

Midway-Benton No. 1 Transmission Line Rebuild Project Preliminary Environmental Assessment



June 2012

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Chapter 1

Purpose of and Need for Action

1.1 Introduction

The Bonneville Power Administration (BPA) is a federal agency that owns and operates more than 15,000 miles of high-voltage transmissions lines. The transmission lines move most of the Pacific Northwest’s high-voltage power from facilities that generate the power to utility customers throughout the region. BPA has a statutory obligation to ensure that its transmission system has sufficient capability to serve its customers while maintaining a system that is safe and reliable. The Federal Columbia River Transmission System Act directs BPA to construct the improvements, additions, and replacements to its transmission system necessary to maintain electrical stability and reliability, and to provide service to BPA’s customers (16 United States Code [USC] 838b(b-d)).

BPA is proposing to rebuild its 115-*kilovolt*¹ (kV) wood-pole Midway-Benton No. 1 transmission line and the BPA-owned portion of the 115-kV wood-pole Benton-Othello No. 1 transmission line. The lines are aging and require replacing wood-pole structures and other components of the transmission line. The Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines currently follow the 230-kV steel Midway-Benton No. 2 transmission line. At this time, BPA is not proposing any work on the Midway-Benton No. 2 transmission line.

This environmental assessment (EA) was prepared for this proposal by BPA pursuant to regulations implementing the National Environmental Policy Act (NEPA) (42 USC 4321 *et seq.*), which requires federal agencies to assess the impacts their actions may have on the environment. BPA prepared this EA to determine if the project would cause impacts that would warrant preparing an Environmental Impact Statement (EIS), or whether it is appropriate to prepare a Finding of No Significant Impact (FONSI).

1.2 Need for Action

BPA needs to take action to ensure the integrity and reliability of the existing aging Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines (see Figure 1-1). Most of the structures and **conductors** on the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines now exceed their service life. The Midway-Benton No. 1 transmission line is located between BPA’s Midway and Benton substations and the Benton-Othello No. 1 transmission line is located between BPA’s Benton Substation and Avista’s Othello Substation. BPA owns, operates, and maintains the first 11 miles of the Benton-Othello No. 1 transmission line after it leaves the Benton Substation. The Midway-Benton No. 1 and the BPA-owned portion of the Benton-Othello No. 1 transmission lines are located

¹ Technical terms that are in bold, italicized typeface are defined in Chapter 6, “Glossary and Acronyms.”

in Benton County, Washington, on the U.S. Department of Energy's (DOE's) "Hanford Site," (Figure 1-1).

Both transmission lines are old, physically worn, and structurally unsound in places. The Midway-Benton No. 1 transmission line helps serve Franklin County Public Utility District (PUD) and the Benton-Othello No. 1 transmission line serves Avista Utilities.

These transmission lines were originally built in the 1940s. In general, wood poles for transmission lines are expected to have a service life of 55 to 60 years, at which point they are usually replaced due to age, rot, and other deterioration. Most of the structures on the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines now exceed their service life. The poor condition of the existing transmission lines creates risks to public and worker safety and may lead to outages that would adversely affect power deliveries to BPA's customers in eastern Washington. Further, the existing *conductors* on both transmission lines do not meet current BPA standards. The existing conductors on Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines are made from copper, and the hardware for this type of conductor is no longer available.

1.3 Purposes of Action

Purposes are defined here as goals to be achieved while meeting the need for the proposed project (collectively, Proposed Action or the ***Rebuild-in-Place Alternative***). BPA has identified the following purposes that it will use to evaluate the alternatives:

- Meet transmission system public safety and reliability standards set by the National Electrical Safety Code (NESC);
- Continue to meet BPA's contractual and statutory obligations;
- Minimize environmental impacts; and
- Demonstrate cost-effectiveness.

1.4 Cooperating Agencies

The proposed project would be located entirely on the Hanford Site. The project would cross the Central Hanford Area, which is managed by the DOE, and the Hanford Reach National Monument, which is managed jointly by the U.S. Fish and Wildlife Service (USFWS) and DOE. BPA has an easement for the existing rights-of-way (ROWs), but those portions of the Proposed Action not located within an existing BPA ROW would require a new easement. Because all alternatives would be located on lands managed by DOE's Richland Operations Office (DOE-RL), the EA will also be used by DOE-RL as part of its NEPA review regarding the decision of whether or not to grant a new easement.

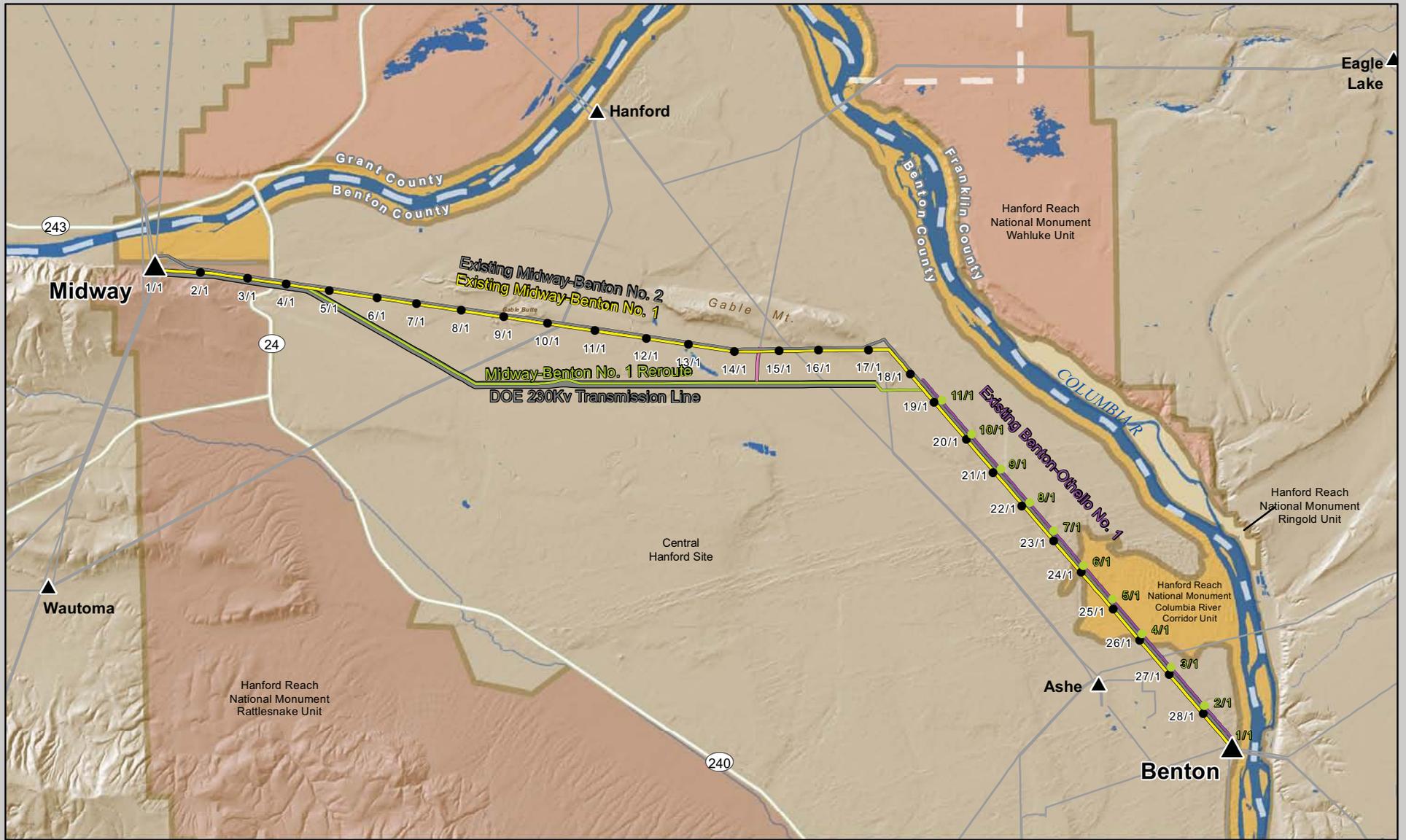


Figure 1.1 Project Location



June 19, 2012

- Existing Midway-Benton No. 1 Line
- Proposed Action Midway-Benton No. 1 Line Reroute
- Proposed Action Scootenev Tap Line Extension
- Existing Benton-Othello No. 1 Line

- Existing Midway-Benton No. 1 Transmission Structure
- Existing Benton-Othello No. 1 Transmission Structure
- ▲ BPA Substation
- Existing Transmission Lines

- Highway
- County Boundaries



1.5 Public Involvement

BPA conducted public outreach for the proposed project through various means, including providing notice of the project, the environmental process, and opportunities to comment. On November 14, 2011, BPA sent an initial letter to public interest groups, local governments, tribes, and State and federal agencies notifying them of the proposed project and upcoming survey activities and providing contact information. The letter explained the Proposed Action, the environmental process, and how to comment during the Preliminary EA scoping period.

BPA also created a website specifically for the project where people can access current information about the Proposed Action and environmental review process (www.bpa.gov/go/midwaybentonrebuild). BPA posted the initial public letter described above on this website and considered all comments in this analysis.

Five written comments were received about the Proposed Action during the scoping period. The comments concerned the following issues:

- Additional information about proposed replacement components and need;
- Purpose of not removing access roads across Gable Mountain and Gable Butte;
- Biological resources, including raptors, sage grouse *leks*, and sensitive botanical species;
- **Cultural resources**, including Gable Mountain, Gable Butte, and ethnobotany; and
- ROW herbicide use.

A list of all interested parties is included in Chapter 5. The public scoping comments can be viewed in their entirety at the following website: www.bpa.gov/comment.

BPA identified five American Indian tribes that have a potential interest in the proposed project, based on their historic or current use of the land in the general vicinity of the transmission lines: the Confederated Tribes of the Colville Indian Reservation, Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Confederated Tribes and Bands of the Yakama Nation, Nez Perce Tribe, and Wanapum Band.

In 2005 and 2010, BPA received letters from the Nez Perce Tribe, Confederated Tribes of the Colville Reservation, and CTUIR requesting that BPA remove transmission facilities from Gable Mountain and Gable Butte. As a result of those requests, BPA is considering the Proposed Action, as discussed further in Chapter 2, which would remove the Midway-Benton No. 1 transmission line from Gable Mountain and Gable Butte. BPA has met with representatives of the CTUIR, Confederated Tribes and Bands of the Yakama Nation, Nez Perce Tribe, and Wanapum Band's cultural resources staff on multiple occasions to discuss cultural resources concerns and to identify impact-minimization measures for project-related activities on Gable Mountain and Gable Butte. BPA also solicited comments from tribal representatives, which were used to shape the cultural resource field investigation and project **mitigation** described in Chapter 3, Section 3.8 of this EA.

BPA also spoke with regional USFWS and Washington Department of Fish and Wildlife (WDFW) representatives in addition to DOE-RL staff to discuss methods to minimize impacts on **special-status** and sensitive fish, wildlife, and plant species. Outreach included review of the project's

biological field survey and analysis plan and discussions about known sensitive species locations and minimization measures.

Further, BPA shared a copy of the project's biological field survey and analysis plan and met with representatives from the CTUIR Department of Science and Engineering to discuss the proposed project, including biological field survey and restoration methods. BPA received draft comments on the biological field survey and analysis plan from the CTUIR Department of Science and Engineering that indicated they do not agree with DOE-RL's approach to the management of certain plant communities (Level I vegetation, see Section 3.4.1). The CTUIR believes that impacts to Level I plant communities should be minimized similar to areas with a higher **level of concern** (i.e., Levels II, III, or IV, see Section 3.4.1). BPA acknowledges the differing views and has sought to minimize disturbance to Level I areas, as practical. However, the project is located on lands managed by DOE-RL and BPA will follow the guidance and measures outlined in the *Hanford Site Biological Resources Management Plan* (DOE-RL 2001), as applicable. Additional draft comments received from the CTUIR Department of Science and Engineering on the biological field survey and restoration methods, such as impacts associated with fire or soil **seed banks**, are addressed as appropriate in this EA. BPA addressed the scoping and biological study plan comments in appropriate sections in the EA as applicable. BPA is releasing this Preliminary EA for review and comment. The Preliminary EA is posted on the BPA project website. During the review period, BPA will accept comments via email, letter, or telephone. After considering comments received during the Preliminary EA review period, the EA will be revised, if necessary, and will then be finalized with a decision on how to proceed.

Chapter 2

Proposed Action and Alternatives

This chapter describes the Proposed Action (**Reroute Alternative**), the Rebuild-in-Place Alternative, the **No Action Alternative**, and alternatives considered but eliminated from detailed study. This chapter also compares the Proposed Action and alternatives and provides a summary of their potential environmental impacts.

2.1 Overview of the Proposed Action and Alternatives

BPA is proposing to replace the approximately 28.2-mile-long, 115-kV Midway-Benton No. 1 transmission line and approximately 11 miles of the 115-kV Benton-Othello No. 1 transmission line (Figure 1-1). Both transmission lines are located on lands managed by the DOE-RL as part of the Hanford Site and the Hanford Reach National Monument in Benton County, Washington.

Table 2-1 provides a summary of the required components for the Proposed Action and the Rebuild-in-Place Alternatives. The activities proposed under each of the alternatives (including the No Action Alternative), are described in detail in the remaining sections of this chapter.

BPA is considering three alternatives:

- The Proposed Action (Reroute Alternative): BPA would rebuild the Midway-Benton No. 1 transmission line within the existing ROW, except for an approximately 14.5-mile-long reroute. The transmission line would be relocated south of the existing line ROW to avoid sensitive cultural features (see Figure 1-1 and Table 2-1). BPA would remove the corresponding segment of the existing Midway-Benton No. 1 transmission line. The entire Benton-Othello No. 1 transmission lines would be rebuilt within the existing ROW.
- The Rebuild-in-Place Alternative: BPA would rebuild within the existing ROWs both the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines (see Figure 1-1 and Table 2-1).
- The No Action Alternative: BPA would not rebuild either transmission line and would continue to operate and maintain both of the deteriorating lines.

Table 2-1. Action Alternatives Summary

Specification		Action Alternatives	
		Proposed Action (Reroute Alternative)	Rebuild-in- Place Alternative
ROW			
Length (miles)	Midway-Benton No. 1 transmission line	28.2	27.9
	Benton-Othello No. 1 transmission line	11.0	11.0
	Scooteney Tap Transmission Line	0.8	—
ROW Width (feet)		100 (rerouted segment); 100 to 300 (existing ROW segments)	100 to 300 (existing ROW segments)
New ROW (miles)¹		14.5	0
Abandoned ROW (miles)²		14.2	0
Structures			
Wood-pole Structures Removed and Not Replaced in Same Location (number)³		102	1
Wood-pole Structures in New Location (number)⁴	Wood, Two-Pole Suspension	114	0
	Wood, Three-Pole Angle or Dead-End	12	0
	TOTAL	126	0
Wood-pole Structures Replaced in Approximately Same Location (number)^{5,6}	Wood, Two-Pole Suspension ⁷	207	302
	Wood, Three-Pole Angle or Dead-End	5	8
	TOTAL	212	310
Total Structures		338	310
Structure Height Aboveground (feet)		55 to 100	55 to 100
Access Roads⁸ (miles)			
New Roads		2.8	1.3
Improved Roads		31.1	33.8
Total Length		33.9	35.1

¹ Includes new ROW associated with the Reroute Alternative and the Scooteney Tap transmission line.

² Transmission line structures would be removed and the previously-maintained ROW would be restored to natural condition. While the ROW would be restored, BPA would retain the ROW in the abandonment sections.

³ One structure removed and not replaced would be located along the Benton-Othello No. 1 transmission line. All other structures removed and not replaced would be located along the Midway-Benton No. 1 transmission line.

⁴ Includes structures along the Scooteney Tap and Midway-Benton No. 1 transmission lines.

⁵ Poles replaced in same location as previously constructed.

⁶ Includes replacement structures associated with Midway-Benton No. 1, Scooteney Tap, and Benton-Othello No. 1 transmission lines.

⁷ A wood, single-pole structure on the Benton-Othello No. 1 transmission line would be replaced with a two-pole structure.

⁸ Access roads include all roads constructed or improved by BPA for the project. This distance does not include public or paved DOE-RL Hanford roads or roads that would not require improvement.

The Proposed Action and Rebuild-in-Place Alternative would include the following activities:

- Construction of new access roads;
- Improvement of some existing access roads;
- Establishment of temporary **material storage and staging yards** for storage of materials;
- Removal of existing structures and conductors;
- Installation of replacement structures and associated components;
- Construction of a **tap** (Scootene Tap);
- Establishment of **pulling and tensioning** sites;
- Installation of conductors, **ground wire**, and **counterpoise**; and
- Revegetation of areas disturbed by construction activities.

To facilitate the discussion of individual components of the Proposed Action and the Rebuild-in-Place Alternative in this EA, the project has been divided into four segments (Segments 1 through 4), as detailed in Table 2-2 and shown on Figure 2-1.

Table 2-2. Midway-Benton No. 1 and Benton-Othello No. 1 Transmission Line Segments.

Segment Number	First and Last Structure ¹	Number of New or Replaced Structures	Length in Miles	Proposed Action (Reroute Alternative)	Rebuild-in-Place Alternative
1	Midway-Benton 1/1 to 4/4	27	3.5	Remove existing structures and rebuild in place	
2 (Reroute)	Midway-Benton 4/5 to 19/2	126 (including Scootene Tap transmission line)	14.5 (Midway-Benton) 0.8 (Scootene Tap transmission line)	Construct structures in new locations	No construction activities
3	Midway-Benton 4/5 to 18/4 existing structure numbering ²	101	14.2	Remove existing structures; structures are not replaced	Remove existing structures and rebuild in place
4	Midway-Benton 19/3 to 31/1 Benton-Othello 1/1 to 11/7	185	10.2 ³	Remove existing structures and rebuild in place	

Notes:

¹ Each Benton-Othello No. 1 structure is designated a unique number based on the distance from the Benton Substation (the designated state point), and each Midway-Benton No. 1 structure is designated by a unique number based on the distance from the Midway Substation and the number of structures within a given mile. For example, in the first mile from the Midway Substation, the first structure is designated as structure 1/1 and the second structure is structure 1/2. The first structure in the second mile is numbered structure 2/1.

² The existing structure numbering is only used in the context of Segment 3 in this EA. Further, because the Proposed Action and the Rebuild-in-Place Alternative are different lengths, the structure numbers differ in the segments between structure 14/4 of the existing ROW and the Benton Substation. For example, structure 4/5 of the current alignment (Segment 3) is located in a different location than structure 4/5 of the rerouted segment (Segment 2). In Segment 4, structure 18/5 of the Rebuild-in-Place Alternative is the same as structure 19/3 of the Proposed Action.

³ A portion of the Benton-Othello No. 1 that would be replaced extends 0.8 mile into Segment 3, so that the total length of the Benton-Othello No. 1 that would be replaced is 11 miles. For analysis purposes, the structures within this 0.8 mile length are considered to be within Segment 4.

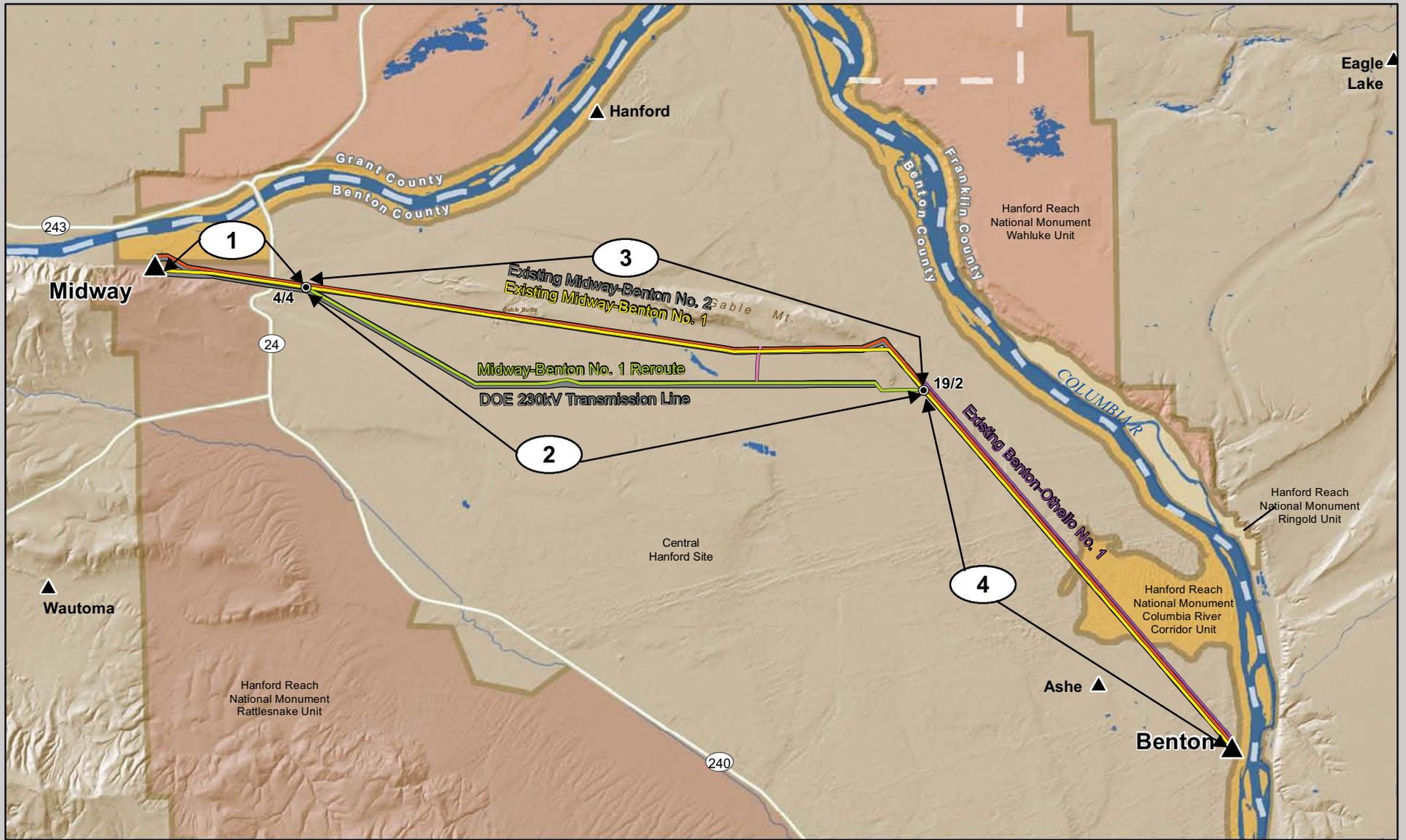


Figure 2-1 Project Segments 1-4



June 19, 2012

- Existing Midway-Benton No. 1 Line
- Proposed Action Midway-Bento No. 1 Line Reroute
- Proposed Action Scootenev Tap Line Extension
- Existing Benton-Othello No. 1 Line
- Existing Transmission Lines

- Planned Transmission Structure
- ▲ BPA Substation

- Highway
- County Boundaries



2.2 Proposed Action—Reroute Alternative

2.2.1 Transmission Line Route and ROW

Under the Proposed Action, the following actions are proposed (see Table 2-2 and Figure 2-1):

- In Segment 1, existing structures along 3.5 miles of the Midway-Benton No. 1 transmission line would be removed and rebuilt in place.
- In Segment 2, the Midway-Benton No. 1 transmission line would be relocated along an approximately 14.5-mile-long reroute that would parallel DOE-RL's 230-kV transmission line that crosses the Hanford Site and runs a maximum of approximately 1.6 miles south of the existing ROW. On the east end of the reroute, Segment 2 would parallel a communication line for about 0.9 mile. Segment 2 also includes a 0.8-mile extension of the Scootney Tap transmission line.
- In Segment 3, existing structures along 14.2 miles of the Midway-Benton No. 1 transmission line would be removed and not replaced.
- In Segment 4, existing structures of 11 miles of the Midway-Benton No. 1 and 10.8 miles of the adjacent Benton-Othello No. 1 transmission lines would be rebuilt in place to the Benton Substation.

The rebuilt line would total approximately 28.2 miles, which is about 0.3 mile longer than the existing ROW. Figures 2-2 and 2-3 are representative of the existing transmission lines ROWs within selected project segments.

The portions of the Proposed Action deviating from the existing Midway-Benton No. 1 transmission line ROW would be located entirely within the Hanford Site. For those rerouted portions of Midway-Benton No. 1 transmission line that would follow the DOE-RL ROW, the project centerline would typically be located approximately 112.5 feet from the DOE-RL transmission line's centerline. The Proposed Action's centerline would be offset approximately 75 feet south of the communication line. In all locations where the Proposed Action would deviate from the existing Midway-Benton No. 1 transmission line ROW, BPA would use a new 100-foot-wide ROW.

The Benton-Othello No. 1 transmission line rebuild portion of the Proposed Action would not deviate from its existing ROW.

Under the Proposed Action, approximately 0.8 mile of new transmission line, called the Scootney Tap transmission line, would extend from the existing Midway-Benton No. 1 transmission line ROW to the Proposed Action ROW. The proposed ROW along the Scootney Tap transmission line would be 100 feet wide.

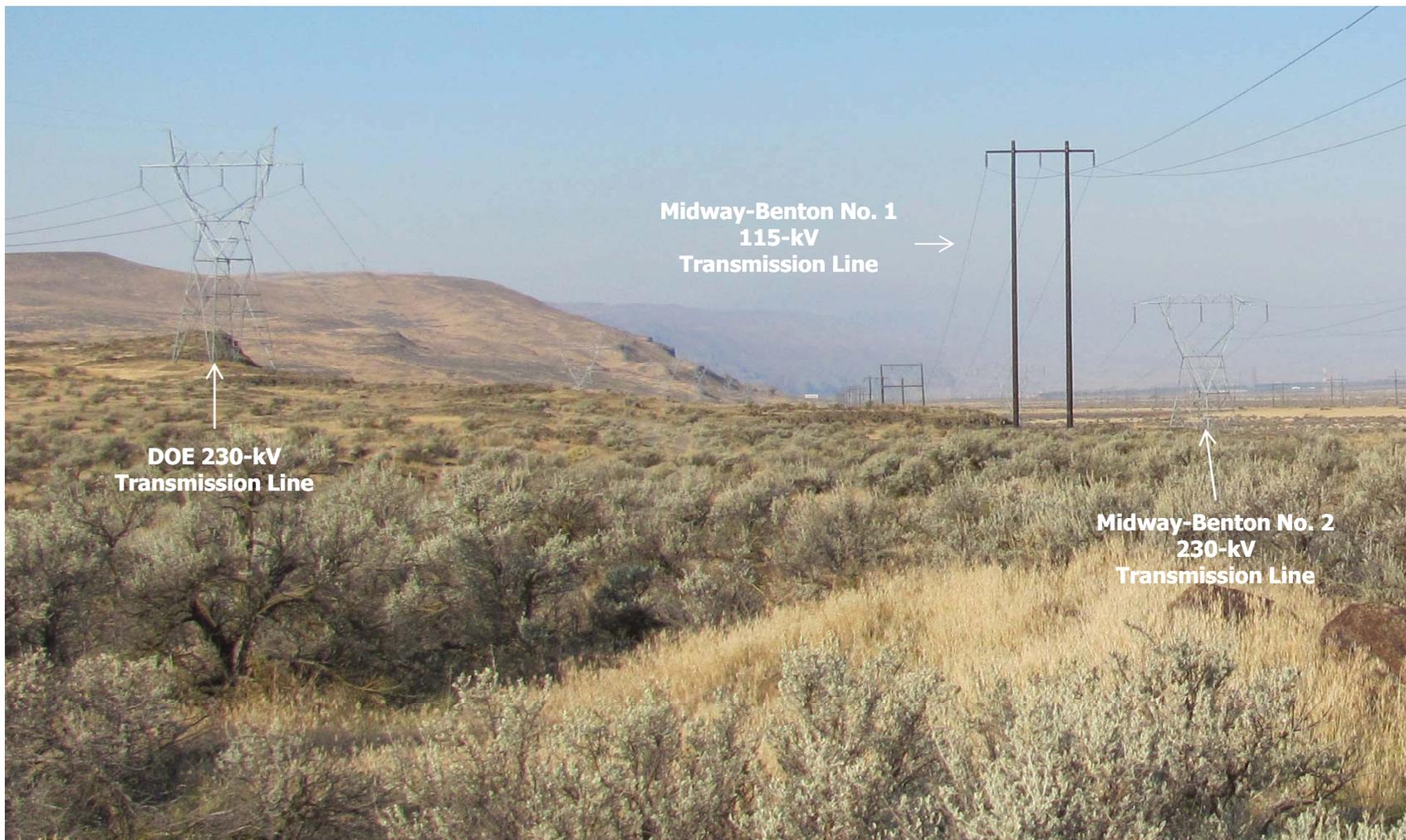


Figure 2-2. Existing Transmission Line Corridor

Looking Towards the Divergence of Segments 2 and 3

BPA Midway-Benton No. 1 and Benton-Othello No. 1 Transmission Line Rebuild





Figure 2-3. Existing Transmission Line Corridor

Segment 4

BPA Midway-Benton No. 1 and Benton-Othello No. 1 Transmission Line Rebuild



2.2.2 Access Roads

Most proposed locations for structure removal and installation are already accessible from existing roads, some of which were built specifically for BPA use while others were built by DOE-RL for use on the Hanford Site to access facilities and for other purposes. Approximately 2.8 miles of new access roads would be constructed within Segments 2 and 4 of the Proposed Action to provide suitable access for transmission line equipment. Approximately 31.1 miles of existing road improvements within Segments 1, 2 and 4 also would be required. Construction or improvement of access roads could involve vegetation clearing and grubbing; grading, shaping, and compacting road surfaces and turnouts; placing road base rock; and installing drainage and *erosion* control features. New access roads constructed and access road improvements made under the Proposed Action would remain during operation and maintenance. Most roads would be constructed to a finished width of 14 feet, although some areas could be wider to allow vehicles to negotiate road curves or bends. The analysis in this EA assumes a potential disturbance width of 20 feet.

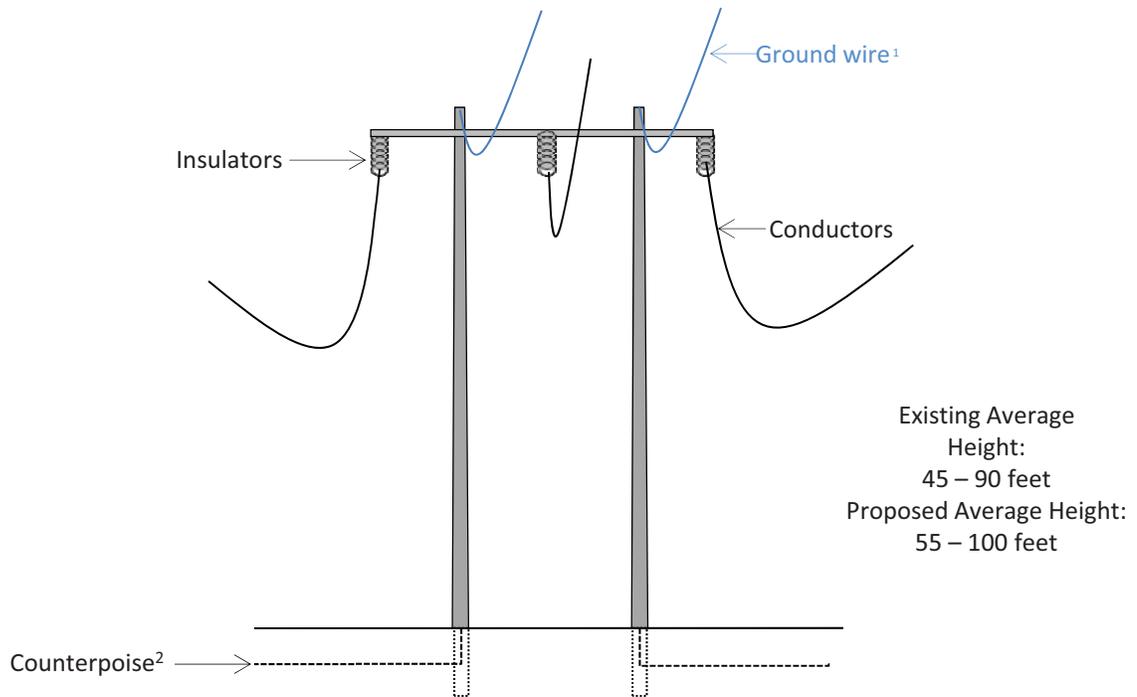
Two existing gates could be replaced along the access roads to discourage unauthorized access to the transmission line corridor.

Under the Proposed Action, BPA does not plan to improve existing access roads to remove structures in Segment 3 (including the Gable Butte and Gable Mountain areas). If road conditions deteriorate prior to or during construction, limited portions of the access roads may require rocking (laying down crushed rock to provide a stable driving surface). Because BPA would still maintain the Midway-Benton No. 2 transmission line in this segment, the existing access roads would be left in place and any rocking necessary due to road deterioration would remain for operation and maintenance.

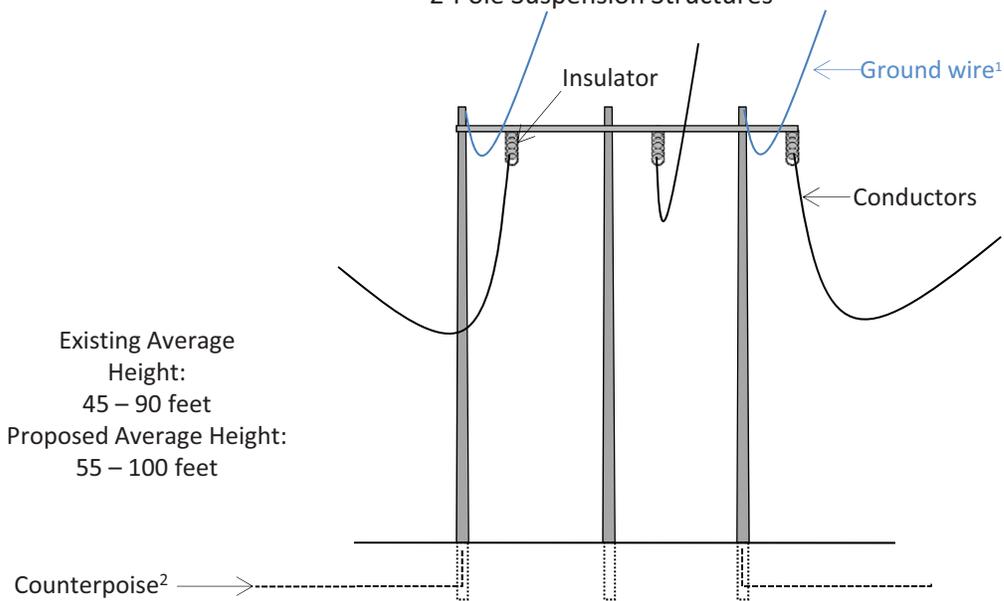
2.2.3 Transmission Line Structures

In general, the wood-pole structures would be replaced with structures of essentially the same design, either two-pole or three-pole structures, and with similar structural components (i.e., structure cross arms, *insulators*, and *dampers*). All new wood structures would have the same general appearance but would vary in size depending on their function. The heights of the new structures would be approximately 10 feet taller than existing structures, although structure heights at particular locations would depend on factors such as terrain and the length of the span. This increase in structure height would be required to maintain the minimum conductor to ground clearance standards. Due to the increased conductor size the transmission line would sag more, which would require an increased structure height.

For the Proposed Action, most of the replacement structures would be two-pole suspension structures (321), while 17 would be three-pole angle or dead end structures (see Table 2-1). Most of the proposed structures would be two-pole suspension structures (Figure 2-4), which are used in straight alignments or where turning angles between structures are generally less than 15 degrees. Only two poles are used because the structures do not need to withstand the stresses created by angles in the conductor.



Existing and Proposed
2-Pole Suspension Structures



Existing and Proposed
3-Pole Wood Dead-End and Angle
Structures

Notes:

1. Ground wire would be installed approximately 0.5 mile from each substation.
2. Counterpoise would be installed at structures where ground wire is present.

Figure 2-4. Existing and Proposed Wood Pole Structures

BPA Midway-Benton No. 1 Transmission Line Rebuild Project



Angle structures (Figure 2-4) would be located at points where the line changes direction, generally at angles of 15 degrees or greater. **Dead-end structures** (Figure 2-4) would be placed at intervals along the transmission line to independently carry the weight and tension of the conductors. Dead-end structures could be used on a straight alignment, at angles greater than 15 degrees, or on very long spans such as river crossings. The dead-end structures would be anchored using **guy wires** with steel plate **guy wire anchors** that would be installed underground to provide extra support and stability.

Conductors, Overhead Ground wire, and Counterpoise

Conductors

Alternating **current** transmission lines, like the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines, require three conductors to make a complete **circuit**. Insulators keep conductors a safe distance from other parts of the structure and prevent electricity in the conductors from moving to other conductors, the structure, or the ground.

The existing conductors on Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines do not meet current standards. The existing conductors on Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines are made from copper, and the hardware for this type of conductor is no longer available. The proposed conductors would be made of steel and would have a higher electrical **capacity** than the existing conductors.

The conductors on the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines would be removed and new ones would be attached using ceramic insulators. BPA proposes to replace the existing 0.65-inch-diameter conductors on each line with new, larger 0.95-inch-diameter conductors. The new conductors would be more reflective than the existing conductors for a few years after installation, until the wires naturally weather and dull.

Overhead Ground wire

Overhead 0.38-inch-diameter ground wire would be attached to the top of structures along the Midway-Benton No. 1 transmission line within 0.5 miles of each substation. Overhead ground wire is currently located along the Benton-Othello No. 1 transmission line within 0.5 miles of the Benton Substation and would be replaced. If a structure or overhead ground wire is struck by lightning, electricity is routed to the grounding down leads and/or counterpoise.

Counterpoise

A system of underground wires, or “counterpoise,” is attached to all structures where overhead ground wire is present for lightning protection. The wires are laid out within the ROW horizontally from each structure and buried in the ground. Typically, counterpoise is buried in a trench measuring approximately 30 inches deep by 24 inches wide by 15 feet to 100 feet long excavated by a small backhoe or trenching device.

Facilities Associated with Scootney Tap Transmission Line

The Scootney Tap transmission line currently connects to the Midway-Benton No. 1 transmission line. As part of the Proposed Action, BPA would extend the Scootney Tap Transmission Line to connect to the proposed rerouted portion of the Midway-Benton No. 1 transmission line. The

Scooteney Tap transmission line would be extended by 7 structures (0.8 mile) and connecting facilities (***disconnect switches, switch platforms***, and other connecting equipment) would be constructed at the new Midway-Benton No. 1 transmission line ROW. An approximately 200-foot by 100-foot area would be required for installation of three disconnect switches. The disconnect switches would sit on an approximately 20-foot-tall, four-legged platform. A 12-foot by 8-foot area would be occupied by the platform. An additional 4-foot by 12-foot platform would be installed at ground level for each disconnect switch.

2.2.4 Operation and Maintenance

Operation and maintenance of the rebuilt transmission lines would be essentially the same as is done now for the existing lines, though a portion of the routine operation and maintenance activities would occur in new ROW. The lines would continue to operate at 115 kV and BPA would conduct routine, periodic inspections and maintenance. A typical maintenance activity on wood structures is insulator replacement. Although emergency repairs may also be needed, the rebuilt line would likely require emergency maintenance less frequently and on a smaller scale than currently required.

2.2.5 Waste Management

Solid waste and fuels or oils generated during construction would be disposed of in accordance with federal, State, and local requirements. Removed transmission line components, including poles, conductors, and other hardware, would be staged in material yards within the Hanford Site. Components would be inspected for radiological contamination by DOE-RL. Upon notification that materials are free of contamination, the materials would be recycled or disposed of off-site. In the unlikely event that materials are found to be contaminated, BPA would coordinate with DOE-RL to identify the appropriate treatment and disposal methods.

2.2.6 Vegetation Management

Vegetation Management during Construction Activities

Due to the vegetation types present in the ***existing and proposed ROWs*** (e.g., sage brush [*Artemisia tridentata*], cheatgrass [*Bromus tectorum*]), large mowers or brush cutters (i.e., brush hogs) would be used to remove vegetation from access road prism, access road shoulders, and work areas during construction activities (see Section 2.4 for further description of workspace dimensions). These vegetation clearing activities would be limited to those areas (e.g., around structures, stringing areas, access roads) where construction equipment and vehicles would require access for construction. The entire ROW would not be cleared of vegetation. In some areas where a mower or brush cutter would not accomplish needed clearing due to vegetation type or topography, an excavator could be used to remove the smaller shrubs growing along or within the workspaces or access roads. Soil disturbance and removal would be minimized as much as possible during vegetation removal.

