not interfere with the line's safe operation and maintenance. For example, no buildings (or other structures) may be built on the ROW, and no flammable materials may be stored there.

4.6.1 Impact Levels

Impacts would be considered **high** where an action would:

- convert active and productive farmlands to a non-farm land uses.
- create areas of non-inhabitable land where residential uses already exist or are permitted.
    - prevent the use of the land according to existing or approved land management plans.

Impacts would be considered **moderate** where an action would:

- adversely affect existing farmlands by limiting farm production or the types of farm uses.
- adversely affect residential properties by eliminating or limiting the potential for residential development to occur around or underneath the transmission lines and/or structures.
- adversely affect commercial or industrial properties by introducing additional or new inconveniences to business operations.
- alter the use of the land according to existing or approved land management plans.

Impacts would be considered **low** where an action would:

- create short-term disturbances such as minor crop damage during construction or restrict improvements to previously affected areas (e.g., existing structure locations).
- create short-term disturbances, but still allow the continued use of the land according to existing or approved land management plans.

No impact would occur when land uses would be able to continue as currently exists.

4.6.2 Impacts Common To Construction Alternatives

Heavy machinery used for construction would temporarily damage crops, compact soils, and disrupt land use activities on approximately 0.3 acre around each structure. Since this disturbance would be temporary and pre-construction conditions would be re-established, the impact level to land uses from construction would be low.

To construct and maintain the proposed transmission line, some existing access roads would need to be improved and new access roads would need to be constructed. The road improvements would occur across lands that support a number of different land uses. Improvements to existing roads would not impact existing land uses. New roads would have a low impact because those within agricultural fields would be temporary, others would be constructed around agricultural fields and residential uses, landowners would be able to use the roads across rangeland and the movement of livestock would not be hindered, and they would not disrupt activities on public land such as the YTC and the Saddle Mountain Unit of the Hanford Reach National Monument.

Table 4.6-1, *Permanent Impacts to Existing Land Uses* and Table 4.6-2, *Temporary Impacts to Existing Land Uses,* provides estimated number of acres that would be used in association with the placement of structures and construction or improvement of access roads, reeling sites, staging areas, and substation by land uses for each alternative. In addition to these impact quantities, there would be some impacts to land uses associated with the presence of overhead conductors.

Table 4.6-1
Permanent Impacts to Existing Land Uses

	Structures, Roads, Reeling Sites, & Substation Impacts (estimated acres)			
Existing Land Use	**Preferred (2)**	**Alternative 1**	**Alternative 3**	**Alternative 1A**
Commercial, Industrial, or Transportation	0.05	0.05	0.05	0.05
Residential	0.35	0.05	0.05	0.05
Forest	0.10	0.10	0.10	0.10
Range	44.40	39.50	175.65	79.00
Agricultural	0.85	3.90	0	0.55
Total	**45.75**	**43.60**	**175.85**	**79.75**

Table has been updated for the FEIS.

Table 4.6-2
Temporary Impacts to Existing Land Uses

	Structures, Roads, Reeling Sites, Staging Areas & Substation Impacts (estimated acres)			
Existing Land Use	**Preferred (2)**	**Alternative 1**	**Alternative 3**	**Alternative 1A**
Commercial, Industrial, or Transportation	2.40	1.25	1.25	1.25
Residential	2.30	1.55	1.55	1.55
Forest	2.10	2.95	3.25	2.10
Range	161.45	174.10	251.20	215.25
Agricultural	22.10	22.05	2.00	2.80
Total	**190.35**	**201.90**	**259.25**	**222.95**

New table for the FEIS.

The area that would become new ROW would have limitations on the types of crops that may be located under the transmission lines. Non-structure supported agricultural crops must be kept at a height of less than 10 feet. As a result, the impact to agricultural lands with these types of crops would be moderate. A special agreement between BPA and the landowner may be reached that allows the growing of ornamental or orchard trees as well as structure supported crops under the transmission lines. If this agreement were in place the impact level would become low.

Rangeland is the highest percentage land use for all alternatives. The existing use of these lands for such things as grazing would be able to continue around the structures and substation facilities, underneath the transmission lines, and over any necessary access roads. Therefore, even though rangeland is the land use with the greatest amount of acres crossed per alternative, the impact level to rangeland would be low.

BOR-administered lands are crossed by Alternatives 1, 1A, and the Preferred Alternative. The BOR manages water resources and maintains and develops water distribution systems, such as irrigation canals, that move water to farmlands. Impacts to BOR land would be low as long as the structures were located in areas that did not disrupt the existing irrigation distribution system or in locations that would not hinder the development of future systems.

All construction alternatives begin at the existing Schultz Substation. There would be no impact from the addition of a new bay and

equipment since no new land outside the existing substation boundary is needed.

On all alternatives, approximately 32 miles of fiber optic cable would be installed from the Vantage Substation north to the Columbia Substation, and from the Vantage Substation south to the Midway Substation, roughly 19 miles. The fiber optic lines would cross both private and public lands along existing transmission lines. Construction of the fiber optic lines would use existing access roads and would not require new structures to be placed. During construction, pulling and reeling areas along the alignment would be needed. These sites could be located within agricultural fields, on rangeland or along public roads, creating a temporary disturbance to the specific land use at each pulling and reeling site. However, since the disturbance associated with the fiber optic line would be temporary, the landowners would be compensated for the use of their land, and no new structures or access roads would be required, land use impacts would be low.

4.6.2.1 Aircraft Safety

The Federal Aviation Administration (FAA) is responsible for oversight of air safety in the United States and issues Federal Aviation Regulations (FAR) regarding marking and lighting of potential obstructions to air navigation. The regulations call for marking and/or lighting any temporary or permanent object that is taller than 200 feet (61 m) above ground level or that exceeds the obstruction standard contained in FAR Part 77, Subpart C. Certain obstructions may not require marking and/or lighting if a FAA aeronautical study indicates they do not impair aviation safety.

FAA regulations also require notification of construction or alteration in buffer zones around airports, including military airports. An airport with runways less than 3,200 feet requires a buffer of 10,000 feet; for runways greater than 3,200 feet, a 20,000-foot buffer is required. Within these buffers the FAA has set standards for the height of objects and notification to the FAA of construction or alteration is required.

Options to meet the FAA safety standards are routing the transmission line outside the buffer zone, using low-profile towers, placing the line underground in the affected area, or marking and/or lighting the towers and/or conductors.

General BPA policy is to follow FAA recommendations with respect to airway marking and lighting near all airports.

Overhead transmission lines represent a hazard to low-flying aircraft such as those used in the military training exercises conducted at the YTC. Segments A and B would parallel existing transmission lines as they cross the YTC. Segment C would cross the YTC in areas where no transmission lines currently exist.

On the YTC overhead transmission towers and conductors would pose a hazard and affect the ability to operate the low flying aircraft (helicopters, F-18s, and A-10s). These aircraft are used for training and ground support during training exercises conducted on the YTC. The towers and conductors would also affect the parachute drops used to bring in supplies during maneuvers.

To reduce the profile of the proposed line where it crosses the YTC, the proposed towers and conductors in the YTC will be at a lower height above ground than elsewhere along the route. This is accomplished by orienting the conductor bundles in a flat configuration at the same height above the ground. Two overhead ground wires are located above the conductor bundles. This design results in a lower profile for the transmission line than does the standard delta (triangular) configuration with overhead ground wires used elsewhere.

In the YTC standard airway marker balls would be installed on the overhead ground wires to enhance visibility of the conductors. At present the technology for lighted marker balls is not reliable.

4.6.3 Preferred Alternative (Alternative 2)

The Preferred Alternative would include Segment A, Segment B (Option B_{SOUTH}), Segment D, and the fiber optic line.

4.6.3.1 Segment A

Reminder

In Segment A, the new and existing transmission lines would have a separation of up to 1,375 feet.

A small portion of Segment A, roughly 0.5 mile (2 percent), would cross agricultural lands. The agricultural land along this segment is predominantly dryland farming with hay or wheat as the prime crop. Due to the very limited amount of agricultural lands along this segment, it is anticipated that there would be no temporary impacts to agricultural lands – the transmission line structures could span the agricultural lands and no access roads or reeling sites would be located on agricultural lands.

Along the north side of the existing transmission line there is an area of lots that contain log cabin residences that would be crossed by the proposed segment. The impact to these residential uses and properties would be high. Locating the segment across the planned subdivision area would alter the development by reducing the

number of residential units. The impact to residential land uses would be high.

A commercial quarry operation near the Vantage Highway would be crossed by Segment A. Structure locations may be designed to have a moderate impact on the quarry by placing them outside the area of use. Impacts to quarry operations would also be moderate as long as facility operations were able to continue within and across the transmission line right-of-way.

Both options of the Sickler-Schultz Reroute, at the north end of Segment A, would cross rangelands. As previously described, impacts to rangeland would be low.

A small portion of Segment A, including a limited amount of Options 1 and 2 of the Sickler-Schultz Reroute, approximately 2.7 miles (9 percent) would traverse lands administered by the DNR. The land in the area of this segment is considered transition lands by DNR and is used as rangeland for livestock. As with all rangeland crossed by the various segments, the impact to this land use would be low since the use activities would be able to continue relatively uninterrupted.

An even smaller portion of Segment A, roughly 0.9 miles (3.2 percent), would traverse lands administered by the BLM. This land is also used as rangeland and, again, the impact to this land use would be low since the use activities would be able to continue relatively uninterrupted.

The southern end of this segment crosses the northern border of the YTC and continues through the Middle Canyon Complex of the YTC for roughly 5.8 miles before it ends just inside the northern border of the Johnson Creek Complex. The U.S. military conducts armor and mechanized infantry movements, tanks and other vehicle movements, and force-on-force maneuver exercises in these two complexes. The existing Schultz-Vantage line that Segment A would parallel was in place prior to this land area becoming part of the YTC. As a result, the military has tailored the type of maneuvers that occur in these two complexes so that the presence of these transmission lines only slightly restricts the maneuverability of the military units. However, a new transmission line parallel to but 1,200 feet away from the existing lines would create additional long-term impacts to the military training mission and would have an impact on land use and land use planning on the installation. Therefore, the impact to the YTC in this area would be moderate.

Reminder

*A **complex** is a specific watershed area within the YTC. The YTC is divided into ten complexes.*

4.6.3.2 Segment B

The Preferred Alternative would follow Option B_{SOUTH} of Segment B. Option B_{NORTH} would not be used for this alternative.

Option B_{SOUTH} – Option B_{SOUTH} would traverse roughly 7.3 miles (77.5 percent) of the Johnson Creek Complex of the YTC with the remaining portion traversing rangeland and open water.

The impact to rangeland would be low. There would be no impact to open water crossed because the transmission line would span water bodies.