With the exception of permanent road surfaces and, potentially, the area around some structures where soil types or terrain would require the addition of rock, areas disturbed by construction activities would be reseeded with a native seed mix or a seed mix agreed upon with DOE-RL. The

original grade and drainage patterns in *sensitive areas* (i.e., areas containing sensitive vegetation or cultural resources) would be restored to the extent possible.

Vegetation Management during Operation and Maintenance

Vegetation would be cleared periodically during ongoing operation and maintenance to maintain access to structures, control noxious weeds, and keep vegetation at a safe distance from the conductors. Based on the extent of vegetation types within the existing and proposed ROWs, it is not anticipated that trees would need to be cleared. Depending on the height and location, some large, mature sagebrush may need to be removed to ensure safe operation of the transmission lines. Vegetation management would be guided by the program identified in BPA's *Transmission System Vegetation Management Program Final Environmental Impact Statement (FEIS) / Record of Decision (ROD)* (BPA 2000). The BPA vegetation management program includes ongoing consultation with landowners or land managers and others concerning vegetation management activities. As part of BPA's consultation with landowners and managers, BPA would also adhere to vegetation management measures outlined in the *Hanford Site Biological Resources Management Plan* (DOE-RL 2001) and the *DOE-RL Final Environmental Assessment for Integrated Vegetation Management of the Hanford Site, Richland, WA* (Integrated Vegetation Management EA) (DOE-RL 2011), as applicable. Vegetation management methods could include manual methods (e.g., hand pulling, clipping, and using chainsaws), mechanical methods (e.g., using roller-choppers and brush hogs), and/or chemical methods (herbicide use).

2.3 Rebuild-in-Place Alternative

2.3.1 Transmission Line Route and ROW

Under the Rebuild-in-Place Alternative, the existing transmission lines would be rebuilt in place in Segments 1, 3, and 4 (see Table 2-2). No work would occur in Segment 2. Specifically, under the Rebuild-in-Place Alternative, the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines would be rebuilt within existing ROWs and at the same general structure locations (see Table 2-1). The Rebuild-in-Place Alternative would remain adjacent to the existing Midway-Benton No. 2 transmission line. The existing ROWs are 100–300 feet wide, depending on location.

2.3.2 Access Roads

No new access roads would be required in Segments 1 or 3. As with the Proposed Action, approximately 1.3 miles of new access road would be constructed in Segment 4 and approximately 33.8 miles of existing access roads would require improvements in Segments 1 and 4. Unlike the Proposed Action, the Rebuild-in-Place Alternative would require 16.8 miles of access road improvements in Segment 3 along Gable Mountain and Gable Butte. Construction activities and equipment for improvement or construction would be the same as described for the Proposed Action. Road widths also would be the same as described for the Proposed Action, as well as the number of gates that would be installed.

2.3.3 Transmission Line Structures

The wood-pole structures that would be used for the Rebuild-in-Place Alternative would be the same type as described for the Proposed Action (see Section 2.2.3). For the Rebuild-in-Place Alternative, the existing wood structures would be replaced in-kind with structures of essentially the same design—two-pole or three-pole—and with the same structural components (see Section 2.2.3). Most of the replacement structures would be two-pole suspension structures (302), while eight would be three-pole angle or dead end structures (see Table 2-1).

Conductors, Overhead Ground wire, and Counterpoise

Conductors

As with the Proposed Action, existing conductors on the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines would be removed and replaced with new, larger 0.95-inch-diameter conductors and ceramic insulators for the Rebuild-in-Place Alternative.

Overhead Ground wire

Overhead ground wire would be attached to structures along the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines within 0.5 mile of the Midway and Benton substations for lightening protection (the same as the Proposed Action).

Counterpoise

Counterpoise installed under the Rebuild-in-Place Alternative would be the same as the Proposed Action.

Facilities Associated with the Scootney Tap Transmission Line

Under the Rebuild-in-Place Alternative, disconnects, switches, and associated facilities would be added where the Scootney Tap transmission line intersects the Midway-Benton No. 1 ROW. Three structures for the Scootney Tap transmission line would be replaced.

2.3.4 Operation and Maintenance

Operation and maintenance of the rebuilt transmission lines would be the same as is done now for the existing lines and would be the same as described for the Proposed Action (see Section 2.2.4).

2.3.5 Waste Management

Solid waste, fuels or oils, and structure components would be disposed in the same manner as described in Section 2.2.5. Waste would be disposed of in accordance with federal, State, local, and DOE-RL requirements.

2.3.6 Vegetation Management

Vegetation management during construction, operation, and maintenance would be the same as that described under the Proposed Action (see Section 2.2.6).

2.4 Construction Activities

The schedule for construction of the proposed project depends on the completion and outcome of the environmental review process. If one of the action alternatives is implemented, construction would likely begin in October 2012 with construction activities completed in April 2013. The general construction sequence for both action alternatives would first include removal of structures, conductors, ground wire, and counterpoise. This work would be followed by installation of structures and/or replacement of the existing transmission line along the Midway-Benton No. 1 transmission line ROW (see Figure 2-1). Replacement of structures along the Benton-Othello No. 1 transmission line would occur at the same time as the Midway-Benton No. 1 transmission line replacement.

2.4.1 Access Road Work

As described above, roadway improvements and reconstruction would be needed along both the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines. Road improvement and new construction work would occur prior to and during structure removal and replacement.

2.4.2 Establishment of Staging Areas

Staging areas would be used to store and stockpile new and removed materials as well as other construction-related equipment. The size of the staging areas would be based on the types of sites available for lease and the size needed to accommodate materials and equipment. Each staging area could be up to 10 acres in size. Staging areas would be established within 10 miles of the transmission line, if possible, to minimize travel. Staging areas are generally existing large, level, paved sites in commercial or industrial areas. At this time, BPA has identified seven potential staging areas located on the Hanford Site. All of the potential staging areas would be located in existing gravel extraction areas and previously disturbed areas.

If the construction contractor identifies additional potential staging areas prior to construction, BPA would complete required site-specific environmental reviews when the locations were determined. Typically, additional staging areas would be located in previously disturbed areas.

2.4.3 Removal of Existing Structures

The conductors and overhead ground wire would be removed by reeling the wires onto large spools using a large truck called a puller. The puller would be set up with empty reels to hold the old conductors as the conductors are reeled in. When removed, the old conductors would be inspected as required by DOE-RL for contamination and, if needed, treated, or delivered to a metal salvage location to be recycled.

In those areas where poles would not be replaced in the same location (i.e., Segment 3 under the Proposed Action), structure removal would involve removing the conductor and ground wire and then excavating around the structure base and either cutting the pole below ground level or fully removing the pole. Pole removal methods would be determined based on site-specific conditions and as discussed with DOE-RL, interested tribes, and other interested parties,

Full removal of existing structures would use a boom crane to pull the structures out of the ground. Removed poles would be hauled from the removal site using a line truck or helicopter. Some vegetation in the ROW might need to be cleared or mowed to allow equipment and machinery to access the structures (see Sections 2.2.6 and 2.3.6). No trees would be removed. If the structure is cut below ground level, a portion of the structure would remain in the ground. The pole would fall to the ground and the pole would be rolled to a flatbed truck, moved by a boom crane to a flatbed truck, or removed from the removal site via helicopter. For those structures containing guy wires, guy wires and anchors would either be fully removed or the guy wires would be cut slightly below the ground. All removed poles would be staged in material yards in Hanford and the removed poles would be inspected as required by DOE-RL for contamination and, if needed, treated or hauled off-site for disposal.

Structure removal would typically require a 50-foot by 50-foot area to stage equipment and conduct the pole cutting or pulling. Additional lands could be temporarily affected where the pole would be allowed to drop after being cut or pulled and would be dragged or rolled to nearby vehicles for removal, which could cause some additional vegetation disturbance.

Construction equipment used for removing and installing the wood structures and other structure components, as described further below, would include boom cranes, graders, line trucks, flatbed trucks, chainsaws, helicopter(s), augers (for drilling holes), backhoes, pullers, *tensioners*, mowers (roller-choppers), and brush cutters (brush hogs). All trucks and equipment would be restricted to operating within the access roads and work areas established for either the Proposed Action or the Rebuild-in-Place Alternative.

2.4.4 Installation of Replacement or New Structures

New wood structures would be brought to the structure sites from the staging areas by flatbed truck. Where new wood structures would be installed, the hole would be drilled with an auger to a depth of approximately 10 feet. Blasting could be required in some locations where bedrock is present. Blasting would not occur near sensitive cultural features or in wetlands.

In direct pole replacement locations (Segments 1 and 4 under both alternatives and Segment 3 under the Rebuild-in-Place Alternative), all wood structures would be replaced and the structure components (cross arms, insulators, and dampers) would be replaced. Wood structures would typically be installed in the same ground holes from which the existing structures were removed. The existing holes would be re-drilled to a depth of approximately 10 feet using an auger on a drill rig. In some locations, depending on site conditions, the hole might require shifting to a new location.



Photo 1: A wood structure being installed.

The new poles would be lifted by crane into position and placed into the holes (Photo 1), which would be backfilled with excavated material and gravel, as required. At most structure sites, any additional soil removed by the auger (Photo 2) that was not used for backfilling would be spread evenly around the structure base for stability. At structure sites in sensitive areas, such as in areas containing sensitive vegetation or cultural resources, the soil disturbed by the auger would be removed from the site and disposed of in an appropriate fill or waste disposal site.

If existing guy wires at a structure site needed to be replaced, a hole would be excavated at the guy wire anchor and the existing guy wire would be cut below ground level. Depending on the location, the underground guy wire anchor would be left in place or removed. Holes for any new guy wire anchors would be dug using a backhoe. A new guy wire anchor would be set in crushed rock, and the remainder of the guy wire anchor hole would be backfilled with material from the site.



Photo 2: An auger in use attached to a drill rig.

Most two-pole suspension structures could disturb an area up to 50 feet by 100 feet per structure (about 0.1 acre). The disturbance area for replacement or new installation of a three-pole structure could be approximately 100 feet by 100 feet (approximately 0.2 acre). Disturbance areas would be reduced to 50 feet by 50 feet (less than 0.1 acre), where possible, in sensitive areas. Staking or flagging would be installed in work areas to restrict vehicle and equipment access to designated routes and work areas.

2.4.5 Installation of Conductors, Ground wire, and Counterpoise

After structures are constructed, conductors would be strung between the structures and then pulled to the proper tension with a tensioner. The counterpoise wires and **ground rods** would then be installed. To string the conductor, a **sock line** (usually a rope) would be strung through all the structures. This would be done either by hand or using a helicopter. The sock line would be



Photo 3: A tensioner pulling conductor.

connected to a hard line (typically a small, stranded steel wire) that would be connected to the new conductor and pulled through the structures.

When in place, the new conductor would be tensioned and sagged in place and securely clipped into all the structures. The tensioner is a large piece of equipment with multiple reels through which a new conductor is fed to obtain proper tension (Photo 3). A pulling and tensioning site would be located about every 2 to 4 miles. The tensioner would occupy less than 0.1 acre (20-foot by 100-foot workspace).

The tensioner workspace would require mowing and may require light blading, depending on the terrain.

Pulling and tensioning of the proposed lines also may require *snubs*, which are wood poles buried in trenches about 8 feet deep by 4 feet wide by 12 feet long located in the ROW and connected to the end of the conductor to resist the tension on the conductor. After the conductor is pulled through the structures and before it is strung under tension, it is tied off on the snub. These trenches for the snubs would be backfilled after completion of construction. The appropriate locations for pulling sites and snubs would be determined by the construction contractor using environmental and land use information provided by BPA and sensitive areas would be avoided where practicable. If the pulling sites are identified outside of the ROW, additional surveys for cultural resources and/or flora and fauna would be conducted for those sites.

Counterpoise wire and ground rods would be installed. The counterpoise wires would be buried at the base of the structure, extending from the wood structures approximately 6 to 18 inches to the location where 0.6-inch-diameter ground rod would be installed. Ground rods typically measure 10 feet in length and would be placed entirely underground in a vertical orientation. The placement of counterpoise wires could be adjusted to avoid sensitive areas, if needed. The wires would be buried approximately 30 inches below the ground surface using a small backhoe. In areas where bedrock is at or near the ground surface, the wires would be laid on the surface and buried with loose aggregate.

2.4.6 Installation of Facilities Associated with the Scootney Tap Transmission Line

BPA would install disconnect switches within the rerouted (Proposed Action) or existing (Rebuild-in-Place Alternative) Midway-Benton No. 1 transmission line ROW to connect the new conductor to the Scootney Tap transmission line.

2.5 No Action Alternative

Under the No Action Alternative, BPA would not rebuild transmission lines and would continue to operate and maintain the existing Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines. Construction activities associated with the Proposed Action or Rebuild-in-Place Alternative would not occur. It is reasonable to expect that as the line structures continue to fail intermittently, the ability of BPA to provide reliable electric service to its customers in the area would be adversely affected and the same safety concerns that prompted the Proposed Action or the Rebuild-in-Place Alternative would persist.

ROW vegetation management would continue under the No Action Alternative. Further, BPA would continue to attempt to maintain the existing lines as their aged and rotting wood structures and cross arms further deteriorate. Because of the condition of lines, it is likely that the No Action Alternative would result in more frequent and more disruptive maintenance activities within the corridor than under the Proposed Action or Rebuild-in-Place Alternative. It might be possible to plan some of this maintenance, but it is expected that the majority of repairs would occur on an emergency basis as various parts of the line continue to deteriorate. Access road improvements or

construction may be required under the No Action Alternative to allow access to the structures for these planned and unplanned maintenance activities. These activities could impact vegetation, wildlife, and soils from emergency repair activities, and any downed lines resulting from structure failures would have a high potential for causing fires in the vicinity of the downed line.

2.6 Alternatives Considered but Eliminated from Detailed Study

Several tribes, including the CTUIR, Nez Perce Tribe, and Confederated Tribes of the Colville Reservation requested that both the Midway-Benton No. 1 and Midway-Benton No. 2 transmission lines be relocated away from Gable Mountain and Gable Butte. As described above, BPA has proposed under the Proposed Action to remove the portion of the Midway-Benton No. 1 transmission line that crosses over or is adjacent to Gable Mountain and Gable Butte. The Midway-Benton No. 2 transmission line is a 230-kV steel lattice line that was constructed in the 1970s. As such, the Midway-Benton No. 2 transmission line is still within the normal operational life span and is not in need of replacement. While BPA recognizes the sacredness of Gable Mountain, as described further in Section 3.8, the relocation of Midway-Benton No. 2 transmission line while it is still operational would result in increased costs for BPA and its customers. Further, relocation may result in transferring impacts of the transmission line to other sensitive resources in the general area. The relocation of Midway-Benton No. 2 transmission line is outside of the scope of this EA and would not meet the need or purposes discussed in Chapter 1 (see Sections 1.2 and 1.3). As such, BPA does not propose to relocate the Midway-Benton No. 2 transmission line at this time.

2.7 Comparison of Alternatives

Table 2-3 summarizes the purposes of the Proposed Action (see Sections 1. 3) and compares the potential for the Proposed Action, Rebuild-in-Place Alternative, and No Action Alternative to meet those purposes. A detailed analysis of the environmental impacts of the Proposed Action, Rebuild-in-Place Alternative, and No Action Alternative is presented in Chapter 3 and is summarized in Table 2-4.

Table 2-3. Comparison of the Action Alternatives and No Action Alternative

Purpose	Action Alternatives		No Action Alternative
	Proposed Action (Reroute Alternative)	Rebuild-in-Place Alternative	
Meet transmission system public safety and reliability standards set by the NESC	Rebuilt transmission lines would continue to operate at 115 kV. The rebuilt lines would improve reliability by reducing scheduled and emergency repairs (and outages). Improved access roads would allow quicker response to make emergency repairs.	Same as Proposed Action	While the existing transmission lines would continue to operate at 115 kV, risks of outages for repairs and maintenance due to outdated and physically worn structures and associated equipment would continue to increase. Emergency response times could be increased by access roads that are in poor condition.
Continue to meet BPA's contractual and statutory obligations	Improvements in the reliability of the rebuilt transmission lines would allow BPA to meet its contractual and statutory obligations to deliver power to its customers in eastern Washington.	Same as Proposed Action.	Existing lines would continue to deteriorate and threaten system reliability and subsequent power delivery.
Minimize environmental impacts	The rerouted segment (Segment 3) would move the Midway-Benton No. 1 transmission line away from Gable Mountain and Gable Butte. The rerouted segment would follow existing utility corridors to minimize impacts from access roads but would require construction of structures and access road improvements within late-successional shrub-steppe habitats. Construction-related environmental impacts would be minimized through appropriate use of Best Management Practices (BMPs) and mitigation measures described for each resource area in Chapter 3 (Sections 3.2 to 3.11).	The Rebuild-in-Place Alternative would result in lower overall disturbance to late-successional shrub-steppe plant communities, compared to the Proposed Action, due to the smaller area of disturbance. However, the continued presence of the Midway-Benton No. 1 transmission line on and near Gable Mountain and Gable Butte would have long-term impacts on cultural resources. Construction-related environmental impacts would be minimized through appropriate use of BMPs and mitigation measures as described for each resource area in Chapter 3 (Sections 3.2 to 3.11).	There would be no construction-related environmental impacts, but maintenance impacts would increase as existing structures and roads deteriorate and require additional maintenance. Impacts could occur during emergency maintenance without the benefit of planned environmental review and mitigation. Emergency repairs could impact cultural resources, vegetation, wildlife, soils, and other resources, and any downed lines resulting from structure failures would have a high potential for causing fires in the vicinity of the downed lines.
Demonstrate technical and economic feasibility and practicality	The Proposed Action would be technically feasible and total project costs would be about \$13.1 million. Over the long term, the Proposed Action would reduce maintenance costs.	The Rebuild-in-Place Alternative would be technically feasible and total project costs would be comparable to the Proposed Action costs. Over the long term, this Rebuild-in-Place Alternative would reduce maintenance costs.	Low short-term construction cost, but increased maintenance costs, which, over time, could be higher than under the action alternatives.

Table 2-4. Summary of Impacts of the Proposed Action, Rebuild-in-Place Alternative, and No Action Alternatives

Environmental Category	Proposed Action Reroute Alternative)	Rebuild-in-Place Alternative	No Action Alternative
Land Use and Transportation	<p>No direct conflicts with land use plans and policies would occur. Segments would be located within or adjacent to existing utility corridors. A minor increase in the size of utility corridor would occur in Segment 2 (typically a 100 foot increase). Segments 1 and 4 would not increase the utility corridor width. Fewer acres of Preservation land use designations (lands managed to preserve archeological, cultural, ecological, and natural resources) would be impacted over the long term (after restoration of Segment 3), but more acres of Conservation land use designations lands managed to protect archaeological, cultural, ecological, and natural resources) would be impacted by the ROWs and access roads over the short and long terms. Construction traffic interference with Hanford Site roads would be temporary. As the project area and the Hanford Site are closed to the public, the Proposed Action would have no direct or indirect impact on residential, recreation, or agricultural lands. Overall, impacts to land use and transportation would be low.</p>	<p>No direct conflicts with land use plans and policies would occur. Segments would be located within existing utility corridors. No Preservation land use designations in existing ROWs would be abandoned and restored. Same traffic impacts as the Proposed Action. Overall impacts to land use and transportation would be low.</p>	<p>The lines would continue to be operated and maintained in the same manner. As the structure deteriorates, increased maintenance activities and the resulting impact on various resources, such as vegetation, wildlife, etc. in the Preservation and Conservation land use designations (compared with the Action Alternatives) would increase as would intermittent traffic delays over the long-term. Impacts would be low.</p>
Geology and Soils	<p>Geology and soils would be disturbed during clearing, grading, and vegetation clearing. Due to the dry, hot conditions and fine-grained and sandy soils, soils in the Proposed Action vicinity are prone to wind erosion and revegetation can be difficult. Overall, impacts to geology and soils would be low to moderate.</p>	<p>Same as the Proposed Action. Overall, impacts to geology and soils would be low to moderate.</p>	<p>Initial construction disturbance would not occur, but long-term disturbance to geology and soils would increase due to increased maintenance and emergency repairs. Impacts would be low.</p>

Table 2-4. Summary of Impacts of the Proposed Action, Rebuild-in-Place Alternative, and No Action Alternatives (continued)

Environmental Category	Proposed Action Reroute Alternative)	Rebuild-in-Place Alternative	No Action Alternative
Vegetation	Vegetation, including some sensitive plant species, may be directly or indirectly impacted through clearing, crushing, and soil disturbance during construction. Soil disturbance may result in the introduction or spread of noxious weeds and invasive plants. Impacts would be <i>low to moderate</i> .	Same types of impacts as the Proposed Action, though less vegetation would be disturbed. Impacts would be <i>low to moderate</i> .	Initial construction disturbance would not occur, but increased long-term disturbance to vegetation would result from increased intermittent maintenance and emergency repairs required by aging structures and components. Impacts would be <i>low</i> .
Wildlife	Disturbance of ferruginous hawks and other migratory birds would be avoided through site-specific timing restrictions (March 1 through August 1) and buffers (0.6 mile) around identified hawk nests. Vegetation clearing is proposed outside of the migratory bird breeding season. Temporary and permanent disturbance to late-successional shrub-steppe would directly reduce the local <i>carrying capacity</i> for shrub-steppe-dependent species. Impacts would be <i>low to moderate</i> .	Same types of impacts as the Proposed Action, though less habitat would be disturbed during construction. Impacts would be <i>low to moderate</i> .	Impacts would be <i>low</i> and limited to periodic disturbance due to increased maintenance and repairs required by aging structures and components. Initial loss of shrub-steppe would not occur, but increased long-term habitat disturbance may occur due to increased intermittent maintenance and emergency repairs required by aging structures and components.
Water Resources	The project area contains no wetlands, streams, vernal pools, or other surface waters. The closest point to the Columbia River (at the Benton Substation) is 1,650 feet (0.3-mile). With the use of BMPs, construction impacts at the Benton Substation should have no impacts on the Columbia River or any other waterbodies.	Same as Proposed Action.	Same as Proposed Action.
Visual Quality	Views would be improved within traditional cultural properties (TCPs) associated with Gable Butte and Gable Mountain. Low sensitivity viewers, such as Hanford commuters and workers, would view changes associated with new structures and conductors. Impacts would be <i>low</i> .	Views would remain similar to existing conditions within TCPs associated with Gable Butte and Gable Mountain, with potentially increased visibility due to new conductors and taller structures. Impacts would be <i>low to moderate</i> .	Impacts would be limited to construction equipment and crews associated with the increased intermittent maintenance and emergency repairs required by aging structures and components. Impacts would be <i>low</i> .

Table 2-4. Summary of Impacts of the Proposed Action, Rebuild-in-Place Alternative, and No Action Alternatives (continued)

Environmental Category	Proposed Action Reroute Alternative)	Rebuild-in-Place Alternative	No Action Alternative
Cultural Resources	Beneficial impacts would result from removing structures from the Gable Butte and Gable Mountain areas. Direct impacts to cultural resources may result from possible disturbance of previously unrecorded cultural resources during construction, Operation, or maintenance activities. Impacts would be low to moderate after appropriate mitigation.	The continued presence of the Midway-Benton No. 1 transmission line would continue to impact the Gable Mountain and Gable Butte TCPs. As with the Proposed Action, direct impacts to cultural resources from possible disturbance of previously unrecorded cultural resources during construction, operation, or maintenance activities could occur. Impacts would be moderate to high , though the implementation of mitigation measures under the National Historic Preservation Act would reduce these impacts to a moderate level.	The presence of the Midway-Benton No. 1 transmission line would continue to impact the Gable Mountain and Gable Butte TCPs. Potential ground disturbance from increased maintenance and repairs would potentially affect previously unrecorded cultural resources. Impacts would be low to moderate .
Socioeconomics, Environmental Justice, and Public Services	Minor positive impacts on local economy from the construction project are expected. No effect on low-income or minority populations. Impacts would be low .	Same as Proposed Action.	Impacts would be low , with no temporary increase in employment and spending during construction.
Air Quality and Climate Change	Construction impacts would be temporary exhaust and dust emissions. Dust may continue to be generated after construction due to dry, windy conditions, fine-grained soils, and difficulties in reestablishing vegetation cover. Impacts would be low to moderate to air quality. Direct impacts from greenhouse gas (GHG) emissions from construction equipment and increased worker traffic, continued operations and maintenance, and vegetation removal would be low .	Same construction emissions air quality impacts as the Proposed Action. Dust may be reduced, compared to the Proposed Action as less soil disturbance would occur. Impacts would be low to moderate to air quality. GHG emissions would be the same as the Proposed Action.	Maintenance activities would likely increase resulting in increased dust and GHG emissions. However impacts would be low because traffic and disturbance would be intermittent.

Table 2-4. Summary of Impacts of the Proposed Action, Rebuild-in-Place Alternative, and No Action Alternatives (continued)

Environmental Category	Proposed Action Reroute Alternative)	Rebuild-in-Place Alternative	No Action Alternative
Noise	Temporary noise impacts from construction equipment, truck traffic, and occasional use of helicopters would occur. Transmission line <i>corona</i> noise impacts would remain about the same as the existing line. Impacts would be <i>low</i> .	Same as Proposed Action.	Impacts would be <i>low</i> and limited to traffic and disturbance from increased intermittent maintenance and emergency repairs required by aging structures and components.
Public Health and Safety	There would be no increases in <i>electromagnetic field</i> (EMF) exposures during operation and maintenance. Maximum EMF at the edges of the ROW would be similar to existing field levels. Impacts would be <i>low</i> .	Same as Proposed Action.	Impacts would be <i>low to moderate</i> due to aging transmission system that could reduce system safety.

Chapter 3

Affected Environment, Environmental Consequences, and Mitigation Measures

3.1 Introduction

This chapter includes an analysis of the potential impacts of the Proposed Action, Rebuild-in-Place Alternative, and the No Action Alternative on the human and natural environment. Each section of this chapter includes a description of the potentially affected environment for a specific resource, an analysis of the impacts on that resource, and the mitigation measures that would reduce those impacts.

To identify potential impacts on a resource area, a specific physical area must be studied. In this EA, this is referred to as the study area. The term project area is also used in this EA and is used to describe the area in the immediate vicinity of the project alternatives. For some resources, the study area includes locations where direct physical impacts could occur as a result of the project and is the same as or very similar to the project area. However, because the project may result in impacts on resources that are geographically removed from the project area (e.g., airborne emissions may result in measurable air pollution miles downwind from a project location), the study area for some resources may be larger and removed from the immediate project area. Unless otherwise specified, the study area for the analysis includes the existing ROW, the access road and travel route system that extends off the ROW, and any adjacent properties that could be affected by the project alternatives. The location of potentially affected resources may be identified by transmission line structure number, project segment, and local landmarks (see Figure 2-1).

Direct, indirect, and cumulative impacts are considered. Direct impacts are those that would occur as a direct result of project construction. Indirect impacts are those that are caused by the proposed project, but would occur later in time and/or further away in distance. Cumulative impacts are impacts that could occur when the alternatives are considered along with other past, present, and reasonably foreseeable future actions. Other such actions within the project vicinity, including actions being conducted or proposed by BPA in addition to this proposed Rebuild Project, that are considered in the cumulative impact analysis are identified and discussed in Appendix A.

To evaluate the impacts associated with construction and operation and maintenance of the proposed project, the impact levels were characterized as high, moderate, low, or no impact. In addition, beneficial impacts are noted where applicable.

Chapter 3
Affected Environment, Environmental Consequences, and Mitigation Measures

Each resource section includes the following primary subsections:

- Affected Environment
- Environmental Consequences—Proposed Action
- Environmental Consequences—Rebuild-in-Place Alternative
- Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative
- Unavoidable Impacts Remaining After Mitigation—Proposed Action and Rebuild-in-Place Alternative
- Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative
- Environmental Consequences—No Action Alternative

3.2 Land Use and Transportation

3.2.1 Affected Environment

The study area for land use and transportation includes the ROWs, the access roads, and any adjacent lands that could be affected by the Proposed Action or Rebuild-in-Place. Both the Proposed Action and Rebuild-in-Place Alternative would be located entirely on the Hanford Site, a 586-square-mile federal reserve managed by the DOE-RL. Approximately 300 square miles of the Hanford Site is designated as the Hanford Reach National Monument, managed jointly by the USFWS and DOE-RL. The Midway Substation and the first approximately 2.7 miles of the Midway-Benton No. 1 transmission line leading from the substation are within the Rattlesnake Unit of the national monument. Approximately 2.5 miles of the Midway-Benton No. 1 and the Benton-Othello No. 1 transmission lines are within the Columbia River Corridor Unit of the national monument, and the remaining portions of the existing and proposed ROWs, including all of Segments 2 and 3², are outside of the Hanford Reach National Monument (see Figure 2-1).

DOE-RL administers land use agreements on all Hanford Site lands, including Hanford Reach National Monument lands, and is the primary land use authority for amending or approving land use agreements required for BPA's Proposed Action, the Rebuild-in-Place Alternative, or the No Action Alternative. DOE-RL administers such agreements through the *Hanford Comprehensive Land Use Plan* (DOE-RL 1999, 2008), the *Hanford Reach National Monument Comprehensive Conservation Plan* (USFWS 2008), and associated planning documents.

The *Hanford Reach National Monument Comprehensive Conservation Plan* provides guidance for management of the national monument consistent with the Presidential Proclamation that established the monument (Code of Federal Regulations [CFR], 3 CFR 7319—Proclamation 7319 of June 9, 2000). The proclamation allows for the continued operation and maintenance of existing utilities, including replacement, modification, expansion, or construction of new facilities “consistent with proper care and management of the objects” of the national monument, which includes natural and cultural resources.

The *Hanford Comprehensive Land Use Plan* provides guidance for future use of the site's lands and resources (DOE-RL 1999). Appendix B contains a complete list of polices and their applicability to the Proposed Action, the Rebuild-in-Place Alternative, and No Action Alternative. The study area includes three land use designations specified in the *Hanford Comprehensive Land Use Plan*: Conservation (Mining), Preservation, and Industrial (Figure 3.2-1). Most of the study area is designated Conservation, as is most of the Hanford Site outside of the Hanford Reach National Monument. Lands under this designation are managed to protect archaeological, cultural, ecological, and natural resources, with limited public access. Mining (e.g., quarrying for sand, gravel, **basalt**, and topsoil for governmental purposes) is allowed as a special use within appropriate areas in the Conservation areas.

² Segment 2 is the proposed (reroute) center segment and Segment 3 is the existing center segment. See Figure 2-1 for the locations of the four segments evaluated as part of the Proposed Action and Rebuild-in-Place Alternative.

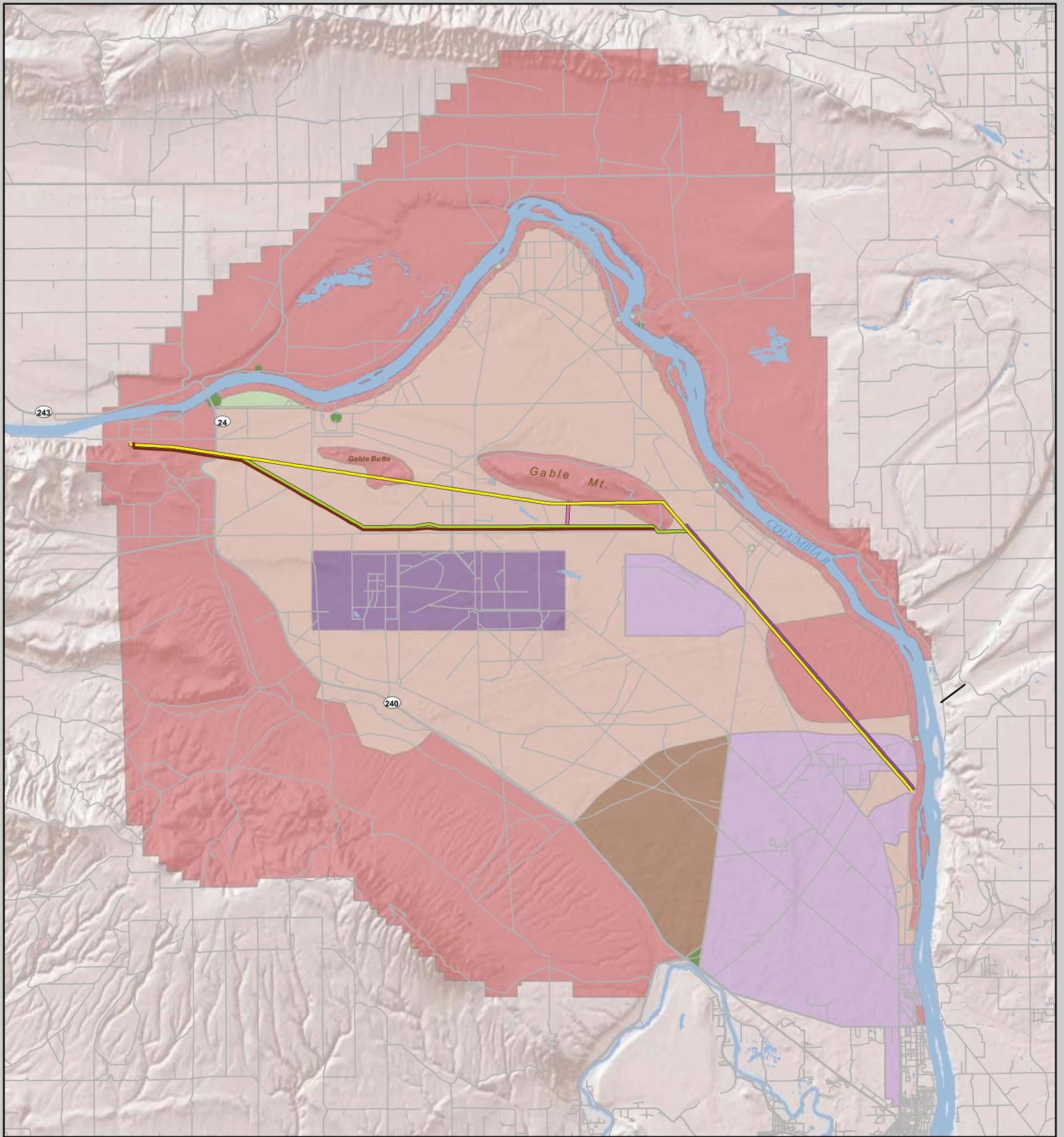


Figure 3.2-1 Land Use Designations

Land Use Designation

- Conservation (Mining)
- Industrial
- Industrial (Exclusive)
- Preservation
- Recreation (High Intensity)
- Recreation (Low Intensity)
- Research & Development
- River

- Existing Midway-Benton No. 1 Line
- Proposed Action Midway-Benton No. 1 Line Reroute
- Proposed Action Scooteney Tap Line Extension
- Existing Benton-Othello No. 1 Line
- DOE 230kV Transmission Line
- Roads



0 2.5 5 10 Miles 1 in = 4 miles

Preservation areas receive a higher level of protection and are managed to *preserve* (rather than *protect*, as is stated under Conservation designation) archaeological, cultural, ecological, and natural resources with limited public access. No new consumptive uses (e.g., mining) are allowed. All national monument lands in Segments 1 and 4 fall under this designation. In addition, Segment 3 crosses 3.1 miles of lands designated Preservation within the Gable Butte and Gable Mountain areas. Segment 2 does not cross any lands designated as Preservation.

Lands designated Industrial are managed to support activities such as nuclear reactor operations, rail, barge transport facilities, mining, manufacturing, food processing, assembly, warehouse, distribution operations, and related activities consistent with industrial uses. The only lands designated Industrial within the existing and proposed ROWs are 1.9 miles of Segment 4.

Land Uses

The entire study area is located within the Hanford Site and, except for the crossing of State Route (SR) 24, is closed to public use. The primary uses within the study area are natural resource and cultural conservation and preservation, with expansive areas of undeveloped land designated for these uses. These lands are crossed by a network of DOE-RL highways and roads, high-voltage electric transmission lines, and distribution lines providing power to widely dispersed industrial facilities (DOE-RL 2009a).

The existing and proposed ROWs are located within or adjacent to existing utility corridors. With the exception of three paved roads that would be crossed by the Proposed Action and one paved road that would be crossed by the Rebuild-in-Place Alternative, the study area is located on undeveloped land with no active uses.

Transportation

Two state highways cross through the Hanford Site. SR 240 travels north from Richland, Washington, and terminates at SR 24, a two-lane State highway that continues east to Yakima, Washington, and north to Vantage, Washington. The Midway-Benton No. 1 transmission line crosses SR 24 along Segment 1.

Segment 2 would parallel approximately 1,000 feet north of Route 11A, a major four-lane arterial that travels due east from the Yakima Barricade approximately 15-miles, where it connects to Route 2 South, a four-lane road that extends 6 miles south to the Wye Barricade entrance. Both Segments 2 and 3 cross Route 11A near its eastern terminus with Route 2 South. These two segments also cross Route 4 North, a two-lane, paved arterial between the 100 Area and the 200 Area.

Almost all vehicular traffic on Hanford Site Routes 11A and 4 North are commuters in vehicles or workers driving heavy equipment and trucks. The number and intensity of commute and work trips on the site's limited road infrastructure is currently at or above carrying capacity (Transportation Solutions 2010). In 2010, approximately 700 vehicles accessed the site through Yakima Barricade each day, which is closest to the project area. Further, 1,800 vehicles accessed the site through the Rattlesnake Barricade, and 5,280 accessed the site through the Wye Barricade. Peak-hour traffic backups are common near the Wye and Rattlesnake Barricade.

3.2.2 Environmental Consequences—Proposed Action (Reroute Alternative)

Land Uses

The portions of the Proposed Action ROWs located on Hanford Reach National Monument lands (portions of Segments 1 and 4) would be rebuilt in the same locations, with no change in land use. Transmission lines and facilities that were in place when the national monument was established were designated in the *Hanford Reach National Monument Comprehensive Conservation Plan* as allowable uses (USFWS 2008). Maintaining and rebuilding such facilities is also allowed (USFWS 2008).

While the Proposed Action would result in a net increase in lands occupied by the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines by approximately 0.3 additional mile of transmission line ROW (28 additional wood-pole structures) and 2.8 additional mile of access road, there would be a net decrease in occupied land designated as Preservation. Segment 3, which would be removed under the Proposed Action, crosses approximately 4.2 miles of lands designated Preservation and 10 miles of land designated as Conservation/Mining. The 4.2 miles of line crossing Preservation lands would be removed from utility corridor use and restored to a condition similar to the surrounding landscape resulting in the net decrease. This allows the Proposed Action to be consistent with the underlying *Hanford Comprehensive Land Use Plan* designations. The new ROW for Segment 2 would be located entirely within land designated as Conservation/Mining.

Because the Proposed Action would result in 0.3 additional mile of ROW, would be located within and adjacent to existing utility corridors, and would have less impact on preservation lands, impacts on existing and future land uses would be **low**. Appendix B includes a summary table that displays the consistency of the Proposed Action with existing land uses.

Transportation

The Proposed Action may result in a short-term, **low** impact to transportation resources from construction-generated traffic. Increased traffic on local roadways and periodic short-term road closures (typically 10 minutes) would occur during construction. During peak project construction, approximately 40 vehicles and heavy equipment separated among four or five work crews would be in use along the existing and proposed ROWs. Most construction would occur away from Hanford Site paved roads and would affect traffic only when crews travel between work areas. The increase in construction-related traffic would represent a **low** increase in daily traffic volume when compared to the reported traffic volumes for the roads in the study area (a peak of 40 project construction vehicles compared to the 7,780 vehicles typically entering the Hanford Site daily).

Construction traffic could delay traffic within the Hanford Site as construction equipment and workers enter and leave access roads from various turnouts along SR 24, Route 4 North, and Route 11A. Project construction would also require temporary road closures where transmission lines would cross over Route 11A, SR 24, and Route 4 North. Such closures would be expected to occur only during removal and installation of conductors, which would occur over a short time period (typically limited to approximately 10 minutes in duration). Assuming this work is not conducted during peak morning or afternoon traffic, traffic delay impacts caused by the temporary road closures would be **low**. Potential conflicts with Hanford Site traffic and safety would be addressed

through implementation of mitigation measures identified in Section 3.2.4 that require BPA and its contractors to coordinate and plan with DOE-RL to minimize disruptions to traffic and safety hazards.

Operation and maintenance activities would be the same as those currently conducted on existing lines. No additional operation and maintenance-related traffic is expected on highways and local roads from the Proposed Action resulting in a **low** impact to transportation.

3.2.3 Environmental Consequences—Rebuild-in-Place Alternative

Land Uses

As with the Proposed Action, portions of the Rebuild-in-Place Alternative located on Hanford Reach National Monument lands (portions of Segments 1 and 4) would be rebuilt in the same locations, with no change in land use. Since these lines and facilities were in place when the national monument was established, they are allowable uses (see Section 3.2.2). For Segment 3 and portions of Segments 1 and 4, Hanford's *Hanford Comprehensive Land Use Plan* specifies that existing utility corridors are "not considered nonconforming uses" within any land designation, including Preservation. Therefore, rebuilding the existing Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines in their existing ROWs is consistent with both the *Hanford Reach National Monument Comprehensive Conservation Plan* and the *Hanford Comprehensive Land Use Plan* and would not involve any change in land use. The structures that would be moved would be shifted only a few feet from existing locations within existing ROWs resulting in **no** impact on existing and future land uses.