The existing transmission lines that Segment B would parallel immediately adjacent to through the Johnson Creek Complex were in place prior to this land area becoming part of the YTC. The U.S. military has tailored its use of this area to accommodate these existing transmission line facilities. Since the new transmission line would be adjacent to an existing line, the impacts to the YTC along B_{SOUTH} would be low.

Option B_{NORTH} – The majority of B_{NORTH}, roughly 7.0 miles (77 percent), traverses the Johnson Creek Complex of the YTC with the remaining portion traversing rangeland and open water.

The impact to rangeland would be low. There would be no impact to open water crossed because the transmission line would span water bodies.

As with Segment A, the existing transmission lines that Segment B would parallel through the Johnson Creek Complex, at a distance of 1,200 feet, were in place prior to this land area becoming part of the YTC. The U.S. military has tailored its use of this area to accommodate these existing transmission line facilities. Still, the new lines would create additional long-term impacts to the military training mission and would have an impact on land use and land use planning on the installation. Therefore, the impact to the YTC in this area would be moderate.

4.6.3.3 Segment D

Reminder

The first number in BPA structure numbers is the transmission line mile and the second number is the structure in that mile.

Segment D would parallel or replace the existing Midway-Vantage 230-kV line and parallel the Midway-Big Eddy 230-kV line from the Vantage Substation to the new Wautoma Substation (about 26.7 miles). The portion of the segment that would replace a single-circuit 230-kV line with a double-circuit 230/500-kV line would traverse an agricultural area located in Grant County, south of the Saddle Mountain ridge and north of the Columbia River. The double-circuit portion from structure 11/1 to 2/4, a total of 8.0 miles, would

minimize the impact to the agricultural fields. The existing crops are expected to continue to be grown underneath the transmission lines.

The remaining agricultural lands crossed by Segment D are located in Benton County south of Umtanum Ridge and north of Cold Creek. Through this area, which consists mainly of vineyards and orchards irrigated using canals rather than circle irrigation, Segment D would parallel the existing Midway-Big Eddy line. Impacts to agricultural land would be minimized by locating new structures on the edges of fields, vineyards, or existing roads. The impact to agricultural lands south of Umtanum Ridge would be high because of the loss of farm land.

The total miles of agricultural land crossed by Segment D would be approximately 8.8 miles. Double-circuiting and the placement of structures at the edge of fields or roads in the remaining agricultural areas would result in a moderate impact to agricultural uses. However, 0.85 acres of permanent impacts to agricultural lands are still anticipated along this segment. Therefore, even though the total quality of agricultural land being affected is relatively limited, the impact to this land would be high due to the land being converted from its agricultural use.

The Preferred Alternative would terminate at the new Wautoma Substation. BPA would acquire approximately 47 acres of rangeland for this facility. Of the 47 acres, roughly 10 acres would be used for the substation, the remaining 37 acres would continue as rangeland.

Residential uses along the double-circuit section would not be impacted. Residential uses would continue in their present location. North of the double-circuit section and Lower Crab Creek, southeast of Beverly, Washington, are two residences along the west side and within 200 feet of the existing transmission line. The northern most residence would need to be removed to construct the new transmission line. The impact to residential land uses would be high.

Less than one mile of Segment D would cross through a section of the Columbia National Wildlife Refuge located on the north side of the Saddle Mountains and along the south side of Lower Crab Creek. Paralleling an existing transmission line through this area would result in a moderate impact due to some loss and degradation of wildlife habitat, increased fragmentation, and increased human disturbance to wildlife.

Segment D would cross approximately 2.9 miles of the western end of the Saddle Mountain Management Area. This land is located north of the agricultural areas in Grant County. BLM manages this land for multiple land uses, such as mineral resources, rangelands, recreation,

and wildlife habitat. The area crossed by this segment is used predominantly as rangeland with some off-road vehicle recreational use. As with all rangeland crossed by the various segments, the impact to this land use would be low since the uses would be able to continue relatively uninterrupted. The impact to off-road vehicle use would also be low as vehicles would be able to move under and around the transmission line. One of the six management objectives of the Saddle Mountain Management Area is to keep public lands open for purposes such as rights-of-way. The overall impact to land uses on BLM lands would be low.

Segment D would cross a small portion of DNR-administered land, approximately two miles (7.5 percent). Roughly 1 mile of this land is used for agricultural purposes and would be in the area of the double-circuiting. The impact to this agricultural land would be low. The remaining portion of DNR land is predominantly rangeland. The overall impact to DNR lands would be low.

Reminder

The land use designation Preservation on the Hanford Reservation is intended to provide protection for sensitive areas or species of concern from impacts associated with intensive land-disturbing activities.

***USDOE** is the U. S. Department of Energy.*

Segment D would also cross a small portion of the Saddle Mountain Unit of the Hanford Reach National Monument before crossing the Columbia River into Benton County and continuing south through the west side of the Monument. This area has a land designation of Preservation according to the USDOE Comprehensive Land Use Plan and EIS. The policies of the Final Hanford Comprehensive Land Use Plan and EIS state that existing utility corridor rights-of-way are the preferred routes for expanded capacity. However, Segment D would expand an existing ROW by 150 feet and require new transmission towers to accommodate the new line. Even though the total quantity of Preservation lands being affected is relatively limited, the impact to this land would still be high because a loss and degradation of wildlife habitat, increased habitat fragmentation, and increased human disturbance to wildlife would occur. As a result, the impact to the Preservation area of the Saddle Mountain Unit of the Hanford Reach National Monument would be high. (See Table 4.6-3, *Preferred Alternative – Land Use Impacts*.)

4.6.3.4 Fiber Optic Line

For the Preferred Alternative, an additional fiber optic line would be constructed from the Midway Substation to the new Wautoma Substation and back. As with the fiber optic line from the Vantage to Midway and Vantage to Columbia Substation, impacts from the Midway to Wautoma fiber optic line would be low since the impacts would be temporary, landowners would be compensated for use of their land, and no new structures or access roads would be required.

Table 4.6-3
Preferred Alternative – Land Use Impacts

Land Use	Impact Level	Main Issue
Agricultural	High	Conversion of farmlands to non-farmland use
Residential	High	Log cabin vacation residences and planned 200-acre subdivision, and removal of one residential trailer.
Range	Low	Current use able to continue
Quarry	Moderate	May affect quarry operations
BLM	Low	Rangeland and recreational uses
DNR	Low	Rangeland and Agricultural land crossed by double-circuit construction method and rangeland
YTC	Moderate/Low	Military maneuvers already structured around the presence of existing transmission lines
USFWS	Moderate	Disturbance to wildlife and wildlife habitat
Hanford Reach National Monument	High	Impacts area of refuge for wildlife by expanding an existing utility corridor through an area designated for Preservation
Overall Impact from Preferred Alternative MODERATE		

Table has been updated for the FEIS.

4.6.4 Alternative 1

Reminder

Segments A and B would have the following land use impacts:
Residential: High
Quarry: Moderate
BLM: Low
DNR: Low
YTC: Moderate/Low

Alternative 1 would include Segment A, Segment B (Option B_{SOUTH}), Segment E, and the fiber optic line between the Vantage and Columbia Substations.

Impacts to land use along Segments A, B, and the fiber optic line would be the same as described for the Preferred Alternative. (See Section 4.6.3.1, *Segment A* and Section 4.6.3.2, *Segment B*).

4.6.4.1 Segment E

In Segment E, the new and existing transmission lines would have a separation of approximately 1,200 ft.

Segment E crosses approximately 4.8 miles (19 percent) of agricultural land. Segment E would parallel an existing transmission line through agricultural areas. Impacts to agriculture could be reduced by constructing new access roads along the edges of agricultural fields and by locating structures at the edges of fields or between crop circles. Even with these measures, it would not completely eliminate the conversion of agricultural land to a non-agricultural use. Therefore, the impact to agricultural lands would be high.

Roughly one mile of Segment E would cross through a section of the Columbia National Wildlife Refuge located on the north side of the Saddle Mountains and along the south side of Lower Crab Creek. Paralleling an existing transmission line through this area would result in a moderate impact due to some loss and degradation of wildlife habitat, increased fragmentation, and increased human disturbance to wildlife.

Segment E would also cross a small portion of DNR administered land that is used predominantly for agricultural purposes. This land, approximately 0.6 mile, would experience the same impacts as the rest of the agricultural land. Therefore, impacts to DNR lands would be high.

There would be two residential structures located between the existing transmission line and Segment E. There would also be two separate residential compounds located between the two transmission lines. In one compound the structures would be over 200 feet from Segment E; the other compound would have structures within 200 feet of the transmission line. Locating the structures as far away from the compound as possible would allow the land use to continue. The impact to residential land uses would be low.

Segment E would parallel the existing Vantage-Hanford line through approximately 4.9 miles of BLM-administered land. This land is located north of the agricultural areas in Grant County and is the western end of the Saddle Mountain Management Area. BLM manages this land for multiple land uses, such as mineral resources, rangelands, recreation, and wildlife habitat. The area crossed by this segment is used predominantly as rangeland and wildlife habitat with some off-road vehicle recreational use. As with all rangeland crossed by the various segments, the impact to this land use would be low since the uses would be able to continue relatively uninterrupted. The impact to off-road vehicle use would also be low as the vehicles would be able to continue operating under and around the transmission facility. One of the six management objectives of the Saddle Mountain Management Area is to keep the public lands open for purposes such as rights-of-way. The impact to land uses on BLM lands along Segment E would be low.

For Your Information

The land use designation Preservation on the Hanford Site is intended to provide protection for sensitive areas or species of concern from impacts associated with intensive land-disturbing activities.

Segment E would cross the Saddle Mountain Unit of the Hanford Reach National Monument before crossing the Columbia River and terminating at the existing Hanford Substation, which is approximately one-quarter mile from the Columbia River, on the Hanford Site. The area crossed by Segment E has a land use designation of Preservation according to the USDOE Comprehensive Land Use Plan and EIS. The policies of the Final Hanford Comprehensive Land Use Plan and EIS state that existing utility corridor rights-of-way are the preferred routes for expanded capacity. Segment E would be a new utility corridor 1,200 feet north of an existing transmission line. The new corridor would result in a loss and degradation of wildlife habitat, increased habitat fragmentation, and increased human disturbance to wildlife. As a result, locating Segment E through this area would have a high impact on the effort to preserve the ecological, archaeological,

cultural, and natural resources of the area as well as the effort to use this area as a refuge for wildlife.

Alternative 1 would terminate at the existing Hanford Substation. There would be no impact from substation work since no new land outside the existing substation boundary would be needed.

The evaluation of impacts to various land uses shows Alternative 1 would have a high impact on agricultural and residential land uses. Alternative 1 would have a high impact to DNR and USDOE land, which is managed by the USFWS. The DNR land covered is predominantly agricultural. Alternative 1 would convert some agricultural land to a non-agricultural use. Alternative 1 would create a new corridor through an area designated as Preservation by USDOE. (See Table 4.6-4, *Alternative 1 – Land Use Impacts*.)

Table 4.6-4
Alternative 1 – Land Use Impacts

Land Use	Impact Level	Main Issue
Agricultural	High	Conversion of farmlands to non-farmland use. Double-circuiting not an option.
Residential	High	Log cabin vacation residences and planned 200-acre subdivision. Towers could be located to minimize impact.
Range	Low	Current use able to continue
Quarry	Moderate	May affect quarry operations.
BLM	Low	Rangeland, recreational uses, and wildlife habitat.
DNR	High	Predominantly agricultural land.
YTC	Moderate/Low	Military maneuvers already structured around the presence of existing transmission lines.
USFWS	Moderate	Disturbance to wildlife and wildlife habitat
Hanford Reach National Monument	High	Impacts area of refuge for wildlife by constructing a new utility corridor through an area designated for Preservation.
Overall Impact from Alternative 1: HIGH		

Table has been updated for the FEIS.

4.6.5 Alternative 3

Alternative 3 would include Segment A, Segment C, and the fiber optic line.

Impacts to land use along Segment A and the fiber optic line would be the same as described for the Preferred Alternative. (See Section 4.6.3.1, *Segment A*).

For a discussion of land use impacts associated with Segment A, please see Section 4.6.3.1, *Segment A*.

Reminder

Segment A would have the following land use impacts:
Residential: High
Quarry: Moderate
BLM: Low
DNR: Low
YTC: Moderate/ Low

Reminder

Training maneuvers that occur in the complexes crossed on the YTC include force-on-force maneuver exercises; light infantry maneuvers and small unit operations; live fire artillery, gunnery, and mortar training; and live fire training for infantry units, tanks, and helicopters.

For this document, agriculture is defined as row crops, pasture, fallow fields, orchards, crops and grains. Land that we refer to as rangeland is grassland and shrubland that may be used for grazing or the movement of livestock.

4.6.5.1 Segment C

About 24.3 miles (80.8 percent) of Segment C is located on the YTC. Beginning where Segment A ends, this segment heads south through the Johnson Creek, Hanson, Alkali Canyon, Corral Canyon, and Cold Creek Training Complexes before exiting from the southeast corner of the YTC. Due to the steep slopes in the Alkali Canyon and Corral Canyon, supplies and support materials for maneuvers are delivered to exercises in the area via parachute drops.

When the military needs to run power to its training areas where live gunnery, artillery, and mortar fire training occurs, which is a stated use in three of the five complexes crossed by this segment, the military has a standing practice of burying their utility lines through those areas. Aboveground transmission lines would eliminate the ability to conduct live mortar fire exercises.

Overhead transmission lines would also affect the ability to operate low-flying aircraft (helicopters, F-18s, and A-10s) that are used as ground support and the parachute drops used to bring in supplies. The presence of a transmission line would force ground maneuvers to work around the structures, which would break up the continuity of the maneuvers and reduce their effectiveness.

Unlike Segments A, B_{NORTH}, and B_{SOUTH}, Segment C would be a new transmission line in an area where training maneuvers are not currently set up to work around such facilities. It would eliminate the ability to have live gunnery, artillery, and mortar training and have a high affect on aviation and ground maneuvers. As a result, Segment C would have a high impact on the land uses in the YTC.

The portion of Segment C not located on the YTC crosses private rangeland and a small portion of rangeland administered by DNR (less than 0.5 mile) and BLM (about 0.2 mile). As with all rangeland crossed by the various segments, the impact to this land use would be low since the uses would be able to continue relatively uninterrupted.

Since the majority of Segment C would be located within the YTC, and would have such a high level of impact on military operations and maneuvers, the overall impact on land use for this segment would be high. (See Table 4.6-5, *Alternative 3 – Land Use Impacts*.)

Alternative 3 would terminate at the new Wautoma Substation. BPA would acquire approximately 47 acres of rangeland. Of the 47 acres, roughly 10 acres would be used for the substation, the remaining 37 acres would continue as rangeland.

4.6.5.2 Fiber Optic Line

Like the Preferred Alternative, Alternative 3 would include the construction of additional fiber optic lines from the Midway Substation to the new Wautoma Substation and back. Impacts from the fiber optic line would be low since the impacts would be temporary, landowners would be compensated for use of their land, and no new structures or access roads would be required.

Table 4.6-5
Alternative 3 – Land Use Impacts

Land Use	Impact Level	Main Issue
Residential	High	Log cabin vacation residences and planned 200-acre subdivision
Range	Low	Current use able to continue
Quarry	Moderate	May affect quarry operations
BLM	Low	Rangeland
DNR	Low	Rangeland
YTC	High	Live gunnery, artillery, and mortar fire training, aviation maneuvers, and ground maneuvers
Overall Impact from Alternative 3: HIGH		

Table has been updated for the FEIS.

4.6.6 Alternative 1A

Alternative 1 would include Segment A, Segment B (Option B_{SOUTH}), Segment F, and the fiber optic line between the Vantage and Columbia Substations.

Impacts to land use along Segments A and B (Option B_{SOUTH}) would be the same as described for the Preferred Alternative. (See Section 4.6.3.1, *Segment A* and Section 4.6.3.2, *Segment B*).

Reminder

Segments A and B would have the following land use impacts:
Residential: High
Quarry: Moderate
BLM: Low
DNR: Low
YTC: Moderate/Low

4.6.6.1 Segment F

Transmission structures and access road improvements along Segment F would permanently impact less than one acre of agricultural land. By locating the structures and new access roads at the edge of fields, these impacts could be reduced. Still, some agricultural lands would be converted from an agricultural use to a non-agricultural use; therefore, the impact to agricultural lands would be high.

There would be a small portion of DNR-administered land crossed by Segment F, approximately 2.5 miles (7.8 percent). This land is predominantly rangeland. As it is on all line segments, the impact to rangeland would be low.

A large portion of Segment F, roughly 12.8 miles (39.2 percent), of the total segment, would run east-west through the Saddle Mountain

Management Area administered by BLM. This segment would traverse nearly the entire length of this management area within new ROW. BLM manages this land for multiple land uses, such as mineral resources, rangelands, recreation, and wildlife habitat. The types of land use activities occurring in the area would be able to continue relatively uninterrupted under and around the new line. One of the six management objectives of the Saddle Mountain Management Area is to keep public lands open for purposes such as rights-of-way. As a result, the impact to land use activities on BLM lands would be low.

Reminder

The land use designation Preservation on the Hanford Reservation is intended to provide protection for sensitive areas or species of concern from impacts associated with intensive land-disturbing activities. The policies of the Final Hanford Comprehensive Land Use Plan and EIS state that existing utility corridor rights-of-way are the preferred routes for expanded capacity.

Segment F would cross the Wahluke Unit and the Saddle Mountain Unit of the Hanford Reach National Monument before crossing the Columbia River and terminating at the existing Hanford Substation, which is approximately one-quarter mile south of the Columbia River. The area crossed by Segment F has a land use designation of Preservation according to the USDOE Comprehensive Land Use Plan and EIS. The policies of the Final Hanford Comprehensive Land Use Plan and EIS state that existing utility corridor rights-of-way are the preferred routes for expanded capacity. Segment F would require new ROW 1,200 feet east of the existing Grand Coulee-Hanford line. The new corridor would result in a loss and degradation of wildlife habitat, increased habitat fragmentation, and increased human disturbance to wildlife. As a result, Segment F would have a high impact on the effort to preserve the ecological, archaeological, cultural, and natural resources of the area as well as the effort to use this area as a refuge for wildlife.

The impact to agricultural lands and the Wahluke Unit and the Saddle Mountain Unit of the Hanford Reach National Monument would be high. However, due to the limited amount of agricultural lands that will experience a high impact (just 1 percent of the total lands in Segment F), and because the Hanford Reach National Monument lands are just over one-third of the total lands crossed by the segment, the overall impact to land uses from Segment F would be moderate to high. (See Table 4.6-6, *Alternative 1A – Land Use Impacts*.)

Alternative 1A would terminate at the existing Hanford Substation. There would be no impact from substation work since no new land outside the existing substation boundary would be needed.

Table 4.6-6
Alternative 1A – Land Use Impacts

Land Use	Impact Level	Main Issue
Agricultural	High	Conversion of agricultural land to non-agricultural land use
Residential	High	Log cabin vacation residences and planned 200-acre subdivision
Range	Low	Current use able to continue
Quarry	Moderate	May affect quarry operations
BLM	Low	Rangeland, recreational uses, and wildlife habitat
DNR	Low	Rangeland
YTC	Moderate/Low	Military maneuvers already structured around the presence of existing transmission lines
Hanford Reach National Monument	High	Impacts area of refuge for wildlife by constructing a new utility corridor through an area designated for Preservation
Overall Impact from Alternative 1A: MODERATE		

Table has been updated for the FEIS.

4.6.7 No Action Alternative

The impacts currently associated with the ongoing operations and maintenance activities for the existing transmission line, substations, and ROW would continue. However, under this alternative, no new impacts to land uses would be expected.

4.6.8 Recommended Mitigation

- Work closely with the various land managers and landowners to minimize conflicts and inconvenience from construction and maintenance activities.
- Locate the new line as far away from residential and commercial land uses as possible.
- Locate structures outside of agricultural fields and on the edges of existing roads where possible or next to existing structures.
- Construct new permanent access roads around agricultural fields and in locations that may benefit the landowner.
- Schedule activities to avoid or minimize crop damage.
- Keep gates and fences closed and in good repair to contain livestock.
- Compensate farmers for crop damage, help them control weeds and restore compacted soils.
- Enter into special agreements with landowners to allow the growing of ornamental or orchard trees as well as other structure-supported crops under the transmission lines.
- Strive to meet substantive requirements of Benton, Grant, Kittitas, Yakima and Douglas County development regulations.

4.6.9 Cumulative Impacts

The expansion of utilities and other non-agricultural land uses would lead to further removal of valuable agricultural lands and rangelands from production, resulting in an incremental increase in lands lost to previous development and to future development that were not necessarily intended to be used for utilities.

This region of Washington, especially Kittitas County due to its proximity to the Seattle urban area, is experiencing an increase in new rural residential structures being constructed by people seeking the benefits of rural living and as vacation homes or resort destinations. As the rural areas are developed for purposes other than agricultural, more people will be living in proximity to the transmission lines. Expanding utility infrastructure in these areas will continue to cause conflicts with various land uses.

Expanding the transmission system in this region may also contribute to the gradual urbanization of the rural landscape. As more power becomes available, areas may begin to experience an increase in development. This new development would impact agricultural and range lands by decreasing the quantity of this land available for production.