As described in Section 3.2.1, the primary land uses in the project area, as defined by *Hanford Comprehensive Land Use Plan* policies, are for management and preservation of archaeological, cultural, ecological, and natural resources. While rebuilding the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines in place would not result in impacts to land use and would be consistent with the *Hanford Comprehensive Land Use Plan* as the lines would be located in an existing ROW, long-term impacts on cultural resources associated with Gable Mountain and Gable Butte in the preservation land use designation would continue (see Section 3.8).

Transportation

The Rebuild-in-Place Alternative would cause the same construction traffic-related impacts as the Proposed Action (short-term and **low**), with approximately 40 vehicles and construction equipment deployed along the existing ROW during the peak of construction. Compared to the current traffic numbers on Hanford, 40 additional trips would have a **low** impact on traffic congestion in the study area (see Section 3.2.2).

Construction traffic would use the same access points at various turnouts from SR 24, Route 4 North, and Route 11A as the Proposed Action. Project construction would also require temporary road closures at the same line crossings over Route 11A, SR 24, and Route 4 North as the Proposed Action. Assuming this work is not conducted during peak morning or afternoon traffic, traffic delay impacts caused by the temporary closures would be **low**. Potential conflicts with Hanford Site traffic and safety would be addressed through implementation of mitigation measures identified in Section 3.2.4.

Operation and maintenance activities would be to the same as those currently conducted on existing lines and as discussed under the Proposed Action resulting in a **low** impact to transportation (see Section 3.2.2).

3.2.4 Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative

If the Proposed Action or Rebuild-in-Place Alternative is implemented, the following mitigation measures would minimize impacts on land use and transportation:

- Reduce access road widths to 14-foot-wide, or less, the extent possible.
- Revegetate disturbed areas, with native seeds and plants, after the conclusion of construction, with the exception of those areas required to remain clear of vegetation to ensure the safety of the transmission line and access to the structures and in previously-cleared staging areas.
- Keep construction activities and equipment clear of DOE-RL access roads, to the extent possible.
- Use water trucks or other measures to minimize fugitive dust during project construction.
- Coordinate the routing and scheduling of construction traffic with DOE-RL staff.
- Publicize road closures and traffic delays to minimize impacts to traffic.
- Employ traffic-control flaggers and post signs warning of construction activity and merging traffic, when necessary, for short interruptions of traffic.

3.2.5 Unavoidable Impacts Remaining After Mitigation—Proposed Action and Rebuild-in-Place Alternative

During construction, potential unavoidable impacts from the Proposed Action and Rebuild-in-Place Alternative could consist of minor delays and interruptions to local traffic in the study area including temporary road closures at line crossings over Route 11A, SR 24, and Route 4 North. Potential conflicts with Hanford Site traffic and safety would be addressed through use of mitigation measures identified in Section 3.2.4. Most of these short-term construction impacts would cease once construction was completed and are considered to be **low**.

3.2.6 Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative

The region of influence considered for cumulative impacts on land use is the Hanford Site. As discussed in Appendix A, reasonably foreseeable future projects in the vicinity of the Proposed Action and Rebuild-in-Place Alternative include the Midway-Moxee Rebuild Project, BPA's vegetation maintenance activities, the Midway-Benton No. 2 Fiber Replacement Project, and multiple Hanford Site cleanup and land management activities.

The Midway-Moxee Rebuild Project and the Midway-Benton No. 2 Fiber Replacement Project are in the planning phase and will proceed independently of the Midway-Benton No. 1 Transmission Line Rebuild Project. Neither the Midway-Moxee No. 1 Rebuild Project nor the Midway-Benton No. 2 Fiber Replacement Project require that actions associated with the Midway-Benton No. 1 Transmission Line Rebuild Project be taken previously or simultaneously and it would not occur in the same ROW or timeframe as the Proposed Action or Rebuild-in-Place Alternative.

BPA vegetation management activities may take place within existing, non-project BPA transmission lines that cross the Hanford Site. Vegetation management activities are not likely to occur within the same timeframe as the Proposed Action or the Rebuild-in-Place Alternative.

Hanford Site cleanup and land management activities, such as waste storage and cleanup activities or habitat restoration, would not take place within the project ROWs, but some actions may occur within the same general timeframe.

Land Uses

Future land use actions occurring on Hanford would be managed through the various land management plans for the Hanford Site. Land use changes from future BPA projects, such as the Midway-Moxee No. 1 Rebuild and the Midway-Benton No. 2 Fiber Replacement Projects, in addition to the proposed project also would be consistent with the overall Hanford land management plans resulting in a **low** cumulative impact to land use.

Transportation

Implementation of the reasonably foreseeable future projects would involve work crews traveling to and from the sites, and material and equipment deliveries. This would result in short-term increases in local traffic and periodic short-term road closures. As noted above, the reasonably foreseeable future BPA and Hanford projects would occur in different timeframes and, as a result, localized impacts to traffic would likely occur in specific locations at different times. The Proposed Action and Rebuild-in-Place Alternative would add incrementally to short-term cumulative transportation impacts but would represent a **low** increase in traffic volume relative to existing volumes in the area (a peak of 40 project construction vehicles compared to the 7,780 vehicles typically entering the Hanford Site daily). The mitigation measures identified in Section 3.2.4 would reduce the incremental contribution of the Proposed Action and Rebuild-in-Place Alternative to potential cumulative impacts on transportation and impacts are expected to be **low**. Following project completion, vehicle trips associated with BPA maintenance activities would be low, which would result in the minor, **low** long-term cumulative transportation impact.

3.2.7 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the existing transmission lines would not be rebuilt; therefore, the impacts on existing land uses would be to the same as existing conditions, with **no** or **low** impact on land use. Maintenance activities would likely increase as existing structures deteriorate with more structure repair and replacement required compared with existing conditions. The maintenance activities could result in intermitted traffic delays, and new impacts on land use.

3.3 Geology and Soils

3.3.1 Affected Environment

The geology and soils study area consists of the existing and proposed ROWs and associated access roads, work areas, and material storage yards. Unless otherwise noted, the information presented in this section is based on DOE-RL's *Hanford Site National Environmental Policy Act (NEPA) Characterization* report (Duncan 2007).

Geology

The Hanford Site lies within the Pasco Basin, a subprovince of the Columbia Basin geographic province. The Pasco Basin is a relatively level area located at the eastern edge of the "Yakima Fold Belt" subprovince, an area composed of a series of west-to-east trending ridges that border the basin. The Pasco Basin is underlain by thick layers of basalt, and basalt outcrops are present within the study area in portions of Segment 1, which is located near the base of Umtanum Ridge, and in portions of Segment 3 in the vicinity of Gable Butte and Gable Mountain, two prominent geologic features of the Hanford Site.

Catastrophic floods during the last ice age greatly altered surface geology and soils at the Hanford Site by eroding some areas and depositing sands and other glacial deposits in other areas. One notable glacial deposit at the Hanford Site is the Hanford Dunes. At 6,320 acres, this area is the largest dune field in eastern Washington.

The majority of the existing Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines cross the gently undulating plateau of the Pasco Basin, where topography is less than 10 **percent slope**. The steepest slopes (14 to 18 percent) within the existing and proposed ROWs occur within Segment 3 and are associated with Gable Butte and Gable Mountain. Portions of the Hanford Dunes (Segment 4) also contain locally steep slopes, where dunes may reach 20 percent slope. Segments 1 and 2 are located on level ground, with slopes less than 10 percent.

The Washington Interactive Geologic Map indicated no known landslides or landslide hazards within the study area (WDNR 2012a). The Hanford Site is located on several **faults**, but the rate and magnitude of earthquakes in the region is relatively low compared with that of other regions in the Pacific Northwest (Duncan 2007).

As there are no known landslide or landslide hazards in the study area and while earthquakes can and do occur in the area, earthquake hazards are not a major concern for transmission lines; therefore, these geologic hazards are not addressed further in this Preliminary EA. In addition, as the project would not impact geologic resources, geologic impacts are not discussed further in this Preliminary EA.

Soil

Soils in the study area include rocky soils, sandy **loams**, and dune sands (Hajek 1966, Duncan 2007). The rocky soils are associated with basalt, and include basalt outcrops, **talus**, and basalt **scree** mixed with **loess**, a windblown, fine-grained soil. Rocky soils are the least abundant soil type in the study

area and are present only in a portion of Segment 1, which is located near the base of Umtanum Ridge, and in the vicinity of Gable Butte and Gable Mountain along Segment 3.

Sandy loams are ***unconsolidated sediments*** composed of a mix of fine-grained sand, silt, and clay and are the most abundant soil type in the study area (Segments 1, 2, and 3 and the northern 2 miles of Segment 4). Dune sands and other unconsolidated sandy soils occur in the southern portion of the study area along the last 9 miles of the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines in Segment 4 leading to the Benton Substation. This area includes the approximately 3.5-mile-long crossing of the Hanford Dunes. Due to dry and windy conditions and unconsolidated, fine-grained soils, the soils within the study area are primarily at risk to erosion by wind, particularly when protective vegetation cover is removed.

Much of the soil where work would occur has already been disturbed by the existing transmission lines and road network. Soils near structures and within roadbeds have been compacted and are unvegetated, making them generally unproductive and vulnerable to erosion. Undisturbed areas may contain ***cryptogamic crusts***, a thin (less than 0.2 inch) consolidated layer of soil particles bound together by algae, lichens, and mosses (Duncan 2007). These crusts are important to soil stability and protection from erosion (Root et al. 2011).

3.3.2 Environmental Consequences—Proposed Action (Reroute Alternative)

Impacts on soils from the Proposed Action would occur from improving existing and constructing new access roads, removing existing structures and installing new structures, use of construction travel routes by heavy equipment and trucks, establishing staging areas, establishing tensioning sites, and installing conductors, overhead ground wires, and counterpoise. These activities would remove topsoil, increase erosion and ***compaction***, and decrease ***soil productivity***. Indirect impacts could occur as a result of vegetation removal that could lead to increased erosion over time.

Due to the dry conditions and extreme summer heat, soils in the study area are prone to wind erosion and revegetation is difficult following disturbance (Feng et al. 2011). In addition, soils that would be permanently compacted within roadbeds and at structure locations would result in permanent loss of soil productivity. Soils temporarily disturbed by access roads and the removal and installation of structures and associated conductors, ground wire, and counterpoise may take several years to fully stabilize. Erosion potential for disturbed soils would be greatest during and immediately after ground disturbance. Afterwards, soils would stabilize as they settle and as vegetation becomes reestablished. The most notable concerns for erosion and soil stability would be for work within the Hanford Dunes. Clearing and removing vegetation within this area could destabilize the dunes sand, thus causing direct impacts at the site of disturbance and possible indirect impacts as disturbed sands shift downwind. With implementation of mitigation measures described in Section 3.3.4 impacts on soil from the Proposed Action would be ***low*** to ***moderate*** in the short term and, upon successful revegetation, ***low*** in the long term.

Removal of Existing Structures and Installation of New Structures

Removing and installing structures under the Proposed Action would require trucks and other construction equipment (e.g., boom cranes, backhoes, and line trucks) that would also disturb soils

through removing vegetation, damaging cryptogamic crusts, and compacting soils. Approximately 28.0 acres of soils would be temporarily disturbed during structure installation (including the installation of guy wires and counterpoise). An additional 2.5 acres of new permanent soil disturbance (i.e., compacted area around structures that would not be restored) would occur within the new structure locations of Segment 2 and where seven structures would be slightly relocated from existing locations in Segments 1 and 4. Because most structures along Segments 1 and 4 would be rebuilt within the same location, where soils have already been disturbed, impacts on soils would **low**. For new structure locations (Segment 2), new holes would be dug for each structure resulting in a **low** to **moderate** impact. Soil from these holes would be piled and then used for backfilling the holes when the poles were put in place. Removal of existing structures that would not be replaced (Segment 3) could require the excavation of soils around the poles to facilitate removal. After pole removal, remaining holes would be backfilled and restored, which would result in a **low** to **moderate** short-term impact on soils. Additional soil disturbance would occur at structures located within 0.5 mile of each substation, where trenches would be dug to install counterpoise and at those structures that would require guy wires.

Other activities that would occur within the structure construction areas (Segments 1, 2, and 4) that could expose soils to erosion include establishing pulling and tensioning sites and the temporary use of snubs. Potential impacts associated with these activities include compaction from heavy equipment degrading soil structure and reducing pore space. Implementation of the mitigation measures identified in Section 3.3.4 would reduce construction-related soil impacts to **low** to **moderate**.

Staging Areas

BPA would require the construction contractor to locate all staging areas outside sensitive areas (native vegetation, cultural resources, or wetlands), in level, open, and likely developed or disturbed sites. All areas temporarily disturbed during construction would be returned to preconstruction conditions and revegetated as appropriate. Potential impacts on soils at staging areas are expected to be **low**. Impacts resulting from dust generation at staging areas are discussed in Section 3.10, "Air Quality and Climate Change."

Access Roads

Access road work under the Proposed Action also would cause soil disturbance by grading, shaping, and compacting the road bed, and placing crushed rock as a road base. Approximately 34.4 miles of existing access roads would be improved and 2.8 miles of new road constructed. Based on a 20-foot-wide access road width (14 feet of road bed and 3 feet of roadside vegetation clearing on each side) and on the width of existing roads being approximately 10 feet, road construction and improvement would disturb a total of approximately 84 acres of soils, which would include the following subtotals:

- Approximately 39 acres of soils within existing road beds that would be regarded;
- Approximately 20 acres of soils outside of existing road beds would be cleared, graded and compacted to make improved and new road beds; and
- Approximately 25 acres of soils outside of existing road beds would be disturbed through roadside vegetation clearing.

Road work within Segment 4 would include grading and vegetation removal within the Hanford Dunes, which would locally destabilize dune sands and result in **moderate** impacts. Overall, with proper road design and use of erosion and sediment control mitigation measures (see Section 3.3.4), the potential for construction-related erosion and resulting impacts on soils would be reduced. As such, impacts associated with access road improvements would result in a **low to moderate** impact on soil in the short term and upon successful revegetation and stabilization, a **low** long-term impact on soil resources.

Operation and Maintenance

Operation and maintenance activities that would continue to disturb soils into the future include intermittent travel along access roads, repairs at structure locations, and vegetation management. All of these activities would cause minor soil disturbance, soil compaction, and vegetation disturbance that could result in subsequent erosion. Based on the small, localized disturbance areas and the infrequent nature of these activities, impacts on soils from operation and maintenance would be **low**.

3.3.3 Environmental Consequences—Rebuild-in-Place Alternative

Impacts from the Rebuild-in-Place Alternative on soils would be similar to those described for the Proposed Action, including improving and constructing access roads, removing existing structures and installing new structures, use of temporary travel routes, establishing staging areas and tensioning sites. These activities would remove topsoil, increase erosion and compaction, and reduce soil productivity. As with the Proposed Action, impacts from erosion and decreased soil stability would occur within the Hanford Dunes. With implementation of mitigation measures described in Section 3.3.4 impacts on soil would be **low to moderate** in the short term and **low** in the long-term.

Removal of Existing Structures and Installation of New Structures

Removing and installing structures under the Rebuild-in-Place Alternative would result in similar impacts as the Proposed Action except that the Rebuild-in-Place Alternative structures would be rebuilt in place. There would be no structure installation in new locations along Segment 2. Under the Rebuild-in-Place Alternative, structures would generally be installed within existing excavations and disturbance of new ground would be limited to temporary construction impacts. Approximately 19 acres of soils would be temporarily disturbed during structure installation (including guy wire and counterpoise installation). An additional 0.7 acres of new permanent soils disturbance (i.e., compacted area around structures that would not be restored) would occur where seven structures would be slightly relocated from existing locations in Segments 1 and 4. Because structures along Segments 1, 3, and 4 would be rebuilt within the same general location where soils have already been disturbed, impacts on soils would **low**.

Establishing pulling and tensioning sites and the temporary use of snubs could expose soils to erosion and compaction degrading soil structure and reducing pore space. Implementation of the mitigation measures identified in Section 3.3.4 would reduce construction-related soil impacts and impacts to **low to moderate**.

Staging Areas

As with the Proposed Action, BPA would require the construction contractor to locate all staging areas outside sensitive areas (including sensitive native vegetation, cultural resources, or wetlands), in level, open, and disturbed sites. All areas temporarily disturbed during construction would be returned to preconstruction conditions and revegetated as appropriate. Potential impacts on soils at staging areas are expected to be **low**. Impacts resulting from dust generation at staging areas are discussed in Section 3.10, “Air Quality and Climate Change.”

Access Roads

Approximately 33.8 miles of existing access roads would be improved and 1.3 miles of new road constructed. Based on a 20-foot-wide access road width (14 feet of road bed and 3 feet of roadside vegetation clearing on each side) and on the width of existing roads being approximately 10 feet, road construction and improvement under the Rebuild-in-Place Alternative would disturb a total of approximately 83 acres of soils, which would include the following subtotals:

- Approximately 40 acres of soils within existing road beds that would be regarded;
- Approximately 18 acres of soils outside of existing road beds would be cleared, graded and compacted to make improved and new road beds; and
- Approximately 25 acres of soils outside of existing road beds would be disturbed through roadside vegetation clearing.

With proper road design and use of erosion and sediment control mitigation measures identified in Section 3.3.4, the potential for construction-related erosion and resulting impacts on soils would be reduced. Impacts on soils associated with access road improvements from Rebuild-in-Place Alternative are expected to be **low**.

As with the Proposed Action, road work within Segment 4 would include grading and vegetation removal within the Hanford Dunes, which would locally destabilize dune sands and result in **moderate** impacts. Overall, with the implementation of the mitigation measures identified in Section 3.3.4 and the use of previously-disturbed structure sites, the Rebuild-in-Place Alternative would result in a **low** to **moderate** impact on soil in the short term and upon successful revegetation, a **low** long-term impact on soil resources.

Operation and Maintenance

Impacts from operation and maintenance of the Rebuild-in-Place Alternative would be the same as those under the Proposed Action and would be **low**.

3.3.4 Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative

If the Proposed Action or Rebuild-in-Place Alternative is implemented, the following mitigation measures would minimize impacts on soils:

- Minimize the project ground disturbance footprint, particularly in areas prone to erosion (i.e., sandy soils).
- Limit the amount of time soils are left exposed.
- Design roads to limit water accumulation and erosion; install appropriate access road drainage (ditches, water bars, cross drainage, or roadside berms) to control and disperse runoff.
- Develop revegetation strategies, including soil preparation as necessary, using site-specific methods developed for use within the Hanford Site (see Section 3.4).

3.3.5 Unavoidable Impacts Remaining After Mitigation—Proposed Action and Rebuild-in-Place Alternative

The mitigation measures described in Section 3.3.4 would reduce impacts on soils to **low** or **low to moderate** levels. Although construction Best Management Practices (BMPs) would reduce the potential for temporary increases in erosion, some increased erosion levels would be expected. Long-term impacts after mitigation would be limited to soil compaction, minor erosion of formerly vegetated ground in areas where reseeding is not successful, and loss or elimination of natural biological functions in areas that were formerly undeveloped. Due to the dry conditions and extreme summer heat, soils in the study area are prone to wind erosion, and vegetation is difficult to establish following disturbance. The erosion potential for disturbed soils would be greatest during and immediately after road construction. Afterwards, soils would stabilize as they settle and as vegetation becomes reestablished.

3.3.6 Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative

The region of influence considered for cumulative impacts on geology and soils is the Hanford Site. Past and present activities that have affected soils at the Hanford Site are development and fire, which have led to soil erosion, compaction, and the removal of vegetation. Project-related activities that result in soil erosion, compaction, and loss of productivity would add to these past and present soil disturbing events. In addition, the other BPA projects proposed on the Hanford Site (see Appendix A) have the potential to result in impacts similar to those described above for the Proposed Action and Rebuild-in-Place Alternative. Implementation of the mitigation measures described in Section 3.3.4 would ensure that the Proposed Action or Rebuild-in-Place Alternative would not contribute significantly to cumulative soil impacts. Further, future unconnected BPA actions on the Hanford Site would be subject to NEPA review, which would likely result in the development of similar mitigation measures as those proposed for the Proposed Action and

Rebuild-in-Place Alternative. As such, the contribution of either alternative to cumulative impacts is considered *low*.

Future impacts from DOE-RL development are expected to be limited to previously disturbed areas, as directed by the *Hanford Comprehensive Land Use Plan* and *Hanford Reach National Monument's Comprehensive Conservation Plan*. A DOE-RL proposed natural gas line project that would cross the Hanford Site would be buried underground and likely result in clearing, grading, and disturbance to soils.

3.3.7 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines would not be rebuilt at one time, but rather, structures would be replaced as they fail or become unacceptably dilapidated. Because most of the existing structures are very close to the end of their useful service life, maintenance activities would likely increase. The No Action Alternative would likely involve the same amount of disturbance on soils as the Rebuild-in-Place Alternative, but such disturbance would be spread over a longer time (multiple years) rather than in one, 7-month construction period (October to April). Replacing structures piecemeal would require multiple entries into the study area rather than a single entry point and could lead to more soil erosion than under existing conditions.

3.4 Vegetation

3.4.1 Affected Environment

The vegetation study area includes all areas within 500 feet of the existing and proposed ROWs, access roads, and staging areas.

The project area is within the Columbia Basin physiographic province (Franklin and Dyrness 1988). **Shrub-steppe** is the most common native vegetation of the Columbia Basin although more than half of the shrub-steppe habitat formerly present has been removed by development primarily for cropland (Wooten No Date). Much of what remains has been severely altered by grazing. The Hanford Site contains some of the largest **stands** of high quality shrub-steppe habitat in Washington. Only about 6 percent of the site has been developed (Duncan 2007; Neitzel 2005), and some stands of **late-successional** shrub-steppe remain in near pristine condition (Duncan 2007).

Level of Concern Ratings

DOE-RL manages vegetation and other biological resources at the Hanford Site through the *Hanford Site Biological Resources Management Plan* (DOE-RL 2001). A key component of the plan is the level of concern ratings, which are broken out by numerical levels, depending on resource sensitivity (Level I, II, III, and IV). Level I resources are of lowest sensitivity while Level IV resources are typically near pristine or unique communities. Levels III and IV resources require mitigation via rectification (on-site restoration) and **compensatory** (off-site) **mitigation**, with the goal of no net loss of Level III or Level IV resources. DOE-RL defines levels of concern for specific plant or animal species and for landscape-level attributes, such as plant communities or habitats.

The general distribution of plant communities and associated level of concern ratings and within the study area include:

- Level I plant communities are scattered in a mosaic within Segments 2, 3, and 4 of the project. Existing roads and structure locations are also classified as Level I vegetation (although not mapped in Figure 3.4-1).
- Level II plant communities occur in a portion of Segment 4 that includes a stand of sand dropseed (*Sporobolus cryptandrus*)-Sandberg bluegrass (*Poa secunda*)-cheatgrass (*Bromus tectorum*) mix and a stand of non-native crested wheatgrass (*Agropyron cristatum*).
- Level III plant communities are the most abundant level of concern within the study area. Most of Segments 1, 2, and 3 contain late-successional shrub-steppe.
- Level IV plant communities occur in several places in the study area. Segment 2 would cross approximately 4,100 feet of shrub-steppe vegetation. Segment 3 crosses a basalt outcrop area associated with Gable Butte and a stand of shrub-steppe associated with the northern slope of Gable Mountain. Segment 4 crosses approximately 3.5 miles of the Hanford Dunes.

Figure 3.4-1 presents a map of level of concern ratings within the study area under both the Proposed Action and the Rebuild-In-Place Alternative.

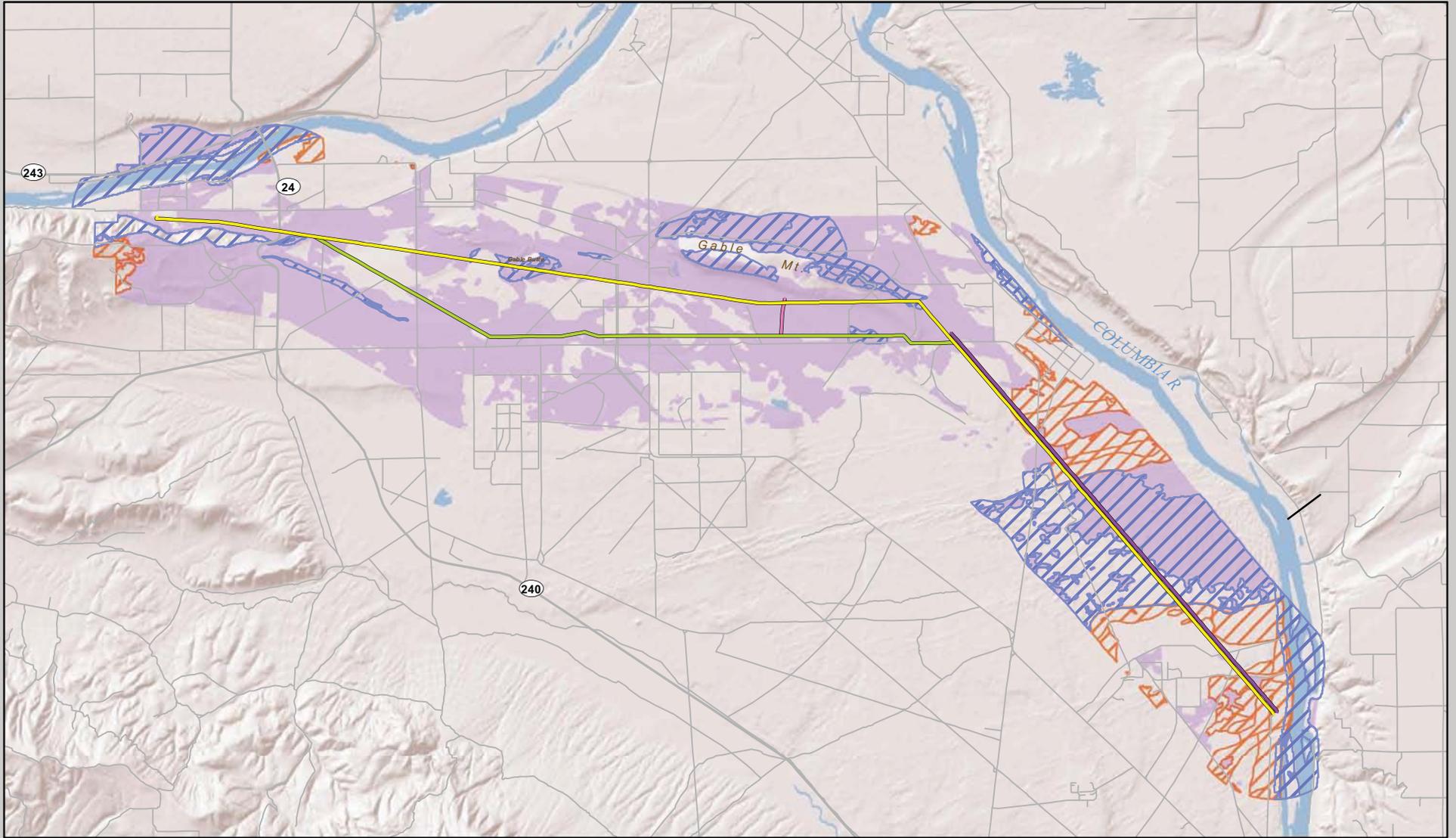
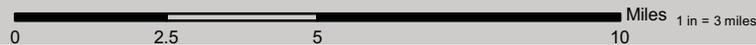


Figure 3.4-1 Vegetation by Level of Concern within 1.8 miles of Proposed and Existing Right-of-way



June 19, 2012

- | | | | |
|---|-----------------------------------|---|--|
|  | Hanford BRMaP Level II Resources |  | Existing Midway-Benton No. 1 Line |
|  | Hanford BRMaP Level III Resources |  | Proposed Action Midway-Benton No. 1 Line Reroute |
|  | Hanford BRMaP Level IV Resources |  | Proposed Actoin Scooteney Tap Extension |
| | |  | Existing Benton-Othello No. 1 Line |
| | |  | Roads |



Special-Status Plant Species

Special-status plant species are those species that have been identified for protection and/or management under the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 *et seq.*), or the Washington State Natural Heritage Program. No plant species listed as **threatened** or **endangered** under the ESA have been identified on the Hanford Site (Duncan 2007). The USFWS (2011) lists one plant species, Ute ladies'-tresses (*Spiranthes diluvialis*), in Benton County as threatened. The Ute ladies'-tresses is associated with floodplains and wet habitats along the Columbia River (WDNR 1999). As discussed in Section 3.6, the study area does not contain water bodies, riparian, or wetland habitats, and therefore suitable habitat is not likely present for Ute ladies'-tresses

The USFWS lists one **candidate species**, Umtanum desert buckwheat (*Eriogonum codium*), as potentially occurring in Benton County (USFWS 2011). This species occurs at elevations ranging from 1,100 to 1,320 feet. Because the maximum elevation of the study area is 715 feet, suitable habitat is not likely present in the study area.

The USFWS recently proposed ESA protection for two plants found only in the Hanford Reach National Monument: the Umtanum desert buckwheat and White Bluffs bladderpod (*Physaria douglasii* subsp. *tuplashensis*) (USFWS 2012). Neither species nor their proposed critical habitat is present within the vegetation study area. The buckwheat and its associated proposed critical habitat are found on basalt outcrops near the top of Umtanum Ridge, approximately one-third mile south of Midway Substation. The bladderpod and associated proposed critical habitat is limited to the White Bluffs area of the Hanford Reach, located across the river from the study area. For these reasons, suitable habitat is not likely present in the study area.

DOE-RL's biological resource inventory data (DOE-RL 2012), obtained by BPA through the Mission Support Alliance (MSA), includes records for five non-ESA-listed sensitive plant species (i.e., State-listed threatened or sensitive species or federal Species of Concern) with known locations within the study area (see Table 3.4-1;). Special-status plants, such as Hoover's desert parsley, Suksdorf's monkey-flower, Great Basin gilia, small-flower evening primrose, dwarf evening-primrose, and gray cryptantha, have been documented along Segments 1, 3, and 4, and Suksdorf's monkey-flower has been documented within the Scootenev Tap extension area of proposed reroute (Segment 2). Based on the presence of big sagebrush (*Artemisia tridentata*) within all line segments, other special-status plant species could be present. Botanical surveys are being conducted concurrently with the preparation of this Preliminary EA, and results will be incorporated into the Final EA. A complete list of sensitive plant species potentially occurring within the study area is presented in Appendix C, "Biological Resource Supplemental Information."

Noxious Weeds

Noxious Weeds are non-native plant species that invade native plant communities and displace native plants. Species identified in the DOE-RL Integrated Vegetation Management EA (DOE-RL 2011) as noxious weeds of high priority for control on the Hanford Site include Russian knapweed (*Rhaponticum repens*), diffuse knapweed (*Centaurea diffusa*), spotted knapweed (*Centaurea maculosa*), yellow starthistle (*Centaurea solstitialis*), rush skeletonweed (*Chondrilla juncea*), dalmatian toadflax (*Linaria genistifolia*), purple loosestrife (*Lythrum salicaria*), baby's breath (*Gypsophila paniculata*), medusahead (*Taeniatherum canput-medusae*), and saltcedar (*Tamarix* spp.) (DOE-RL 2011).

Table 3.4-1. Special-Status Plant Species Documented within the Study Area

Species	Federal Status ¹	State Status ^{2,3}	Habitat Association	Location in or near Study Area
Hoover's desert parsley <i>Lomatium tuberosum</i>	Federal Species of Concern	State Sensitive	Loose talus, where hot, dry, rocky, and unstable conditions support few other plant species	Associated with the talus slopes of Umtanum Ridge, south of Segment 1
Suksdorf's monkey-flower <i>Mimulus suksdorfii</i>	None	State Sensitive	High moisture with small-scale erosion that expose the mineral soils needed for seed germination	Segment 1 near basal outcrops
				Segment 2, Scootney Tap extension area
Great Basin gilia <i>Gilia leptomeria</i>	None	State Threatened	Dry, gravelly or sandy, fine reddish to blackish lithosols	Segment 1 near basal outcrops
Small-flower evening-primrose <i>Camissonia minor</i>	None	State Sensitive	Gravelly basalt, sandy soils and cryptogamic crust	Segment 1 near basal outcrops
Dwarf evening-primrose <i>Camissonia pygmaea</i>	None	State Sensitive	Open environments associated with disturbed, unstable soil or gravel in steep talus, dry washes, banks, and road cuts	Segment 3, south of central Gable Mountain
Gray cryptantha <i>Cryptantha leucophaea</i>	Federal Species of Concern	State Sensitive	Shifting sand dunes	Segment 4, Hanford Dunes

Sources: WDNR 2012b, DOE-RL 2012

Notes:

¹ Federal species of concern is an informal term that refers to those species which the USFWS believes might be in need of concentrated conservation actions.

² State sensitive species are vulnerable or declining and could become endangered or threatened in the state.

³ State threatened species include "any wildlife species native to the state of Washington that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats."

Other non-native, invasive plant species that are of concern at the Hanford Site are Russian thistle (*Salsola tragus*) and cheatgrass because areas infested with these species are prone to intensive wildfires (DOE-RL 2011). These species are so abundant at the Hanford Site that they are considered "naturalized," and control, rather than eradication, is the primary management objective for these species. In addition to increasing fire risks, invasive species are a major concern for protection of shrub-steppe habitats at the Hanford Site. Field studies are being conducted in spring of 2012 to identify noxious weed populations in the study area. Field study results will be included in the Final EA.

Fire History

Due to the hot, dry climate of the study area, wildfire is a natural element of shrub-steppe habitats; however, due to altered habitats, particularly those supporting high-density weed populations such

as Russian thistle and cheatgrass, wildfires burn more frequently, intensively, and over larger areas than under historic conditions, and fire is a major threat to late-successional shrub-steppe (Link et al. No Date). Fire history maps maintained by DOE-RL (DOE-RL 2012) indicate historic fires near the Midway Substation but outside of the study area in 1977, 1993, and 1996. A large fire in 1984 burned much of Segment 4, including a portion of the Hanford Dunes. The fire caused some dune areas that had been stabilized by vegetation to “reactivate” and begin transporting sand downwind (Duncan 2007).

3.4.2 Environmental Consequences—Proposed Action (Reroute Alternative)

Potential impacts on vegetation from the Proposed Action would occur when improving existing roads and constructing new access roads; establishing staging areas; removing existing structures and installing new structures; establishing tensioning sites; and installing conductors, overhead ground wires, and counterpoise. Direct impacts on vegetation would include the removal of or disturbance to vegetation, including crushing vegetation; damage to plant roots from compaction of soils by heavy equipment; and the loss of seed banks through soil disturbance. As discussed in Sections 2.2.6 and 2.4, vegetation disturbance would primarily occur in areas around and adjacent to work areas (e.g., structure removal and installation areas, access roads, stringing sites). The entire ROW would not be cleared of vegetation for construction.

Indirect impacts could include the introduction and spread of noxious weed species and disturbance to plant communities from erosion and sedimentation.

Removal of Existing Structures and Installation of New Structures

Removing and installing structures under the Proposed Action would require trucks and other construction equipment (e.g., boom cranes, backhoes, and line trucks) that would disturb vegetation, damage cryptogamic crusts, disturb seed banks, and compact soils within an approximately 50-feet by 100-feet (0.1 acre) area at two-pole structures and within an approximately 100-feet by 100-feet (0.2 acre) area at three-pole structure sites (see Section 2.4.4). To minimize disturbance in sensitive areas, such as Levels III and IV habitats, the disturbance area could be reduced to 50 feet by 50 feet per structure (0.06 acre), if site-specific conditions allow (see Section 3.4.4). Based on typical construction work areas (i.e., not reduced), removing and installing structures would disturb approximately 30.1 acres of vegetation, of which 18.4 acres would be Level III plant communities and 3.1 acres would be Level IV plant communities (Table 3.4-2).

Impacts, such as crushing or removing special-status plant through accessing work areas; using staging yards, stringing sites, or snubs; or excavating for structure removal, replacement, and/or new construction (including guy wire and counterpoise installation or removal) would be avoided if possible. Suksdorf’s monkey-flower and other associated ***special-status species*** (see Table 3.4-1) may be disturbed or destroyed in portions of Segment 1 and along the Scootenev Tap transmission line. Also, individuals and clusters of gray cryptantha are known to occur within a 3.5-mile-long project crossing of the Hanford Dunes in Segment 4. Suitable habitat for other special-status species is present within much of the project area, particularly in stands of vegetation classified as Level III and IV, and special-status plants may be disturbed or destroyed in these areas as well.

Table 3.4-2. Vegetation Impacts from Installing and Removing Structures (in Acres)

Level of Concern	Proposed Action			Rebuild-in-Place Alternative		
	Temporary ¹	Permanent ²	Total	Temporary	Permanent	Total
Level I	6.8	0.6	7.3	4.1	0.1	4.2
Level II	1.1	0.1	1.2	1.1	0.1	1.3
Level III	16.7	1.7	18.4	10.3	0.5	10.9
Level IV	3.1	0.1	3.1	3.2	0.0	3.2
Total	27.7	2.4	30.1	18.7	0.7	19.5

¹Temporary disturbance areas would be restored following construction.

²Permanent disturbance includes new disturbance around structures that would remain unvegetated. For structures that would be removed and rebuilt in the same locations, structures would be installed on previously disturbed ground and no new permanent impacts would occur.

Signage, fences, or flagging would be installed where needed to restrict vehicles and equipment to designated routes outside of sensitive plant communities and species habitat. Because disturbance to vegetation from the Proposed Action would occur mainly in Level III plant communities, temporary impacts could be *moderate* to *high*, although implementation of the mitigation measures described in Section 3.4.4 would reduce construction-related impacts to *moderate*. In the long-term, development of a restoration plan, as described in Section 3.4.4, would compensate for permanent vegetation loss; long-term impact would be *low* to *moderate*.

Potential vegetation impacts associated with tensioning sites could include clearing and crushing of vegetation, damage of plant roots from soil compaction, and soil disturbance. These areas would be sited, as practical, to minimize impacts to vegetation communities, and mitigation measures discussed in Section 3.4.4 would be implemented in these areas. Overall, vegetation impacts at tensioning and guy wire sites would be *low* to *moderate*, depending on their placement.

Access Roads

Access road construction and improvement would require removal of existing vegetation, grading, compaction, and placement of crushed rock as a road base. Based on an assumed 14-foot-wide road bed, an additional 4.0 feet could be required for expanded roadbeds, where needed, and an additional 6.0 feet (3.0 feet on each side of the road bed) would be cleared of shrubby vegetation (see Section 2.2.6). Access road improvements, construction of new roads, and roadside clearing would permanently remove approximately 45.1 acres of vegetation, of which 20.6 acres would be Level III and 7.6 acres would be Level IV plant communities (Table 3.4-3). Implementation of the mitigation measures described in Section 3.4.4 would reduce construction-related impacts on vegetation resulting from access road improvements to *moderate*.

Table 3.4-3. Permanent Vegetation Impacts from Access Road Work (in Acres)

Level of Concern	Proposed Action			Rebuild-in-Place Alternative		
	New Road Bed ¹	Roadside Clearing ²	Total	New Road Bed ¹	Roadside Clearing ²	Total
Level I	6.2	7.1	13.3	4.3	5.7	10.0
Level II	1.6	2.0	3.6	1.6	2.0	3.6
Level III	8.9	11.7	20.6	8.6	12.6	21.2
Level IV	3.4	4.2	7.6	4.1	5.2	9.3
Total	20.1	25.0	45.1	18.5	25.5	44.0

¹ New road bed includes cleared and compacted surfaces.

² Includes areas where vegetation would be managed under BPA's *Transmission System Vegetation Management Program Final Environmental Impact Statement/Record of Decision* (BPA 2000) and additional areas where road width may be expanded beyond the 14-foot standard road width.

Impacts associated with access road construction on populations of special status plants would be avoided if possible. In the vicinity of special status plant populations, staking or flagging would be installed where needed prior to construction to restrict vehicles and equipment to designated routes. Construction would likely avoid most special status plant populations entirely; however, Suksdorf's monkey-flower and other associated special-status species (see Table 3.4-1) may be disturbed or destroyed through vegetation removal within the access road beds or vegetation trimming along the access road shoulders in portions of Segment 1 and along the Scootney Tap transmission line. Also, known populations of gray cryptantha are found along the 3.5-mile portion of line in the Hanford Dunes in Segment 4. Suitable habitat for other special-status species is also present within much of the project area. Impacts to these populations would be reduced by implementation of the mitigation measures identified in Section 3.4.4. Impacts on special status plants from the Proposed Action are expected to be **low** to **moderate**.

Staging Areas

Proposed staging areas would be in previously disturbed, cleared areas and would result in little-to-no direct vegetation loss. Noxious and invasive weeds at such sites would be managed according to the DOE-RL Integrated Vegetation Management EA (DOE-RL 2011). After completion of the project, staging areas would be returned to pre-project condition based on photo documentation and revegetated as needed. Overall, vegetation impacts at staging areas would be **low**.

Operation and Maintenance

Ongoing vegetation management would occur within the existing ROWs (Segments 1 and 4) or in a new ROW adjacent to an existing ROW (Segment 2). Vegetation management would be conducted in accordance with BPA's *Transmission System Vegetation Management Program FEIS / ROD* (BPA 2000), which prescribes a variety of methods to keep plants from interfering with transmission lines, including manual, mechanical, chemical, and biological methods to foster low-growing plant communities and keep plants from interfering with transmission lines (BPA 2000). In addition, vegetation management subsequent to construction would be subject to DOE-RL's Integrated Vegetation Management EA (DOE-RL 2011), as applicable, which outlines DOE-RL's site-wide

vegetation management program to manage invasive plants and noxious weeds (DOE-RL 2011). Control of invasive species, including noxious weeds, and associated measures to avoid and minimize impacts on native vegetation communities are included in the program. Overall, the continuation of ongoing vegetation management would have a **low to moderate** impact on vegetation.

During operation and maintenance, impacts on sensitive plant species could also occur during periodic clearing of shrubs, soil disturbance, and the application of herbicides. Operation and maintenance under the Proposed Action would include periodic trimming, cutting, or clearing of shrubs, including sage brush, to allow access to the transmission line and to prevent vegetation from growing too close to conductors. Such actions can directly reduce habitat quality within late-successional shrub-steppe habitats and inhibit the reestablishment of native plants within disturbed areas. Impacts to sensitive plant species during operation and maintenance would be **low to moderate** depending on activity type.

Noxious Weeds

Construction activities would result in soil disturbance and removal of existing vegetation, which may introduce invasive plant species. The aggressive nature of invasive species, their prevalence on the Hanford Site, and their preference for disturbed sites means that non-native species (such as cheatgrass, tumbled mustard [*Sisymbrium altissimum*], and Russian thistle) are likely to colonize disturbed areas. In addition, increases in non-native species, particularly cheatgrass and Russian thistle, would increase the risks fire and associated loss of big sagebrush cover within Levels II, III and IV shrub-steppe plant communities. While much of the areas that would be vulnerable to increased invasive species would be within areas already disturbed by existing structures and roads (i.e., Segments 1 and 4), installing structures in new locations for Segment 2 would create new areas of disturbance, likely resulting in more invasive species where current native vegetation is dominant (particularly in Levels III and IV areas). In addition, abandoned structure sites within Segment 3, which would be revegetated, would remain vulnerable to encroachment by invasive species for many years, based on the difficulty of reestablishing shrub-steppe vegetation on previously disturbed ground.

Several mitigation measures identified in Section 3.4.4 would be implemented to reduce the likely spread of invasive species and measures, specified under BPA's *Transmission System Vegetation Management Program FEIS/ROD* (BPA 2000) and under DOE-RL's *Integrated Vegetation Management EA* (DOE-RL 2011), such as conducting invasive weed species surveys before and after construction and treating new infestations identified after construction. Because invasive species would be actively controlled according to established plans, the Proposed Action would be expected to result in a **moderate** impact from invasive species within areas disturbed by construction and operation and maintenance.

3.4.3 Environmental Consequences—Rebuild-in-Place Alternative

Impacts on vegetation from the Rebuild-in-Place Alternative would be similar to those described under the Proposed Action. As discussed in Sections 2.3.6 and 2.4, vegetation disturbance would primarily occur in areas around and adjacent to work areas (e.g., structure removal and installation

areas, access roads, stringing sites). The entire ROW would not be cleared of vegetation for construction.

Removal of Existing Structures and Installation of New Structures

The primary difference between the Rebuild-in-Place Alternative and the Proposed Action is that the Midway-Benton No. 1 transmission line would not be rerouted, and structures would generally be rebuilt in place, thereby resulting in lower amounts of ground disturbance and loss of vegetation. Structures would be rebuilt within areas previously disturbed from existing structures. However, adjacent vegetation would be temporarily disturbed by trucks and other construction equipment that would crush vegetation, damage cryptogamic crusts, disturb seed banks, and compact soils within work areas. Based on typical construction areas, removing and installing structures (including the installation of guy wires and counterpoise) for the Rebuild-in-Place Alternative would temporarily disturb approximately 18.7 acres of vegetation, of which 10.3 acres would be Level III plant communities and 3.2 acres would be Level IV plant communities (see Table 3.4-2). To minimize disturbance in sensitive areas, such as Levels III and IV habitats, the project disturbance area could be reduced to 50 feet by 50 feet per structure (0.1 acre), if site-specific conditions allow (see Section 3.4.4). While disturbance under the Rebuild-in-Place Alternative would be less than under the Proposed Action, vegetation impacts in Level III plant communities would still occur. Temporary impacts could be **moderate** although implementation of mitigation measures (see Section 3.4.4) would reduce construction-related impacts to **low**. As with the Proposed Action, long-term impacts would be **low to moderate** with development and implementation of a restoration plan.

Impacts from structure replacement and construction for the Rebuild-in-Place Alternative on populations of special status plants would be avoided if possible. Because the Rebuild-in-Place Alternative would not include the extension of Scootney Tap transmission line, disturbance to Suksdorf's monkey-flower and associated species in this portion of the study area would be avoided. Because of the overall lower disturbance within Levels III and IV vegetation, impacts on other special-status species from removal of existing structures and installation of new structures under the Rebuild-in-Place Alternative would be **low to moderate** (**low** in the long-term with development of a restoration plan as described in Section 3.4.4). As with the Proposed Action, signage, fences, or flagging would be installed where needed, to restrict vehicles and equipment to designated routes outside of sensitive plant communities and.

Impacts from tensioning sites for the Rebuild-in-Place Alternative would be to the same as those under the Proposed Action (**low to moderate**, depending on their placement).

Access Roads

As with the Proposed Action, access road construction and improvement would require removal of existing vegetation, grading, compaction, and placement of crushed rock as a road base. Access road construction and improvement and roadside vegetation management under the Rebuild-in-Place Alternative would permanently remove approximately 44.0 acres of vegetation, of which 21.2 acres would be Level III plant communities and 9.3 acres would be Level IV plant communities (see Table 3.4-3). With implementation of mitigation measures (see Section 3.4.4) construction-related impacts on vegetation resulting from access road improvements would **low to moderate**.

As with the Proposed Action, impacts on populations of special status plants from access road construction under the Rebuild-in-Place Alternative may occur. Staking or flagging of special status plant populations prior to construction to restrict vehicles and equipment to designated routes would reduce impacts. Construction would likely avoid most special status plant populations entirely. However, populations of gray cryptantha found along the 3.5-mile portion of line in the Hanford Dunes may be impacted, though disturbance would be avoided if possible. Suitable habitat for other special-status species is also present within much of the project area. Impacts to these populations would be reduced by implementation of the mitigation measures identified in Section 3.4.4 resulting in a **low** to **moderate** on special status plants from the Rebuild-in-Place Alternative.

Staging Areas

As with the Proposed Action, staging areas under the Rebuild-in-Place Alternative would be on previously cleared, disturbed soil areas and would result in little to no direct vegetation loss. Overall, vegetation impacts at staging areas would be **low**.

Operation and Maintenance

Operation and maintenance activities under the Rebuild-in-Place Alternative would be to the same as those described under the Proposed Action, including periodic trimming, cutting, or clearing of shrubs to allow access to the transmission line and to prevent vegetation from growing too close to conductors. Vegetation maintenance would be conducted in accordance with BPA's *Transmission System Vegetation Management Program FEIS/ROD* (BPA 2000) and DOE-RL's *Integrated Vegetation Management EA* (DOE-RL 2011), as applicable. Overall, the continuation of ongoing vegetation management under the Rebuild-in-Place Alternative would have a **low** to **moderate** impact on vegetation.

As with the Proposed Action, operation and maintenance of the Rebuild-in-Place Alternative could cause impacts on sensitive species. With implementation of mitigation measures described in Section 3.4.4 during maintenance activities, impacts to sensitive species would be **low** to **moderate** depending on activity type.

Noxious Weeds

The Rebuild-in-Place Alternative would result in the removal of existing vegetation and soil disturbance, which may increase invasive plant species and associated fire risks. However, in contrast with the Proposed Action, this alternative would not involve placing structures in new locations, likely resulting in lower levels of disturbance and corresponding levels of introduced invasive species. As with the Proposed Action, mitigation measures described in BPA's *Transmission System Vegetation Management Program Final EIS/ROD* (BPA 2000) and under DOE-RL's *Integrated Vegetation Management EA* (DOE-RL 2011), such as conducting invasive weed species surveys before and after construction and treating new infestations identified after construction, would be implemented to minimize the spread of invasive species. The Rebuild-in-Place Alternative would likely result in some increase of invasive species within areas disturbed by construction and operation and maintenance and this impact is anticipated to be **low** to **moderate**.

3.4.4 Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative

If the Proposed Action or Rebuild-in-Place Alternative is implemented, the following mitigation measures would minimize impacts on vegetation:

- Cut or crush vegetation rather than blade in areas that would remain vegetated to maximize the ability of native plants to resprout.
- Prepare soils if needed prior to seeding (see Section 3.3.4).
- Collaborate with the DOE-RL to determine and carry out the best control measures deemed locally effective for weed control during construction and over the life of the line.
- Conduct invasive weed surveys prior to and following construction to determine potential weed spread and appropriate corrective actions.
- Where possible, treat identified infestations prior to construction either manually, mechanically, and/or chemically.
- Air- or water-pressure wash vehicles and other equipment that have been in weed infested areas at established blow or wash stations upon leaving the infested areas to prevent spreading weeds to uninfested areas during construction.
- Monitor and treat existing and new infestations during construction on a minimum annual basis and for 3 years after construction.
- Use weed-free mulch, if mulch is used for erosion control.
- Equip all vehicles with basic fire-fighting equipment, including extinguishers and shovels to prevent fires that could encourage weed growth.
- Reduce access road widths to 14-foot-wide or less (instead of a maximum of 20 feet) to the extent possible. Reduce road width within Levels III and IV vegetation (e.g., 12-foot-wide maximum) as much as possible.
- Reduce construction footprint to 50-feet by 50-feet instead of 50-feet by 100-feet or 100-feet by 100-feet in Levels III and IV habitat types, as much as possible.
- Make BPA contractors aware of the locations of sensitive plants identified in the preconstruction botanical survey and establish site-specific avoidance strategies during construction.
- Develop a soil and vegetation restoration plan prior to construction in coordination with DOE-RL and other interested parties.
- Catalog all individual plants and clusters of special-status plant species that cannot be avoided and include in the soil and vegetation restoration plan measures to replace at least as many individual plants as were lost.

- Use seed and rooted planting materials in accordance with Section 7.7.2 of the *Hanford Site Biological Resources Management Plan* (DOE-RL 2001) that (1) represent a broad community (shrubs, forbs, grasses) and include species of plants that have cultural significance to the tribes, (2) are native to the Hanford Site, and (3) are the appropriate specific genetic or ecotypic derivation for the Hanford Site.
- Implement restoration or stabilization actions as soon as is reasonably possible after ground disturbing activities.
- Develop a plan, in cooperation with DOE-RL and other interested parties, to support off-site restoration projects that would compensate for long-term or permanent sensitive vegetation loss, if needed.

3.4.5 Unavoidable Impacts Remaining After Mitigation—Proposed Action and Rebuild-in-Place Alternative

The Proposed Action and Rebuild-in-Place Alternative would directly remove late-successional shrub-steppe and could directly remove special-status plant species (full extent to be determined based on the outcome of botanical field surveys). Implementation of the mitigation measures identified in Section 3.4.4, including on-site restoration and offsite mitigation, would reduce impacts to these plant populations. Therefore, impacts are anticipated to be temporary and **moderate**, with unavoidable adverse impacts occurring during the lag-time between the on-site losses and achievement of successful on-site restoration or off-site compensatory mitigation targets.

Construction-related ground disturbance and long-term vegetation management would likely result in invasive species colonizing disturbed areas. Impacts from weed spread could be **moderate to high** without appropriate mitigation; however, the mitigation measures discussed in Section 3.4.4 would be implemented to minimize the spread of invasive species. Because invasive species would be actively controlled according to established programs, the project would likely result in **moderate** increases of invasive species within areas disturbed by project construction and operation and maintenance.

3.4.6 Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative

The region of influence considered for cumulative impacts on vegetation is the Hanford Site. While the Hanford Site contains some of the largest blocks of remaining shrub-steppe habitat in the Columbia Basin, several past and ongoing actions (see Appendix A) have disturbed and removed large areas of shrub-steppe at the site, including historic nuclear facilities and related infrastructure, site cleanup activities, and wildfires. Collectively, these past impacts have disturbed approximately 45 percent of shrub-steppe vegetation at the Hanford Site (based on acreages presented in DOE-RL 2009a, Appendix T).

Reasonably foreseeable future actions, such as BPA vegetation management on ROWs crossing the Hanford Site not associated with the project, the future rebuild of Midway-Moxee No. 1 transmission line, the Midway-Benton No. 2 Fiber Replacement Project, future development under the *Hanford Comprehensive Land Use Plan*, the establishment of trails, and future energy

development, would result in vegetation clearing, soil disturbance, and compaction, and the potential introduction of noxious and other invasive weeds. Current restoration and rehabilitation efforts are underway over many hundreds of acres at the Hanford Site, which will have a long-term beneficial ongoing and future impact on vegetation within the site. Over time, these areas are expected to increase the amount of Levels III and IV habitats at the Hanford Site, such as shrub-steppe.

Contributions to cumulative impacts on vegetation under either the Proposed Action or Rebuild-in-Place Alternative would be limited to the temporary reduction of late-successional shrub-steppe during lag time between vegetation losses during construction and vegetation gains during restoration and mitigation, if needed. Therefore, over the long term, the project's contribution to cumulative impacts on vegetation would be **low**.

3.4.7 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the Proposed Action or Rebuild-in-Place Alternative would not be constructed and construction-related impacts on vegetation would not occur; however, current vegetation management practices would continue, including application of herbicides at structure locations. No new disturbance would occur within Levels III or IV vegetation, and no special-status plant species would be removed. Ongoing maintenance activities would likely be higher than under the Proposed Action or Rebuild-in-Place Alternative because the aging structures would require more repairs and piecemeal replacement, resulting in more frequent disturbance to vegetation such as trampling by vehicles accessing structures. Overall, because the No Action Alternative would be a continuation of the existing transmission line, impact levels on vegetation would likely be **low** except where deteriorating structures require increased maintenance activities that could lead to more vegetation impacts than under existing conditions

3.5 Wildlife

3.5.1 Affected Environment

The study area for wildlife includes all terrestrial habitats (upland) within 0.6 mile of the existing and proposed ROWs centerlines, based on the buffer distance for ferruginous hawks (*Buteo regalis*) specified in the *Hanford Site Biological Resources Management Plan* (DOE-RL 2001). Unless otherwise cited, information regarding wildlife species and habitat use is based on the *Hanford Site National Environmental Policy Act (NEPA) Characterization Report* (Duncan 2007) and on biological resource inventory data provided by DOE-RL for all lands within 1.8 miles of the existing and proposed ROWs (DOE-RL 2012).

Wetland, riparian, and riverine habitats at the Hanford Site are associated with the Columbia River, which at its closest point (near the Benton Substation) is 0.3 mile from the existing and proposed ROWs (see Section 3.6).

Terrestrial habitats within the study area that support wildlife include late-successional shrub-steppe, basalt outcrops associated with Gable Butte and Gable Mountain, and the Hanford Dunes.

The State of Washington considers shrub-steppe a priority habitat because of its relative scarcity in the state and its importance to several state-listed wildlife species (WDFW 2008). As described in Section 3.4, the existing and proposed ROWs cross large areas of late-successional shrub-steppe (Levels III and IV vegetation). These areas support many types of terrestrial wildlife, including game animals such as the Rocky Mountain elk (*Cervus canadensis*) and mule deer (*Odocoileus hemionus*); predators such as coyote (*Canis latrans*), bobcat (*Lynx rufus*), and badger (*Taxidea taxus*); and small herbivores such as western harvest mice (*Reithrodontomys megalotis*), voles (*Microtis* sp.), and black-tailed jackrabbits (*Lepus californicus*). The Great Basin pocket mouse (*Perognathus parvus*) is the most common mammal at the Hanford Site and occurs throughout all habitat types. Forty-one bird species are common to shrub and grassland habitats, including common raven (*Corvus corax*), western meadowlark (*Sturnella neglecta*), horned lark (*Eremophila alpestris*), long-billed curlew (*Numenius americanus*), vesper sparrow (*Pooecetes gramineus*), and sage sparrow (*Amphispiza belli*) (DOE-RL 2009a). Appendix C, “Biological Resource Supplemental Information,” contains a list of wildlife species likely to occur within the project area.

Basalt outcrops, talus, and rocky soils also contribute to biodiversity and support nesting habitat for prairie falcons (*Falco mexicanus*) and hawks and resting, cover, foraging, and hibernating habitats for snakes (called **hibernaculum**). Extensive talus slopes and cliffs associated with Umtanum Ridge are present in the study area south of Segment 1. Talus, basalt outcrops, and cliffs are also present where Segment 3 crosses near Gable Butte.

Segment 4 crosses approximately 3.5 miles of the Hanford Dunes, which is located in the Hanford Reach National Monument and an area that is known to support reptiles such as side-blotched lizard (*Uta stansburiana*) and several species of snake, including racer (*Coluber constrictor*), gopher snake (*Pituophis melanoleucus*), and western rattlesnake (*Crotalus viridis*).

The project area is outside of primary winter ranges of both Rocky Mountain elk and mule deer. The Rattlesnake Hills elk herd that inhabits the Hanford Site tends to winter on the Fitzner-Eberhardt

Arid Lands Ecology Reserve Unit, located south and west of the project area (Newsome 2011). Mule deer tend to concentrate near the Columbia River, where they rely mainly on shoreline vegetation and bitterbrush shrubs for browse (Duncan 2007).

Special-Status Species

Federal Threatened and Endangered Species

The USFWS has not designated any terrestrial habitats of the Hanford Site as critical habitat (USFWS 2011). Two species listed as threatened or endangered potentially occur in Benton County: the pygmy rabbit (*Brachylagus idahoensis*) and the gray wolf (*Canis lupus*) (USFWS 2011). The pygmy rabbit is a federal and State endangered species. The last known wild subpopulation was extirpated by early 2004 (WDFW 2012). The WDFW has been conducting a captive breeding and release program that has established isolated populations in Grant and Adams counties and, most recently, in the Sagebrush Flat Wildlife Area in Douglas County (Duncan 2007, WDFW 2011). Due to this restricted current distribution, pygmy rabbits are likely absent from the study area.

The gray wolf is becoming reestablished in Washington, but the closest wolf pack is in the Blue Mountains approximately 70 miles east of the study area (WDFW 2012), and no wolf sightings have been reported at the Hanford Site. Based on this current distribution, use of the site by wolves is limited to possible wide-ranging transients.

The USFWS species list identified two candidate species as potentially occurring in Benton County: the yellow-billed cuckoo (*Coccyzus americanus*) and the greater sage-grouse (*Centrocercus urophasianus*) (USFWS 2011). According to the Washington breeding bird atlas, yellow-billed cuckoo is believed to have been extirpated as a breeder in Washington and, therefore, is likely absent from the study area (Washington NatureMapping Program 2012). Greater sage-grouse were historically present at the Hanford Site, but major fires are believed to have eliminated the native bunchgrass cover needed by the species, and only infrequent transient individuals are expected to occur in the area (Stinson et al. 2004, Duncan 2007). Long-term plans of shrub-steppe recovery at the Hanford Site include possible reintroduction of this species in the future (Stinson et al. 2004).

Level of Concern Ratings

As described in Section 3.4, DOE-RL manages biological resources at the Hanford Site following the *Hanford Site Biological Resources Management Plan* (DOE-RL 2001) and associated level of concern ratings (Levels I, II, III and IV), with Level I being the lowest sensitivity and Level IV the highest.

For wildlife species, levels of concern track closely (but not exactly) with special-status species designations of the WDFW's priority habitats and species (PHS) program (WDFW 2008).

- Level I wildlife species (i.e., not special status) present in the study area include common species (typically not PHS species), such as the Great Basin pocket mouse and deer mouse (*Peromyscus maniculatus*).
- Level II wildlife species include most species of birds (due to protection under the Migratory Bird Treaty Act, see Section 4.3.4) and species identified as **monitor species** (species not considered species of concern, but are monitored for status and distribution by the WDFW).

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- Level III wildlife species include state-threatened species, including the ferruginous hawk, as well as several shrub-steppe-associated or -dependent species such as burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), sage sparrow, and striped whipsnake (*Masticophis taeniatus*). The golden eagle (*Aquila chrysaetos*) is also included in this category.
- Level IV wildlife species include four terrestrial species, only one of which, the bald eagle (*Haliaeetus leucocephalus*), is known to regularly occur at the Hanford Site but not in the study area (DOE-RL 2001). Bald eagles use is limited to within 0.25 mile of the Columbia River, primarily during winter (DOE-RL 2009a). While bald eagles can be wide-ranging and may occasionally fly over any portion of the Hanford Site, no bald eagle foraging, perching, or night roosting locations are located within the study area (DOE-RL 2009b).

DOE-RL's biological resource inventory data include records of Level III species within the study area, including ferruginous hawk, Swainson's hawk (*Buteo swainsoni*), and burrowing owl (DOE-RL 2012). Project-specific surveys for ferruginous hawks and other hawks that nest in stick nests were conducted in April 2012 using protocols developed in consultation with the WDFW and DOE-RL (Point Environmental Consulting 2012a) and three active ferruginous hawk nests were found within the study area. Two were located on steel-lattice towers of the Midway-Benton No. 2 transmission line, which follows the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines within Segment 4 (Point Environmental Consulting 2012b) and one was located on a basalt cliff 0.5-mile north of Segment 3 on the north side of Gable Butte. Additional surveys will be conducted later in the 2012 nesting season for hawks and burrowing owl, and results of these surveys will be included in the Final EA.

Other Level III species present in the study area include the shrub-steppe-dependent sage sparrow and loggerhead shrike, which are likely present within portions of Segments 2, 3, and 4 that contain late-successional (Levels III and IV) shrub-steppe. Table 3.5-1 lists all special-status species (or groups of species) likely to occur within the study area.

Table 3.5-1. Special-Status Wildlife Species Likely to Occur within Study Area

Species	Federal Status ¹	State Status ^{2,3,4}	Level of Concern	Distribution in Vicinity of Study Area
Ferruginous hawk <i>Buteo regalis</i>	Species of Concern	Threatened	III	Nesting occurs on steel-lattice towers associated with 230-kV lines located adjacent to the existing and proposed ROWs and on Gable Butte. Most foraging occurs off-site on and near croplands.
Swainson's hawk <i>Buteo swainsoni</i>	None	Monitor	III	Nesting occurs on steel-lattice towers associated with 230-kV lines located adjacent to the existing and proposed ROWs.
Golden eagle <i>Aquila chrysaetos</i>	None	Candidate	III	Not known to nest on the Hanford Site, but breeding pairs, migrants, dispersing juveniles, and wintering individuals may forage throughout the study area.
Burrowing owl <i>Athene cunicularia</i>	Species of Concern	Monitor	III	Known to occur near Segment 2 (proposed center segment) and near the Hanford Dunes in Segment 4 (eastern segment).
Loggerhead shrike <i>Lanius ludovicianus</i>	Species of Concern	Candidate	III	Occurs throughout Levels III and IV shrub-steppe habitat.

Table 3.5-1. Special-Status Wildlife Species Likely to Occur within Study Area (continued)

Species	Federal Status ¹	State Status ^{2,3,4}	Level of Concern	Distribution in Vicinity of Study Area
Sage sparrow <i>Amphispiza belli</i>	None	Candidate	III	Occurs throughout Levels III and IV shrub-steppe habitat.
Striped whipsnake <i>Masticophis taeniatus</i>	None	Candidate	III	Uncommon presence, but individuals may be present throughout the study area.
Pale Townsend's big-eared bat <i>Corynorhinus townsendii pallescens</i>	Species of Concern	Candidate	III	Not reported on Hanford Site, but potentially present throughout the study area.
Townsend's ground squirrel <i>Spermophilus townsendii</i>	Species of Concern	Candidate	II	Documented in and near the Hanford Dunes. May be present throughout the Hanford Site.
Black-tailed jackrabbit <i>Lepus californicus</i>	None	Candidate	II	Uncommon species presence, but potentially present throughout the study area.
Grasshopper sparrow <i>Ammodramus savannarum</i>	None	Monitor	II	Occurs throughout Levels III and IV shrub-steppe habitat.
Long-billed curlew <i>Numenius americanus</i>	None	Monitor	II	May nest and forage in cleared areas (Level I vegetation) located in scattered patches throughout the study area.
Northern grasshopper mouse <i>Onychomys leucogaster</i>	None	Monitor	II	Associated with Hanford Dunes.
Sagebrush lizard <i>Sceloporus graciosus</i>	Species of Concern	Candidate	II	
Peregrine falcon <i>Falco peregrinus</i>	None	Monitor	II	Nests in cliffs. Forages throughout the study area.
Prairie falcon <i>Falco meicanus</i>	None	Monitor	II	
Short-horned lizard <i>Phrynosoma douglassi</i>	None	Monitor	II	Occurs at low densities throughout the study area.
Night snake <i>Hypsiglena torquata</i>	None	Monitor	II	Associated with talus. Most likely in Segment 1 (western segment) and Segment 3 (existing center segment).
Special-status bats (five species) ⁵	None	Monitor	II	Roost near basalt outcrops. Forage throughout the area, but this species is more common near the Columbia River.
Special-status butterflies (eight species) ⁵	None	Monitor	II	Occurs throughout Levels III and IV shrub-steppe habitat.

Sources: Duncan 2007, TNC 1999, WDFW 2008, USFWS 2011, Gitzen et al. 2001, Hallack 1998

¹Federal species of concern is an informal term that refers to those species which the USFWS believes might be in need of concentrated conservation actions

²State threatened species include "any wildlife species native to the state of Washington that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats."

³State monitor species are not considered species of concern, but are monitored for status and distribution. They are managed by the WDFW, as needed, to prevent them from becoming endangered, threatened, or sensitive.

⁴State candidate species are those planned for review for possible listing as state endangered, threatened, or sensitive. A species will be considered for designation as a state candidate if sufficient evidence suggests that its status may meet the listing criteria defined for state endangered, threatened, or sensitive.

⁵ See Appendix C for a full list of the special-status bat and butterfly species.

3.5.2 Environmental Consequences—Proposed Action (Reroute Alternative)

Impacts on wildlife from the Proposed Action could include incidental mortality from construction equipment and associated ground disturbance from access road work and structure removal and installation; temporary displacement of wildlife near work areas and helicopter flight paths; avian mortality due to collisions with conductors, ground wires, and guy wires; and long-term habitat modification, loss, and degradation from access road work and removal and installation of structures.

Wildlife Disturbance

Incidental mortality from project construction under the Proposed Action would be avoided for most wildlife species because animals are typically highly mobile and will quickly flee if startled by construction equipment. However, small mammals and reptiles that take refuge and hibernate underground (construction would occur over winter) could be harmed or killed during construction. Species that could be harmed in this way include the abundant Great Basin pocket mouse and some less abundant state monitor species such as short-horned and sagebrush lizards, Townsend's ground squirrels, and northern grasshopper mouse. Direct disturbance of snake hibernaculum, including those possibly used by striped whipsnake, a Level III species, would not occur because no talus habitat would be affected. Overall, while some incidental mortality of small animals may occur as a result of the Proposed Action, for those species that are common and prolific reproducers, impacts would occur at the scale of individuals and would likely not have an effect on the local or regional populations. Therefore, incidental mortality impacts on wildlife would be ***low*** to ***moderate***.

Temporary displacement of wildlife would result from increased noise and activity levels, including the use of heavy equipment and helicopters to remove and install structures, string conductor, and conduct access road work. Noise from land-based construction activities along the existing and proposed ROWs would represent a temporary increase over ***ambient*** noise conditions. Periods of elevated helicopter noise, which may disturb wintering elk and bald eagles, would typically be limited in duration to approximately 3 hours for any given line mile. Given the temporary nature of the construction activity noise and the limited duration of helicopter use in any particular line mile, the impact associated with noise would be temporary and ***moderate***.

Avian Disturbance

Avian mortality is known to occur due to collisions with human-made structures, including transmission lines (USFWS 2002). The existing and proposed ROWs are located away from the Columbia River and associated flyways and avian concentration areas, so the risks to birds from the Proposed Action would remain similar to the existing ***low*** levels.

Under the Proposed Action, aging conductors and ground wire would be replaced, and the new conductors and ground wire would be more reflective for a few years after installation until the wires naturally weather and dull. Initially, the potential for collisions may be reduced due to the new conductors being slightly larger and more reflective than those currently deployed, but it is likely that any benefit will decrease over time. Even after the conductors and ground wires weather and dull, bird mortality risks as a result of collisions with conductors or ground wires would remain similar to current levels because the lines would remain generally in the same location and away

from the Columbia River and associated flyways and avian concentration areas. Therefore, conductors and ground wires that would be reinstalled under the Proposed Action would result in same **low** impact as current conditions.

Disturbance during the migratory bird nesting season would be avoided through construction timing. Vegetation clearing is proposed to take place from October 2012 through March 2013, which is outside of the migratory bird breeding season. BPA would avoid impacts on nesting ferruginous hawks by avoiding construction within 0.6 mile of any active nest site from March 1 through August 1, as required by the *Hanford Site Biological Resources Management Plan* (DOE-RL 2001). BPA is conducting surveys for nesting hawks and burrowing owls along the entire proposed and existing ROWs and will be developing site-specific timing restrictions to avoid disturbing nesting hawks and burrowing owls. Based on the implementation of mitigation measures (see Section 3.5.4), **no** direct impacts on active nest sites or dens in vegetation clearing sites would occur.

Seasonal timing restrictions (see Section 3.5.4) would also minimize possible disturbance of nesting migratory birds from work crews entering the area for operations and maintenance, and thus, the impacts on migratory birds is considered **low**.

Habitat Disturbance

Long-term habitat modification, loss, and degradation would be the most notable impact on wildlife from the Proposed Action because impacts would be long term and would affect many types of wildlife, including the several special-status species known to occur within the study area. The Proposed Action would result in temporary disturbance of approximately 19.4 acres of late-successional shrub-steppe habitat (Levels III and IV) and 0.4 acre of basalt outcrops (a Level IV habitat type) (Table 3.4-2). The Proposed Action would also result in the permanent loss of 30.0 acres of late-successional shrub-steppe habitat (Levels III and IV) through structure placement and access road construction/improvement (Tables 3.4-2 and 3.4-3). Loss of this habitat would directly reduce the local carrying capacity for shrub-steppe-dependent species, including sage sparrow and loggerhead shrike.

As required under the *Hanford Site Biological Resources Management Plan*, direct loss of late-successional shrub-steppe habitat (i.e., Levels III and IV resources) would require on-site restoration and/or off-site compensatory mitigation to achieve no net loss of habitat values (DOE-RL 2001). Mitigation measures (see Section 3.5.4) would include specific measures to avoid, minimize, and restore or mitigate for impacts to late-successional shrub -steppe and associated wildlife habitat values. Through the implementation of the mitigation measures identified in Section 3.5.4 and those developed in coordination with DOE-RL and other interested parties, net impacts on special-status wildlife species from long-term habitat loss would be **low** to **moderate**.

Special-Status Species

As described in Section 3.5.1, no federally listed threatened, endangered, or candidate species are present within the wildlife study area. Impacts on other special-status species would be **low** to **moderate**, as evaluated in the previous three subsections (as part of Section 3.5.2) and as summarized in Table 3.5-2.

Table 3.5-2. Impact Determinations for Special-Status Wildlife Species

Impact Magnitude	Rationale¹	Species	Level of Concern
Low	Nest disturbance would be avoided through seasonal timing restrictions. Minor reduction in habitat, based on large home range.	Ferruginous hawk (most foraging occurs off-site)	III
		Swainson’s hawk	
		Burrowing owl	
		Long-billed curlew	II
	Likely absent during proposed construction.	Striped whipsnake	III
		Night snake	II
	Minor reduction in habitat, based on large home range. Nesting occurs greater than 0.6 mile from proposed construction areas.	Golden eagle	III
		Peregrine falcon	II
		Prairie falcon	
Moderate	Nest disturbance would be avoided through seasonal timing restrictions.	Loggerhead shrike	III
		Sage sparrow	
		Grasshopper sparrow	II
		Black-tailed jackrabbit	
	Possible disturbance and incidental mortality during construction. Impacts would be limited to the site of action and at the scale of individuals and would not likely affect local or regional population levels for common and fast reproducing species.	Townsend’s ground squirrel	II
		Northern grasshopper mouse	
		Short-horned lizard	
		Sagebrush lizard	

¹For all species, habitat loss would require, as applicable, on-site restoration and/or off-site compensatory mitigation, in accordance with the *Hanford Site Biological Resources Management Plan* (DOE-RL 2001) and *Hanford Site Biological Resources Mitigation Strategy* (DOE-RL 2003).

3.5.3 Environmental Consequences—Rebuild-in-Place Alternative

Impacts on wildlife from the Rebuild-in-Place Alternative would be similar to those described under the Proposed Action. Similar activities could cause incidental wildlife mortality; temporary displacement of wildlife; avian collisions; and long-term habitat modification, loss, and degradation.

Wildlife Disturbance

As with the Proposed Action, incidental mortality from project construction under the Rebuild-in-Place Alternative would be avoided because most wildlife species are highly mobile and will flee if startled by construction equipment. However, small mammals and reptiles that take refuge and hibernate underground could be harmed or killed during construction. Overall, while some incidental mortality of small animals may occur as a result of the Rebuild-in-Place Alternative, for those species that are common and prolific reproducers, impacts would occur at the scale of

individuals and would likely not have an effect on the local or regional populations. Therefore, incidental mortality impacts on wildlife would be **low to moderate**.

As with the Proposed Action, increased noise and activity levels during construction of the Rebuild-in-Place Alternative would result in temporary displacement of wildlife although the impact would be temporary. Periods of elevated helicopter noise, would typically be limited in duration to approximately 3 hours for any given line mile. Given the temporary nature of the construction activity noise and the limited duration of helicopter use in any particular line mile, the impact associated with noise would be temporary and **moderate**.

Avian Disturbance

As with the Proposed Action, the existing ROWs are located away from the Columbia River and associated flyways and avian concentration areas, so the risks to birds from the Rebuild-in-Place Alternative would remain similar to existing **low** levels.

New conductors and ground wire installed for the Rebuild-in-Place Alternative be more reflective for a few years after installation until the wires naturally weather and dull similar to the Proposed Action. This may initially reduce the potential for collisions, but it is likely that any benefit would decrease over time. Bird mortality risks as a result of collisions with conductors or ground wires would remain similar to existing impact levels (**low**) as the lines would remain in the same location.

As with the Proposed Action, the migratory bird nesting season would be avoided (vegetation clearing would occur between October 2012 and March 2013). Nesting ferruginous hawks within 0.6 mile of project activities would be avoided from March 1 through August 1. Based on the implementation of these measures, **no** direct impacts on active nest sites in vegetation clearing sites would occur. BPA is conducting surveys for nesting hawks and burrowing owls along the existing ROWs and will be developing site-specific timing restrictions to avoid disturbing nesting hawks and burrowing owls.

Seasonal timing restrictions (see Section 3.5.4) would also be used during operation and maintenance to minimize possible disturbance of nesting migratory birds; impacts during operation and maintenance would be **low**.

Habitat Disturbance

Temporary and permanent alteration of shrub-steppe habitat during access road construction and reconstruction, structure replacement, and the installation of new structures under the Rebuild-in-Place Alternative would reduce habitat for wildlife species associated with such habitats. These impacts would be minimized under the Rebuild-in-Place Alternative because, with the exception of seven structures, all would be constructed within the footprints of existing structures. The structure installation, access road construction, and associated work would result in the temporary disturbance of approximately 18.7 acres of late-successional shrub-steppe habitat (Levels III and IV) (Table 3.4-2) and a permanent loss of approximately 30.3 acres of late-successional shrub-steppe habitat (Levels III and IV) and 0.7 acres of basalt outcrop (a Level IV habitat type) (Tables 3.4-2 and 3.4-3).

As with the Proposed Action, loss of late-successional shrub-steppe habitat (i.e., Levels III and IV resources) would require on-site restoration and/or off-site compensatory mitigation to achieve no net loss of habitat values. Through the implementation of mitigation measures (see Section 3.5.4) and those developed in coordination with DOE-RL and other interested parties prior to project construction, the direct impacts from loss of habitat would be **low to moderate**.

Special-Status Species

As discussed in Sections 3.5.1 and 3.5.2, no federally listed threatened, endangered, or candidate species are present within the wildlife study area (**no** impact would occur to these species under the Rebuild-in-Place Alternative). Impacts on other special-status species would be **low to moderate**, as described above in this section (Section 3.5.3), and summarized in Table 3.5-2.

3.5.4 Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative

If the Proposed Action or Rebuild-in-Place Alternative is implemented, the following mitigation measures would minimize impacts on wildlife and their habitats:

- Minimize the project ground disturbance footprint, including access road widths, particularly in special-status areas, which can include shrub-steppe.
- Reseed disturbed areas (see Section 3.4.4).
- Prepare for fire control (see Section 3.4.4) to protect habitats.
- Plant native shrubs, such as big sagebrush, to replace shrub cover temporarily lost during construction.
- Reseed disturbed areas after construction and regrading are complete, at the appropriate time period for germination, with a seed mix recommended by DOE-RL and other Hanford land management agencies and in consultation with other interested parties, as appropriate.
- Avoid construction or other disturbance within 0.6 mile of active or potentially active ferruginous hawk nest sites from March 1 through August 1.
- Avoid all historic ferruginous hawk nest site locations after March 1 until it is certain a particular location will not be used for nesting that breeding season.
- Develop a nest site protection plan that addresses construction-related impacts on Swainson's and red-tailed hawks, burrowing owl, long-billed curlew, and other bird species.
- Continue to advise transmission maintenance crews on an annual basis of the occurrence (general and/or specific locations), seasons of use, and sensitivity of nesting migratory birds, raptors, and other special-status species that could be adversely affected by maintenance activities. These crews will incorporate this information into their maintenance planning and schedules to minimize adverse impacts on sensitive species.

3.5.5 Unavoidable Consequences Remaining After Mitigation— Proposed Action and Rebuild-in-Place Alternative

Some incidental mortality of small mammal and reptile species that hibernate or take refuge underground may be unavoidable, but impacts would occur at the scale of individuals; therefore, impacts would be **low** to **moderate**.

Temporary displacement of wildlife would result from increased noise and activity levels during construction, but such impacts would be temporary, and wildlife would be expected to return after construction; therefore, impacts would be **low**.

The Proposed Action and Rebuild-in-Place Alternative would result in the loss of wildlife habitat, including late-successional shrub-steppe habitat (Levels III and IV). Loss of late-successional shrub-steppe would directly reduce the local carrying capacity for shrub-steppe-dependent species, including sage sparrow and loggerhead shrike. With the implementation of avoidance, minimization, rectification and compensatory mitigation measures (Section 3.5.4) to reduce wildlife habitat impacts, net long-term impacts on special-status wildlife species from long-term habitat loss would be **low** to **moderate**.

3.5.6 Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative

The region of influence considered for cumulative impacts on wildlife is the Hanford Site. While the Hanford Site contains some of the largest blocks of remaining shrub-steppe habitat in the Columbia Basin, several past and ongoing actions have disturbed and removed large areas of shrub-steppe at the site, including development associated with nuclear facilities, site cleanup, and wildfires.

Reasonably foreseeable future actions are expected to have disturbance at a **low** incremental contribution to cumulative impacts because the *Hanford Comprehensive Land Use Plan* directs future development to previously disturbed areas. Future BPA actions, as described in Appendix A, would occur in previously-disturbed ROW in areas with previous habitat alteration. Shrub-steppe habitat values at the Hanford Site are also undergoing some cumulative improvement, as rehabilitation efforts are underway over many hundreds of acres. Over time, these areas are expected to increase the amount and values of shrub-steppe habitats at the Hanford Site.

Considered collectively, these past, ongoing, and reasonably foreseeable actions have resulted in cumulative losses at a much larger scale than would occur under the Proposed Action or Rebuild-in-Place Alternative. Impacts resulting from the proposed project would be limited to the site of action, and on-site restoration and off-site compensatory mitigation would result in no net loss of Levels III and IV shrub-steppe habitats. As such, the incremental contribution of the Proposed Action or the Rebuild-in-Place Alternative to cumulative impacts on wildlife and their habitat would be **low**.