The miles of improved and new access roads, necessary in order to gain access to transmission lines during maintenance and repair activities, would provide increased access opportunities to areas previously inaccessible by motorized vehicles. These new roads could lead to increased recreational activities such as hunting, wildlife viewing, and off-road vehicle operating in areas unaccustomed to such activities. This increased activity would impact the existing use of the land for preservation or natural habitat purposes.

Aside from increased access opportunities into certain preservation areas, establishing a new ROW through an area such as the Saddle Mountain Unit of the Hanford Reach National Monument may make it easier to construct future lines through the same corridor. As the number of transmission lines through the area increases, the ability to successfully preserve the ecological, archaeological, cultural, and natural resources of the area may decrease.

4.7 Socioeconomics

4.7.1 Impact Levels

A **positive** impact would occur when an alternative produces one or more of the following effects: provides employment, increases tax revenues, increases property values, or creates other similar effects on the social and economic vitality of affected communities.

A **negative** impact would occur when an alternative produces one or more of the following effects: reduces employment, reduces a tax base, takes land out of production without compensation, exceeds current capacities for housing and public services, or creates other similar effects on the social and economic vitality of affected communities.

No impact would occur if employment levels, tax revenues, property values, land production, demand for housing and public services, or other similar effects remain unchanged or if impacts would be of short duration.

For Your Information

*In addition to positive and negative impacts, **short-term socioeconomic impacts** include those created by an influx of construction workers into a local area and the additional tax monies generated.*

***Long-term socioeconomic impacts** include the value of any agricultural crops taken out of production, interference with agricultural practices, reductions in the taxable land base, and the perceived effects on property values from new transmission and substation facilities.*

4.7.2 Population

Constructing a new transmission line would not encourage population growth in the area, but rather would be a response to growth that is already occurring in central Washington and the Pacific Northwest. The local population has not and would not increase because of the availability of electric power. However, population growth would likely slow and could decline if transmission system capacity is not increased. (See also Section 4.7.12, *No Action Alternative*.)

From an assessment of ***demographic*** data and aerial photography, it has been determined that places where minority and low-income populations may reside, work, or otherwise spend large parts of their days are not highly or disproportionately concentrated within the study area. None of the alternatives would have a detrimental effect on minorities or economically disadvantaged groups in the area. (See also Section 5.8, *Executive Order on Environmental Justice*.)

Demographic *information relates to the dynamic balance of a population, especially with regard to density and the capacity for expansion or decline.*

Reminder

The only portion of the project that crosses lands within Douglas County is the fiber optic line for roughly 5 miles. No socioeconomic issues would arise and no impacts would occur since the fiber optic line would be installed on existing structures and construction equipment would use existing roads.

No impact to the population would occur as a result of the proposed project.

4.7.3 Economy and Industry

Because transmission line construction requires specialized labor, construction crews would likely be brought in from outside the local area. Specialized workers may come from outside the region such as

Spokane or Seattle, Washington; Portland, Oregon; Boise, Idaho; or from other parts of the United States or the world. The primary construction contractor may hire local contractors to fill less specialized roles such as roadwork and ROW clearing.

Construction would likely occur over one year, with one or two primary contractors. About 100 people would be needed to construct a project of this scale on this timeline. This would be a positive impact on employment in general, but not necessarily a local impact if workers do not come from the study area.

Constructing a new transmission line would not impact the distribution of jobs within industry sectors, personal and household incomes, or industry earnings.

4.7.4 Housing and Public Services

Socioeconomic impacts to temporary housing facilities are relatively minor for transmission line construction projects in most areas. Most construction workers would likely provide their own housing (e.g., campers and trailers) or seek temporary commercial lodging. Recreational vehicle (RV) parks are available throughout the area. These facilities are typically available by the day, week, month, or season. Because of the relatively small number of construction crews who would build the project, there should be few negative impacts to the temporary housing supply in the area.

Two residences would be relocated as a result of the Preferred Alternative. One residence is along Segment A and one residence is along Segment D. Both displacements would be conducted in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (See also Section 5.9, *Displacements and Real Property Acquisition*.).

Impacts to public services such as police, fire, and medical response, would be of short duration during the construction phase. Impacts to the two residences would be negative.

4.7.5 Retail Sales and Use Tax

The major cost of any transmission line project is labor and materials. A combined state and local sales and use tax would be levied on materials purchased for the project by the contractor. Although BPA, as a federal agency, is exempt from Washington state taxes, they agree to pay a fee to the counties based on the materials purchased for the project. This fee is generally 7.8 percent, or approximately $2,400,000. This would be a positive impact to local and state revenues.

The sales and use tax would also be assessed on incidental purchases by the contractor, crews, and subcontractors. Because crews would be in the area only temporarily, incidental purchases would be limited to provisions such as food (tax exempt), lodging, fuels, tools, clothing, and other minor purchases. These purchases would be in small amounts and any sales or use tax collected would be a positive but minor impact.

4.7.6 Business and Occupation Tax and Public Utility Tax

For Business and Occupation (B&O) tax purposes, contractors performing work for BPA are classified as government contractors and are subject to the B&O tax. The gross contract price is subject to this tax. Therefore, the Preferred Alternative would generate about $145,000 in B&O tax. Other alternatives would result in similar amounts of tax. This would be a positive impact to state revenues.

Final distribution of a utility is subject to the public utility tax. BPA is exempt from this tax; thus no impact to the state or local revenues would result.

4.7.7 Property Tax

BPA, as a federal agency, is exempt from paying local property taxes. None of the alternatives would impact local property tax revenues, except in the case of acquiring real property to build a new substation.

The Preferred Alternative and Alternative 3 would terminate at a new substation site. Any land purchased by BPA to construct a new substation would reduce the taxable land base. The extent of this reduction is approximately 47 acres for the substation and would be for the duration of the facility, which is about 50 years. The loss of tax revenues for this acreage reduction would have a small negative impact on Benton County and to an even lesser extent on the state school fund.

Alternatives 1 and 1A would terminate at the existing Hanford Substation, which would be expanded to make room for an additional bay. Enough land is already available and owned by BPA to expand this substation. No additional land would be needed at Schultz, Vantage, or Midway Substations. Therefore, no impact to local or state property tax revenues would occur.

4.7.8 Property Value

Any new transmission line or access road easements would be appraised, and landowners would be offered the fair market value for these land rights. Some short-term adverse impacts on property value and salability along the new ROW may occur on individual properties. However, these impacts are highly variable, individualized, and unpredictable. The new line is not expected to cause overall long-term adverse effects on property values. See Appendix E, *Property Impacts*, for more information on impacts to property values.

4.7.9 Land Taken Out of Production

Activities such as farming, that do not interfere with the transmission line or endanger people, are usually not restricted.

In cases where productive lands cannot be avoided, some land may be taken out of production. This includes the placement of structures in productive lands, reduction in irrigated land use (i.e., reconfigured irrigation circles), and locating the new Wautoma Substation in productive land. Constructing new towers in productive lands and changes to existing irrigation circles would have a negative impact on individual landowners. Locating the new Wautoma Substation in productive lands would take up to 47 acres of land out of production; a negative impact to taxable land base. Landowners would be compensated for any lands taken out of production.

4.7.10 Fiber Optic Line

Socioeconomic impacts resulting from the Vantage-Columbia fiber optic line would be minimal. No impacts to population, economy, housing and public services, and property value would be anticipated. Additional tax revenue may be generated through contractors' taxable expenditures and B&O tax on the contract value.

➡ Reminder

Excise *taxes are internal taxes imposed on the production, sale, or consumption of a commodity or the use of a service.*

4.7.11 Other Taxes

Other state taxes that would be assessed include ***excise*** taxes on fuel, cigarettes, tobacco products, liquor, timber, and rental cars. Local excise taxes that would be applicable to the project include hotel/ motel taxes and municipal taxes and licenses. The contractor, crews, and subcontractors would likely bear the expense of these taxes. Revenues generated from these miscellaneous taxes would have a positive impact on state and local revenues, but are expected to be small due to the limited crew size involved in this type of construction.

Sales of privately owned property to BPA for a new substation or for right-of-way would not be subject to real estate tax. This is based on WAC 458-61-420(1)(c), which states that excise tax does not apply to "Transfers to the United States, the state of Washington, or any political subdivision thereof, or a municipal corporation, either under threat of eminent domain or as a result of the actual exercise of eminent domain." Local real estate revenues generated by the project would have a small negative impact on local counties because the property acquired by BPA would not be available for transfers that would generate real estate tax.

4.7.12 No Action Alternative

The No Action Alternative would not directly or indirectly impact the local population, economy, or tax base. However, this alternative would have other socioeconomic impacts to the local area and greater region, as a result of the lack of adequate transmission line infrastructure to support expected growth in the Pacific Northwest. The lack of transmission capacity could cause seasonal localized power deficiencies. The development of clean power generation in areas that can support it may be offset by combustion generation closer to load centers.

The No Action Alternative would potentially have negative socioeconomic effects in the greater Pacific Northwest region.

4.7.13 Eminent Domain

BPA has the power of eminent domain, or the power to condemn landrights needed to support its projects. If, after good faith negotiations, BPA and a landowner are not able to agree on terms of a purchase, BPA would ask the U.S. Department of Justice to begin condemnation proceedings in U.S. District Court on behalf of BPA (See Appendix K, *Condemnation*, for a broader description of the condemnation process.). A landowner may request that the condemnation process be used if they are not willing to negotiate.

4.7.14 Recommended Mitigation

- BPA would compensate private landowners for the fair market value of any landrights needed.
- BPA would work with landowners and land managers to site the new line to minimize impacts and land taken out of production.
- BPA or the landowner could elect to utilize the condemnation process if they are not able to agree on terms of purchase.

- BPA would comply with the Uniform Relocation Assistance and Real Properties Acquisition Policies Act.

4.7.15 Cumulative Impacts

It is unclear whether the introduction of more transmission capacity would be a catalyst to population growth. Other infrastructure (such as water or sewer), local economies, and employment opportunities would play an important role in whether an area can absorb population increases. The alternatives could contribute, along with other factors, to increased growth in the region.

4.8 Visual Resources

Reminder

Visually sensitive locations have been identified based on their visual quality, uniqueness, cultural significance, or viewer characteristics (Sevi, 1986).

Potential impacts to visual and aesthetic resources consist of a combination of changes in the visual environment and their effect on viewers who are sensitive to these changes. Transmission line projects are generally not perceived as providing visual enhancement to the landscape. However, they can be built in ways that minimize visual impacts so that their benefits (i.e., improved service reliability, increased transmission capacity, and new jobs) can be realized.

The following analysis discusses areas that are considered typical to this project, for which visual simulations have been created. Three locations within the project area were determined to be Visually Sensitive Locations. Visual simulations were also created for these sensitive locations and the viewpoint for each is shown on Map 10, *Visual Analysis*.