3.5.7 Environmental Consequences—No Action Alternative

Under the No Action Alternative, current vegetation management practices would continue, including application of herbicides at structure locations. The frequency of maintenance events and the level of associated impact would likely increase under the No Action Alternative as structures deteriorate over time and more substantial maintenance activities are required. If it were necessary to perform repairs on an emergency basis, it would likely not be possible to plan or time them to minimize impacts to wildlife and their habitat.

3.6 Water Resources

3.6.1 Affected Environment

The water resources study area includes all areas within 500 feet of existing and proposed ROWs, access roads, and staging areas. Unless otherwise noted, the information presented here regarding water resources is based on DOE-RL's *Hanford Site National Environmental Policy Act (NEPA) Characterization* report (Duncan 2007).

Surface Water and Wetlands

West Lake, a 23-acre wetland, is located approximately 1,800 feet north of Segment 3 and near the base of the western end of Gable Mountain. This wetland would be located outside of the study area, but it is the nearest wetland identified. ***Vernal pools***, small bodies of water that exist seasonally, are known to occur below the ridgelines of Gable Butte and Gable Mountain near Segment 3, but none of these features were identified within the project impact areas during field surveys. Additionally, the study area is well outside the riparian zone of the Columbia River, with the closest points being at the Midway Substation, which is approximately 4,100 feet (0.8 mile) from the Columbia River, and at the Benton Substation, which is approximately 1,650 feet (0.3 mile) from the Columbia River. In addition, because the area contains no nearby surface waters or riparian habitat (see Section 3.4), fish and other aquatic organisms are absent from the affected environment and are not evaluated further.

Floodplains

DOE-RL mapped the "probable maximum flood" area, which depicts those areas that would be flooded during a "500-year flood" event (Duncan 2007)³. Based on review of the probable maximum flood mapping, the Midway Substation is located on the southernmost edge of the Columbia River flood boundary and the Benton Substation is located about 200 feet west of the maximum 500-year flood event.

Groundwater

Groundwater at the Hanford Site includes a shallow aquifer and a deep aquifer, neither of which have been defined as ***sole source aquifers***. The shallow aquifer is "unconfined," meaning that there is no physical barrier between the ground surface and the aquifer and that fluids can reach this aquifer through drainage from the surface. Depths of this aquifer range from approximately 40 feet at the Midway and Benton substations to approximately 100 feet in the central portions of the existing and proposed ROWs (Duncan 2007). Groundwater at the Hanford Site is obtained by DOE-RL groundwater pump stations throughout the site.

³ The Federal Emergency Management Agency (FEMA) maps flood elevations and floodplain areas of major water bodies (such as the Columbia River) throughout the United States for use by insurance companies and land owners in assessing flood risks and needs to protect against flooding. No floodplain maps have been prepared for the Hanford Site because FEMA only maps developing areas, which are primarily private lands and therefore excludes the Hanford Site.

3.6.2 Environmental Consequences—Proposed Action (Reroute Alternative)

Because the study area is 1,650 feet from the Columbia River, the Proposed Action would have **no** impact on the Columbia River or its associated floodplains. The unintentional release of fuels, oils, or chemicals during construction may result in hazardous materials entering the groundwater through drainage. However, the risk of spills would be minimized by implementation of mitigation measures (see Section 3.6.4), which require a Spill Prevention and Response Procedures to be prepared and that spill prevention and response equipment be present at all construction sites. Impacts to groundwater contamination would be **low**.

Because the study area contains no wetlands, streams or other surface waters, the Proposed Action would have **no** effect on surface waters or wetlands.

3.6.3 Environmental Consequences—Rebuild-in-Place Alternative

As with the Proposed Action, the Rebuild-in-Place Alternative at its closest point would be approximately 1,650 feet from the Columbia River, and would not cross other surface waters, wetlands, or floodplains. Therefore, the Rebuild-in-Place Alternative also would have **no** impact on surface waters. Groundwater impacts associated with hazardous material spills would be the same as those under the Proposed Action. Impacts to groundwater contamination would be **low** following the development of Spill Prevention and Response Procedures (see Section 3.6.4).

3.6.4 Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative

If the Proposed Action or Rebuild-in-Place Alternative is implemented, the following mitigation measures would minimize potential impacts on water resources:

- Prepare and implement, in coordination with DOE-RL, Spill Prevention and Response Procedures to prevent and contain accidental spills, including notification procedures.
- Locate refueling and servicing operations where spilled material cannot enter natural or manmade drainage conveyances (e.g., ditches, catch basins, ponds, wetlands, streams, and pipes). Use pumps, funnels, absorbent pads, and drip pans when fueling or servicing vehicles.

3.6.5 Unavoidable Consequences Remaining After Mitigation—Proposed Action and Rebuild-in-Place Alternative

The Proposed Action and Rebuild-in-Place Alternative would be unlikely to impact water resources, including surface water and wetlands, floodplains, and ground water quantity; therefore, there would be **no** project-related unavoidable impacts.

3.6.6 Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative

With the implementation of mitigation measures (see Section 3.6.4), the Proposed Action and Rebuild-in-Place Alternative would be unlikely to contribute to any cumulative water resource impacts in the study area.

3.6.7 Environmental Consequences—No Action

The existing Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines do not cross any water resources. Therefore, any future maintenance activities would have **no** impact on water resources, even if maintenance frequency increases as the existing transmission lines deteriorates.

3.7 Visual Quality

3.7.1 Affected Environment

The study area for visual resources includes the existing and proposed ROWs, access roads, and surrounding lands from which the ROWs and access roads can be seen.

The visual setting of the Hanford Site consists of expansive views of low-relief grass and shrub-steppe over the relatively level plateau of the Pasco Basin. These views are complemented by high-relief geologic features, including Umtanum and Yakima ridges to the west, Rattlesnake Mountain to the south, and the Columbia River and associated White Bluffs formation to the north. Gable Butte and Gable Mountain are prominent features within the otherwise level plateau study area.

Development within the Hanford Site is primarily widely spaced industrial areas, including historic reactors located along the Columbia River and two designated industrial zones: the Central Plateau (also called the 200 Area), located less than a mile south of Segment 2, and the South 600 Area, located in the southeast portion of the Hanford Site and near the Benton Substation. The South 600 Area is where Energy Northwest's Columbia Generating Facility nuclear power plant is located and from which cooling towers and stream plumes can be seen from miles away. The Energy Northwest nuclear reactors and DOE facilities of the Central Plateau are brightly lit at night and are highly visible from many areas.

Transmission lines and structures are also a major visual component of the Hanford Site, with several 500-kV and 230-kV lines with steel-lattice towers and 115-kV lines with H-framed wood structures. Both the existing and proposed ROWs for the proposed project are located adjacent to existing utility ROWs. Other built components that comprise the visual landscape at the Hanford Site include SR 24 and SR 240.

The built features, while clearly evident, do not dominate the landscape and, within the context of the Hanford Site as a historic nuclear facility, can be considered an integral part of the Hanford landscape. Based on criteria developed by the U.S. Bureau of Land Management (BLM) to rate scenic quality (BLM 1986), overall scenic values of the Hanford Site are high because the area contains the following:

- High-vertical geographic features, such as Gable Butte and Gable Mountain, Rattlesnake Mountain, set against expansive open space.
- The Hanford Reach of the Columbia River, which is in the Hanford Reach National Monument, is eligible, but not currently proposed, for designation as a Wild and Scenic River (USFWS 2008).
- Historic cultural features, including the "B-Reactor," located approximately 1.5 miles south of Segment 3. The B-Reactor is a National Historic Landmark that is also being proposed for designation as part of the Manhattan Project ***National Historical Park*** (NPS 2010).

Viewer groups within the study area include American Indians, public viewers from area highways, recreational viewers from the Columbia River Unit of the Hanford Reach National Monument, and

Hanford site workers and visitors. The majority of the study area is closed to public access and, therefore, has relatively few public viewers. American Indians have access to portions of the Hanford Site that have cultural significance and American Indians are the primary viewers using the Gable Butte and Gable Mountain area for traditional cultural uses (see Section 3.8.1). American Indians and recreational viewers from the Columbia River are the viewer groups most sensitive to visual change.

The following viewpoints have been selected as representative views for the visual quality analysis (Figure 3.7-1) and indicate which viewer groups are likely to use the viewpoint.

- **Viewpoint 1—Gable Mountain East:** Eastern summit of Gable Mountain, looking south toward Segments 2 and 3 (primarily American Indian viewers)
- **Viewpoint 2—Gable Butte:** Top of Gable Butte looking southwest along Segment 3 (primarily American Indian viewers)
- **Viewpoint 3—Gable Mountain West:** Western summit of Gable Mountain, looking south toward Segments 2 and 3 (primarily American Indian viewers)
- **Viewpoint 4—Route 11A:** Route 11A looking north toward Gable Mountain (primarily Hanford Site workers)
- **Viewpoint 5—State Route 24:** SR 24 looking east toward Gable Butte (primarily motorists)

A description of the current *viewshed* from each of the viewpoints is discussed below.

Viewpoint 1—Gable Mountain East

Viewer sensitivity from Viewpoint 1 is high. American Indians use this area for traditional cultural uses (see Section 3.8.1). Many major landforms are visible from this location, including the Columbia River and White Bluffs to the north and east, the expansive floor of the Pasco Basin to the north and south, and the western portion of Gable Mountain to the west. Rattlesnake Mountain and Yakima and Umtanum ridges are visible in the background, and the top of Mount Adams can be seen in the far background behind Yakima Ridge. Collectively, these visual components combine to create high visual quality, which was determined qualitatively based on the eight key factors listed in BLM “Scenic Quality Rating Form” (BLM 2006).

The existing Midway-Benton No. 1 and Midway Benton No. 2 transmission lines are visible in the middle ground approximately 0.5 mile from Viewpoint 1. However, most structures are visually set against the dark background and broken texture of shrub-steppe cover; therefore, the existing wood and steel structures have relatively low contrast to the landscape and are minor visual elements from this viewpoint (Figures 3.7-2 and 3.7-3). The Midway-Benton No. 1 transmission line structures located against the lighter background of grasslands are more visible. Energy Northwest’s Columbia Generating Facility and the Hanford Site 200 Area are visible in the distance, but these features do not dominate the view during the daylight. These two facilities’ visual presence is greater at night, when lighting from these areas is clearly visible.

MIDWAY - BENTON NO.1 REBUILD PROJECT

Viewpoint Map

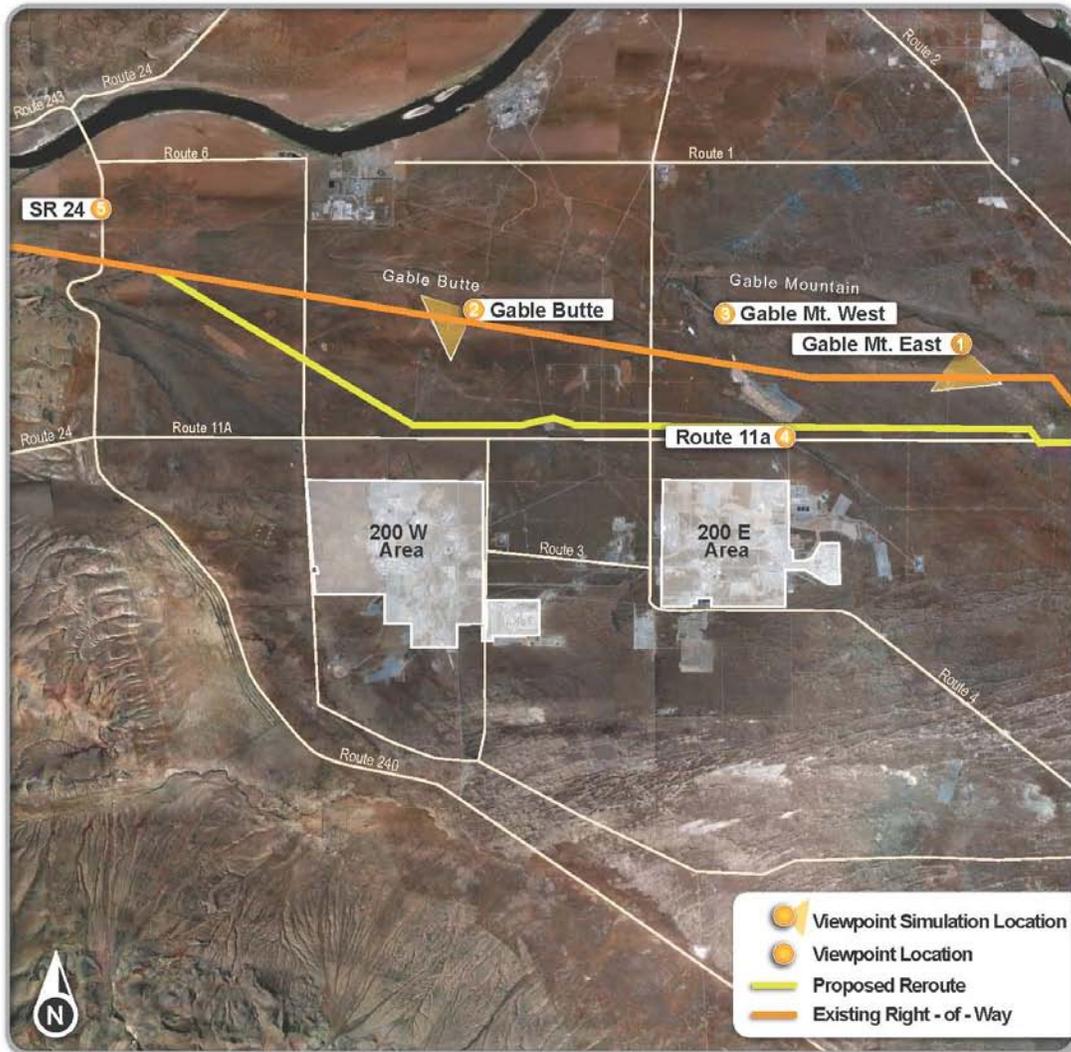


Figure 3.7-1. Representative Viewpoints



Figure 3.7-2. Viewpoint 1. Gable Mountain, Looking South

Note: Arrows on right and left indicate wood structures of the Midway-Benton No. 1 transmission line. Center arrow indicates steel-lattice tower structures of the Midway Benton No. 2 line.

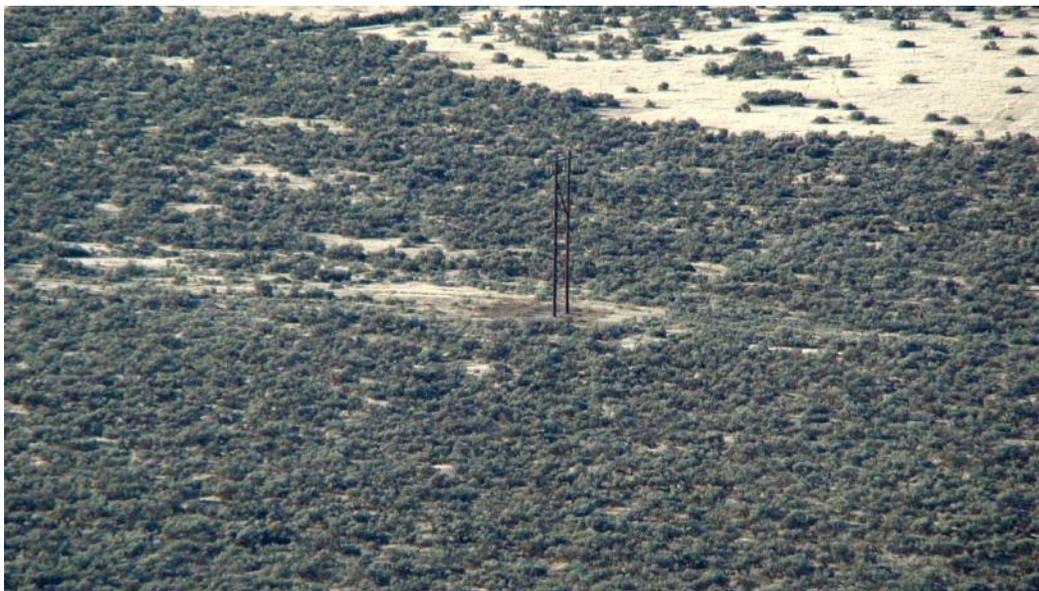


Figure 3.7-3. Background Effects. Existing wood structures viewed from Gable Mountain (photographed using a telephoto lens) are mostly set against a dark background (bottom photo), which greatly reduces their visibility. Structures located against the lighter background of grasslands are more visible (top).

Viewpoint 2—Gable Butte

Viewer sensitivity from Viewpoint 2 is high. American Indians use this area for traditional cultural uses.

Visual quality from Viewpoint 2 is high, which was determined qualitatively based on the eight key factors listed in BLM “Scenic Quality Rating Form” The elevated viewpoint from Gable Butte provides expansive views of the Hanford Site and surrounding landforms.

The industrial zones of the 200 Area are visible 2.8 miles to the south, but these features do not dominate the view. The existing Midway-Benton No. 1 transmission line center segment structures are visible from portions of Gable Butte (Figure 3.7-4). The structures are less than 500 feet horizontal distance at the closest point to Gable Butte and are also set against light-colored grasses, thus increasing the contrast and associated visibility of the existing structures. The transmission lines are also visible from this viewpoint extending west toward the Midway Substation. The visibility of these structures decreases as the distance from the viewpoint increases.



Figure 3.7-4 Viewpoint 2, Gable Butte, Looking Southwest

Note: Arrows indicate existing Midway-Benton No. 1 structures within immediate view. Other Midway-Benton No. 1 structures are visible in background (upper right corner of photo).

Viewpoint 3—Gable Mountain West

Viewer sensitivity from Viewpoint 3 is high. American Indians use this area for traditional cultural uses (see Section 3.8.1).

Visual quality from Viewpoint 3 is high, which was determined qualitatively based on the eight key factors listed in BLM “Scenic Quality Rating Form.” Similar to those described for Viewpoint 1, most of the Pasco Basin’s major landforms and the surrounding landforms can be seen from Viewpoint 3.

The 200 Area industrial zone is visible 2.7 miles directly south of Viewpoint 3, but the industrial features appear near the visual junction of the western base of Rattlesnake Mountain and Yakima Ridge. While noticeable, industrial features do not dominate the view. The existing Midway-Benton No. 1 and No. 2 transmission lines are located approximately 0.7 mile south of the viewpoint, where they are set mostly against the dark background of shrub-steppe vegetation, resulting in low contrast and visibility (Figures 3.7-5 and 3.7-3). Structures set against the lighter grass vegetation are more visible but are relatively minor elements of the view.



Figure 3.7-5. Viewpoint 3. West Gable Mountain, Looking Southwest
Note: Arrow indicates existing Midway-Benton No. 1 two-pole wood structure.

Viewpoint 4—Route 11A

Viewer sensitivity from Viewpoint 4 is low. Route 11A is closed to the public and viewers are primarily Hanford Site workers and commuters with moderate to low concern for visual quality due to high travel speeds and the presence of viewers on the site for work purposes.

Visual quality from Viewpoint 4 is moderate, which was determined qualitatively based on the eight key factors listed in BLM “Scenic Quality Rating Form.” Route 11A is major four-lane divided highway that runs east approximately 15 miles from the Yakima Barricade entrance of the Hanford Site to where the road meets Route 2 near the Columbia River.

The 230-kV DOE-RL steel-lattice tower transmission line with which Segment 2 would follow runs approximately 650 feet north of Route 11A (Figure 3.7-6). A substation and several distribution lines are also located north of the central portions of Route 11A. The current Midway-Benton No. 1 transmission line is located approximately 0.8 mile from the roadway and is visible but not visually dominant.



Figure 3.7-6. Viewpoint 4. Route 11A, Looking Northeast toward Gable Mountain

Note: Midway-Benton No. 1 transmission line is not visible in this photo. The steel-lattice towers are the 230-kV DOE-RL transmission line that the Proposed Action would follow (Segment 2).

Viewpoint 5—State Route 24

Viewer sensitivity from Viewpoint 5 is moderate. Viewers in this area are primarily private motorists and commercial drivers using the public road. Moreover, motorists along this portion of SR 24 typically travel at a relatively high speed (50 to 60 miles per hour [mph]), which reduces their visual sensitivity.

Visual quality from Viewpoint 5 is moderate, which was determined qualitatively based on the eight key factors listed in BLM “Scenic Quality Rating Form.” From SR 24, Gable Butte is visible in the distance (approximately 4 miles) (Figure 3.7-7).

SR 24 is the only publicly accessible area with direct views of the Midway-Benton No. 1 transmission line (Figure 3.7-7). Other than the Washington State Department of Transportation rest stop located 1.5 miles north of the existing Midway-Benton No. 1 transmission line, no vehicle turnouts are located along SR 24 in the study area. The existing wood-pole structures of the Midway-Benton No. 1, the steel-lattice structures of the Midway-Benton No. 2, and DOE-RL transmission lines in this area are sufficiently visible to attract attention and detract somewhat from the scenic quality of Gable Butte viewed from this area; however, the Midway-Benton No. 1 transmission line does not dominate the viewshed due to the speed of viewer travel and the presence of other transmission lines and natural features in the viewshed.



Figure 3.7-7. Viewpoint 5. SR 24 Looking East toward Gable Butte

Note: White solid arrows (pointing downwards) indicate the location of the existing Midway-Benton No. 1 and Midway Benton No. 2 lines. Not all Midway-Benton No. 1 or No. 2 structures are indicated by arrows. Dashed arrow (pointing left to right) indicates a DOE-RL, wood-pole transmission line that is visible in this photo in front of the Midway-Benton No. 1 and No. 2 lines.

3.7.2 Environmental Consequences—Proposed Action (Reroute Alternative)

The Proposed Action would result in temporary and permanent visual changes in the study area. During construction, work crews, backhoes, bucket trucks, boom cranes, and other equipment distributed at up to five work sites would be visible from many locations over the approximate 7-month-long construction period (October to April). Staging areas would be located within previously disturbed areas. Material and equipment storage in these areas would temporarily introduce construction equipment and materials in the visual landscape. Because work crews are a common sight at the Hanford Site and impacts would be temporary, visual impacts of project construction would be **low**.

Constructing new, unpaved access roads; removing existing structures; installing new structures; and establishing pulling and tensioning sites would remove vegetation and expose soils, thereby increasing visual contrast along access roads and at worksites. Further, in areas with rocky substrate, counterpoise may be placed on the ground with aggregate placed over the wires, which would also contribute to a visual contrast. Due to the relatively level terrain, visual changes would be visible primarily from higher viewpoints, such as viewpoints associated with Gable Butte and Gable Mountain. Also, soils and rocks visible in unpaved access roads are generally similar muted color tones as the dominant grass groundcover in the area, so contrast and associated visual impacts would be **low**.

The visual quality in Segments 1 and 4 would be relatively unchanged from current conditions under the Proposed Action, although the replacement structures would be more visible because of the average 10-foot increase in height and more reflective and larger diameter conductors. However, these increases in structure and conductor visibility would not change the overall visual dominance of the line or the visual setting of the study area because replacement conductors would weather and darken over time, which would reduce their visibility. Therefore, the overall impact on visual quality in these areas would generally be **low**.

The greatest permanent visual change from the Proposed Action would occur within Segment 3, where the structures would be removed and not replaced, and within Segment 2, where replacement structures and conductors would be installed in a new location adjacent to an existing 230-kV transmission line. Visual changes in these segments are evaluated below by viewer group—American Indians, Hanford Site visitors and workers, public viewers, and recreational viewers.

Visual impacts from operation and maintenance activities would be temporary, localized, and not result in any substantially new or different impacts on visual resources than existing conditions; therefore, visual impacts would be **low**.

Visual Changes by Viewer Group

American Indian Viewers (Viewpoints 1, 2, and 3)

Construction disturbance from removing existing structures and disturbing adjacent vegetation would result in temporary and **low** visual changes within the Gable Butte and Gable Mountain areas. Structure removal work would be conducted in consultation with DOE-RL cultural resource staff and the consulting tribes (Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes Of the Colville Reservation, CTUIR, Nez Perce Tribe, and Wanapum Band) to minimize disturbance. Once structures are removed from Segment 3, views from Viewpoints 1 through 3 would change because there would be fewer transmission structures and conductors. The most noticeable change would be from near the southern edge of Gable Butte (Viewpoint 2), where existing structures at the base of Gable Butte would be removed and replaced approximately 1.5 miles to the south, where the structures would essentially blend into the background (Figure 3.7-8).

Views from the western summit of Gable Mountain (Viewpoint 3) would be similarly affected, with temporary construction impacts followed by a long-term reduced presence of transmission lines. The Proposed Action would result in less visual change for viewers from the eastern summit of Gable Mountain (Viewpoint 1) because existing structures are set against the dark background of shrub-steppe (Figure 3.7-9).

The proposed extension of the Scootene Tap transmission line by approximately 0.8 mile would introduce seven wood structures south of central Gable Mountain. Existing Scootene Tap transmission line steel-lattice tower structures would remain in place and in use. The Scootene Tap transmission line extension would be located below the low-elevation saddle of Gable Mountain and greater than 1.5 miles from the two highest vantage points on the eastern and western sides of Gable Mountain (Viewpoints 1 and 2). New structures would be set against a background of dark shrub vegetation in this area, which would likely further reduce the contrast and overall visibility of the new structures. As a result, overall visual impacts of the Scootene Tap transmission line extension on views from higher elevations on Gable Mountain would be **low**. Development of the facilities associated with Scootene Tap transmission line (disconnect switches) would be located approximately 2 miles from the higher-elevation viewpoints (1 and 3) and would likely be visible from these viewpoints, but the disconnect switches would be a non-dominant visual feature due to the distance from the viewpoints; therefore, the visual impacts would be **low**.

BPA does not anticipate any road improvements or construction within Segment 3, so roads below Gable Mountain and Gable Butte would look the same as existing unpaved access roads present in the area.

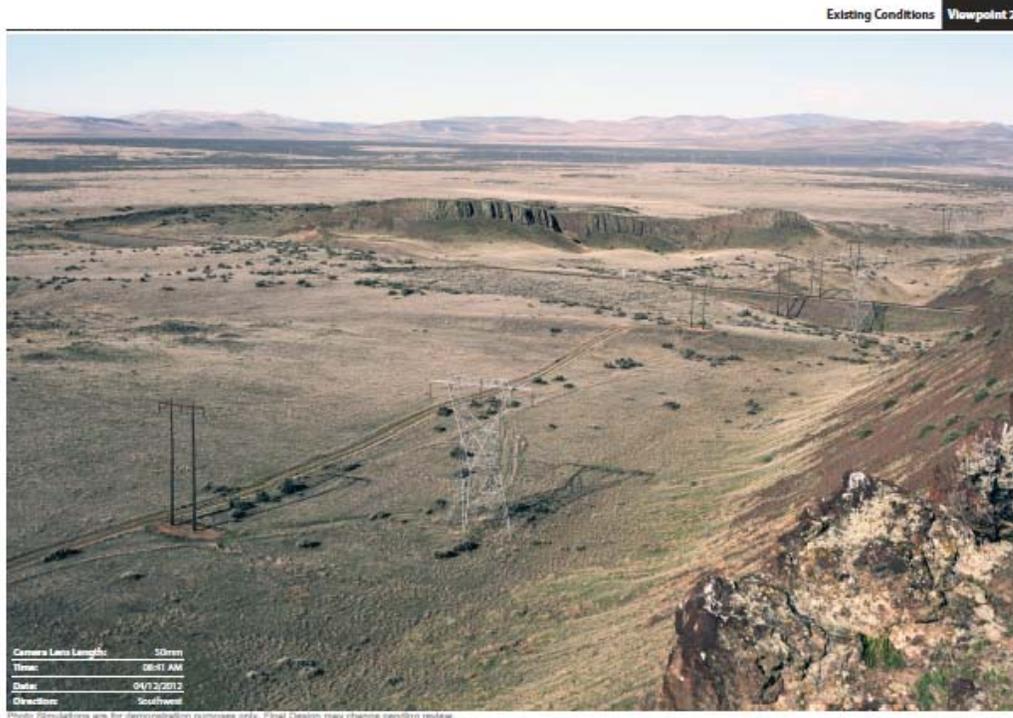


Figure 3.7-8. Existing (top) and Simulated View of the Midway Benton No. 1 and Midway Benton No. 2 Transmission Lines from Gable Butte under the Proposed Action



Figure 3.7-9. Existing (top) and Simulated View of the Midway Benton No. 1 and Midway Benton No. 2 Transmission Lines from East Gable Mountain under the Proposed Action. Due to distance and dark background, the wood structures are minor visual elements within the landscape.

One of the seven staging areas identified by BPA (Pit 26 Site) is located south of the Gable Butte Traditional Cultural Property (TCP), but views are partially screened by the basalt feature adjacent to the butte. Because construction materials would be only temporarily visible in this area and partially screened, the visual impact associated with this staging area would be **low**.

Overall, the visual changes resulting from the Proposed Action to American Indian viewers would include temporary and **low** impacts during construction and long-term **low** to **moderate** beneficial impacts (improvements to views), particularly from the Gable Butte area (Viewpoint 2).

Hanford Site Visitors and Workers (Viewpoint 4)

Segment 2 would be visible from Route 11A (Viewpoint 4), along which the Midway-Benton No. 1 transmission line would be located approximately 1,000 feet from the road. Segment 2 would be located adjacent to the existing DOE-RL 230-kV transmission line. The collocation of the Midway-Benton No. 1 transmission line with the existing 230-kV line would minimize the overall visual effect of the Proposed Action, but the addition of a 115-kV line in the utility corridor would introduce increased visual clutter (from the increased number of structures and differing structure types in the corridor) along Route 11A. The quality of views towards Gable Butte and Gable Mountain from the road would be reduced because of this increased visual clutter in the foreground. Because Route 11A is closed to public use, most viewers would be Hanford Site workers travelling to and from work sites, and this viewer group is generally not sensitive to visual changes because they are travelling at high speeds and are onsite to work. Therefore, the overall visual impact would be **low**.

Public Viewers (Viewpoint 5)

The majority of Segments 1, 2, and 3 would be located outside of the public viewshed, with only the portions near the roadway being potentially visible to motorists traveling along SR 24 (Viewpoint 5). As noted in Section 3.7.1, no formal viewing pullouts are oriented toward the study area. Views from SR 24 would change under the Proposed Action because structures in Segment 2 would be routed south of the current ROW and away from Gable Butte and Gable Mountain. Overall, the visual change would be a moderate improvement over existing conditions because the transmission line would be moved away from Gable Butte, though transmission lines would remain noticeable visual features from this viewpoint. Because most public viewers are traveling at a relatively high speed (50 to 60 mph) through this area, the moderate improvement of views to Gable Butte may not be noticed by most viewers. Overall, the Proposed Action would result in a **low** beneficial impact on public viewers.

Recreational Viewers (Columbia River)

Due to the 1.8 mile distance from the Columbia River to the study area, views of the existing and proposed lines would be background features from the Columbia River and neither Segments 2, 3, or 4 would be dominant features for recreational viewers from this area. Segment 3 is currently most visible from the Columbia River as it crosses the relatively high eastern edge of Gable Mountain. Under the Proposed Action, existing structures in Segment 3 would be removed, but due to the distance, the overall visual change would be **low**. Segment 4 would be rebuilt within the Hanford Dunes, where future recreational trails may be developed. However, because structures would be rebuilt in the same location as existing structures, the overall visual change would be **low**. In addition, this change would have no effect on the eligibility of the Hanford Reach of the Columbia River for designation as a Wild and Scenic River because the existing lines were present when the

eligibility was determined and the proposed lines would be visually similar to the existing structures. Therefore, the overall visual impact on recreational viewers would be **low**.

3.7.3 Environmental Consequences—Rebuild-in-Place Alternative

Temporary construction-related visual impacts associated with the Rebuild-in-Place Alternative would include the presence of construction equipment and construction activities in the study area, vegetation removal for access road and structure installation, earthwork and grading (ground disturbance), and the use of staging areas. Overall, because work crews are a common sight at the Hanford Site and impacts would be temporary, impacts on views from project construction would be **low**.

Rebuilding Segment 3 would require a workspace disturbance over a larger area, compared to the Proposed Action's workspace required for only removing structures in Segment 3. The increased workspace needed for rebuilding structures would disturb more vegetation than removing structures in Segment 3, as would occur under the Proposed Action. The Rebuild-in-Place Alternative would result in more vegetation clearing and soil disturbance that would be visible from higher-elevation viewing areas on Gable Mountain and Gable Butte. This visual impact associated with vegetation clearing and soil disturbance would be temporary until the reestablishment of vegetation. Overall, the temporary change in visual impacts due to vegetation clearing and soil disturbance in workspaces would be **moderate** while vegetation is being restored and **low** once vegetation becomes reestablished.

Visual changes from the Rebuild-in-Place Alternative would be identical to the Proposed Action within Segments 1 and 4. While replacement structures would be on average 10 feet taller than existing structures, the overall appearance of the structures and lines would be similar to existing structures and overall landscape character would remain essentially unchanged compared to current conditions. New, larger, and brighter conductors would increase the visibility of the line spans between structures, although this effect would diminish over time as the conductors weather and dull. Overall, due to the similarity of appearance of the proposed new structures and conductors compared to existing structures and the location of these lines in an existing transmission line corridor, the visual impact of rebuilding these segments in place would be **low**.

Below is a description of the impacts on specific viewer groups under the Rebuild-In-Place Alternative.

American Indian Viewers (Viewpoints 1, 2, and 3)

Rebuilding Segment 3 through the Gable Butte and Gable Mountain areas would result in visual impacts similar to existing conditions. As discussed above, the taller structures and new conductors would slightly increase the visibility of the line. The Rebuild-in-Place Alternative would have the greatest impact on views from Gable Butte (Viewpoint 2) and the west summit of Gable Mountain (Viewpoint 3), where structures would be rebuilt in locations directly below viewing areas. Based on the distance from these viewpoints to the structures, the additional 10 feet of structure height, lighter color of the new wood, and larger and brighter conductors, the rebuilt structures would be more noticeable than existing structures. Because the Rebuild-in-Place Alternative would be a continuation of an existing transmission line, the overall visual impact over existing conditions would be **moderate**.

Under the Rebuild-in-Place Alternative, views from eastern Gable Mountain (Viewpoint 1) would be similar to existing conditions, with structures only moderately visible due to dark shrub cover in the background. Although the new structures and conductors would be slightly more visible than the existing structures, the overall visual impact to viewers at Gable Mountain (Viewpoints 1 and 3) under the Rebuild-in-Place Alternative would be **low**.

Hanford Site Visitors and Workers (Viewpoint 4)

The Rebuild-in-Place Alternative would have **no to low** impact on the viewshed of Hanford workers and visitors from Route 11A. The Midway-Benton No. 1 transmission line would be rebuilt in the same location and would be more than 0.7 mile from the road; therefore, the visual appearance of the transmission line would remain a minor component of the viewshed.

Public Viewers (Viewpoint 5)

Under the Rebuild-in-Place Alternative, the taller, rebuilt structures would be visible from SR 24 (Viewpoint 5) where, as with the existing transmission line, they would be seen angling toward the base of Gable Butte. Overall visual impacts to public viewers would be similar to existing conditions, with structures and new conductors moderately detracting from the natural setting of Gable Butte. Because most public viewers are traveling at a relatively high speed (50 to 60 mph) through this area, the changes in structure height may not be noticed by most viewers. Overall, due to the nature of travel on SR 24, visual impacts to public viewers would be **low**.

Recreational Viewers (Columbia River)

Under the Rebuild-in-Place Alternative, the portion of Segment 3 that is most visible to recreational users along the Columbia River (the portion that crosses a high-elevation area on the eastern edge of Gable Mountain) would be rebuilt in the same location. Due to new, brighter conductors, conductor reflection could be visible from the Columbia River during bright sunlight conditions. However, the overall visual impact would be **low** due to the distance (the closest point would be 1.8 miles away from viewers), the intermittent nature of the reflection, the likelihood the reflection will decrease as the conductor weathers and dulls, and because this area is only a small portion of the total viewshed from the Columbia River.

3.7.4 Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative

If the Proposed Action or Rebuild-in-Place Alternative is implemented, the following mitigation measures would minimize impacts on visual quality:

- Site all construction staging and storage areas away from locations that would be clearly visible from sensitive scenic areas, as much as practical.
- Implement construction site maintenance and clean-up and keep construction areas free of debris.
- Reseed disturbed areas (see Section 3.4.4).

3.7.5 Unavoidable Consequences Remaining After Mitigation— Proposed Action and Rebuild-in-Place Alternative

Both the Proposed Action and Rebuild-in-Place Alternative would have generally **low** impacts on the visual landscape at the Hanford Site and on most viewer groups. The notable exception is for American Indian viewers, particularly in the vicinity of Gable Butte. For these viewers, the Proposed Action would eliminate the presence of H-framed wood structures that, together with the Midway-Benton No. 2 transmission line (steel-lattice towers), visually detract from the natural landscape south Gable Butte (Viewpoint 2) and the west summit of Gable Mountain (Viewpoint 3). Visual change would be less noticeable on the eastern side of Gable Mountain (Viewpoint 1), where the visibility of existing structures is already **low**.

Under the Rebuild-in-Place Alternative, the visual quality impacts of the Midway-Benton No. 1 transmission line would continue from Gable Butte and western summit of Gable Mountain. Because the Rebuild-in-Place Alternative would be a continuation of an existing transmission line, the overall visual impact over existing conditions would be **moderate**.

For other viewer groups, both the Proposed Action and the Rebuild-in-Place Alternatives would generally have **low** impacts on visual quality. Viewers along Hanford Site Route 11A would see the rerouted Midway-Benton No. 1 transmission line under the Proposed Action approximately 1,000 feet north, but due to the low sensitivity of these viewers traveling at high speeds and the presence of an existing 230-kV line along Route 11A, the adverse visual impact would be **low**. The majority of the study area is isolated and, within the visual context of the Hanford Site that includes numerous transmission lines, rebuilding an existing line with similar structures would result in an overall **low** impact on visual quality.

3.7.6 Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative

The region of influence considered for cumulative impacts on visual quality is the Hanford Site and surrounding lands from which the existing and new transmission line ROWs and access roads would be seen. Past development and ongoing actions by DOE-RL and BPA at the Hanford Site have altered the visual landscape of this area by introducing manmade features including utility infrastructure, buildings, and roads.

Reasonably foreseeable future actions within the Hanford Site such as future energy development by DOE-RL and the rebuilding of BPA's Midway-Moxee No. 1 transmission line could create long-term visual impacts through vegetation clearing and the addition of new permanent structures. However, both comprehensive plans for the Hanford Site and the Hanford Reach National Monument limit most development to previously disturbed areas. Future BPA actions, as described in Appendix A, would occur in previously-disturbed ROW.

New ROW and access roads for the Proposed Action would introduce new structures to the landscape where none currently exist. Because they would be located in an area with other DOE-RL transmission lines and roads, the cumulative impact would be **low to moderate**. While the Rebuild-in-Place Alternative would remain in the current location, the cumulative impact on visual quality

would be ***moderate*** because the line would continue to be visible on Gable Butte and Gable Mountain, a sensitive landscape to American Indian viewers.

3.7.7 Environmental Consequences—No Action Alternative

Under the No Action Alternative, no new impacts on visual resources would occur. Continued operation and maintenance of the existing transmission lines would result in intermittent visual impacts on the public, American Indians, and Hanford Site workers and visitors. As structures continue to degrade under the No Action Alternative, more frequent maintenance activities, including structure repair and replacement would be required. These activities would result in a visual impact associated with a temporary increase in construction activity within the study area. Long-term operation and maintenance activities would result in a ***low to moderate*** impact.

3.8 Cultural Resources

3.8.1 Affected Environment

Cultural resources include things and places that demonstrate evidence of human occupation or activity related to history, architecture, archaeology, engineering, and culture. Historic properties, as defined by 36 CFR 800, the implementing regulations of the National Historic Preservation Act (NHPA; 16 USC 470 *et seq.*), are a subset of cultural resources that consists of any district, site, building, structure, artifact, ruin, object, work of art, or natural feature important in human history that meets defined eligibility criteria for the National Register of Historic Places (NRHP).

The NHPA requires that cultural resources be inventoried and evaluated for eligibility for listing in the NRHP and that federal agencies evaluate and consider effects of their actions on these resources. Cultural resources are evaluated for eligibility in the NRHP using four criteria commonly known as Criterion A, B, C, or D, as identified in 36 CFR Part 60.4(a–d). These criteria include an examination of the cultural resource’s age, integrity (of location, design, setting, materials, workmanship, feeling and association), and significance in American culture, among other things. A cultural resource must meet at least one criterion to be eligible for listing in the NRHP.

Historic properties include prehistoric resources that predate European contact and settlement. TCPs are properties that are eligible for inclusion in the NRHP because of their association with the cultural practices or beliefs of a living community that are rooted in that community’s history and are important in maintaining the continuing cultural identity of the community (Parker and King 1998). The area of potential effects (APE; defined in 36 CFR 800.16[d]), for cultural resources includes the existing ROW (Segments 1, 3, and 4), the proposed reroute ROW (Segment 2), the proposed new and reconstructed access roads that extend outside of the ROW, staging areas, and pulling sites.

The earliest inhabitants in the region surrounding the APE were present by at least 12,000 years before present (B.P.). During the early portion of this period the people of the region would have been mobile, migrating between reliable habitation sites throughout the year. These habitation sites were likely situated near stable and predictable seasonal food resources, such as plants and **anadromous** fish, and can be seen in the archaeological record by the presence of a variety of artifacts such as stone and bone tools, associated debris from the manufacture of those tools, and **midden** materials (i.e., plant remains and organic remains such as shell and bone) (Dampf et al. 2012).

A shift in moisture levels and temperature in the region occurred from 5,000 B.P. until 2,000 B.P., and with this change, there was a regional shift from a mobile foraging strategy to a more semi-sedentary “collector” subsistence pattern. This change in subsistence pattern is represented in the archaeological record in a number of ways. Semi-sedentary habitation sites were generally used more intensively and in more redundant locations, close to reliable resources. These semi-sedentary sites are also hard to distinguish from resource exploitation and processing sites, but with the passage of time, increasingly newer (more recent) sites from this period tend to display increasing amounts of storage-related features (subsurface pits), structural features (winter villages with pit houses along the Columbia River), and an intensification of features, (e.g., larger midden remains

and cleaned or reused hearth features). By roughly 2,000 B.P., modern vegetation and climates in the region were established, and based on *ethnographic* data, the “Plateau culture area” was first recognized. Plateau cultures include such characteristics as the riverine settlement pattern, which placed a reliance on anadromous and resident fish, and diverse game and root resources (Dampf et al. 2012).

The region and APE was historically inhabited and used by the Sahaptin-speaking people and groups that include the Columbia, Nespelem, Sanpoil, Southern Okanogan, Umatilla, Walula, Wanapum, Wauykma, and Yakama. Nearby groups such as the Cayuse, Chelan, Columbia, Colville, Kittitas, Lower, Middle and Upper Spokane, Methow, Nez Perce, Palus, Wayampum, Wenatchi, and Wishram also used the area (DOE-RL 2003). The groups moving around and using the land in the APE practiced an annual subsistence round. Beginning in early spring people left their winter settlements to fully exploit the first round of resources. These include first root foods, such as camas (quamash; *Camassia quamash*), bitterroot (piahe; *Lewisia rediviva Pursh*), and skolkul (*Lomatium canbyi*), which were processed and either eaten or transported back to the winter villages for long-term storage. While the most intense fishing occurred during the spring through fall seasons, several species of anadromous fish were available in the Columbia River Basin year-round. The runs of salmon utilized were Chinook (*Oncorhynchus tshawytscha*), sockeye (*Oncorhynchus nerka*), coho (*Oncorhynchus kisutch*), and steelhead (*Oncorhynchus mykiss*). Green (*Acipenser medirostris*) and white (*Acipenser transmontanus*) sturgeon were also available during the winter. Hunting, gathering, and processing activities continued in the uplands until the first severe frost, and then the people would generally congregate in larger family groups at riverine villages and prepare for winter (Dampf et al. 2012)

The early 1800s brought the beginning of the Euro-American explorers, fur traders, and missionaries entering the region, although the impact of the visitors had been felt long before they arrived. Disease epidemics introduced by European explorers decimated native populations starting as early as the 1500s. Europeans traveling through the Columbia River Valley carried new diseases and caused devastating epidemics that had a profound impact on the societies of Columbia Plateau American Tribes and Bands. By the mid-1800s, tensions between the new American settlers and the native populations were increasing, which eventually led to the U.S. government negotiating treaties with various Columbia Plateau American Tribes and Bands. With the signing of the treaties, the newly formed tribal groups, which included multiple tribes and bands, ceded lands and were moved to live on reservations. These tribal groups retained rights to conduct some traditional activities, such as hunting and fishing, off of the reservations.

Following the Indian treaties and the wars of the mid- to late-1850s, the Homestead Act of 1862 was passed and the General Land Office began surveying and mapping the lands in the mid-Columbia basin for the newly formed Washington Territory. The new communities along the mid-Columbia basin used the river transportation system of ferries and later, steamboats. Most of those settling in the mid-Columbia basin area at this time were cattle and sheep ranchers. After the harsh winter of 1880–1881, many cattlemen switched to farming and started creating small irrigation systems for their family farms. During the 1880s and 1890s, large-scale irrigation systems were introduced into the mid-Columbia Basin along with the railroad, which helped the area to grow in population. By the early twentieth century, with the consolidation of several irrigation districts, Richland became a small and prosperous agricultural community.

In the 1920s and 1930s the area saw depressed economic conditions due to dry climatic conditions, poor farming practices, and the economic hardships that were gripping the nation. Economic conditions improved in the area by the early 1940s and in 1943 the Federal government acquired lands and established the Hanford Engineer Works as a secret Manhattan Project along the Columbia River. It was also during this time that BPA began building transmission infrastructure, including Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines, to support the work at Hanford. As World War II progressed the area grew with new roads and support facilities for the Hanford Engineer Works and the population of nearby Richland grew to approximately 27,000 by the mid-1950s.

Archaeological Resources

In compliance with NHPA, BPA is identifying and documenting cultural resources in the APE and evaluating them for eligibility for listing in the NRHP. In the first step of identification, BPA conducted a literature review of known cultural sites (Dampf et al. 2012). This literature review identified a total of 153 prehistoric sites, 67 historic sites, and six multi-component sites (sites that have both pre-historic and historic resources) (226 total) within a mile search radius (0.5 mile on either side of the APE was included in the survey area due to the large number of previously recorded sites). Of these 226 sites, 14 sites were identified during the background research within the project APE, including 7 prehistoric sites, 5 historic sites, and 1 possible ***modern isolated find***. The APE also passes through the edge of one archaeological district, 45DT102, Nookshai or the Gable Mountain-Gable Butte Cultural District. This district consists of archaeological resources including isolated and clustered rock cairns, talus pits and lithic scatters. The background research identified one site from the archaeological district, 45BN356, as being near or in the APE.

BPA conducted field surveys of the APE to identify previously undocumented sites and to determine any impacts the project may have on the resources. All sites located in the APE are listed in Table 3.8-1. As a result of APE field surveys, BPA identified seven new sites and revisited the previously identified sites to further evaluate their location relative to the ROWs. The seven new sites identified during the survey include three historic archaeological sites, one prehistoric archaeological site, one historic ***isolate***, and two prehistoric isolates. Of the seven new sites identified during the survey, one site was determined eligible for listing on the NRHP, 1918-PS-1. Two sites, 1918-PI-1 and 1918-PI-2, were determined to be potentially eligible for listing in the NRHP, and further testing would be needed if the sites cannot be avoided during construction. Of the 14 sites (including 45BN356 within the Nookshai Archaeological District) identified through the background review BPA field surveys found that only four were within the APE. Of the revisited sites, BPA considers three out of the four to be eligible for listing on the NRHP, 45BN1107, 45BN1164 and 45BN1314.

Table 3.8-1. Cultural Resources within the APE

Site	Location	Site Type	Date Recorded	Cultural Materials	Alternatives ¹	
					Proposed Action APE	Rebuild-in-Place APE
45DT102 ²	Multiple	Archaeological District	1989	Multiple lithic scatters, rock cairns, talus pits	x	x
45BN1107 ²	T10N, R28E Sec 15	Historic	1998	Railroad system	x	x
45BN1164 ²	T13N, R25E Sec 23	Prehistoric	1987	Projectile point base, and flakes	x	
45BN1314 ²	T13N, R27E Sec 35	Historic	2004, 2010	Small concrete foundation and trash scatter	x	x
45BN1343 ²	T13N, R24E Sec 14	Historic	2003	295 acre farmstead of Earl Knaub, includes a concrete structure, irrigation features and trash scatter	x	x
1918-HS-1	T13N, R26E Sec 29	Historic	2012	Trash scatter consisting mostly of tin cans	x	
1918-HS-2	T13N, R27E, Sec 28	Historic	2012	Trash Scatter consisting of tin cans		x
1918-HS-3	T13N, R26E Sec 29	Historic	2012	Earthen ditch with two segments of steel pipe	x	
1918-PS-1 ²	T13N, R25E Sec 17	Prehistoric	2012	Small lithic scatter including a <i>chert</i> projectile point	x	x
1918-HI-1	T13N, R25E Sec 18	Historic	2012	Cast iron valve head for a Chevy Capitol Series AA	x	x
1918-PI-1 ²	T13N, R25E Sec 14	Prehistoric	2012	Isolated orange/tan chert flake		x
1918-PI-2 ²	T13N, R27E Sec 29	Prehistoric	2012	Fragment of a white/gray chert projectile point		x

¹The 'x' in table indicates that the resource was identified within the APE for each respective alternative during the field survey.

²These sites are considered to be eligible or potentially eligible for listing on the NRHP.

Built Resources

BPA is also evaluating ***built resources*** (built environment which includes historic sites, buildings, structures, objects, districts, and landscapes) for inclusion in the NRHP. Currently, BPA is in the process of compiling a Multiple Property Submission (a thematic group listing of similar resources) to the NRHP for BPA's transmission infrastructure and defined the period of significance as 1937 to 1974. The existing Midway-Benton No. 1, Midway-Benton No 2, and the Benton-Othello No. 1 transmission lines are part of BPA's transmission infrastructure and were all constructed during the period of significance. BPA has determined that these lines are eligible for listing on the NRHP. BPA is evaluating what effects the Proposed Action, Rebuild-in Place Alternative, or the No Action Alternative may have on these lines.

Traditional Cultural Properties

There are two known TCPs in the APE, Gable Mountain and Gable Butte. These two TCPs are sacred to and highly revered by American Indians and are periodically used by the tribes for ceremonies and other cultural practices. Both TCPs have not been formally determined eligible to the NRHP, but have been considered eligible in the past by BPA and consulting parties. BPA is consulting with the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Colville Reservation, the Nez Perce Tribe, the CTUIR, and the Wanapum Band to determine if there are any additional TCPs present within the APE and to determine any impact the Proposed Action, Rebuild-in Place Alternative, or the No Action Alternative may have on identified TCPs.

3.8.2 Environmental Consequences—Proposed Action

BPA is required under the NHPA to consider the effects of the Proposed Action to sites eligible for listing on the NRHP. An additional four new sites were identified within the Proposed Action APE. Most of the sites located within the APE have either been determined not eligible for listing on the NRHP or they will be avoided during construction; therefore, the undertaking will have no effect on them. Of the sites that are eligible or potentially eligible for listing on the NRHP, site 45BN1314 is the only site that could be impacted if further avoidance or minimization efforts are not undertaken. Avoidance and minimization measures could include moving the structure out of the boundaries of site 45BN1314 or using mats to cover the site during construction. BPA, in consultation with DOE-RL, Washington State Historic Preservation Office (SHPO), and the consulting tribes, is currently evaluating methods to eliminate or reduce impacts to site 45BN1314 and these mitigation measures will be included in Section 3.8.4 of the Final EA.

Removal of the line in Segment 3 would result in temporary ground disturbance in the Gable Mountain and Gable Butte TCPs. BPA is currently working with the consulting Tribes (the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Colville Reservation, the Nez Perce Tribe, the CTUIR, and the Wanapum Band) to determine and minimize any impacts to these TCPs. Depending upon the avoidance and minimization measures implemented based on consultation with the Tribes, the removal of the existing Midway-Benton No. 1 transmission line across the Gable Mountain and Gable Butte topographic TCP high points may result in a ***moderate to high*** short-term impact on the TCPs. Implementation of mitigation and minimization measures developed in coordination with the Tribes through the NHPA consultation process would reduce these ***moderate to high*** short-term impacts to the TCP. Over the long term,

removal of the Midway-Benton No. 1 transmission line from the TCPs would have a **high** beneficial impact on cultural resources.

Construction activities, including removal of existing structures, the installation of new structures and construction or improvement of access roads, have the potential to affect cultural resources, including human remains, not currently known to exist in the APE. Implementation of the mitigation measures described in Section 3.8.4 would ensure that previously undiscovered historic properties were managed properly as required by the NHPA, and would minimize both direct and indirect impacts from the Proposed Action.

BPA is currently consulting with the tribes to identify any **ethnobotanical** populations of concern related to first foods and traditional gathering areas. Populations and individual plants identified in project workspaces, including the ROWs, access roads, or tensioning/pulling sites, would be disturbed by vegetation clearing, ground disturbance, or vehicle access activities. Impacts on these culturally significant plants would be the same as those described in Section 3.4. The mitigation measures identified in Section 3.8.4 and 3.4.4 would minimize project-related impacts on these resources to **low to moderate**.

Some impacts on cultural resources could occur during the operation and maintenance of the Proposed Action. Impacts would likely be **low to moderate**, depending on the level and amount of disturbance and the eligibility of the resource for listing on the NRHP in the APE.

3.8.3 Environmental Impacts—Rebuild-in-Place Alternative

Under the Rebuild-in-Place Alternative, impacts could occur to known cultural resources within the APE. Field surveys confirmed three previously-identified cultural resources sites and five newly-identified sites in the APE (some of these sites would be along both the Rebuild-In-Place Alternative and the Proposed Action). Most of the sites located within the APE have either been determined not eligible or they will be avoided during construction. Of the sites that are eligible or potentially eligible for listing on the NRHP along the Rebuild-in-Place Alternative APE, 45BN1314 is the only site located in an impact area (in the same location as described for the Proposed Action). As with the Proposed Action, this site could be impacted if further avoidance or minimization efforts are not undertaken. BPA, in consultation with DOE-RL, SHPO, and the consulting tribes, is currently evaluating methods to eliminate or reduce impacts to site 45BN1314.

BPA is currently consulting with the Tribes to identify any ethnobotanical populations of concern. Traditional food or medicinal plants identified in project workspaces would be disturbed by vegetation clearing, vehicle access, and ground disturbance activities. The direct replacement of most structures under the Rebuild-in-Place Alternative would minimize the impacts on these resources by using areas that were disturbed by the original installation of the transmission lines. The mitigation measures identified in Section 3.8.4 and 3.4.4 would minimize project-related impacts on these resources to **low to moderate**.

The existing ROW currently runs adjacent to or over Gable Mountain and Gable Butte. Rebuilding the line in place would have temporary **moderate to high** impacts on these TCPs during structure replacement. Further, over the long term, the continued presence of the Midway-Benton No. 1 transmission line on Gable Mountain and Gable Butte would likely have a **high** long-term impact on

the TCPs. As part of the NHPA Section 106 consultation process, BPA would implement the mitigation measures identified in Section 3.8.4 in addition to implementing additional mitigation measures developed with the consulting parties to reduce impacts to the TCPs.

3.8.4 Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative

The following mitigation measures would be implemented under both the Proposed Action and the Rebuild-in-Place Alternative to avoid and minimize impacts on cultural resources.

- Restrict work areas, such as through the installation of exclusion fencing and matting, to avoid disturbance to cultural resource sites.
- Employ tribal monitors to be present during all ground-disturbing activities with the potential to affect cultural resources.
- Implement BPA's Inadvertent Discovery Procedure for projects. This procedure provides that: should ground-disturbing activities reveal any cultural materials (e.g., structural remains, Euro-American artifacts, or Native American artifacts), all activities in the vicinity of the find would cease. The BPA archaeologist, the Washington Department of Archaeology and Historic Preservation, and affected tribes would be notified immediately.
- The Inadvertent Discovery Procedure would also require crews to cease construction immediately within 200 feet of any human remains, suspected human remains, or any items suspected to be related to a human burial (i.e., funerary items, sacred objects, or objects of cultural patrimony) encountered during project construction. The area around the discovery will be secured and the Benton County Sheriff, the BPA archaeologist, the State Historic Preservation Officer, DOE-RL archeologist, and the affected tribes would be contacted immediately. All response processes would be coordinated with DOE-RL staff in accordance with the agreements and management plans for the Hanford Site.
- Minimize construction footprints in areas containing identified ethnobotanical species of concern, where practical.
- Minimize workspace footprints within TCP boundaries, as much as practical.
- Revegetate TCP disturbance areas with native seed and vegetation species, as developed through consultation with interested tribes and DOE-RL.

3.8.5 Unavoidable Impacts Remaining After Mitigation—Proposed Action and Rebuild-in-Place Alternative

The potential impacts described in Sections 3.8.2 and 3.8.3 would be unavoidable because they are associated with impacts on cultural resources that are currently not known to exist but that may be discovered during construction of the Proposed Action or Rebuild-in-Place Alternative.

Implementation of the mitigation measures described in Section 3.8.4 would minimize those construction-related impacts.

3.8.6 Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative

The region of influence considered for cumulative impacts on cultural resources is the APE. Cultural resources in the APE have likely been cumulatively affected by past, present, and current development activities. Most impacts have likely occurred as a result of inadvertent disturbance or destruction during ground-disturbing activities such as the Hanford Site development, including road work, facility construction, and waste disposal and cleanup. Similar to the Proposed Action and Rebuild-in-Place Alternative, other reasonably foreseeable future projects in the vicinity of the APE have the potential to disturb previously undiscovered cultural resources. Implementation of the mitigation measures described in Section 3.8.4 would minimize potential proposed project impacts and would reduce the potential for construction activities to contribute incrementally to the adverse cumulative impact on cultural resources in the APE. In the event that previously undiscovered historic properties were encountered, potential impacts would be **low to moderate**, depending on the level and amount of disturbance and the eligibility of the resource for listing on the NRHP.

3.8.7 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the existing Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines would not be rebuilt and impacts related to project construction would not occur. The continued presence of the Midway-Benton No. 1 transmission line would continue to impact the Gable Mountain and Gable Butte TCPs. Operation and maintenance activities would continue and would be similar to existing practices, however, the frequency and scope of maintenance activities would likely increase as existing structures deteriorate, and more structure repairs and replacements are required. This could in turn result in additional ground disturbance that would have the potential to affect cultural resources. Impacts associated with continued routine maintenance of the existing line as well as emergency additional repairs could range from **low to high**, depending on the level and amount of disturbance, the location of the disturbance (i.e., within a TCP or not), and the eligibility of other resources for listing on the NRHP.

3.9 Socioeconomics, Environmental Justice, and Public Services

3.9.1 Affected Environment

The study area for socioeconomics, environmental justice, and public services is Benton County, Washington, the county in which the project would occur.

The closest private lands are cropland parcels located approximately 0.8 mile west of the Midway Substation and approximately 1.2 miles east and across the Columbia River from the Benton Substation. Because the Proposed Action and the Rebuild-in-Place Alternative would not be in proximity to private lands, property values and other impacts to private lands are not discussed in this section.

Population Centers

The Hanford Site is located in northern Benton County, Washington, across the Columbia River from Franklin County, Washington, to the east and Grant County, Washington, to the north. The Hanford Site itself does not have residential areas and the closest residential communities are Desert Aire and Mattawa in Grant County, Washington. Desert Aire is located approximately 6 miles northeast of the project area and has a population of approximately 1,300 (City-Data.Com 2012). Mattawa is located approximately 10 miles northeast of the project area, with a population of approximately 4,500 (MRSC 2012).

The Tri-Cities area, which lies approximately 9 miles south of the Benton Substation, is the major population center of the region and is composed of following cities (U.S. Census Bureau 2012):

- Richland, population 48,000⁴, and West Richland, population 12,000;
- Kennewick, population 73,000, located immediately south of Richland; and
- Pasco, population 60,000, located across the Columbia River (Franklin County).

Based on U.S. census data, the population increase between 2000 and 2010 was 23 percent in Benton County, compared to the 14 percent state-wide population increase (U.S. Census Bureau 2012).

Economy and Employment

The top five employment sectors in Benton County are government (14.9 percent), professional and technical services (14.2 percent), administrative and waste services (13.6 percent), wholesale/retail (12.0 percent), and health care and social assistance (9.8 percent) (Washington State Employment Security Department 2012).

Construction sector jobs rank eighth, comprising approximately 5 percent of the Benton County workforce.

⁴ Population numbers are rounded to the nearest 500.

For the Kennewick-Pasco-Richland Metropolitan Statistical Area, which contains both Benton and Franklin Counties, the December 2011 preliminary unemployment rate was 9.7 percent, up 22.8 percent from 7.9 percent in December 2010 (Washington State Employment Security Department 2012).

The Hanford Site has been a major regional employer for decades, and the economy of the Tri-Cities area tracked closely with the level of activity at the Hanford Site for many years. However, the Tri-Cities economy has diversified and grown over the last decade and is currently not as tied to the Hanford Site as in previous years (Fowler and Scott 2009). Employment and economic activities at the Hanford Site have fluctuated and continue to evolve as operations at the site transition from cleanup to a combination of industry, research, recreation, and conservation, as envisioned in the *Hanford Comprehensive Land Use Plan* (see Section 3.2).

Environmental Justice Populations

All projects involving a federal action (funding, permit, or land) must comply with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by President Clinton on February 11, 1994. This Executive Order directs federal agencies to take the appropriate and necessary steps to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on the health or environment of **minority populations** and **low-income populations** (collectively, the **environmental justice populations**) to the greatest extent practicable and permitted by law (see Chapter 4).

The 2010 Census data shows that Benton County has a higher percentage of people who are of Hispanic or Latino origin (19 percent) than the state average (11 percent) (U.S. Census Bureau 2012). The percentages of Asian, Black and American Indian population percentages are lower than the state-wide averages, with 2.7 percent Asian (7.2 percent statewide), 1.3 percent Black (3.5 percent statewide) and 0.9 percent American Indian (1.5 percent statewide)

The 2010 Census identified that from 2006 through 2010, approximately 12.7 percent of the population of Benton County was living below the poverty level, compared with 12.1 percent statewide (US Census Bureau 2012).

Public Services and Lodging

DOE-RL provides all of its own internal services on the Hanford Site, including a fire department, security, a water system, and an electric power distribution system (DOE-RL 2009a).

There is no lodging on the Hanford Site. The closest lodging is a hotel located in Desert Aire approximately 6 miles northeast of the Midway Substation. Most temporary contractors who work at the Hanford Site stay in Richland. Contract workers are known to stay in hotels and shared rental housing while working on the Hanford Site (DOE-RL 2009a).

3.9.2 Environmental Consequences—Proposed Action

Economy and Employment

The Proposed Action would have a small, positive impact on the regional economy during construction through the local procurement of materials and equipment and spending by construction workers. These direct expenditures generate economic activity in other parts of the economy through what is known as the multiplier effect, with direct spending generating indirect and induced economic impacts. Indirect impacts consist of spending on goods and services by industries that produce the items purchased as part of the project. Induced impacts include expenditures made by the households of workers involved either directly or indirectly in the construction process.

Local purchases would likely include fuel for vehicles and equipment, some equipment rentals, staging area rental, and other incidental materials and supplies. Local purchases, employment of local residents, and the temporary relocation of construction workers to the project area would have **low**, but positive impacts on local businesses.

The Proposed Action would require 30 to 40 construction workers, each working an average of 60 hours per week for approximately 7 months. The total labor construction payroll, including per diem payments and other allowances, is expected to be approximately \$4 million. This direct increase in site workers and the indirect increase in local workers associated with local purchases would represent a minor contribution to the area's employment, which includes approximately 80,000 full- and part-time jobs in Benton County, of which approximately 4,300 are in the construction industry. Further, the small influx of temporary jobs associated with the Proposed Action would not result in a large enough employment source to significantly alter the county's 9.7 percent unemployment rate. Overall, the Proposed Action would result in a **low**, temporary beneficial impact to the local economy during construction.

Operation of the project would also have **low** positive impacts on local employment. Existing BPA staff would be responsible for operation and maintenance of the new transmission lines and associated facilities. No existing employees would be required to relocate to the area. Local expenditures on project-related goods and services would be **low**.

Environmental Justice Populations

As described above, the Proposed Action would have a small but positive impact on local economic conditions in the study area. Construction of the Proposed Action is not expected to have high or adverse human-health or environmental effects on nearby communities. The study area has a relatively high Hispanic and Latino populations located in Tri-Cities area several miles away from the Proposed Action, but none of these populations reside on the Hanford Site. Thus, there would be **no** adverse or disproportionate impact on environmental justice populations from the Proposed Action.

Public Services and Lodging

The Proposed Action would create only minor additional needs for public services. As discussed in Section 3.4, the Proposed Action is not expected to increase risk or frequency of fires and water use would be limited during construction.

During construction, guard structures would be placed over local utility lines and roadways to ensure continued service and safe passage in the event that the conductor line or other materials were dropped during construction. As described in Section 3.2, construction truck traffic would result in minimal localized delays of only a few minutes and would not impede emergency vehicles. Dust suppression may require the use of water trucks. The contractor may obtain water from internal Hanford water sources. Overall, the Proposed Action would result in **low** or **no** impacts on Hanford public services during construction.

Project construction under the Proposed Action is expected to require 7 months and is scheduled for October 2012 through April 2013, with a workforce of approximately 30 to 40 individuals working in four to six crews. Based on BPA experience with similar projects, most of the workers are likely to originate from outside of Benton County and the Tri-Cities. Such workers typically reside temporarily near the construction site with or without their families, using motels or trailer parks for lodging. Workers would likely find lodging in the Richland and Mattawa/Desert Aire areas. These areas regularly accommodate temporary workers associated with the Hanford Site, and the Proposed Action's relatively low number of workers would not deplete area lodging availability (DOE-RL 2009a). Section 3.2 addresses the transportation effects associated with workers commuting from lodging to the project work sites. Overall, due to the small number of project workers and their associated demands on public services relative to the overall population of Benton County and the number of workers on the Hanford Site, the Proposed Action would result in a **low** impact to public services and lodging.

3.9.3 Environmental Consequences—Rebuild-in-Place Alternative

The Rebuild-in-Place Alternative would result in the use of the same number of workers and similar expenditures as that described under the Proposed Action. Therefore, the Rebuild-in-Place Alternative would also have temporary **low** positive effects on socioeconomics, and public services due to the temporary increase in expenditures resulting from local supply procurement and worker spending in the Benton County area. As with the Proposed Action, the Rebuild-in-Place Alternative would result in **no** impact on environmental justice populations.

3.9.4 Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative

Because **no** adverse socioeconomic, environmental justice populations, or public service impacts were identified for the Proposed Action or Rebuild-in-Place Alternative, no additional mitigation other than the mitigation proposed in Section 3.2 and 3.10 are proposed.

3.9.5 Unavoidable Consequences Remaining After Mitigation—Proposed Action and Rebuild-in-Place Alternative

Because the Proposed Action would result in **low** but beneficial impacts on socioeconomic resources, no unavoidable adverse impacts on socioeconomics, environmental justice populations, or public services would occur.

3.9.6 Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative

The region of influence considered for cumulative impacts on socioeconomics, environmental justice populations, and public services is Benton County. While many construction and cleanup projects underway on the Hanford Site bring temporary workers to the area, the proposed project would result in a minor increase (roughly 30 to 40 construction workers) in the temporary Hanford workforce. When considered collectively with other projects in the study area, the 30 to 40 workers associated with the Proposed Action and Rebuild-in-Place Alternative would not result in a large increase in the number of workers or spending related to work at the Hanford Site or in Benton County. The small influx of revenue and taxes associated with the temporary increased spending and lodging in the study area would combine with the spending associated with workers employed on other projects occurring at the same time, which would result in a **low** positive cumulative impact on Benton County's economy.

The proposed project is anticipated to have a **low** impact on public services and the project is not anticipated to disproportionately affect environmental justice populations; therefore, cumulative impacts would be **low**.

3.9.7 Environmental Consequences—No Action Alternative

There would be **no** impacts on the socioeconomics, public services, or environmental justice populations under the No Action Alternative because the new lines would not be rebuilt. Without the rebuilding of the transmission lines, the beneficial socioeconomic impacts of construction activities would not occur. In addition, there would be the potential for greater cost of electrical service and more frequent disruption of service, because the existing transmission line would likely require more frequent maintenance and upkeep.

Maintenance activities would likely increase as existing structures deteriorate, and more structure repair and replacement could be required. Maintenance of access roads would be needed and access road work would likely need to take place as an operations and maintenance activity. The maintenance activities would also result in some **low** impacts on socioeconomics and public facilities, related to temporary construction-related disturbances. **No** impacts on environmental justice populations would occur during maintenance activities.

3.10 Air Quality and Climate Change

3.10.1 Affected Environment

The air quality study area considered is the Hanford Site and surrounding *airsheds* within Benton and Franklin Counties. Unless otherwise noted, information regarding climate and air quality is based on DOE-RL's NEPA Characterization Report (Duncan 2007).

Under the Clean Air Act (42 USC 7401 *et seq.*), the U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for six criteria air pollutants: carbon monoxide (CO), ozone, *particulate matter* (PM), lead, sulfur dioxide, and nitrogen dioxide. EPA has delegated authority to regulate the Clean Air Act in Washington to the Washington State Department of Ecology (Ecology) and Ecology has adopted the standards set by EPA. For each of the six criteria pollutants, the NAAQS represents a maximum concentration above which adverse effects on human health may occur. When an area's air quality exceeds these standards, it is designated a *nonattainment area*. Air quality at the Hanford Site and the study area meets NAAQS standards (Ecology 2012). The closest nonattainment area in Washington to the Hanford Site is in Pierce County, which is located approximately 100 miles west of the study area.

PM is generated by industrial emissions, residential wood combustion, motor vehicle tailpipes, and fugitive dust from roadways and unpaved surfaces. Two forms of PM are regulated by EPA: particulate matter less than 10 micrometers in size (*PM₁₀*) and particulate matter less than 2.5 micrometers in size (*PM_{2.5}*). *PM_{2.5}* has a greater health effect than *PM₁₀* at locations far from the emitting source, because it remains suspended in the atmosphere longer and travels farther.

The Hanford Site is exposed to strong winds, and such winds can increase dust (fine PM) into the air. The NAAQS 24-hour standard for *PM₁₀* is 150 $\mu\text{g}/\text{m}^3$ and 35 $\mu\text{g}/\text{m}^3$ for *PM_{2.5}*. DOE-RL began monitoring PM in 2001, and daily average *PM₁₀* concentrations on the Hanford Site have not exceeded the EPA standards for any days when measurements were conducted (Duncan 2007). Monitoring conducted by the Benton Clean Air Agency has also found PM levels to be within EPA standards, although dust storms are not included in the calculations (Duncan 2007).

CO is an air pollutant generally associated with transportation sources. The highest ambient CO concentrations often occur near congested roadways and intersections during periods of low temperatures, light winds, and stable atmospheric conditions. The NAAQS standards for CO levels are as follows: 8-hour standard of 9 parts per million and 1-hour standard of 35 parts per million. The Hanford Site receives relatively high levels of vehicular traffic and congestion. In 2009, approximately 8,300 vehicles passed in and out of the site each work day (Transportation Solutions, Inc. 2010). No traffic-related air quality problems have been reported for the Hanford Site.

Due to the historical and current nuclear and industrial activities at the Hanford Site, radioactive contaminants are the primary air pollutant of concern at the Hanford Site. Standards for emissions of *radionuclides* to air from DOE-RL facilities have been established by EPA (40 CFR 61) and the State of Washington (Washington Administrative Code [WAC]; WAC 173-480 and WAC 246-247). DOE-RL constantly monitors airborne contaminants and has found levels near existing and historic nuclear facilities at or above 10 percent of maximum levels, which requires reporting to Ecology. Areas at the site that are not next to nuclear facilities, such as the study area, have been found to be below

10 percent of maximum safe levels (Duncan 2007). Stack pollutants are mainly emitted from power-generating and chemical-processing facilities in the 200 and 300 Areas on the Hanford Site. Emissions are controlled and monitored and reported through a 5-year operating permit issued by Ecology on January 1, 2007 (Duncan 2007). This permit was revised on December 23, 2010 to incorporate new Washington State Department of Health and Ecology air emission licenses, approval orders, and regulatory requirement updates (DOE-RL 2011).

Class I areas are specific areas of national or regional natural, recreational, scenic, or historic value where air quality is to be preserved, protected, and enhanced under Section 160 of the Clean Air Act (42 USC 7470[2]). No Class I areas are located within or near (within 90 miles) the study area.

Climate Change

Greenhouse gases (GHGs) are chemical compounds found in the Earth's atmosphere that absorb and trap infrared radiation as heat. Global atmospheric GHG concentrations are a product of continuous emission (release) and removal (storage) of GHGs over time. In the natural environment, this release and storage is largely cyclical. For example, through the process of photosynthesis, plants capture atmospheric carbon as they grow and store it in the form of sugars. When plants decay or are burned, the stored carbon is released back into the atmosphere, where it is available to be taken up again by new plants (Ecological Society of America 2008). There is also a large amount of GHGs stored deep underground in the form of fossil fuels, and soils store carbon in the form of decomposing plant material and serve as the largest carbon reservoir on land.

Human activities such as deforestation, soil disturbance, and burning of fossil fuels disrupt the natural cycle by increasing the GHG emission rate over the storage rate, which results in a net increase of GHGs in the atmosphere. When forests are permanently converted to cropland, for instance, or when new buildings or roads displace vegetation, the GHG storage capacity of the disturbed area is diminished. Carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄) emissions increase when soils are disturbed, and burning fossil fuels releases GHGs that have been stored underground for thousands of years and cannot be readily replaced (Kessavalou et al. 1998). The resulting buildup of heat in the atmosphere is due to increased GHG levels, which causes warming of the planet through a greenhouse-like effect (EIA 2009a). Increasing levels of GHGs could increase the Earth's temperature by up to 7.2 degrees Fahrenheit by the end of the twenty-first century (EPA 2010a).

The principal GHGs emitted into the atmosphere through human activities are CO₂, CH₄, N₂O, and fluorinated gases such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) (EPA 2010a). CO₂ is the major GHG emitted, and the burning of fossil fuels accounts for 81 percent of all U.S. GHG emissions (EPA 2010a; Houghton 2010; EIA 2009b). CO₂ enters the atmosphere as a result of such activities as changing land use; burning of fossil fuels including coal, natural gas, oil, and wood products; and from the manufacture of cement. CO₂ levels have increased to 379 parts per million within the last century, a 36 percent increase, as a result of human activities (IPCC 2007). A report discussing these specific GHGs in more detail is in Appendix D.

3.10.2 Environmental Consequences—Proposed Action

Impacts on air quality from the Proposed Action would occur primarily during the 7-month-long construction period planned for October 2012 through April 2013. Crew vehicles and construction equipment would generate exhaust and dust while clearing and grading for access road work, removing and installing structures, and traveling over unpaved roads to and from work sites. Several construction crews would likely be working simultaneously on separate areas of the study area (e.g., road crews, assembly crews, wire stringing crews, framing crews). Construction equipment would consist of about 20 vehicles (pickups, vans) and another 20 pieces of heavy equipment, including bucket trucks, cranes, excavators (bulldozers, backhoes), road construction equipment (dump trucks, rollers, road bladers), line tensioners/pullers, and possibly one or two helicopters.

Construction activities have the potential to temporarily increase PM, CO, ozone, nitrogen dioxide, and volatile organic compound levels on a temporary basis within a localized area. The increase in vehicle emissions from construction equipment would be temporary and localized to specific work areas, and would change on a daily or weekly basis. The increase in vehicle and equipment emissions would likely be small comparable to current emission levels found in the study area. Further, mitigation measures, as described in Section 3.10.4, would require that all construction equipment meet vehicle emission standards and, therefore, the Proposed Action would not likely violate air quality standards. Because of these mitigation measures, and because most exhaust emissions would be temporary, overall air quality impacts from emissions other than PM (discussed below) would be **low**.

PM would be the pollutant of most concern generated by construction activities. Fugitive dust could be created during site preparation, including access road work, onsite travel on unpaved surfaces, and soil-disrupting operations. Dry, hot, and windy conditions and the fine-grained unconsolidated soils within the study area are prone to wind erosion and associated dust when protective vegetation cover is removed. In addition, vegetation at the Hanford Site is difficult to establish after being disturbed because of the dry and hot conditions (Benson et al. 2011, Feng et al. 2011). Therefore, the impacts from fugitive dust generated during and after construction, but before vegetation cover has been restored, in disturbed areas would be **moderate**. Dust control is one of the primary issues addressed by the mitigation measures described in Section 3.10.4, which include minimizing the extent and duration of exposed soils, watering disturbed areas as needed to control dust, and seeding disturbed areas to establish protective vegetation cover. BPA would also require completion of a Fugitive Dust Control Plan for the proposed project.

Operation and maintenance would involve vehicle traffic and heavy equipment for larger repairs that would generate **low** levels of emissions. Further, during operation, the transmission line also emits limited amounts of ozone and nitrogen oxides as a result of the **corona** effect (i.e., the breakdown of air at the surface of conductors). Also, after vegetation has been stabilized, sources of dust from operation and maintenance would be limited to that generated by periodic maintenance traffic. Overall, air effects associated with vehicle traffic, corona effects, and dust generation during project operation would be **low**.

Greenhouse Gases and Climate Change

GHG emissions resulting from the Proposed Action were calculated using the methodology described in the GHG technical report (see Appendix D, Greenhouse Gas Supplemental Information). Calculations were done for two types of activities that produce GHG emissions: rebuilding the transmission line (approximately 7 months) and ongoing annual operations and maintenance for the estimated 50-year-long operational life of the lines. The Proposed Action would result in fewer operation and maintenance trips, compared to existing conditions, but this slight reduction cannot be quantified and was not included in this analysis.

The Proposed Action would result in an estimated total of 6,924 metric tons of **carbon dioxide equivalent** (CO₂e)⁵ emissions during construction and an estimated 62 total metric tons of CO₂e emissions for ongoing operations and maintenance activities over the 50-year lifespan of the line (see Table 3.10-1). Detailed information related to these calculations is presented in Appendix D.

Table 3.10-1. Net Carbon Footprint over 50-Year Life of the Proposed Action

Type of Activity	Total CO ₂ e Emissions in Metric Tons
Construction	6,924
Operation and maintenance (over the entire project life)	62

To provide context for this level of emissions, the EPA mandatory reporting threshold primarily for large sources of GHGs is 25,000 metric tons of CO₂e emitted annually (74 Federal Register 56260). This threshold is approximately the amount of CO₂e generated by 4,400 passenger vehicles per year. Comparatively, the emissions during construction of the Proposed Action would be equivalent to the emissions generated by about 1,219 passenger vehicles per year, or 28 percent of the reporting threshold. Operation and maintenance activities would result in considerably less emissions, with CO₂ emissions about equal to that of 11 passenger vehicles per year, or 0.3 percent of the reporting threshold. Therefore, contributions of the Proposed Action to GHG emissions would be **low**.

3.10.3 Environmental Consequences—Rebuild-in-Place Alternative

Under the Rebuild-in-Place Alternative, impacts on air quality and climate change would be similar to the Proposed Action, including dust and exhaust emissions from crew vehicles and construction equipment. Due to the same construction timing, the number of vehicles and equipment required, and the similar general location of the Rebuild-in-Place Alternative and the Proposed Action, the Rebuild-in-Place Alternative would result in essentially the same amount of vehicle emissions and GHG emissions as the Proposed Action.

The primary difference in air emissions between the Proposed Action and the Rebuild-in-Place Alternative would be the total area of soils disturbed and associated dust. The Rebuild-in-Place Alternative would require work at fewer structures sites and along fewer miles of access roads,

⁵ CO₂e is a unit of measure used by the Intergovernmental Panel on Climate Change that takes into account the global warming potential of each of the emitted GHGs using global warming potential factors.

compared to the Proposed Action, resulting in a total decrease in the quantity of disturbed soil area. Therefore, the Rebuild-in-Place Alternative would likely result in lower levels of dust generation due to soil disturbance, compared to the Proposed Action. Despite the decreased soil disturbance and associated dust, the overall impacts would remain within the *moderate* range due to the dry soils that have a high potential to produce more fugitive dust within the study area.

When construction is completed and exposed soils stabilized by vegetation, sources of dust would be limited to that generated by periodic operation and maintenance traffic. As with the Proposed Action, air effects associated with vehicle traffic, corona effects, and dust generation are expected to remain at *low* levels.

3.10.4 Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative

The following mitigation measures would be implemented under both the Proposed Action and the Rebuild-in-Place Alternative to avoid and minimize impacts on air quality and climate change:

- Incorporate measures into a Fugitive Dust Control Plan, identified in consultation with DOE-RL, which would minimize dust in the dry, windy conditions at the Hanford Site.
- Water or use *palliatives* on exposed soil surfaces in areas disturbed during construction.
- Gravel access road surfaces in areas of sustained wind to reduce potential dust erosion.
- Encourage construction personnel to travel at low speeds on access roads and at construction sites to minimize dust.
- Reseed disturbed areas (see Section 3.4.4) to prevent dust from erosion.
- Shut down idling construction equipment, if feasible.
- Ensure all vehicles are in compliance with applicable federal and state air quality regulations for tailpipe emissions. Certification that vehicles meet applicable regulations will be provided by contractors to BPA in writing.
- Maintain and certify in writing that all construction equipment is in proper working condition according to manufacturer's specifications.
- Locate all staging areas as close to construction sites as practicable to minimize driving distances between staging areas and construction sites. Locate staging areas in previously disturbed or graveled areas to minimize soil and vegetation disturbance where practicable.
- Use the proper size of equipment for the job.
- Use locally sourced rock for road construction, if possible.