4.8.1 Impact Levels

Although the visual resource impacts of transmission line projects are not locally regulated within the study area, the construction of a new transmission line will change the physical appearance of the landscape and affect viewer groups. To assess the visual impacts of this project, the following criteria were used.

Impacts would be considered **high** where:

- the transmission line(s) would become a view's dominant feature or focal point.
- a large number of highly sensitive viewers would see the line(s) in predominantly the ***foreground*** and ***middleground***.

Foreground *is within 0.25 to 0.5 mile of the viewer.*

Middleground *is from the foreground to about 5 miles from the viewer.*

Impacts would be considered **moderate** where:

- the transmission line(s) would be clearly visible but not the dominant feature of the view.
- a large number of sensitive viewers would see the line(s) mostly in the middleground.

Impacts would be considered **low** where:

- the transmission line(s) would be somewhat visible but not evident in the view.
- few sensitive viewers would see the transmission line(s) because they would be either screened or predominantly seen in the middleground and ***background***.

Background *is more than 5 miles from the viewer*

No impact would occur where:

- the transmission line would be isolated, screened, not noticed in the view, or seen from a great distance.
- views would be of short duration.
- no visually sensitive resources would be affected.

4.8.2 Impacts Common to Construction Alternatives

Transmission line facilities would be seen from a variety of potential viewpoints along all of the proposed routes, including private residences, highways, and recreation areas. The construction, operation, and maintenance of the proposed transmission line and substation facilities would have short- and long-term effects on visual resources. Structures, conductors, insulators, spacers, aeronautical safety markings, vegetation clearing, access roads, ground preparation for structures, and pulling sites for the conductor would all create visual effects. A transmission line's visual presence would last from construction throughout the life of the line.

4.8.3 Preferred Alternative (Alternative 2)

The Preferred Alternative is made up of sagebrush and agricultural landscapes. View 1 (Photo 4.8-1) simulates crossing the Vantage Highway in Segment A. See Map 10, *Visual Analysis*, for location. The sagebrush terrain is characteristic of most of Segments A and B. In this location, the addition of a new line would be clearly visible and would briefly extend the motorist's visual experience of the transmission corridor, but it is expected that sensitive viewers will not find this objectionable because the additional line would not become the dominant feature of this relatively common view.

Photo 4.8-1. Visual simulation of Segment A crossing Vantage Highway (General View 1 — See Photo 3.9-5 for original photo)

The area near Colockum Pass (Segment A) is a Visually Sensitive Area due to the number of residences with foreground views of the transmission line project. (See photo below and location of Viewpoint A on Map 10, *Visual Analysis*.) In the Colockum Pass area, Segment A would pass close to a number of residences whose owners have expressed concerns about the visual impact of the project. Residential viewers would notice the additional structures and conductors during and after construction. However, the proposed structures would not dominate or become the focal feature because they would be located parallel to an existing transmission line that already impacts the views. Visual impacts to this Visually Sensitive Area would be moderate.

Photo 4.8-2. Visual simulation looking northeast and east along Gage Road towards Colockum Road (Visually Sensitive Viewpoint A — See Photo 3.9-1 for original photo)

Option 1 of the Sickler-Schultz Reroute would result in a moderate to high impact for one residence where the line would be in the foreground view. The impact on this residence would not change the overall impact for the Preferred Alternative. Option 2 was developed to lessen the impact to that one residence. The new line would still be within the foreground view at its closest location, but it would be screened and not be a dominate feature in the view. Option 2 would be a low to moderate impact to one residence.

View 2 (Photo 4.8-3) simulates crossing the Columbia River, south of the Wanapum Dam in Segment B. It illustrates how the addition of a new line would replicate the visual experience of the existing line and transmission ROW. It is expected that sensitive viewers will not find this objectionable, since the additional line would not become the dominant feature in this view.

Photo 4.8-3. Visual simulation of Segment B looking west across the Columbia River near the Vantage Substation (General View 2 — See Photo 3.9-7 for original photo)

The north face of the Saddle Mountains (Segment D) near the Columbia River and Lower Crab Creek is a Visually Sensitive Area due to its unique and striking landform, relationship to adjacent water bodies, and the number of viewers on Route 243. See Photo 4.8-4 below and location of Viewpoint B on Map 10, *Visual Analysis*.

In this area, the new transmission line would be clearly visible (primarily in the middleground) to most viewers including residents, tourists, and recreationalists traveling through the area. Three of the alternatives would scale the Saddle Mountains in this general area. The Preferred Alternative would be closest to most viewers. Viewers would notice the additional structures and conductors during and after construction, but the transmission line would not become the dominant feature in any view. There are existing transmission lines in the area, and the scale of the mountain would greatly minimize the perceived size of the proposed structures.

Visual impacts in this Visually Sensitive Area would be moderate.

Photo 4.8-4. Visual simulation looking east to Saddle Mountains from Highway 243 (Visually Sensitive Viewpoint B — See Photo 3.9-2 for original photo)

The crossing of the Columbia River west of the Vernita Bridge is considered a Visually Sensitive Area due to the number of motorists and potentially sensitive recreationalist viewers, as well as the presence of natural water bodies and dramatic landforms. However, these locations are 2 to 3 miles away from Segment D and seven existing transmission lines exist between the two locations. Segment D would occur on the furthest side of these existing seven lines. The grouping of lines occurs in the middleground of the view and is subordinated by the background of the Yakima Ridge. The new lines would be clearly to somewhat visible, depending on the time of day and weather conditions. The presence of the new lines would likely be difficult to discern from the existing lines. Impacts in these areas would be moderate to low.

For Your Information

The addition of a smaller diameter fiber optic cable to these structures would be largely unnoticeable from existing conditions. Therefore, the visual impacts would be low to none.

Overall, the impact to visual resources would be low to moderate for the Preferred Alternative. Visual impacts for the majority of the

alternative would be low excluding the two Visually Sensitive Locations where the impacts would be moderate.

Reminder

For most of the length of Segments A and B, visual resource impacts would be low. There is one Visually Sensitive Area where the impact would be moderate.

4.8.4 Alternative 1

Impacts to visual resources along Segment A and B would be the same as described for the Preferred Alternative.

In Segment E, the new transmission line would cross a combination of agricultural fields and sagebrush landscape. Where Segment E climbs the north face of the Saddle Mountains is a Visually Sensitive Area similar to the area seen in Viewpoint B, above. Alternative 1 would be slightly further from the road than the Preferred Alternative. Viewers would notice the additional structures and conductors during and after construction, but the transmission line would not become the dominant feature in any view. There are existing transmission lines in the area, and the scale of the mountain would greatly minimize the perceived size of the proposed structures. Visual impacts to this Visually Sensitive Area would be moderate.

Overall, the impact to visual resources would be low to moderate for Alternative 1. Visual impacts for the majority of the alternative would be low with one Visually Sensitive Area where the impacts would be moderate.

4.8.5 Alternative 3

For most of the length of Segment A, visual resource impacts would be low. There is one Visually Sensitive Area where the impact would be moderate.

Impacts to visual resources along Segment A would be the same as described for the Preferred Alternative.

There would primarily be two sets of viewers of Segment C. Army personnel on maneuvers would have a foreground view of the new transmission line; however, these viewers are not deemed to be sensitive to aesthetics while on maneuvers. The other set would be viewers from across the Columbia River. There is no existing line in the area that Segment C would be built; therefore, Segment C would change an existing landscape view. The new transmission line would be in the mid- to background for most of these viewers, and due to the varied terrain elevation, sitings of the towers and conductors would not be continuous. Impacts to Segment C would be low to moderate.

Overall, the impact to visual resources would be low to moderate for Alternative 3. Visual impacts for the majority of the alternative would be low with one Visually Sensitive Area where the impacts would be moderate.

4.8.6 Alternative 1A

Reminder

For most of the length of Segment A and B, visual resource impacts would be low. There is one Visually Sensitive Area where the impact would be moderate.

Impacts to visual resources along Segment A and B would be the same as described for the Preferred Alternative.

In Segment F, the new transmission line would cross the south face of the Saddle Mountains and sagebrush landscape. Where Segment F climbs the north face of the Saddle Mountains is a Visually Sensitive Area similar to the area seen in Viewpoint B (Photo 4.8-4). Alternative 1A would be farther east than the other alternatives and in an area that does not have existing transmission lines. View 3 simulates looking across Lower Crab Creek at Segment F ascending the north face of the Saddle Mountains (Photo 4.8-5). Although the new line would be clearly visible and impact a seemingly undisturbed portion of the mountain, the large scale of the landform dominates the view. Furthermore, it would also be in an area that would not have as many viewing opportunities. Visual impacts to this Visually Sensitive Area would be moderate.

Photo 4.8-5. Visual simulation of Segment F ascending the north face of Saddle Mountains (General Viewpoint 3 — See Photo 3.9-17 for original photo)

Due to its striking landform and recreational value, the Saddle Mountain Ridgeline is considered a Visually Sensitive Area (Viewpoint C on Map 10, *Visual Analysis*). Locating the transmission line on top of the ridgeline would change the view of the landform and have a high visual impact. However, locating Alternative 1A near the base of

the mountains would easily mitigate this sensitivity. A simulation of this placement is shown in Photo 4.8-6, below.

With proposed placement of line, visual impacts would be low.

Photo 4.8-6. Visual simulation looking northwest towards Saddle Mountains from Wahluke Slope (Visually Sensitive Viewpoint C — See Photo 3.9-3 for original photo)

View 4 (Photo 4.8-7) simulates Segment F, looking north toward the Saddle Mountains. (See Map 10, *Visual Analysis*, for location.) The structure in the middle of the photo is part of the existing line, the new line simulation is on the left. Although the addition of a new line would replicate the visual experience of the existing line and transmission corridor (which is clearly visible but not the dominant feature), this view will be seen by relatively few viewers.

Photo 4.8-7. Visual simulation looking north toward the Saddle Mountains, of Segment F, parallel to the Grand Coulee-Hanford transmission line (General View 4 — See Photo 3.9-19 for original photo)

Overall, the impact to visual resources would be low to moderate for Alternative 1A. Visual impacts for the majority of the alternative would be low with three Visually Sensitive Locations where the

impacts would be moderate for Viewpoints A and B, and low for Viewpoint C.

4.8.7 No Action Alternative

Existing transmission lines would continue to be seen from a variety of views. Visual effects would continue as they currently exist.

4.8.8 Recommended Mitigation

Mitigation includes enhancing positive effects as well as minimizing or eliminating negative effects. Potential mitigation measures include:

- using a non-specular conductor and insulator to reduce visual impacts that cannot be avoided in sensitive areas.
- locating facilities in relationship to landforms so that they will screen transmission line features.
- avoiding highly erodible soils, if possible.
- revegetating disturbed areas with native plant communities.