3.10.5 Unavoidable Consequences Remaining After Mitigation— Proposed Action and Rebuild-in-Place Alternative

Emissions of dust and exhaust would be unavoidable, particularly during and after project construction until, soils become stabilized by revegetation. Operation and maintenance vehicles would also generate emissions and dust along roadways.

Although fugitive dust emissions would occur, increased emissions would be temporary, and neither the Proposed Action nor Rebuild-in-Place Alternative would generate sufficient emissions to violate NAAQS standards. The EPA considers Benton County and the Hanford Site to be “in attainment” for federal and state ambient air quality standards. Emissions from the Proposed Action and the Rebuild-in-Place Alternative would not change this status. Therefore, unavoidable impacts on air quality would include **moderate** levels of fugitive dust and **low** levels of other air pollution emissions, including GHG emissions for the reasons discussed in Section 3.10.2 and 3.10.3.

3.10.6 Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative

As described above, the Proposed Action would generate relatively **low** GHG emissions. All levels of GHG emissions are significant in that they contribute to global GHG concentrations and climate change. However, given the small amount of contribution, the project’s incremental impact on GHG concentrations would be **low**. This would also be the case when combined with the other past, present, and reasonably foreseeable future projects and activities.

Project dust generation would be in addition to other sources of dust throughout the study area, including soil disturbance from site cleanup operations, vehicles traveling on unpaved roads, and construction within industrial zones. Future BPA actions (see Appendix A) in the study area would occur after project construction, when a majority of the dust would be produced. With appropriate mitigation measures to control dust during project implementation (see Section 3.10.4), the increase in dust levels would result in overall **low** cumulative contributions to relative dust levels in the study area. All areas would continue to meet NAAQS PM standards.

Reasonably foreseeable future projects would also contribute to air pollutants through emissions from construction equipment. Ongoing and reasonably foreseeable future activities in the study area are not, however, expected to violate NAAQS due to the current level of activity and applicable air quality permitting requirements. While the Proposed Action would contribute a small amount to pollutant levels, it is unlikely that cumulative emission concentrations would violate the NAAQS; therefore, cumulative impacts on air quality and climate change would be **low**.

3.10.7 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the existing transmission lines would not be rebuilt, so the impacts related to project construction would not occur. Maintenance activities would likely increase as existing structures deteriorated, and more structure repair and replacement could be required, resulting in increased dust and GHG emissions. Further, maintenance of access roads would be needed, and road work would likely need to take place as an operation and maintenance activity. The maintenance activities would result in minor increases in dust and GHG emissions. Because the increase would be small, the impacts on air quality and climate change are expected to be **low**.

3.11 Noise, Public Health, and Safety

3.11.1 Affected Environment

The study area for the human noise environment includes areas within 1,000 feet of the transmission line ROWs or within 500 feet of access roads. The study area for public health and safety is the existing and proposed ROWs (Segments 1 through 4), material storage yards, and roads located outside of ROWs.

Noise

Noise is commonly defined as loud, unwanted, or unexpected sound that disrupts normal human activities or diminishes the quality of the human environment. Audible noise is measured in **A-weighted scale decibels** (dBA). The A-weighted decibel scale describes sound that corresponds to human perception. Table 3.11-1 contains examples of common activities and their associated noise level in dBA.

Table 3.11-1. Common Activities and Associated Noise Levels

Noise Source	Noise Level (dBA)
Loud live band music	110
Truck 50 feet away	80
Gas lawnmower 100 feet away	70
Normal conversation indoors	60
Moderate rainfall on vegetation	50
Refrigerator	40
Bedroom at night	25

Noise-Sensitive Land Uses

Land uses most sensitive to noise include occupied buildings (residences, libraries, hospitals, and businesses), natural areas used for recreation, and other areas where noise can interfere with peoples' use or enjoyment of the environment.

As described in Section 3.2, the study area is located entirely on federal lands with restricted public access and no occupied structures (e.g., residences, hospitals, or schools) within 1.0 mile. Recreational access is currently not allowed.

Ambient Noise Environment

Within the study area, ambient noise levels vary with the proximity of the transmission line corridor to highways and other noise-generating activities. The study area is located on the Hanford Site, where noise levels are generally **low**. In 1996 and 2007, background noise levels were measured at the Hanford Site and it was found that background noise levels (measured as the 24-hour equivalent

sound level) ranged from 30 to 60.5 dBA. These studies also found that wind was the primary contributor to background sound levels (Duncan 2007). Further, current traffic associated with Hanford operation contributes to noise levels. The Hanford Site includes major noise sources such as industrial facilities, equipment, and machines; however, most industrial facilities are far enough from the site boundary that noise levels from these sources are either immeasurable or barely distinguishable from background noise levels in noise-sensitive areas (Duncan 2007). Hanford is currently in compliance with state noise regulations (Duncan 2007).

Audible noise from high-voltage transmission lines occurs as a result of corona activity (the electrical breakdown of air molecules in the vicinity of high-voltage conductors), which produces a hissing, crackling, popping sound, particularly during wet conditions such as rain or fog. Generally, audible noise from 115-kV lines is so low that the noise is not noticeable (due to the low amount of corona activity generated at this voltage level) and is usually well below other ambient noise levels in the area. BPA designed the 115-kV Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines to meet applicable state and federal noise regulations. Historically, public complaints/inquiries of transmission line audible noise at this voltage level are extremely rare.

Noise within the study area is regulated by Ecology for compliance with WAC 173-60. This regulation specifies noise limits according to the type of property where the noise would be heard (the receiving property) as well as the land use designation for the area where the noise would be generated (the noise source). The noise study area is classified as a Class C area (Duncan 2007). Within a Class C area, nighttime noise limits in residential areas are 50 dBA. Day noise limits are 60 dBA in residential areas, 65 dBA in commercial areas, and 70 dBA in industrial areas. Transmission lines are classified as industrial sources for the purpose of establishing allowable noise levels at receiving properties.

Public Health and Safety

All electrical wires, from household wiring to transmission lines, produce EMF. The primary parameters that affect the EMF levels produced by a power line are line voltage, current loading, line configuration, and line routing. Exposure to EMF depends on the design of the line and proximity to the line. The State of Washington has no regulations regarding transmission line EMF, and no nationally recognized regulatory standards or limits exist for ***electric fields*** from transmission lines. The NESC does specify a 5-milliampere criterion for maximum permissible induced shock current from large vehicles traveling under any BPA transmission line. BPA designs transmission line projects to meet the NESC exposure criteria within and outside the transmission corridor ROW.

Electromagnetic fields can also interfere with electrical equipment, including radio and television interference. ***Electromagnetic interference*** (EMI) can occur from corona activity or as a result of ***spark-discharge activity*** from aging hardware. Corona activity is primarily a function of the operating line voltage, while spark-discharge activity on connecting hardware is usually associated with the aging condition of hardware (e.g., over time, hardware connections can become loose and corroded, thus causing small spark-gaps). As with corona audible noise, corona

EMI is generally associated with lines operating at voltages of 345 kV or higher. Historically, public complaints of radio and television interference from BPA transmission lines operating at 115-kV are rare.

Electric fields from high-voltage transmission lines can cause nuisance shocks when a grounded person touches an ungrounded object under a transmission line or when an ungrounded person touches a grounded object. BPA transmission lines are designed so that the electric field would be below levels where primary shocks could occur, even for the largest (ungrounded) vehicles expected under the line.

Magnetic fields are measured in units of gauss (G) or milligauss (mG). The strength of an average magnetic field in most homes (away from electrical appliances and home wiring) is typically less than 2 mG. Very close to appliances that carry a high current, fields of tens or hundreds of mG are present. Unlike electric fields, magnetic fields from outside power lines are not reduced in strength by trees and building material. Therefore, transmission lines and distribution lines (the lines feeding a neighborhood or home) can be a major source of magnetic field exposure throughout a home located close to the line. There are no national guidelines or standards for magnetic fields in the United States, and the State of Washington does not have a limit for magnetic fields from transmission lines.

3.11.2 Environmental Consequences—Proposed Action

Noise

Construction Noise

Construction noise from the Proposed Action would be short-term, intermittent, and limited to between 7:00 a.m. to 5:00 p.m. Noise would come from construction equipment and vehicles used for road work, structure removal, and structure replacement. Noise from truck traffic and increased worker trips would temporarily contribute to existing traffic noise on local roads and highways. Traffic noise related to the Proposed Action is not expected to result in a significant increase in average traffic noise levels. Human noise impacts from construction and worker traffic along local roads would likely be **low**. Noise impacts and disturbance to wildlife species are addressed in Section 3.5.

Helicopters may be used to install conductors at structures and may be used to remove structures in Segment 3. Noise associated with helicopter use would be temporary and intermittent. It would generally take less than 10 minutes to string the conductor at each structure, and BPA estimates that helicopters would not be in any given line mile for more than 3 hours. Although helicopter noise may briefly (in the range of seconds) exceed regulatory noise thresholds in some places, the effect on people would be temporary because most of the ROWs are located miles from any areas regularly used by people. Due to the lack of noise-sensitive land uses in the study area and the short duration of elevated noise, noise impacts from helicopters would be **low**.

Table 3.11-2 summarizes noise levels generated by typical equipment that would likely be used to construct the Proposed Action. Noise levels at 50 feet from a construction site would range from 80 to 89 dBA. A helicopter may be used to string the conductor. A loaded cargo helicopter flying 250 feet away produces about 95 dBA, which is the same amount of noise produced by a diesel locomotive 100 feet away (Helicopter Association International 1993). Noise produced by construction equipment would decrease with distance from the site. Based on this assumed attenuation rate, residences located over 1.0 mile from the study area would not experience daytime noise levels higher than the applicable noise threshold for residences (60 dBA). Project

construction would not exceed applicable noise thresholds for residences; therefore, construction activities under the Proposed Action would have no noise impact on residences.

Table 3.11-2. Typical Construction Noise Levels

Type of Equipment	Maximum Noise Level (dBA) at 50 feet
Road grader	85
Bulldozer	85
Heavy truck	88
Backhoe	80
Pneumatic tools	85
Concrete pump	82
Crane	85
Combined equipment	89

Source: FTA (2006)

Maintenance and Operational Noise

Periodic noise impacts would occur during maintenance activities and would typically be associated with equipment used to maintain or repair infrastructure (e.g., wood structures, access roads) associated with the Proposed Action. These events would typically occur less than five days per year and last less than two hours. Given the short-term nature of this noise, operation and maintenance activities would have a **low** noise impact.

BPA also conducts routine inspection patrols of the federal transmission line system in the Pacific Northwest via helicopter, including BPA’s lines on the Hanford Site. BPA would continue to use helicopters to fly along the rebuilt lines and other BPA lines to identify repair needs. These patrols typically occur two or three times per year, generally in March, July, and October. Any noise experienced by receptors on the ground during these flyovers would be infrequent, brief, and **low** (i.e., only for the few seconds it would take for the helicopter to pass over).

During stormy or very humid weather, audible corona noise from a transmission line operating at 230 kV or greater can contribute significantly to ambient noise, along with wind and rain hitting vegetation. BPA design criteria ensure a maximum level of 50 dBA for corona-generated noise associated with all new transmission lines (115 kV, as well as 230 kV and higher) at the edge of the ROW. Because the lines would continue to operate at 115 kV (well below 230 kV), corona-generated noise would stay within this 50 dBA maximum level, would not contribute to the ambient noise levels of the surrounding areas, and would comply with all pertinent state noise regulations. Thus, there would be **no** impact from corona activity on noise levels from the Proposed Action.

No changes to the operating line voltage of the 115-kV Midway-Benton No. 1 or Benton-Othello No. 1 transmission lines would occur. Thus, the audible noise environment is not expected to change

as a result of the Proposed Action along segments that would remain in the same location (Segments 1 and 4). Audible noise along the rerouted segment (Segment 2) is not expected to generate greater levels of noise than is currently produced by the adjacent 230-kV transmission line.

BPA has calculated representative audible noise levels (for wet conditions) for the Proposed Action (Table 3.11-3). BPA selected Segment 4 of the Proposed Action to study noise emissions because that segment contains both the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines. The data illustrate that the Proposed Action would not change the audible environment near the ROW (maximum dBA would change from an existing 42.1 dBA to 42.0 dBA under the Proposed Action). The affected lines would remain compliant with applicable State of Washington noise regulations.

Table 3.11-3. Representative ROW Audible Noise, Proposed Action (dBA, wet conditions)¹

ROW Segment Description		Eastern ROW Edge (dBA)	Maximum on ROW (dBA)	Western ROW Edge(dBA)
Midway-Benton No. 1, Benton Othello No. 1, and Midway-Benton No. 1 collocation (Proposed Action structures 19/2 to 30/1) ²	Existing Conditions	38.0	42.1	32.5
	With Proposed Action	37.9	42.0	31.5

Notes:

¹ Values developed from BPA modeling programs.

² Audible noise calculations are for existing 287.5-foot-wide ROW for the three lines.

Public Health and Safety

Public Health and Safety during Construction

Potential public health and safety impacts would be associated with the use of construction and heavy equipment; potential exposure to hazardous materials, such as fuels and lubricants during construction; construction traffic entering and traveling across the transmission line corridor; potential aircraft hazards; and worker proximity to high-voltage transmission lines. Implementation of the mitigation measures discussed in Section 3.11.4 would reduce these potential public health and safety impacts during construction to **low**.

Public Health and Safety during Operation

In Segments 1 and 4, the proposed wood structure (and connecting hardware) replacements would not appreciably change any of the parameters that affect EMF levels (line voltage, current loading, line configuration, and line routing). Therefore, no change to EMF in the vicinity of the lines is expected in these areas.

BPA has calculated representative electric field and magnetic field levels for the Proposed Action in Tables 3.11-4 and 3.11-5, respectively. The ROW segment (Segment 4) modeled was selected to represent the maximum change in EMF for the Proposed Action. The data illustrate that the

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Affected Environment, Environmental Consequences, and Mitigation Measures

Proposed Action would not significantly change either the electric or magnetic field environment within the ROW. Specific EMF data for the DOE-RL 230-kV line is not available from DOE-RL for this analysis, but BPA does not expect that the construction of Segment 2 adjacent to the DOE-RL 230-kV line would differ appreciably from the calculations depicted in Tables 3.11-4 and 3.11-5 because Segment 2 would not have a different voltage. Overall, EMF emissions from the Proposed Action are expected to conform to BPA and NESC criteria; therefore, EMF emission impacts from the Proposed Action would be *low*.

Table 3.11-4. Representative ROW Electric Field¹

ROW Segment Description		Eastern ROW Boundary (kV/m)		Maximum on ROW (kV/m)		Western ROW Boundary (kV/m)	
		Annual Average	Annual Peak	Annual Average	Annual Peak	Annual Average	Annual Peak
Segment 4: Midway-Benton No. 1, Benton Othello No. 1, and Midway-Benton No. 1 collocation (Proposed Action structures 19/2 to 30/1)	Before action	1.4	25.3	4.2	86.1	0.4	6.6
	After action	1.4	24.7	4.2	87.6	0.5	8.1

Notes:

¹ Electric field calculations are for existing 287.5-foot-wide ROW for the three lines.

kV/m = kilovolt per meter

Table 3.11-5. Representative ROW Magnetic Field¹

ROW Segment Description		Eastern ROW Boundary (mG)		Maximum on ROW (mG)		Western ROW Boundary (mG)	
		Annual Average	Annual Peak	Annual Average	Annual Peak	Annual Average	Annual Peak
Segment 4: Midway-Benton No. 1, Benton Othello No. 1, and Midway-Benton No. 2 collocation (Proposed Action structures 19/2 to 30/1) ²	Before action	10.2	25.3	34.8	86.1	3.9	6.6
	After action	9.8	24.7	35.7	87.6	5.2	8.1

Notes:

¹ Calculation of annual average and annual peak magnetic field are based on historical 2006–2011 annual line loading statistical data obtained from BPA’s Supervisory Control of Data Acquisition system.

² Magnetic field calculations are for existing 287.5-foot-wide ROW for the three lines.

mG = milligauss

The presence of the transmission lines poses a hazard to low-flying aircraft; however, given the relative low height of the Midway Benton No. 1 and Benton-Othello No. 1 transmission lines, the risk associated with this potential hazard would be extremely low. Furthermore, the structures would be installed adjacent to existing, taller 230-kV structures, which aircraft likely currently avoid. Therefore, risks to low-flying aircraft would not change appreciably from current conditions.

No changes to the operating line voltage of the Midway-Benton No. 1 or Benton-Othello No. 1 transmission lines would occur. Additionally, this project would result in new, properly installed connecting hardware that would reduce any risk associated with aging hardware spark-discharge activity. As a result, the Proposed Action is expected to either not change or possibly slightly improve radio and television performance within the study area and, based on past performance, interference complaints are not expected. However, any legitimate radio or television interference complaint received by BPA would be investigated. If BPA facilities were determined to be the cause of the interference, BPA would take corrective action to eliminate the interference. Therefore, through the implementation of the mitigation measures discussed in Section 3.11.4 and the installation of new connecting hardware that would reduce interference, potential public health and safety impacts during operation would be **low**.

3.11.3 Environmental Consequences—Rebuild-in-Place Alternative

Noise

Construction Noise

As with the Proposed Action, the Rebuild-in-Place Alternative would result in short-term and intermittent noise impacts within the study area during construction. No residences or noise-sensitive land uses (such as residences, schools, hospitals, or churches) would be located within 1.0 mile of the Rebuild-in-Place Alternative.

Noise would come from construction equipment and vehicles used for road work, structure removal, and structure replacement. Noise from truck traffic and increased worker trips would temporarily contribute to existing traffic noise on local roads and highways. Traffic noise is not expected to result in a significant increase in average traffic noise levels and noise impacts from construction traffic along local roads would be **low**. Noise impacts and disturbance to wildlife species are addressed in Section 3.5.

Helicopters may be used to install conductors at structures. Noise associated with helicopter use would be temporary and intermittent. Helicopter noise would not likely exceed noise thresholds for noise-sensitive land uses; therefore, the construction noise impact would be **low**.

Maintenance and Operational Noise

Periodic noise impacts during maintenance activities would typically be associated with equipment used to maintain or repair infrastructure and routine BPA helicopter inspection patrols. These noise levels would be the same as those that would occur under the Proposed Action (see Section 3.11.2).

Because the existing lines are currently operating at 115 kV, which is well below the 230 kV level at which corona noise can contribute substantially to ambient noise, and the lines would be located in the same ROWs along Segments 1, 3, and 4, any corona noise that might occur would be the same

as current conditions. No new corona noise would be generated along Segment 2. Any corona noise generated would be below ambient noise levels of the surrounding areas and would comply with all pertinent state noise regulations (see Section 3.11.1). Overall, noise impacts associated with maintenance, operation, and inspection activities would be **low**.

Public Health and Safety

Public Health and Safety during Construction

Potential public health and safety hazards from equipment use, hazardous materials, construction traffic, aircraft use, and working around high voltage power lines under the Rebuild-in-Place Alternative would be to the same as those described under the Proposed Action (see Section 3.11.2). Implementation of mitigation measures discussed in Section 3.11.4 would reduce these potential impacts to **low**.

Public Health and Safety during Operation

The presence of the transmission lines poses a hazard to low-flying aircraft; however, given the relative low height of the Midway Benton No. 1 and Benton-Othello No. 1 transmission lines, the risk associated with this potential hazard would be extremely low. Furthermore, the structures would replace similar existing structures; therefore, risks to low-flying aircraft would not change appreciably from current conditions.

The electric and magnetic field levels presented in Tables 3.11-3 and 3.11-4 are also representative of the levels expected under the Rebuild-in-Place Alternative, which would result in EMF emissions from the transmission lines similar to the existing lines. Overall, EMF emissions for the Rebuild-in-Place Alternative are expected to conform to BPA and NESC criteria; therefore, EMF emission impacts from operation would be **low**.

Because the Rebuild-in-Place Alternative would retain the operating voltage of the existing transmission lines (115 kV), any EMI related to corona activity is expected to remain **low**. As with the Proposed Action, the Rebuild-in-Place Alternative is expected to have **no**, or possibly reduce, existing radio and television interference in the study area.

3.11.4 Mitigation Measures—Proposed Action and Rebuild-in-Place Alternative

The following mitigation measures would be implemented under both the Proposed Action and the Rebuild-in-Place Alternative to avoid and minimize impacts on public health, noise, and safety:

- Ensure standard sound-control devices, including mufflers, are on all construction equipment and vehicles prior to and during construction.
- If blasting is required, take appropriate safety measures and follow all applicable regulations. Lock up or remove all explosives from work sites at the end of the workday.
- Prepare and implement Spill Prevention and Response Procedures to prevent spills of hazardous materials and respond to emergency situations.
- Prepare and maintain an on-site safety plan in compliance with state requirements.

- Prepare for fire control (see Section 3.4.4).
- Coordinate activities the Hanford Patrol and Hanford Fire Department.
- Fuel all highway-authorized vehicles off-site to minimize the risk of fire. Fueling of construction equipment that is transported to the site via truck and is not highway authorized will be done in accordance with regulated construction practices and applicable laws. Helicopters will be fueled and housed at local airfields or at staging areas.
- Ensure that BPA contractors flying helicopters prioritize public safety during flights. For example, establish flight paths to avoid populated areas or schools.
- Implement appropriate airport safety measures prior to construction.
- Obtain appropriate Hanford excavation permits.
- Report possible hazardous materials, toxic substances, or petroleum products discovered along the transmission line route that would pose an immediate threat to human health or the environment, including large dump sites, drums of unknown substances, suspicious odors, stained soil, etc.
- Design, construct, and operate the new transmission line according to the NESC.
- Restore reception quality if there is radio or television interference due to the transmission lines.

3.11.5 Unavoidable Impacts Remaining After Mitigation—Proposed Action and Rebuild-in-Place Alternative

Unavoidable noise impacts would include elevated noise in the study area during project construction. Due to the distance of residences and other noise-sensitive areas and the implementation of mitigation measures described in Section 3.11.4, construction noise impacts would be **low** and cease with completion of construction activities.

Potential unavoidable public health and safety risks would include accidental release of fuels or oils, accidental injury to construction workers, and possible collisions between construction vehicles and vehicles driven by the public. Nuisance shocks may occur infrequently under the Proposed Action. Implementation of the mitigation measures described in Section 3.11.4 would reduce these hazards to a **low** level.

3.11.6 Cumulative Impacts—Proposed Action and Rebuild-in-Place Alternative

Project construction noise would temporarily contribute to existing noise levels from Hanford operations in the study area (see Appendix A). Cumulative noise impacts typically occur when noise receptors are exposed to more than one noise source at approximately the same time, such as cumulative noise from construction traffic and activities. Therefore, the proposed project would contribute to a cumulative temporary increase in noise levels in the study area. Noise levels would

return to current levels after project construction. Future BPA activities in the study area (see Appendix A) would not overlap temporally with the project; therefore, BPA actions would not result in a cumulative noise increase. The cumulative noise levels in the study area are not expected to exceed state noise level standards and would be primarily limited to the duration of project construction. Therefore, the potential for the Proposed Action and Rebuild-in-Place Alternative to contribute to construction noise-related cumulative impacts is expected to be **low**.

The Proposed Action and Rebuild-in-Place Alternative would not cumulatively increase the overall level of EMF exposure along the ROWs. Where the ROWs would remain unchanged, the transmission lines with new wood structures would have EMF levels similar to those of the existing lines. Where the ROW would be rerouted to follow the existing DOE-RL 230-kV transmission line, BPA does not anticipate an appreciable increase in EMF levels. There are no known plans to construct additional transmission lines in the study area, so the potential for the Proposed Action or Rebuild-in-Place Alternative to contribute to cumulative levels of EMF is expected to be **low**.

3.11.7 Environmental Consequences—No Action Alternative

Under the No Action Alternative, noise associated with project construction would not occur. Noise associated with transmission line maintenance would continue as in the past and could occur more often than under the Proposed Action or Rebuild-in-Place Alternative. Line maintenance and associated noise would likely increase under the No Action Alternative because of the deteriorated condition of the existing lines and the likely need for more frequent maintenance activities. Potential public health and safety risks associated with construction would also not occur under the No Action Alternative. EMF and EMI exposure would remain similar to current conditions. Continued operation and maintenance of the existing transmission line would have **low** impacts on Noise, Public Health, and Safety.

Chapter 4

Consultation, Review, and Permit Requirements

This chapter addresses federal statutes, implementing regulations, and executive orders applicable to the Midway-Benton No. 1 Transmission Line Rebuild Project. This EA is being sent to tribes, federal agencies, and State and local governments as part of the consultation process for the project. Persons consulted are listed in Chapter 5.

4.1 National Environmental Policy Act

BPA prepared this Preliminary EA pursuant to regulations implementing NEPA (42 U.S.C. 4321 *et seq.*), which require federal agencies to assess the impacts that their actions may have on the environment. NEPA requires preparation of an EIS for major federal actions significantly affecting the quality of the human environment. BPA will consider the information presented in the EA to determine if the Proposed Action or Rebuild-in-Place Alternative would cause any significant environmental impacts that would warrant preparation of an EIS or whether it is appropriate to prepare a FONSI.

4.2 Vegetation

4.2.1 Endangered Species Act

The ESA (16 USC 1531 *et seq.*), establishes a national program for the conservation of threatened and endangered species of fish, wildlife and plants, and the preservation of the ecosystems on which they depend. The ESA is administered by the USFWS for wildlife and freshwater species and by NOAA Fisheries Service (NOAA Fisheries) for marine and anadromous species. The ESA defines procedures for listing species, designating critical habitat for listed species, and preparing recovery plans. It also specifies prohibited actions and exceptions.

Section 7(a) (2) of the ESA requires federal agencies to ensure that the actions they authorize, fund, and carry out do not jeopardize the continued existence of endangered or threatened species or destroy or adversely modify their critical habitats. Section 7(c) of the ESA and other federal regulations require that federal agencies prepare biological assessments addressing the potential effects of major construction actions on listed or proposed endangered species and critical habitats.

No plant species listed as threatened or endangered under the ESA have been identified on the Hanford Site (Duncan 2007). The USFWS lists or proposes to list Ute ladies'-tresses, Umtanum desert buckwheat, and White Bluffs bladderpod in Benton County as threatened (USFWS 2011). The Ute ladies'-tresses is associated with floodplains and wet habitats along the Columbia River. The Umtanum desert buckwheat and its associated proposed critical habitat are found on basalt

outcrops near the top of Umtanum Ridge, approximately one-third mile south of the project area. The white bluff bladderpod and associated proposed critical habitat is limited to the White Bluffs area of the Hanford Reach, located across the Columbia River from the project area. As discussed in Section 3.6, suitable habitat is not likely present for these plant species.

4.3 Fish and Wildlife

4.3.1 Endangered Species Act

The ESA is summarized above in Section 4.2.1. The USFWS has not designated any terrestrial habitats of the Hanford Site as critical habitat (USFWS 2011). According to the USFWS, two species listed as threatened or endangered occur in Benton County: the pygmy rabbit and the gray wolf (USFWS 2011). The pygmy rabbit is a federal and state endangered species. WDFW reports that the last known wild subpopulation of pygmy rabbit in Washington was extirpated by early 2004 (WDFW 2012). The WDFW has been conducting a captive breeding and release program that has established isolated populations in Grant and Adams counties and, most recently, in the Sagebrush Flat Wildlife Area in Douglas County (Duncan 2007, WDFW 2011). Due to this restricted current distribution, pygmy rabbits are likely absent from the study area.

The gray wolf is becoming reestablished in Washington, but the closest wolf pack is in the Blue Mountains approximately 70 miles east of the study area (WDFW 2012), and no wolf sightings have been reported at Hanford Site. Based on this current distribution, use of the site by wolves is limited to possible wide-ranging transients.

The USFWS lists indicate that Columbia River **Distinct Population Segment** (DPS) of the bull trout (*Salvelinus confluentus*) listed as threatened, may be present in the Columbia River. In addition, NOAA Fisheries identifies several Columbia River salmon and steelhead as threatened and endangered. As presented in Section 3.6, the project is located outside the riparian zone of the Columbia River, with the closest points being at the Midway Substation, which is approximately 4,100 feet (0.8 mile) from the Columbia River, and at the Benton Substation, which is approximately 1,650 feet (0.3 mile) from the Columbia River. Therefore, neither the Proposed Action nor Rebuild-in-Place Alternative would adversely affect threatened or endangered fish species or their designated critical habitats.

4.3.2 Fish and Wildlife Conservation Act and Fish and Wildlife Coordination Act

The Fish and Wildlife Conservation Act of 1980 (16 U.S.C. 2901 *et seq.*) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife and their habitats. In addition, the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*) requires federal agencies with projects affecting water resources to consult with USFWS and the state agency responsible for fish and wildlife resources.

BPA coordinated with the WDFW and the USFWS in developing the scope of issues to be addressed in this EA. BPA also coordinated with WDFW and USFWS in developing a Biological Resources Study Plan prepared specifically for the proposed project to identify nesting hawks, burrowing owls and

other wildlife (Point Environmental Consulting 2012a). Results of these studies will be incorporated into the Final EA.

The analyses in Section 3.5 and 3.6, indicate that the Proposed Action and Rebuild-in-Place Alternatives would result in **moderate** impacts to wildlife and **no** impact on fish. Mitigation designed to avoid and minimize impacts to wildlife is identified in Section 3.5.4 of this EA. The USFWS and WDFW have been sent copies of this Preliminary EA for review and comment, and BPA will continue to coordinate with these agencies.

4.3.3 Magnuson-Stevens Fishery Conservation and Management Act

Public Law 104–297, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 *et seq.*). Under Section 305(b) (4) of the Act, BPA is required to consult with NOAA Fisheries for actions that adversely affect essential fish habitat (EFH). EFH can include all streams, lakes, ponds, wetlands, and other viable water bodies, and most of the habitat historically accessible to fish necessary for spawning, breeding, feeding or growth to maturity. NOAA Fisheries is required to provide EFH conservation and enhancement recommendations.

The Columbia River is designated as EFH for anadromous salmon and steelhead; however, as presented in Section 3.6, the proposed project is located outside the riparian zone of the Columbia River. The Benton Substation, which is approximately 1,650 feet (0.3 mile) from the Columbia River, would be the proposed project’s closest point to the river. In addition, because the area contains no nearby surface waters or riparian habitat, no indirect impacts on EFH would likely occur.

4.3.4 Migratory Bird Treaty Act and Federal Memorandum of Understanding

The Migratory Bird Treaty Act implements various treaties and conventions between the United States and other countries, including Canada, Japan, Mexico, and the former Soviet Union, for the protection of migratory birds (16 U.S.C. 703–712). Under the Act, taking, killing, or possessing migratory birds, or their eggs or nests, is unlawful. The Act classifies most species of birds as migratory, except for upland and nonnative birds such as pheasant, chukar, gray partridge, house sparrow, European starling, and rock dove.

BPA (through DOE) and USFWS have a memorandum of understanding (MOU) to address migratory bird conservation in accordance with Executive Order 13186 (Responsibilities to Federal Agencies to Protect Migratory Birds), which directs each federal agency that is taking actions possibly negatively affecting migratory bird populations to work with the USFWS to develop an agreement to conserve those birds (DOE and USFWS 2006). The MOU addresses how both agencies can work cooperatively to address migratory bird conservation and includes specific measures to consider implementing during project planning and implementation.

The Proposed Action and Rebuild-in-Place Alternative may affect migratory birds through nest site disturbance, loss of habitat, and potential for collisions with the transmission line. Vegetation clearing is proposed from October 2012 through March 2013, which is outside of the migratory bird

nesting season; therefore, direct impacts to active migratory bird nest sites would be avoided. Disturbance of early nesting ferruginous hawks and other special-status raptors (e.g., Swainson's hawks) would be avoided through additional seasonal timing and site-specific timing restrictions and buffers, developed in consultation with DOE-RL and USFWS, as necessary to avoid disturbing nest sites. Possible disturbance of nesting migratory birds caused by work crews entering the area as part of operations and maintenance would also be minimized through seasonal timing restrictions (see Section 3.5.4).

Construction, operation, and maintenance of the Proposed Action and Rebuild-in-Place Alternative would result in a similar level of impact on migratory birds as it would on other birds and wildlife described in Section 3.5.2. Both the Proposed Action and Rebuild-in-Place Alternative would reduce habitat for migratory birds through clearing and modification of shrub-steppe habitat during construction and ongoing vegetation management (see Sections 2.2.4 and 2.2.5). Species affected include shrub-steppe dependent migratory birds such as the sage sparrow and loggerhead shrike. Shrub-steppe loss would be minimized as practicable during construction. Mitigation measures would be implemented to include on-site restoration and potentially off-site compensatory mitigation for losses of late-successional shrub-steppe habitats (see Section 3.4.4).

4.3.5 Bald Eagle and Golden Eagle Protection Act

The Bald Eagle and Golden Eagle Protection Act prohibits the taking or possessing of and commerce in bald and golden eagles, with limited exceptions (16 U.S.C. 668–668d). The Act covers only intentional acts, or acts in “wanton disregard” of the safety of bald or golden eagles.

Potential occurrence of bald eagles in the Hanford Site and potential impacts from the Proposed Action and Rebuild-in-Place Alternative are discussed in Section 3.5 of this EA. No bald eagle foraging, perching, or night roosting locations are located within the site (DOE-RL 2009b). Mitigation measures to avoid and minimize impacts to birds, including eagles, are identified in Section 3.5.4.

In addition, the Proposed Action and Rebuild-in-Place Alternative would be consistent with the *Hanford Site Bald Eagle Management Plan* (DOE-RL 2009b).

4.4 Water Resources

4.4.1 Clean Water Act

The Clean Water Act (33 U.S.C. 1251 *et seq.*) regulates discharges into waters of the United States. The various sections that would be potentially applicable to the Proposed Action and Rebuild-in-Place Alternative include Sections 401, 402, and 404. As presented in Section 3.6, the proposed project is located over 0.3 mile from the Columbia River and would not cross any surface waters of wetlands. Thus, the proposed project would not result in any discharges into waters of the United States and would not implicate the Clean Water Act.

4.4.2 Wetlands and Floodplain Protection

The DOE mandates that impacts on floodplains and wetlands be assessed and alternatives for protection of these resources be evaluated in accordance with Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR 1022.12) and Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands). Wetland management, regulation, and protection are also addressed in several sections of the Clean Water Act, including Sections 401, 402, and 404 (see Section 4.4.1). Wetlands are also addressed in a combination of other state and federal laws, including the Coastal Zone Management Act, ESA, NHPA, Rivers and Harbors Act, and Wild and Scenic Rivers Act.

As described in Section 3.6, neither the Proposed Action nor the Rebuild-in-Place Alternative would impact wetlands or floodplains.

4.5 Cultural Resources

Several regulations are in place to govern management of cultural resources. A cultural resource is an object, structure, building, site, or district that provides irreplaceable evidence of natural or human history of national, state, or local significance, such as national landmarks, archeological sites, and properties listed (or eligible for listing) on the National Register of Historic Places (NHRP). Established regulations include:

- National Historic Preservation Act of 1966 (16 U.S.C. 470 *et seq.*), as amended, inclusive of Section 106
- Antiquities Act of 1906 (16 U.S.C. 431–433)
- Historic Sites Act of 1935 (16 U.S.C. 461–467)
- Archaeological Data Preservation Act of 1974 (16 U.S.C. 469 a–c)
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa–mm), as amended
- Native American Graves Protection and Repatriation Act (25 U.S.C. 3001 *et seq.*)
- Executive Order 13007 Indian Sacred Sites
- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996, 1996a)

Section 106 of the NHPA requires federal agencies to consider the effects of their actions on historic properties. The NHPA provides a process, known as the Section 106 process that enables agencies to assess impacts on historic properties along with participation from interested and affected parties such as tribes, and then avoid, minimize, or mitigate for these impacts. Historic properties may be prehistoric or historic sites, including objects and structures that are included in or eligible for inclusion in the NRHP. Historic properties also include artifacts or remains within historic sites and properties of traditional and cultural importance to tribes.

To this end, BPA has provided information about the project and requested input on the level and type of proposed identification and evaluation efforts of the prehistoric resources from the following tribes: the Confederated Tribes of the Colville Indian Reservation, CTUIR, Confederated Tribes and Bands of the Yakama Nation, Nez Perce Tribe, and Wanapum Band (see Section 3.8).

In compliance with NHPA, BPA is identifying and documenting cultural resources in the study area and evaluating them for eligibility for listing on the NRHP. BPA is also conducting field surveys of the APE, in consultation with the tribes, to identify previously undocumented sites and to determine any impacts the project may have on the resources (see Section 3.8).

BPA is also consulting with the tribes to identify any ethnobotanical populations of concern. Populations and individual plants identified in project workspaces would be disturbed by vegetation clearing, ground disturbance, or vehicle access activities. Impacts on these culturally significant plants would be to the same as those described in Section 3.4. The mitigation measures identified in Section 3.8.4 and 3.4.4 would minimize impacts from the proposed project on these resources.

4.6 Socioeconomics and Public Services

4.6.1 Federal Communications Commission

Federal Communications Commission (FCC) regulations require that transmission lines be operated so that radio and television reception would not be seriously degraded or repeatedly interrupted. Further, the FCC regulations require that the operators of these devices mitigate such interference. It is expected that there would be no interference with radio, television, or other reception as a result of the Proposed Action or the Rebuild-in-Place Alternative (see Section 3.11). BPA would comply with FCC requirements relating to radio and television interference from the Proposed Action or Rebuild-in-Place Alternative if any such interference occurs.

4.6.2 Executive Order on Environmental Justice

In February 1994, Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was released to federal agencies. This order states that federal agencies must identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Neither the Proposed Action nor Rebuild-in-Place Alternative would cause disproportionately high and adverse impacts on minority nor low-income populations (see Section 3.9).

4.6.3 Overhead Power and Communication Lines

WAC 468-34-280 recommends that longitudinal installations of power lines (on public ROWs) be of single-pole construction, and that joint-use single-pole construction is generally desirable and should be used whenever feasible. The proposed project's designs calls for the rebuilt line to be supported by structures composed of two or three wood poles and essentially replace the existing structures in kind. It is not feasible to construct the proposed project with single-pole structures.

Single poles would result in twice as much disturbance and be more costly because more poles would be required for the line.

4.6.4 Vertical Clearance and Location

WAC 468-34-290 and 468-34-300 require that vertical clearances for overhead power lines conform to the NESC and/or the clearances identified in the WAC, whichever are greater. The minimum clearance specified by NESC for 115 kV transmission lines is 32 feet above the groundline, including roadways. The code also specifies that utility lines be located as near as practicable to the edge of the ROW while still maintaining a reasonably uniform alignment. The Proposed Action and Rebuild-in-Place Alternative would conform to the minimum clearances, as required by the NESC, and would be located as close to the ROW edge as practicable.

4.7 Air Quality

4.7.1 Clean Air Act

The federal Clean Air Act, as amended (42 U.S.C. 7401 *et seq.*), requires EPA and individual states to carry out a wide range of regulatory programs intended to assure attainment of the NAAQS. In the state of Washington, EPA has delegated authority to Ecology, which has regulations requiring all industrial activities (including construction projects) to minimize windblown fugitive dust.

There would be no burning of cleared material. Vehicles used during construction of the proposed Action or Rebuild-in-Place Alternative would be maintained so as to minimize emissions. Water trucks would be used to minimize fugitive dust during project construction. Potential impacts from the proposed project on air quality are discussed in detail in Section 3.10.

4.7.2 Climate Change

Various federal and state mandates address the need to reduce GHG emissions, including the following.

- The Clean Air Act (as described in Section 4.7.1) is a federal law that establishes regulations to control emissions from large generation sources such as power plants; limited regulation of GHG emissions occurs through New Source Review permitting program.
- EPA has issued the *Final Mandatory Reporting of Greenhouse Gases Rule* (40 CFR 98) that requires reporting of GHG emissions from large sources. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHGs are required to submit annual reports to EPA (EPA 2010b).
- Executive Orders 13423 and 13514 require federal agencies to measure, manage, and reduce GHG emissions by agency-defined target amounts and dates.

- In Washington State, Executive Orders 07-02 and 09-05 direct state agencies to work with western states and Canadian provinces to develop a regional emissions reduction program designed to reduce GHG emissions to 1990 levels by 2020 (Ecology 2010).

GHG emissions were calculated for activities under the Proposed Action and Rebuild-in-Place Alternative that would produce GHG emissions: construction of the transmission line and ongoing annual operations and maintenance for the estimated 50-year operational life of the transmission line. GHG emissions would be below EPA's mandatory reporting threshold. The impact of the Proposed Action and Rebuild-in-Place Alternative is discussed in Section 3.10.