4.8.9 Cumulative Impacts

Generally, the construction of additional structures, lines, roads and substations would add physical features (and thus, visual effects) to the landscape. Cumulatively, although these effects are considered minor, they will alter and contribute to an ever-increasing manmade visual presence on the natural landscape of the study area.

4.9 Recreational Resources

Reminder

Recreation terms introduced in Chapter 3 include:

***Dispersed Recreation** includes activities that are not limited to a finite location. They do not require improvements that commit the resource to a particular type of recreation.*

***Dedicated Recreation** includes recreational activities that are limited to a finite geographic location and are supported by improvements that commit the resource to a specific recreational activity.*

4.9.1 Impact Levels

Impacts would be considered **high** where transmission facilities would:

- preclude existing or planned ***dispersed*** recreational uses after construction of transmission lines or access roads.
- alter or eliminate ***dedicated*** recreational activities after construction of transmission lines or access roads.

Impacts would be considered **moderate** where transmission facilities would:

- temporarily preclude or limit dispersed and dedicated recreation opportunities during peak use periods during construction of transmission line and/or access roads.

Impacts would be considered **low** where transmission facilities would:

- temporarily preclude or limit dispersed and dedicated recreation opportunities during off-peak use periods during construction of transmission line and/or access roads.
- require minor relocation of dispersed recreational activities to equal or better location after construction of transmission line and/or access roads.

No impact would occur to recreation areas if there was no effect upon the location or safety of recreational uses during and after construction.

4.9.2 Impacts Common to Construction Alternatives

All of the alternatives would have temporary impacts related to construction. For safety reasons, during construction, recreation would not be allowed within the construction area. This could result in a temporary closure of existing access roads and trails and, consequently, temporarily limit access to some recreation areas. During conductor and fiber optic stringing, activities such as sightseeing, watersports, and boating would be limited in the construction area.

*A **rock hounder** is a recreationalist in search of rocks, including petrified wood.*

Dispersed recreation such as hunting, off-road vehicle use, fishing, hiking, ***rock hounding***, horseback riding, camping, snowshoeing, snowmobiling, sightseeing, wildlife viewing, falconry, mountain

biking, bird watching, hang gliding, paragliding, and field dog training and trials might experience low impacts during construction. Although peak season for these activities correlates with the typical construction season, potential impacts are considered low because these dispersed activities are not limited to a specific area and could undergo a minor relocation without much interruption.

The low intensity nature of most dispersed activities could allow them to continue even within proximity to construction. In particular, fishing, hiking, rock hounding, horseback riding, camping, snowshoeing, sightseeing, wildlife viewing, falconry, bird watching mountain biking and some watersports are all unmotorized activities that move at relatively slow speeds and can therefore quickly adjust for minor disturbances.

Following construction of the transmission lines, fiber optic lines and access roads, recreation activities may resume without impacts. Recreational use of areas that were temporarily closed during construction would resume as before construction. Also, with improved and/or additional access roads, changes in access to recreational opportunities may occur.

4.9.3 John Wayne Trail

All alternatives would cross the Iron Horse State Park portion of the John Wayne Trail at least once while crossing the YTC. The trail, which follows the old railroad grade, is in a series of cuts and fills in the area of Segments B_{NORTH}, B_{SOUTH} and C. Views are limited approximately 50 percent of the time by the cut walls on either side of the trail. From fill portions of the trail, two other transmission lines are easily seen. B_{NORTH} would cross the trail in two places, with the view being localized to the crossings. B_{SOUTH} would follow on the south side of the trail and an existing transmission line. The trail in the area of these segments would be temporarily closed during construction. The temporary impacts to the trail-related activities would be moderate if construction was conducted during the peak use periods, and they would be low if conducted during the off-peak use periods.

The Preferred Alternative and Alternatives 1 and 1A would cross the Milwaukee Road Corridor portion of the John Wayne Trail on the east side of the Columbia River outside Beverly, Washington. The three alternatives would cross the east/west running trail roughly perpendicularly, spanning the trail corridor. Construction would temporarily close the trail at the location of the transmission line crossings, causing temporary impacts to trail-related activities.

Impacts would be moderate if construction occurred during peak use periods and low if it occurred during off-peak use periods.

Photo 4.9-1. John Wayne Trail along Segment B_{SOUTH}

Once the transmission line is constructed, users of the trail will continue to use the trail as before. There would be short-term evidence of construction activities until disturbed areas are revegetated.

4.9.4 No Action Alternative

No impacts would be expected to recreation resources under this alternative.

4.9.5 Recommended Mitigation

- Coordinate with agencies to inform the public about construction closures.
- Inform the YTC Environment and Natural Resources Division, Operations Center, and the guards at the entry points of any planned construction-related closures to the trail so they may inform potential users.
- Provide directions to the nearest access point to the open portions of the John Wayne Trail on the YTC to the guards at the entry sign-in points so they may inform trail users.

- Discuss locations of new structures, conductor lines, and access roads with land managers and owners in order to avoid sensitive recreation areas.

- After consultation with land owners/agencies, install gates and fencing where needed to discourage unauthorized public use of access roads on private lands.

4.9.6 Cumulative Impacts

Generally, this region of Washington is rural in nature and is characterized by agricultural uses and striking natural landforms. However, it is experiencing increased development growth by people looking for the benefits of rural living and as a vacation destination. The construction of a new transmission line would add physical features to the landscape and contribute to the ever-increasing manmade presence on the natural landscape. All of these factors affect the type and experience of recreation activities.

Development provides access opportunities to areas previously inaccessible. New access roads could lead to increased recreational opportunities such as hunting, wildlife viewing, sightseeing, and off-road vehicle operating in areas unaccustomed to such activities.

Providing access to new areas reduces the areas available for recreationalists looking to experience nature.

4.10 Cultural Resources and Historic Properties

Reminder

*The **Area of Potential Effect (APE)** for this project is defined as the entire ROW for the length of the proposed transmission line, access roads, and fiber optic route.*

This section assesses the project's potential impacts on cultural resources and historic properties in the ***APE***. This assessment is based on information gathered from:

- literature searches and pedestrian surveys
- compilation and assessment of records, reports, and survey results of sites that would be potentially impacted.

A discussion of both generalized and site-specific impacts and mitigation is included in this section.

4.10.1 Impact Levels

Because cultural resources and historic properties are considered invaluable, any impact to them would be considered to be equally important. For this reason, potential impacts are discussed in general terms without the relative ratings of high, moderate, or low.

4.10.2 Impacts Common to Construction Alternatives

Any ground-disturbing activity within the boundaries of a cultural resource or significant historic property could be destructive, resulting in the permanent, irreversible, and irretrievable loss of scientific information and/or cultural value. Ground disturbance activities associated with construction include clearing vegetation, grading and backfilling, using heavy equipment, constructing structures, and constructing access roads.

Non-ground-disturbing activities, such as acquiring new right-of-way, cutting vegetation, reseeding, changing access and use, and ongoing operations and maintenance may or may not have negative impacts on cultural resources or historic properties depending on the type of resource or property involved and the proximity of the activity to the resource or property.

4.10.3 Preferred Alternative (Alternative 2)

Site-specific impacts to potentially significant historic properties would be avoided by locating structures and access roads outside of known historic property boundaries. New historic properties could be discovered during construction.

Pedestrian surveys were conducted only for the Preferred Alternative, including access roads, ROW, and the fiber route. If an alternative

other than the Preferred Alternative is chosen, further surveys would need to be conducted to identify cultural resources and potentially significant historic properties as well as site-specific avoidance and mitigation strategies for historic properties.

4.10.4 No Action Alternative

The No Action Alternative includes no new or additional impacts.

4.10.5 Recommended Mitigation

BPA designed the Preferred Alternative so that all known historic properties would be avoided by project construction, operation, and maintenance activities. Site-specific mitigation is described below to ensure nearby known historic properties are protected during these activities. In addition, general measures for protecting any newly discovered historic properties during the course of construction, maintenance, and operation activities are listed below.

4.10.5.1 Site-Specific Avoidance Measures

Specific avoidance measures are recommended for significant or potentially significant historic properties that are near the Preferred Alternative. The following measures will be implemented at specific sites:

- use on-site construction monitors to coordinate with construction contractor, road engineers, and design engineers
- keep all construction equipment and vehicles on existing roads
- use flagging to restrict ground disturbance activities
- reroute the location of new or upgraded roads and towers to avoid known properties
- conduct subsurface probes if needed to determine presence or absence of cultural deposits
- place protective fabric or rock on roads and ROW as needed
- adjust direction of fiber optic line pulling
- perform subsurface investigations for three properties to determine the eligibility to meet NRHP criteria
- conduct additional surveys for any design adjustments made before construction
- staging area locations would be determined by the construction contractor before or during construction. The size of each location may vary. The construction contractor would negotiate with the landowner for the use of staging areas. A pedestrian

survey of the staging area would be done to assure absence of historic properties before staging sites are approved.

4.10.5.2 Discovery of New Cultural Resources

If previously unknown historic properties are discovered in the course of project activities, work in the immediate area would halt and the area would be secured. The SHPO, affected Native American tribes, and agency archaeologists would be notified immediately, and a professional archaeologist who meets the Secretary of Interior's Qualifications Standards would examine the site and make recommendations for mitigation.

As required for compliance with Sections 106 and 110 of the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act (ARPA), the Native American Graves Protection and Repatriation Act (NAGPRA), the National Environmental Policy Act (NEPA) and Executive Order 13007, BPA would consult with the following groups concerning discovered historic properties, their management, and potential impacts that the proposed project could have on them:

- the Washington State Historic Preservation Officer (SHPO) through the Office of Archaeology and Historic Preservation (OAHP)
- affected Native American tribes
- the owning federal agency, if discoveries are made on federal lands.

4.10.6 Cumulative Impacts

This and other projects in the area are providing monetary resources for the discovery of important cultural resources and historic properties. The negative side of this is that as resources and properties are discovered and become part of public knowledge, the possibility of their destruction becomes greater. BPA, in cooperation with Native American tribes, other federal agencies administering public lands, and the Washington State Office of Archaeology and Historic Preservation, is limiting the distribution of specific information pertaining to cultural resources and historic properties. Results of the literature review and pedestrian survey are only summarized in the EIS for this purpose. Therefore, adverse cumulative impacts through the discovery, documentation, and public knowledge of new cultural resources and historic properties are minimized.

4.11 Public Health and Safety

For Your Information

This section discusses the potential causes of impacts that could affect public health and safety.

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

People must also take certain precautions when working or playing near power lines. It is extremely important that people do not place potential conductors, such as TV antennae, irrigation pipes, or streams of water from irrigation, too close to the lines. BPA provides the free booklet *Living and Working Safely Around High Voltage Power Lines*, which describes safety precautions for people who live or work near transmission lines.

4.11.1 Impact levels

Impact levels are dependent on public and occupational use of the land. The potential for public health and safety impacts increases in areas where human activities take place.

A **high** impact would occur if:

- the new line precludes the use of the ROW for pre-existing activities.
- noise levels for the new line exceed existing state standards.

A **moderate** impact would occur if:

- the new line alters pre-existing ROW activities.
- residents are present and nuisance noise levels occur, exceeding **ambient noise** levels during a portion of the time.

Reminder

Ambient noise *is the noise level of the surrounding area.*

A **low** impact would occur if:

- the new line would not produce a change in ROW activities.
- there would be no perceived change in noise levels.

4.11.2 Electric and Magnetic Fields

To quantify ***EMF*** levels along the alternatives, the EMFs from the new and existing lines were calculated using the BPA Corona and Field Effects Program (USDOE, undated) for all alternatives. Minimum clearances were assumed to provide worst-case (highest) estimates for EMF levels. These worst-case conditions would seldom occur. (See Appendix I, *Electrical Effects*.)

The possible effects of EMF from transmission lines interacting with people on and near a ROW fall into two categories:

1. Short-term health and safety effects that can be perceived and may represent a nuisance: possible short-term effects are discussed below.

2. Possible long-term health and safety effects: The issue of whether there are long-term health effects associated with transmission line fields is controversial. In recent years, considerable research on possible biological effects of EMF has been conducted. Evidence that EMF exposures pose health risks is weak and there are no exposure standards based on long-term health effects. A review of recent studies and their implications for health-related effects is provided in a separate technical report, Appendix J, *Assessment of Research Regarding EMF and Health and Environmental Effects*.

4.11.2.1 Electric Fields – Short-Term Effects

Short-term effects from transmission line electric fields are associated with experiencing shocks from induced currents and voltages, and perceiving the electric field. Under certain conditions, induced current (spark-discharge) shocks can be experienced when a person contacts objects in an electric field. These effects occur in fields associated with transmission lines that have voltages of 230-kV or higher, and could occur under the new transmission line.

Primary shocks are those that can result in direct physiological harm. These shocks will not occur from induced currents under the existing or new lines, because clearances aboveground required by the NESC prevent large vehicles from these shocks, and grounding practices eliminate large stationary objects as sources of these shocks.

Secondary shocks are defined as those that could cause an involuntary and potentially harmful movement, but no direct physiological harm. Secondary shocks could occur under the proposed 500-kV line when making contact with ungrounded conducting objects such as vehicles or equipment. However, such

occurrences are anticipated to be very infrequent. Shocks, when they occur under the 500-kV line, are most likely to be at a nuisance level.

Induced currents are always present in electric fields under transmission lines and will be present near the new line. However, during construction BPA routinely grounds metal objects located on or near the ROW. Grounding eliminates these objects as sources of induced current and voltage shocks. Induced currents are extremely unlikely to be perceived off the ROW of the new line.

Unlike fences or buildings, mobile objects such as vehicles and farm machinery cannot be grounded permanently. There are several ways to limit the possibility of induced currents from mobile objects to persons. First, required clearances for aboveground conductors tend to limit field strengths to levels that do not represent a hazard or nuisance. The NESC (IEEE, 1990) requires that sufficient conductor clearance be maintained in order to limit the induced short-circuit current in the largest anticipated vehicle under the line to 5 ***milliamperes*** (mA) or less. This can be accomplished by limiting access or increasing conductor clearances in areas where large vehicles could be present.

For Your Information

*A **milliampere** is one thousandth of an ampere, a measure of electric current.*

The BPA and other utilities design and operate lines in compliance with NESC standards. The NESC's 5-mA criterion would be met for perpendicular road crossings of the proposed line, and the conductor clearance at each road crossing would be checked during the design stage of the line to ensure that this criterion is met. In accordance with NESC standards, line clearances would also be increased in critical areas such as over railroads and water areas suitable for sail boating.

The potential impacts of electric fields could be mitigated through implementing grounding policies, adhering to NESC standards, and increasing clearances above the minimums specified by the NESC. Worst-case levels are used for safety analyses, but in practice induced currents and voltages are considerably reduced by unintentional grounding and by shielding provided by conducting objects, such as vehicles and vegetation.

Computer models were run to calculate electric fields for the different alternatives, the results of which can be found in Appendix I, *Electrical Effects*. The maximum calculated peak electric field expected for the new transmission line would be 8.9 kilovolts-per-meter (kV/m) or less, depending on the location along each alternative. These peak values are only directly under the line near mid-span, where the conductors are at the minimum clearance.

The largest values expected at the edge of the ROW nearest the new transmission line would be 2.0 kV/m. The largest fields at the edges of the existing ROWs are 5.2 and 2.0 kV/m for the 500- and 230-kV lines, respectively.

The existing 500-kV, 230-kV and 115-kV lines in the study area have peak electric fields of 9.7, 3.3, and 1.7 kV/m respectively. These would be the electric fields present if the No Action Alternative was chosen.

4.11.2.2 Magnetic Fields – Short-Term Effects

The magnetic field generated by currents on transmission line conductors extends from the conductors through the air and into the ground. The magnitude of the field at a height of 1 meter is frequently used to describe the magnetic field under transmission lines. The most important transmission line parameters that determine the magnetic field are conductor height above ground and magnitude of the currents flowing in the conductors. As distance from the transmission line conductors increase, the magnetic field decreases.

Computer models were run to calculate magnetic fields for the different alternatives, the results of which can be found in Appendix I, *Electrical Effects*. The field values on the ROW and at the edge of the ROW are given for projected maximum currents during summer peak load, for minimum and average conductor clearances. Field levels for the new line would be comparable with those for existing lines in the study area. The actual magnetic field levels would vary as currents on the lines change daily and seasonally and as ambient temperature changes. Average currents over a year would be considerably reduced from peak values. On the new ROW with no parallel lines and with the conductors at a height of 33 feet, the maximum magnetic field at 1 meter above ground is 244 milligauss (mG). For an average conductor height of 47 feet, the maximum field would be 137 mG. The maximum fields under the new line in the configurations with parallel lines would be less than these values.

At the edge of the new ROW, the calculated magnetic field for maximum current conditions would be 55 mG for conductor height of 33 feet and 46 mG for a conductor height of 47 feet. Fields at the edge of the ROW of the new line in configurations with parallel lines would be slightly more than those stated above. The field at the edge of the ROW adjacent to a parallel line would depend on that line.

The magnetic field falls off rapidly as distance from the line increases. The calculated magnetic field for maximum current would be less than 10 mG at about 185 feet from centerline of the new transmission

line. At a distance of 200 feet from centerline, the field would be 8 mG for maximum current conditions.

The peak magnetic fields on the ROWs are 302 mG and 170 mG, for the 500-kV and 230-kV lines, respectively. Fields at the edges of the existing ROWs range from 158 mG for the Schultz-Vantage 500-kV line to 7 mG for the North Bonneville-Midway 230-kV line, which has a very wide ROW. These would be the magnetic fields present if the No Action Alternative was chosen.

4.11.2.3 Health and Safety Impacts

Impacts from electric and magnetic fields are based on how the new line would potentially change activities presently occurring on the land that would become ROW. Farming is the activity most commonly affected by EMFs because moving and operating irrigation systems must be done with care. The impacts shown in Table 4.11-1, *Health and Safety Impact Level*, are for each alternative by segment.

Table 4.11-1
Health and Safety Impact Level

	Seg A	Seg B	Seg C	Seg D	Seg E	Seg F	Overall Impact
Preferred (2)	Low/Mod	Low		Mod			Low/Mod
Alternative 1	Low/Mod	Low			Mod		Low/Mod
Alternative 3	Low/Mod		Low				Low
Alternative 1A	Low/Mod	Low				Low	Low

4.11.3 Noise

The Washington Administrative Code (WAC) provides noise limitations by class of property: residential, commercial, or industrial. Transmission lines are classified as industrial, and can cause the maximum permissible noise level of 60 decibels (dBA) to intrude into residential property. During nighttime hours (10 pm to 7 am), the maximum permissible limit for noise from industrial to residential areas is reduced to 50 dBA. The latter level applies to transmission lines that operate continuously. The WDOE accepts the 50 dBA level at the edge of the ROW for transmission lines, but has encouraged BPA to design lines with lower audible noise levels.

4.11.3.1 Construction Noise

Noise impacts would result from construction activities. However, this noise would be short term, occurring mostly during daylight hours. It would typically occur for a few days only at any one location, such as near a residence.

Reminder

Corona *is a discharge at the surface of a conductor.*

Corona-generated noise can be characterized as a hissing, crackling sound. A technical definition is included in Chapter 9, (Glossary and Acronyms.

4.11.3.2 Transmission Line Noise

Corona-generated audible noise is of concern primarily for contemporary lines operating at voltages of 345-kV and higher during foul (wet) weather conditions. Based on meteorological records near the proposed transmission line routes, these conditions are expected to occur less than 7 percent of the time during the year. For a few months after line construction, residual grease or oil on the conductors can cause water to bead up on the surface. This results in more corona sources and slightly higher levels of audible noise and electromagnetic interference if the line is energized. However, the new conductors "age" in a few months, and the level of corona activity decreases to the predicted equilibrium value. The proposed line has been designed with three subconductors per phase, to yield acceptable corona levels.

During foul weather, there would be an increase in the perceived noise above ambient levels for all alternatives, at the edges of new ROW. The foul weather audible noise at the edge of the ROW for the new line alone would be 50 dBA. Along the sections of the Preferred Alternative (Segment D) where new ROW parallels the existing 230-kV ROW, the increase in line-noise levels during foul weather would be perceived as doubling the noise level at the edge of the ROW adjacent to the existing lines.

During fair weather conditions, which occur about 93 percent of the time in the study area, audible noise levels would be about 20 dBA lower than foul weather conditions (if corona were present). These lower levels could be masked by ambient noise on and off the ROW and would probably not be detectable above ambient levels.

Off the ROW, the level of audible noise from the proposed line would be well below the 55-dBA levels that can produce interference with speech outdoors. It is also highly unlikely that indoor noise levels from the line would exceed the 35-dBA level, when sleep interference can occur. In addition, because corona is a foul weather phenomenon, people tend to be inside with windows closed, which decreases their perception of corona noise when it is present. Ambient noise levels can also be high during foul weather periods (due to rain hitting foliage or buildings) and can mask corona noise.

Audible noise from the new transmission line would be below EPA guideline levels, and would meet the BPA design criterion that complies with the Washington state noise regulations.

4.11.3.3 Substation Noise

Alternatives 1 or 1A, ending at the Hanford Substation, would pass through the existing Vantage Substation, but no expansions would be necessary within the substation grounds. The Preferred Alternative (Alternative 2) would bypass the existing Vantage and Midway Substations. As a result, the area surrounding these two substations would not experience an increase in noise.

Reminder

See Map 2, Alternatives, for location of routes and substations.

The proposed added equipment at Schultz Substation would not result in increased noise levels. The alternatives terminating at the Hanford Substation would not result in increased noise levels at the substation. The additional substation equipment required would be similar to the equipment already in use.

The Preferred Alternative would terminate at a new Wautoma Substation, which would be a new noise source in the area. As with all substations, noise levels from the new Wautoma Substation would depend on the equipment installed and the operating modes of that equipment. However, due to the rural location of the substation and the absence of any residences in the general area, noise impacts would be minimal.

Expansion of the Schultz and Hanford Substations and creation of a new Wautoma Substation would be designed so that the maximum noise level at the property line would not exceed the 65-dBA level required by the Washington State standard for Class C property (industrial zones that includes range and agricultural lands).

4.11.3.4 Noise Impacts

Noise impacts are based on the level of the noise produced by the new line and the people present to hear the noise. If a nuisance level of noise is produced, but people sensitive to the noise are not present, then there is a low impact. This is the impact rating given for agricultural areas where the people present are primarily working. The noise impact levels shown in Table 4.11-2, *Noise Impact Level*, are for each alternative by segment.

Table 4.11-2
Noise Impact Level

	Seg A	Seg B	Seg C	Seg D	Seg E	Seg F	Overall Impact
Preferred (2)	Low/Mod	Low		Low			Low
Alternative 1	Low/Mod	Low			Low		Low
Alternative 3	Low/Mod		Low				Low
Alternative 1A	Low/Mod	Low				Low	Low

4.11.3.5 Radio and TV Interference

Corona on transmission line conductors can also generate electromagnetic noise in the frequency bands used for radio and television signals. This noise can cause radio and television interference (RI and TVI). Interference with electromagnetic signals by corona-generated noise is generally associated with lines operating at voltages of 345-kV or higher. This is especially true of interference with television signals. The three-conductor bundle design of the proposed 500-kV line is intended to mitigate corona generation and thus keep radio and television interference at acceptable levels.

Spark gaps on distribution lines and on low-voltage wood-pole transmission lines are a more common source of RI/TVI than corona from high-voltage electrical systems. This gap-type interference is primarily a fair weather phenomenon caused by loose hardware and wires. The new transmission line would be constructed with modern hardware, which would eliminate these problems and minimize gap noise. Consequently, this source of EMI is not anticipated for the proposed line.

Reminder

EMI *(electromagnetic interference) is a high-frequency noise caused by corona that can cause radio and television interference.*

Radio reception in the AM broadcast band (535 to 1,605 kilohertz (kHz)) is most often affected by corona-generated electromagnetic interference ***(EMI)***. FM radio reception is rarely affected. Generally, RI can affect only residences very near transmission lines. Predicted RI levels indicate that fair weather RI will be within the acceptable levels for all proposed route configurations at distances greater than 100 feet from the outside conductor of the proposed line.

Corona-caused TVI occurs during foul weather and is generally of concern for transmission lines with voltages of 345-kV or above, and only for conventional receivers within about 600 feet of a line. As is the case for RI, gap sources on distribution and low-voltage transmission lines are the principal observed sources of TVI. The use of modern hardware and construction practices for the new transmission line would minimize these sources. Predicted TVI levels at 100 feet from the outside conductor of the new transmission line, which would be operating at 500-kV, are comparable with TVI levels from other existing BPA 500-kV lines, and lower than those from the existing Sickler-Schultz 500-kV line.

There is a potential for interference with television signals at locations very near the new transmission lines in fringe reception areas. However, interference with television reception can be corrected by several approaches: improving the receiving antenna system; installing a remote antenna; installing an antenna for TV stations less vulnerable to interference; connecting to an existing cable system; or installing a translator. It is anticipated that all instances of TVI caused by the new transmission line could be effectively mitigated.

If interference should occur, there are various methods for correcting it, and BPA has an active program to identify, investigate, and mitigate legitimate RI and TVI complaints. Therefore, the anticipated impacts of corona-generated interference on radio, television, or other reception would be minimal.

4.11.4 Toxic and Hazardous Materials

Several common construction materials (e.g., concrete, paint, etc.) and petroleum products (e.g., fuels, lubricants, and hydraulic fluids) would be used during construction. BPA would follow strict procedures for disposal of these or any hazardous materials. No impacts would occur.

Some of the new substation equipment required at the Schultz Substation may contain oil. The new equipment at the Hanford Substation may contain oil, however, the Spill Prevention Control and Countermeasure Plan currently in place would be modified to include this expansion.

The Preferred Alternative would terminate at the new Wautoma Substation. The new line termination equipment required would contain limited amounts of oil. This equipment includes such things as breakers, switches, capacitors, buswork, substation dead ends, and a control house. Since it is expected that there would be no transformers required at this new substation, a spill containment system is not likely to be installed.

Contaminated media (soil, surface water or groundwater) if unexpectedly encountered during construction of the project may present potential risk/liability to BPA. Potential risk and liability includes workers health and safety, management of contaminated materials and/or exacerbation of contaminated media (soil, surface water, or groundwater).

Should contaminated media be unexpectedly encountered during construction of the project, work will be stopped, and an environmental specialist will be called in to characterize the nature and extent of the contamination and to determine how the work may

safely be completed. Work will proceed only after measures approved by the WDOE are put in place to prevent the spread of contaminated materials and protect the health and safety of workers.

4.11.5 Fire

Construction of the new transmission line could take place at any time of the year. However, it can be expected that some construction activities will occur during summer when the weather is hot and dry. During the summer months, the potential for wildfires is high due to dry vegetation, such as sagebrush and grasses, along the new ROW. The fire risk increases even more with the increased use of vehicles and other motorized equipment during construction. The addition of construction workers in the area also elevates the potential for fire. Vehicles would carry fire suppression equipment, including a shovel, fire extinguisher, and bladder or water supply Construction crews will supply additional suppression equipment if construction occurs on an agency's property that requires more caution, or if the chance of fire is high (e.g., dry wheat fields).

To prevent fires and other hazards, BPA maintains a safe clearance between the tops of trees and power lines. Because electricity can arc from a conductor to a treetop, trees are generally not allowed to grow over 20 feet high on the ROW. Trees that need to be cleared from the ROW, and any that could fall into the line (danger trees) are marked and removed.

4.12 Air Quality

4.12.1 Impact Levels

Impacts would be **moderate** if one or more of the following would occur:

- An effect would be created that could only be partially mitigated.
- Air quality would be reduced locally.
- A possible (but unlikely) risk to human health or safety would occur due to air quality.

Impacts would be **low** if one or more of the following would occur:

- An effect would be created that could be largely mitigated.
- A reduction in air quality near the construction or clearing site would occur.
- The project would cause insignificant or very unlikely health and safety risks due to air quality.

For Your Information

Corona *is an electrical discharge at the surface of a conductor transmission line. A technical definition is included in Chapter 10, Glossary and Acronyms.*

When corona is present, the air surrounding a conductor is ionized and many chemical reactions take place that produce small amounts of ozone and other oxidants. Ozone comprises approximately 90 percent of these oxidants, and the remaining 10 percent is mainly composed of nitrogen oxides. The national primary ambient air quality standard for photochemical oxidants, of which ozone is the principal component, is 235 micrograms per cubic meter, or 120 parts per billion. The maximum incremental ozone levels at ground level produced by corona activity on the proposed transmission lines during foul weather would be much less than one part per billion. This level is insignificant when compared with natural levels and fluctuations in natural levels.

4.12.2 Impacts Common to Construction Alternatives

Construction vehicles and windblown dust from the construction sites and clearing activities would create short-term low impacts on air quality.

Construction vehicles and heavy equipment would emit pollutants such as carbon monoxide (CO), sulfur oxides, particulate matter, nitrogen oxides, volatile and semi-volatile organic compounds, and carbon dioxide (CO_2). Emissions would be short-term and would have low or no impact on air quality.

The only potential for long-term impacts to air quality would come from the new line itself, which would cause limited air emissions. The high electric field strength of a 500-kV transmission line can cause a breakdown of air at the surface of the conductors, which is called ***corona***. The proposed 500-kV line is designed to have lower corona levels than are present on the older 500-kV lines in the area and would not result in impacts to air quality.

4.12.3 No Action Alternative

No impacts are expected from this alternative.

4.12.4 Recommended Mitigation

- In order to minimize windblown dust, water trucks would be used to spray roadways and construction sites when necessary.
- Dust Control procedures would be included in the construction Storm Water Pollution Prevention (SWPP) specifications and the SWPP plan.
- Lop and scatter would be used to recycle vegetation.
- To prevent erosion, disturbed areas would be reseeded with grass or an appropriate seed mixture.

4.12.5 Cumulative Impacts

Over the long term, the proposed project would cause no cumulative effects on local or global air quality.

4.13 Short-Term Use of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The alternatives under consideration do not pose impacts that would significantly alter the long-term productivity of the affected environment. A good example of this is the existing lines in the study area. They were built in the 1940's through the 1960's. The affected environment has recovered since then and, while there is never complete recovery, the long-term productivity of the affected environment has not been significantly altered. Likewise, if the proposed project was built and then removed and the affected areas restored, little change in long-term environmental productivity would occur.

4.14 Irreversible and Irretrievable Commitment of Resources

The proposed project would include the use of aluminum, steel, wood, gravel, sand, and other non-renewable materials to construct steel structures, conductors, insulators, access roads, and other facilities. Materials may come either from on-site borrow pits or from outside sources. Petroleum-based fuels would be required for vehicles and equipment.

The proposed project would cause commitments that result in the loss of wildlife habitat for certain species and the loss of production or renewable resources, such as circle-irrigated cropland. The proposed project would irreversibly convert wildlife habitat and shrub-steppe habitat to utility and associated maintenance uses.

The proposed project would result in a loss of cropland and rangeland. These commitments are irretrievable rather than irreversible, because management direction could change and allow these uses in the future.

4.15 Adverse Effects that Cannot be Avoided

Implementation of the proposed project would result in some adverse impacts that cannot be fully avoided. These impacts and proposed mitigation are discussed under the specific resource section earlier in this chapter. Many adverse effects would be temporary, occurring during site-specific activities.

Some of the adverse effects that cannot be avoided in the proposed project include the following:

- The elimination small areas of vegetation, including wetlands and riparian vegetation, due to permanent physical developments such as transmission line structures and maintenance roads.
- Intermittent and localized decreases in air quality from dust caused by the construction, maintenance, and use of roads.
- Short-term soil compaction, erosion, vegetation degradation, and stream sedimentation from construction and maintenance.
- Short-term disturbance to wildlife during construction.
- Short-term disruption of agricultural activities during construction.
- An increased level of habitat fragmentation and reduction in the amount of shrub-steppe vegetation available for wildlife habitat.

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