4.8 Noise, Public Health, and Safety

Several Federal laws related to hazardous materials and toxic substances potentially apply to the Proposed Action or Rebuild-in-Place Alternative. Various provisions of the Spill Prevention Control and Countermeasures Rule (40 CFR Part 112), the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. 9601 et seq.), and the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. 9601 et seq.) may apply to the project, depending upon the exact quantities and types of hazardous materials stored on-site.

4.8.1 Maximum Environmental Noise Levels

The federal Noise Control Act of 1972 (42 U.S.C. 4901 *et seq.*) sets forth a broad goal of protecting all people from noise that jeopardizes their health or welfare. The Act further states that Federal agencies are authorized and directed, to the fullest extent consistent with their authority under Federal laws administered by them, to carry out the programs within their control in such a manner as to further this policy. Environmental noise limits relevant to the project are regulated by Ecology Maximum Environmental Noise Levels (WAC 173-60), which establish limits on levels and duration of noise. Allowable maximum sound levels depend on the land use of the noise source and receiving property. In addition, BPA has established a 50 dBA design criterion for corona-generated audible noise from transmission lines at the edge of the ROWs. Ecology has interpreted this criterion to meet its noise regulations. As described in Section 3.11, the Proposed Action and Rebuild-in-Place Alternative would have temporary **low** to **moderate** noise impacts, and mitigation measures identified in Section 3.11 would further reduce these impacts.

4.8.2 Transportation Permits

According to Revised Code of Washington 46.44, oversized or overweight vehicles need transportation permits to travel on highways and local public roads in the state. The construction contractors will consult with WSDOT and the Benton County Public Works Departments to comply with state and local requirements. Necessary transportation permits for oversized or overweight vehicles used for project construction and maintenance would be secured as required.

4.8.3 Uniform Fire Code

The development of a hazardous materials management plan may be required by local fire districts in accordance with the Uniform Fire Code. BPA will develop and implement such a plan, if required.

Chapter 5

Persons, Tribes and Agencies Consulted

Federal Agencies

National Oceanic and Atmospheric Administration, National Marine Fisheries Service
U.S. Army Corps of Engineers- Walla Walla District
U.S. Department of Energy Richland Operations Office
U.S. Department of Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency

State Agencies

Washington State Historic Preservation Office (SHPO)/ Washington State Department of
Archaeology & Historic Preservation
Washington State Department of Ecology
Washington Department of Natural Resources
Washington Department of Fish and Wildlife
Washington Energy Facility Site Evaluation Council

County and City

Benton County
City of Mattawa
City of Richland
City of West Richland
Grant County

Tribes

Confederated Tribes of the Colville Reservation
Confederated Tribes and Bands of the Yakama Reservation
Confederated Tribes of the Umatilla Indian Reservation
Nez Perce Tribe
Wanapum Band

Non-Government Organizations

Columbia Basin Chapter- Washington Native Plant Society
Center for Columbia River History
Lower Columbia Basin Audubon Society
The Nature Conservancy - Washington Field Office
Tapteal Greenway Association

Chapter 6

Glossary and Acronyms

6.1 Glossary

Airshed—A geographic area used to evaluate air quality. Typically involves areas regional in scale (e.g., Columbia Basin Airshed), though local airsheds can be defined as well.

Ambient (noise)—Background noise generated by existing noise sources in the surrounding area.

Anadromous (fish)—Chinook, coho, and sockeye salmon and steelhead trout, which hatch in fresh water, spend part of their life at sea, and then migrate up rivers to their home waters to spawn.

Angle structures—Structures that support the transmission line at points where it changes direction at an angle of 15 degrees or more (see also Dead-End Structure).

A-weighted decibel—The scale used to measure and describe volume that corresponds to human perception.

Basalt—Rock formed from free-flowing lava. The Hanford Site is underlain by thick layers of basalt, some of which are exposed as basalt cliffs, outcrops, talus and lithosols (defined below).

Best management practices (BMPs)—Standard measures applied to address recurring environmental impacts.

Built Resources—Human built infrastructure, such as transmission lines.

Candidate Species—Plants and animals that have been studied and the U.S. Fish and Wildlife Service has concluded that they should be proposed for addition to the Federal endangered and threatened species list. These species have formerly been referred to as category 1 candidate species. From the February 28, 1996 Federal Register, page 7597: “those species for which the Service has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list but issuance of the proposed rule is precluded.”

Capacity (electrical)—The ability to store an electrical charge.

Carbon dioxide equivalent—A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as “million metric tons of carbon dioxide equivalents (MMTCO₂Eq).” The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP.

Carrying Capacity—Largest number of individuals of a particular species that can survive over long periods of time in a given environment, range or habitat. Carrying capacity is determined by limiting factors, such as habitat suitability, food, predation and competition.

Chert—A rock resembling flint that was used to create projectile points by prehistoric peoples

Circuit—A connection that allows electrical current to flow.

Compaction (soil)—Compression of soil, typically from heavy equipment, that removes pores, eliminating water- and air-holding capacity.

Compensatory Mitigation—Compensating for the impact by replacing or providing substitute resources away from the site of disturbance.

Conductor—The wire cable strung along a transmission line through which electricity flows.

Corona activity (Corona)—The electrical breakdown of air molecules in the vicinity of high-voltage conductors

Conservation Land Use Designation—Lands that are managed to protect archaeological, cultural, ecological, and natural resources, with limited public access. Mining (e.g., quarrying for sand, gravel, basalt, and topsoil for governmental purposes) is allowed as a special use within appropriate areas in the Conservation areas.

Counterpoise—Underground wires that extend horizontally from each structure and that connect with ground wire to provide lightning protection.

Critical habitat—A formal term under the Endangered Species Act that refers to specific geographic areas, whether occupied by listed species or not, that are determined to be essential for the conservation and management of listed species, and that have been formally described in the Federal Register.

Cryptogamic crust—A soil crust dominated by a plant community of algae, lichens, or mosses that is indicative of undisturbed shrub-steppe vegetation.

Cultural resources—A general term, not defined in federal law, which includes historic resources as well a larger universe of resources including archeological, Native American graves, and traditional uses.

Cumulative impacts—Impacts that could occur when considered along with other past, present, and reasonably foreseeable future actions.

Current (transmission lines)—The amount of electrical charge flowing through a conductor (as compared to voltage, which is the force that drives the electrical charge).

Dampers—Devices attached to insulators in order to minimize vibration of the conductors in windy conditions.

Dead-end structures—Heavier, 3-pole structures designed for use where the transmission line loads the tower primarily in tension rather than compression, such as in turning large angles along a line or bringing a line into a substation.

Decibels—Unit of measure for audible noise.

Direct impacts—Impacts that would occur as a direct result of project construction within the work area and would have an immediate impact on the environmental resource being evaluated.

Disconnect switch—A power system switch, manually or motor operated, used for changing connections in a circuit (open or close) or for isolating a circuit or piece of equipment from the source of power.

Distinct Population Segment—A vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The ESA provides for listing species, subspecies, or distinct population segments of vertebrate species.

Electric and magnetic fields—The two kinds of fields (electric and magnetic) produced around the electric wire or conductor when an electric transmission line or any electric wiring is in operation.

Electromagnetic Interference (EMI)—Interference of an electrical device caused by the presence of an electromagnetic field.

Endangered (species)—Those species officially designated by the USFWS or the NMFS as being in danger of extinction throughout all or a significant portion of their range. A designation also used by state agencies for state lists.

Environmental Justice Population—Low-income and minority populations protected under Executive Order 12898 from disproportionate adverse effects of federal projects.

Erosion—The movement of soil due to water, gravity or wind.

Ethnobotanical—Relating to cultural value of plants, including traditional uses for medicine, food and fiber.

Ethnographic—Relating to specific human cultures.

Existing and proposed ROWs—For the Midway-Benton No. 1 Rebuild Project, this area was defined as all areas within 50 feet of centerline of either the existing ROW or the proposed (reroute) ROW.

Faults—A crack in the earth's crust resulting from the displacement of one side with respect to the other.

Global Warming Potential—A measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide.

Ground rod—Rod that connects to a ground wire that is placed in the ground to route lightning-strike electricity into the earth.

Ground wire—Wires placed above the conductors to route lightning-strike electricity to the ground.

Guy wire—A tensioned cable that anchors a structure to the ground to provide extra stability.

Guy wire anchors—Anchor plates buried into the ground to which guy wires are attached.

Hibernaculum—A place where snakes spend the winter. Can include multiple individuals and species.

Indirect impacts—Impacts that would occur after project construction or adjacent to the work area.

Insulators—A component made of non-conductive materials that connects the conductor to the suspension structure and prevents the transmission of electrical current from the conductor to the ground.

Isolate—An archeological find found away from others. See *modern isolated find*.

Kilovolt—One thousand volts of electrical power.

Late-successional—Referring to a vegetation community that has grown near climax condition. Similar to the term “old growth” used for forests in the Pacific Northwest.

Lek—A breeding and courtship area used by grouse.

Level of concern—A management designation defined in the *Hanford Site Biological Resources Management Plan*.

Lithosols—Shallow soils consisting of imperfectly weathered rock fragments.

Loam—A soil type that is a mix of sand, silt, and clay.

Loess—Windblown soils.

Low Income Population—Any readily identifiable group of low-income persons who live in geographic proximity who would be affected by the Proposed Action, policy or activity. Low-income is generally defined as a household income at or below the US Department of Health and Human Services poverty guidelines.

Material Storage and Staging Yards—Locations where construction-related materials, equipment, and offices are staged and located.

Midden—A mound of domestic refuse containing shells and animal bones marking the site of a prehistoric settlement.

Minority Population—Any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed program, policy or activity.

Mitigation—Steps taken to lessen the impacts of proposed activities on a specific resource. Measures may include reducing the impact, avoiding it completely, or compensating for the impact.

Modern Isolated Find—An item found that was made by humans in the past 50 years or less, i.e., not historic.

Monitor species—Taxa of potential concern; a term frequently used to describe status, but not a legal designation; species native to the state of Washington that: (1) were at one time classified as endangered, threatened, or sensitive; (2) require habitat that has limited availability during some portion of its life cycle; (3) are indicators of environmental quality; (4) require further field investigations to determine population status; (5) have unresolved taxonomy which may bear upon their status classification; (6) may be competing with and impacting other species of concern; or (7) have significant popular appeal.

National Historical Park—Protected areas of national historic significance in the United States. A National Historical Park usually contains a single historical feature directly associated with its subject and contains a variety of resources and encompasses large land or water areas to help provide adequate protection of the resources. Hunting, mining and consumptive activities like logging and grazing are not authorized.

No Action Alternative—The alternative of continuing current management direction.

Nonattainment area—An area that does not meet air quality standards set by the Clean Air Act for specified localities and periods.

Obligates—Biologically essential for survival.

Palliatives—Compounds used to mitigate fugitive dust on roads in arid climates. Several types of palliatives are found to control dust which includes polymer emulsions, lignosulfonates, chloride salts, synthetic fluids, an asphalt emulsion, a polysaccharide solution, a polyacrylamide, and a guar gum.

Particulate matter—A criteria air pollutant. Particulate matter includes dust, soot and other tiny bits of solid materials that are released into and move around in the air.

Percent slope—A measure of slope determined by dividing the increase in elevation (rise) over horizontal distance (run).

PM₁₀—A measure of particles in the atmosphere with a diameter of less than or equal to a nominal 10 micrometers.

PM_{2.5}—A measure of particles in the atmosphere with a diameter of less than or equal to a nominal 2.5 micrometers.

Preservation Land Use Designation—Lands managed to preserve (rather than protect, as is stated under Conservation designation) archaeological, cultural, ecological, and natural resources with limited public access. No new consumptive uses (e.g., mining) are allowed.

Pulling and tensioning—Process of installing and tightening new conductors.

Radionuclide—An unstable form of a chemical element that radioactively decays, resulting in the emission of nuclear radiation. Also called a radioisotope.

Rebuild-in-Place Alternative—The alternative that would not include a reroute.

Reroute Alternative—The Proposed Action that includes a reroute of 14.2 miles of the existing ROW with 14.5 miles of a new ROW that avoids sensitive cultural resources associated with Gable Mountain and Gable Butte.

Scree—Loose rock debris covering a slope.

Seed bank—Viable seeds stored in the soil.

Sensitive Area—Area containing sensitive vegetation or cultural resources.

Shrub-steppe—Native vegetation of the Columbia Basin characterized by native shrubs and perennial grasses.

Snubs—Trenches about 8 feet deep by 4 feet wide by 12 feet long used during installation of conductors.

Sock line—The line or rope connected to a steel wire that is used to pull the conductors through the structures during installation.

Soil productivity—The capacity of soil, in its normal environment, to support plant growth.

Sole Source Aquifers—EPA defines a sole or principal source aquifer as one which supplies at least fifty percent (50%) of the drinking water consumed in the area overlying the aquifer. These areas can have no alternative drinking water source(s) which could physically, legally, and economically supply all those who depend upon the aquifer for drinking water. For convenience, all designated sole or principal source aquifers are referred to as “sole source aquifers.”

Spark-discharge activity—**Electric sparks between electrical separations (gaps) in the metal parts of a transmission line. Spark discharges can create noise and possible electromagnetic interference (EMI). Spark-discharge activity with transmission lines is often associated aging connecting hardware.**

Special-status species—Plant or animal species listed under the ESA or by state agencies.

Stand—An area of uniform vegetation that typically contains similar soil, light and water conditions and history of disturbance.

Switch platform—Platform on which a disconnect switch is placed.

Talus—Loose, rocky areas that provide habitat for a wide range of reptiles and other species.

Tap transmission line (i.e., Scootency)—A transmission line that connects to an existing transmission or distribution line without breakers at the tap point, resulting in an additional terminal on the existing line. The Scootency Tap transmission line connects to the Midway-Benton No. 1 transmission line at a “tap” that allows power to be transmitted from the Midway Substation to the Scootency Substation.

Tensioner—Equipment that pulls the conductors to the correct sag so that proper ground clearance is maintained.

Threatened (species)—Those species officially designated by the USFWS or the NMFS at risk of becoming endangered throughout all or a significant portion of their range. A designation also used by state agencies for state lists.

Unconsolidated Sediment—Loose deposits (sediment) lacking cohesion or cement.

Vernal Pools—Temporary pools of water that fill with rain water and are dry for at least part of the year.

Viewshed—Area that can be seen from a particular viewpoint.

6.2 Acronyms

APE	area of potential effects
BLM	Bureau of Land Management
B.P.	years before present
BPA	Bonneville Power Administration
BMP	best management practice
CFR	Code of Federal Regulations
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide equivalent
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
dba	decibels on the A-weighted scale
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy Richland Operations Office
DPS	Distinct Population Segment
EA	environmental assessment
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
EIS	environmental impact statement
EMF	electromagnetic field
EMI	electromagnetic interference
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact

G	gauss
GHG	greenhouse gas
GIS	geographic information system
GWP	global warming potential
HFC	hydrofluorocarbon
kV	kilovolt
kV/m	kilovolt per meter
mG	milligauss
MOU	Memorandum of Understanding
mph	miles per hour
MSA	Mission Support Alliance
N ₂ O	nitrous oxide
NAAQS	national ambient air quality standards
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NHPA	National Historic Preservation Act
PM _{2.5}	particulate matter less than or equal to a nominal 2.5 micrometers
PM ₁₀	particulate matter less than or equal to a nominal 10 micrometers
NOAA	
NOI	Notice of Intent
NRHP	National Register of Historic Places
PFC	perfluorocarbon
PHS	priority habitats and species (program)
PM	particulate matter
PUD	Public Utility District
ROD	Record of Decision
ROW	right-of-way
SF ₆	sulfur hexafluoride

Chapter 6
Glossary and Acronyms

SHPO	State Historic Preservation Office
sq ft	square feet or square foot
SR	State Route
TCP	Traditional Cultural Property
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife

Chapter 7

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DOE-RL See U.S. Department of Energy Richland Operations Office

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EIA See U.S. Energy Information Administration

EPA See U.S. Environmental Protection Agency

ESA See Ecological Society of America

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Appendix A

Projects in the Rebuild Project Vicinity

Cumulative impacts are the impacts on the environment that result from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1500–1508). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The Proposed Action and Rebuild-in-Place Alternative in combination with past, present, and reasonably foreseeable future actions would result in low to moderate cumulative impacts to all assessed resources.

The following sections include activities and projects that were identified as applicable to cumulative impacts related to the Proposed Action and Rebuild-in-Place Alternative. The list of projects is based on a review of the following sources:

- BPA list of current and proposed transmission line projects within the vicinity of the Hanford Site
- 2012 DOE-RL memorandum documenting current and upcoming projects requiring NEPA analysis for the Hanford Site
- Correspondence with USFWS regarding upcoming projects in the Hanford National Monument
- DOE-RL list of current and proposed projects undergoing NEPA review (DOE-RL 2011)
- Cumulative impact project summaries from past DOE-RL NEPA documents

A.1 Past and Present Actions

A.1.1 BPA Transmission Lines and Projects

The project area contains several BPA transmission lines that cross the Hanford Site. Some recent BPA projects completed within the project's area of influence (region of influence) are described below.

Midway Area Fiber Project

The Midway Area Fiber Project took place during 2011. BPA replaced overhead ground wire with aerial fiber optic cable for approximately 1.5 miles on the existing Midway-Rocky Ford No. 1 230-kV and Midway-Vantage 230-kV transmission lines. The fiber spans from a tower in the Midway Substation to the north side of the Columba River. No ground disturbing activities or access road improvements were required for this project. BPA completed a categorical exclusion for this project to satisfy its NEPA compliance obligations in 2011.

Ashe Substation to Energy Northwest's Columbia Generating Station Fiber Project

BPA installed approximately 200 feet of fiber optic cable between the Ashe Substation and Energy Northwest's Columbia Generating Station. Fiber was installed primarily on existing structures. One new wood pole was installed within the Columbia Generating Station administrative area. BPA completed a categorical exclusion to satisfy NEPA compliance obligations in 2011.

A.1.2 Hanford Site Development

The Hanford Site was developed beginning in 1943, when the Federal government selected the area for a plutonium production facility. By 1945, 554 buildings were constructed in the site, including three nuclear reactors; three processing canyons; 64 underground high-level waste storage tanks; and many facilities dedicated to fuel fabrication. The project included 386 miles of roadway, 158 miles of railroad, and 50 miles of electrical transmission lines (EPA 2012).

After World War II, the facilities continued to be used and upgraded until the late 1980s. Beginning in 1989, DOE-RL's primary mission at the Hanford Site switched from production to waste cleanup. In May of that year, the DOE, EPA, and Ecology signed the Tri-Party Agreement and, since then, no plutonium has been produced for defense purposes at the site. A DOE-maintained road network within the Hanford Site consists of approximately 377 miles of asphalt paved road that provides access to the various work centers. Numerous existing and abandoned unpaved roads crisscross the area.

Site cleanup, waste disposal, and tank waste stabilization are currently underway on the Hanford Site, with several large areas in various states of reclamation. Current activities include the following:

- Continued transport of U.S. Navy reactor compartments from the Columbia River and their disposal within the Hanford Site
- Continued operation of the Columbia Generating Station
- Continued operation of the commercial low-level radioactive waste disposal facility
- Current land use, biological, and cultural management activities in support of the Hanford Site, Hanford Reach National Monument, and National Wildlife Refuge
- DOE also maintains several electric transmission and distribution lines, including the 230-kV line that would be followed by the rerouted portion of the Proposed Action.

A.1.3 Hanford Site Fire

Major fires have occurred at the Hanford Site periodically over the years. During the 20-year period from 1990 through 2010, a total of 302 wildfires burned an estimated 532 square miles (DOE-RL 2011). The largest, known as the Command Fire, burned more than 250 square miles; all of the burned area is south of the existing and proposed ROWs (Duncan 2007).

Fire history maps maintained by DOE-RL include a series of fires that burned areas near the Midway Substation but outside of the ROW (1977, 1993, and 1996) and a large fire in 1984 that burned

much of Segment 4, including a portion of the Hanford Dunes (DOE-RL 2012). The fires caused some dunes areas that had been stabilized by vegetation to “reactivate” and begin transporting sand downwind (Duncan 2007).

A.2 Reasonably Foreseeable Future Actions

A.2.1 Other BPA Projects

BPA may conduct future activities within the project’s region of influence. Each activity will proceed independently of the others and does not require that actions associated with the other BPA activities be taken previously or simultaneously. These projects will be evaluated under separate environmental reviews.

Below is a summary of reasonably foreseeable future activities identified at this time.

Right-of-Way Vegetation Management and Maintenance

BPA conducts periodic vegetation management activities and may conduct future maintenance activities within the Midway-Benton No. 2 transmission line corridor and other transmission line ROWs that cross the Hanford Site. In recent years BPA’s periodic vegetation management activities have included the control of weeds and removal of vegetation that was growing too close to transmission line facilities. Supplement Analyses to BPA’s *Transmission System Vegetation Management Program Final Environmental Impact Statement / Record of Decision* (BPA 2000) have been completed to satisfy compliance with NEPA.

Midway-Moxee No. 1 Rebuild Project

The Midway-Moxee No. 1 Rebuild Project would be located in Benton and Yakima Counties and is proposed to commence in mid to late 2014. BPA may rebuild the approximately 34-mile-long Midway-Moxee No. 1 transmission line in place, which would include structure replacement and access road construction and improvements. None of the project would be rebuilt within the Midway-Benton No. 1 or Benton-Othello No. 1 transmission ROWs, but the project would originate at the Midway Substation and approximately 2.0 miles of the rebuild project would be located on the Hanford Site. The Midway-Moxee No. 1 Rebuild Project will proceed independently of the Midway-Benton No. 1 Rebuild Project and does not require that actions associated with other BPA projects be taken previously or simultaneously. Thus, this project is not a “connected action” under NEPA and can be evaluated under separate environmental review¹. The Midway-Moxee No. 1 Rebuild Project is in the early planning phase and the NEPA review process has not yet been initiated.

¹ Under NEPA, actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements. (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously. (iii) Are interdependent parts of a larger action and depend on the larger action for their justification. See 40 C.F.R. § 1508.25(a)(1).

Midway-Benton No. 2 Fiber Replacement Project

The Midway-Benton No. 2 Fiber Replacement Project would be located between the Midway and Benton substations on the Hanford Site and is proposed to commence in 2015 or 2016. The new fiber optic cable would replace the existing fiber optic cable along the Midway-Benton No. 2 transmission line to meet current BPA standards. Vehicles would access each structure via existing access roads and the ROW to remove and replace the fiber optic cable. Ground disturbance would be minimal and vehicle and worker presence would be limited in duration to a couple of hours per structure. The Midway-Benton No. 2 Fiber Replacement Project will proceed independently of the Midway-Benton No. 1 Rebuild Project and does not require that actions associated with other BPA projects be taken previously or simultaneously. Thus, this project is not a “connected action” under NEPA and can be evaluated under separate environmental review. The Midway-Benton No. 2 Fiber Replacement Project is in the very early planning phase and the NEPA review process has not yet been initiated.

A.2.2 Hanford Site Operation

The *Hanford Comprehensive Land Use Plan* (DOE-RL 1999, 2008) limits most development to previously disturbed areas, primarily within lands designated Industrial. The *Hanford Comprehensive Land Use Plan* anticipates multiple uses of the Hanford Site, including waste management operations in the Central Plateau and industrial development in the eastern and southern portions of the site.

DOE-RL will continue to conduct projects to accelerate its existing cleanup program, including projects to demolish nuclear and support facilities, remediate contaminated groundwater, and retrieve solid waste from burial grounds. Further, DOE-RL recently issued a Notice of Intent (NOI) to prepare an EIS for a proposed 30-mile-long natural gas pipeline that would deliver natural gas to the Hanford Site to support Hanford Waste Treatment Plant and evaporator operations. The proposed natural gas pipeline would begin near the Pasco airport, cross under the Columbia River onto the Hanford Site near the 300 area. The pipeline would then follow Route 4S, and would then terminate in the Hanford Site 200 East Area. The pipeline would be located south and east of BPA’s proposed project.

The 2008 *Hanford Reach National Monument Comprehensive Conservation Plan* (USFWS 2008) identifies possible hiking trails within the Hanford Dunes portion of the Columbia River Corridor Unit, which may occur near Segment 4 of the proposed project. Otherwise, little recreational use is anticipated on project lands through the foreseeable future. The Hanford Reach National Monument Comprehensive Conservation Plan also identifies that the USFWS will expand the High-Intensity Recreation area near Vernita Bridge (where the current Washington State rest stop is located) to include an area across State Highway 24, a boat ramp and other visitor-serving facilities. These actions would occur north of the project area, on the other side of the Columbia River.

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- USFWS See U.S. Fish and Wildlife Service

Appendix B

Land Use Supplementary Information

This appendix supplements information presented in Section 3.2.

B.1 Hanford Comprehensive Land Use Plan Policies

B.1.1 General Policies

The *Hanford Comprehensive Land Use Plan* (DOE-RL 1999, 2008) includes nine overall policies to guide DOE-RL decision-making regarding land use actions at the Hanford Site. Of these nine policies, two apply most directly to the Midway-Benton No. 1 Rebuild Project.

General Policy 2 requires that, wherever possible, new development should be located in previously disturbed areas. Segment 2 was sited next to an existing utility corridor to minimize disturbance in new areas.

General Policy 3 requires that natural and cultural resources be preserved and protected. The proposed reroute under the Proposed Action would reduce impacts on sensitive cultural resources at Gable Butte and Gable Mountain, which is consistent with this policy. However, it is not possible to construct Segment 2 without disturbing natural resources, including Level III and IV plant communities, as defined in the *Hanford Site Biological Resources Management Plan* (DOE-RL 2001). Mitigation measures to address these impacts are included in Section 3.4.

The other seven general *Hanford Comprehensive Land Use Plan* policies (DOE-RL 1999) are not as readily applicable to decisions regarding the project. Table B-1 summarizes the nine policies included in the *Hanford Comprehensive Land Use Plan* and project-specific considerations.

Appendix B
Land Use Supplementary Information

Table B-1. Hanford Comprehensive Land Use Plan General Land Use Policies

The *Hanford Comprehensive Land Use Plan* established nine general policies to guide DOE-RL decision-making for all new development proposed on the Hanford Site, including utility and transportation corridors and economic development.

Hanford Comprehensive Land Use Plan Policy	Project Consistency
1. Protect the Columbia River and associated natural and cultural resources and water quality.	The project would be 1,650 feet from the Columbia River at its closest point with no adverse effects likely.
2. Wherever possible, locate new development in previously disturbed areas.	While the Proposed Action is not a new development, Segment 2 follows an existing utility right-of-way intended to minimize new disturbance. However, some structures and access roads in the Section 2 would be constructed in areas with undisturbed vegetation. The Rebuild-in-Place Alternative would be located in previous disturbance areas.
3. Protect and preserve the natural and cultural resources of the site.	The Proposed Action would result in a net benefit to cultural resources while minimizing impacts to natural resources.
4. Honor treaties with American Indian Tribes as they relate to land uses and resource uses.	American Indian tribes are being consulted with under the NHPA.
5. Reduce exclusive use zone areas to maximize the amount of land available for alternate uses while still protecting the public from inherently hazardous operations.	Not applicable to proposed project.
6. Allow access for other uses (e.g., recreation) outside of active waste management areas, consistent with the land use designation.	Project is located in areas currently closed to public use.
7. Ensure that a public involvement process is used for amending the <i>Hanford Comprehensive Land Use Plan</i> and land use designations to respond to changing conditions.	The project would not require a <i>Hanford Comprehensive Land Use Plan</i> amendment. However, BPA is conducting a public involvement process (i.e., NEPA scoping and the Preliminary EA will be available for public comment) as part of the NEPA review process.
8. As feasible and practical, remove pre-existing, nonconforming uses.	The existing Midway-Benton No. 1 and Benton Othello-No. 1 transmission lines are, by definitions used in the <i>Hanford Comprehensive Land Use Plan</i> , not considered nonconforming uses. The Proposed Action would remove a portion of the existing Midway-Benton No. 1 transmission line that is currently within a sensitive cultural resource area, which is consistent with the intent of this policy.
9. Facilitate cleanup and Waste Management.	Not applicable to the proposed project.

Source: (Duncan 2007)

B.1.2 Policies Specific to Utility Corridors

The project would be consistent with the *Hanford Comprehensive Land Use Plan* utility policies, as presented in Table B-2.

Table B-2. Hanford Comprehensive Land Use Plan Utility and Transportation Corridor Policies

Hanford Comprehensive Land Use Plan Policy	Project-Specific Considerations
1. With to-be-identified exception(s), existing utility and transportation corridor right-of ways are the preferred routes for expanded capacity and new infrastructure.	The Proposed Action would maintain and not expand the capacities of the Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines. Both facilities are existing infrastructure. Segments 1, 3, and 4 would occur within the existing BPA ROWs. Segment 2 would follow existing utility rights-of-way.
2. Existing utility corridors that are in actual service, clearly delineated, and of defined width, are not considered “nonconforming” uses in any land-use designation.” Utility corridors and systems that are not clearly delineated or of defined width are considered to be nonconforming uses.	Work in Segments 1, 3, and 4 would occur within existing ROWs that are maintained and in service. Segment 2 would follow an existing utility corridor that is currently maintained by DOE-RL and in service.
3. Avoid the establishment of new utility corridors within the Conservation and Preservation designations unless the use of an existing corridor(s) is infeasible or impractical. “	Work in Segments 1, 3, and 4 would occur within existing ROWs. Segment 2 would follow an existing utility corridor.
4. Avoid the location of new above-ground utility corridors and systems in the immediate viewshed of an American Indian sacred site. Prioritize for removal, as funding is available, existing nonconforming utility corridors and systems in such areas.	The Proposed Action would removal the Midway-Benton No. 1 transmission line from the immediate viewshed of Gable Mountain and Gable Butte.

Source: Duncan (2007)

B.2 Hanford Reach National Monument Comprehensive Conservation Plan

The presidential proclamation that established the Hanford Reach National Monument allowed for continued use of transmission facilities in place at the time of National Monument designation. However, such continued use needs to be carried out “in a manner consistent with proper care and management of the objects of this proclamation.” Such consistency is related to the *Hanford Reach National Monument Comprehensive Conservation Plan* management goals and objectives.

The *Hanford Reach National Monument Comprehensive Conservation Plan* defines 10 management goals that apply to the entire National Monument. Table B-3 discusses the project’s consistency with the *Hanford Reach National Monument Comprehensive Conservation Plan’s* 10 management goals.

Table B-3. 2008 Hanford Reach National Monument Comprehensive Conservation Plan National Monument Land Management Policies

Hanford Reach National Monument Comprehensive Conservation Plan Policy	Project-Specific Considerations
1. Conserve and restore the plants, animals, and shrub-steppe and other upland habitats native to the Columbia Basin.	Proposed activities on National Monument lands would be limited to replacing existing structures in the same location. However, some disturbance to shrub-steppe and other habitats would be unavoidable. Mitigation measures to address these impacts are discussed in Sections 3.4.4.
2. Conserve and restore the communities of fish and other aquatic and riparian-dependent plant and animal species native to the National Monument.	The project would not involve aquatic work. All work would be more than 1,650 feet from the Columbia River and would not occur in wetlands or riparian areas.
3. Enhance National Monument resources by establishing and maintaining connectivity with neighboring habitats.	The project would not fragment any habitats beyond what has already occurred due to original construction and operation of the lines.
4. Protect the distinctive geological and paleontological resources of the National Monument.	The project would have no effect on geologic or paleontological resources of the National Monument.
5. Protect and acknowledge the Native American, settler, atomic, and Cold War histories of the National Monument, incorporating a balance of views, to ensure that present and future generations recognize the significance of the area’s past.	The project would not alter historic National Monument resources or the telling or appreciation of their stories.
6. Compatible with resource protection, provide a rich variety of educational and interpretive opportunities for visitors to gain an appreciation, knowledge and understanding of the National Monument.	The areas of the National Monument where the project would occur are not open for public uses.

Table B-3. 2008 Hanford Reach National Monument Comprehensive Conservation Plan National Monument Land Management Policies (continued)

Hanford Reach National Monument Comprehensive Conservation Plan Policy	Project-Specific Considerations
7. Compatible with resource protection, provide access and opportunities for high-quality recreation.	The project would be located entirely on lands closed to recreational use.
8. Protect the natural visual character and promote the opportunity to experience solitude in the National Monument.	The project would be built in the same location as the existing line on National Monument lands, which is not visible from important public viewing areas (see Section 3.7.
9. Facilitate research compatible with resource protection, emphasizing research that contributes to management goals of the National Monument.	The project would not interfere with scientific research.
10. Establish and maintain a cooperative fire management program that protects facilities, resources, and neighbors and fulfills natural resource management objectives.	BPA fire management would be consistent with DOE-RL requirements.

References

DOE-RL See U.S. Department of Energy Richland Operations Office

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Appendix C

Biological Resources Supplemental Information

C.1 Vegetation

C.1.1 Special-Status Plants

Suitable habitat may be present for several state-listed plant species that have not yet been previously identified in the Proposed Action or Rebuild-in-Place Alternative ROWs, work areas, staging areas, and access roads. Botanical field surveys are underway concurrently with the Preliminary EA to determine the presence or absence of these species (Table C-1) and results from these surveys will be included in the Final EA.

Appendix C
Biological Resources Supplemental Information

Table C-1. Sensitive Plant Species Potentially Occurring in the ROWs¹

Species	Common name	Washington Natural Heritage Program Status ^{2,3}
<i>Physaria douglasii</i> ssp. <i>tuplashensis</i>	White Bluffs bladderpod	Threatened
<i>Astragalus geyeri</i>	Geyer's milkvetch	
<i>Cistanthe roseum</i>	rosy pussypaws	
<i>Cuscuta denticulata</i>	desert dodder	
<i>Eatonella nivea</i>	white eatonella	
<i>Loeflingia squarrosa</i> var. <i>squarrosa</i>	loeflingia	
<i>Cryptantha spiculifera</i>	Snake River cryptantha	Sensitive
<i>Erigeron piperianus</i>	Piper's daisy	
<i>Nicotiana attenuata</i>	Coyote tobacco	
<i>Oenothera caespitosa</i> ssp. <i>caespitosa</i>	caespitose evening-primrose	
<i>Pediocactus nigrispinus</i>	snowball cactus	
<i>Penstemon eriantherus</i> var. <i>whitedii</i>	Whited's penstemon	
<i>Pellaea glabella simplex</i>	smooth cliffbrake	R2
<i>Atriplex canescens</i> var. <i>canescens</i>	hoary saltbush	R1
<i>Epilobium pygmaeum</i>	smooth spike-primrose	R1
<i>Gilia inconspicua</i>	shy gily-flower	R1
<i>Leymus flavescens</i>	yellow wildrye	R1
<i>Minuartia pusilla</i> var. <i>pusilla</i>	annual sandwort	R1

Sources: WDNR (2011) and Duncan (2007).

¹ Includes species where habitat is present but species has not been found.

² None of these species are listed as threatened or endangered under the ESA (USFWS 2011).

³ **Threatened**—Likely to become Endangered in Washington.

Sensitive—Vulnerable or declining and could become Endangered or Threatened in the state.

R1—Review group 1. Of potential concern but needs more field work to assign another rank.

R2—Review group 2. Of potential concern but with unresolved taxonomic questions.

C.1.2 Noxious Weeds

Noxious weeds potentially present within the project area are listed in Table C-2. Botanical field surveys are currently being performed to identify portions of the project area with noxious weed populations. The Final EA will be updated with these field survey results.

Table C-2. Washington State Designated Noxious Weeds Potentially Occurring on the Hanford Site

Common Name	Scientific Name	Priority	Class ¹
Flowering Rush	<i>Butomus umbellatus</i>	None Identified	A
Russian knapweed	<i>Acroptilon repens</i>	High	B
Diffuse knapweed	<i>Centaurea diffusa</i>	High	B
Spotted knapweed	<i>Centaurea stoebe</i>	High	B
Yellow starthistle	<i>Centaurea solstitialis</i>	High	B
Rush skeletonweed	<i>Chondrilla juncea</i>	High	B
Dalmation toadflax	<i>Linaria genistifolia dalmatica</i>	High	B
Purple loosestrife	<i>Lythrum salicaria</i>	High	B
Babysbreath	<i>Gypsophila paniculata</i>	High	C
Medusahead	<i>Taeniatherum caput-medusae</i>	High	C
Saltcedar	<i>Tamarix spp.</i>	High	B
Johnsongrass	<i>Sorghum halepense</i>	Moderate	A
Camelthorn	<i>Alhagi psedalhagi</i> (= <i>A. maurorum</i>)	Moderate	B
Plumeless thistle	<i>Carduus acanthoides</i>	Moderate	B
Longspine sandbur	<i>Cenchrus longispinus</i>	Moderate	B
Yellow nutsedge	<i>Cyperus esculentus</i>	Moderate	B
Perennial pepperweed	<i>Lepidium latifolium</i>	Moderate	B
Eurasian water milfoil	<i>Myriophyllum spicatum</i>	Moderate	B
Perennial sowthistle	<i>Sonchus arvensis</i>	Moderate	B
Swainsonpea	<i>Sphaerophysa salsula</i>	Moderate	B
Kochia	<i>Kochia scopria</i>	Low	B
Poison hemlock	<i>Conium maculatum</i>	Low	B
Puncturevine	<i>Tribulus terrestris</i>	Low	B
Common Reed	<i>Phragmites australis</i>	None Identified	B
Dalmatian Toadflax	<i>Linaria dalmatica ssp.</i> <i>dalmatica</i>	None Identified	B

Table C-2. Washington State Designated Noxious Weeds Potentially Occurring on the Hanford Site (continued)

Common Name	Scientific Name	Priority	Class ¹
Hairy willow-herb	<i>Epilobium hirsutum</i>	None Identified	B
Houndstongue	<i>Cynoglossum officinale</i>	None Identified	B
Indigobush	<i>Amorpha fruticosa</i>	None Identified	B
Musk Thistle	<i>Carduus nutans</i>	None Identified	B
Myrtle Spurge	<i>Euphorbia myrsinites</i>	None Identified	B
Parrotfeather	<i>Myriophyllum aquaticum</i>	None Identified	B
Scotch Thistle	<i>Onopordum acanthium</i>	None Identified	B
Quackgrass	<i>Agropyron repens</i>	Low	C
Hoary cress	<i>Cardaria draba</i>	Low	C
Canada thistle	<i>Cirsium arvense</i>	Low	C
Bull thistle	<i>Cirsium vulgare</i>	Low	C
Field bindweed	<i>Convolvulus arvensis</i>	Low	C
Common St. Johnswort	<i>Hypericum perforatum</i>	Low	C
Yellow toadflax	<i>Linaria vulgaris</i>	Low	C
Cereal rye	<i>Secale cereale</i>	Low	C
Bitter nightshade	<i>Solanum dulcamara</i>	Low	C
Common tansy	<i>Tanacetum vulgare</i>	Low	C
Common mullein	<i>Verbascum thapsus</i>	Low	C
Spiny cocklebur	<i>Xanthium spinosum</i>	Low	C
Curlyleaf Pondweed	<i>Potamogeton crispus</i>	None Identified	C
Himalayan Blackberry	<i>Rubus armeniacus</i>	None Identified	C
Reed Canarygrass	<i>Phalaris arundinacea</i>	None Identified	C
Tree-of-heaven	<i>Ailanthus altissima</i>	None Identified	C
Yellow Flag Iris	<i>Iris pseudacorus</i>	None Identified	C

Source: DOE-RL (2011), *Final Environmental Assessment for Integrated Vegetation Management of the Hanford Site, Richland, WA*. Updated using Washington State Noxious Weed Control Board website (WNWCB 2012)

¹Class A species are non-native with limited distribution in the state. Eradication of all Class A noxious weeds is required

Class B species are non-native with limited distribution in the state. Class B species are designated for control and preventing new infestations is a high priority.

Class C species are already widespread in the state or are of special interest to the agricultural interest to the agricultural industry. Counties can enforce Class C control if it is beneficial to that county.

C.1.3 Preliminary EA Vegetation Impact Area Calculations

Project impacts for this Preliminary EA were determined based on DOE-RL vegetation maps and level-of-concern ratings. The Final EA will contain impact area calculations based on field survey results. The DOE-RL vegetation cover map does not map out roads, structures, or other areas where native vegetation has already been removed or seriously disturbed. These areas are mapped as containing the vegetation cover type and level-of-concern rating of surrounding lands. Therefore, the vegetation cover type Geographic Information System (GIS) layer cannot distinguish between impacts to areas that currently support vegetation and areas associated with roads and structures or other past disturbance that are already unvegetated or highly disturbed.

To make this distinction, average disturbance areas for existing structures and roads was determined by (1) measuring visible disturbance on ortho-photographs and then (2) verifying these measurements in the field at representative structures and roads. The following provides more details on assumptions and calculations used to determine acreage of vegetation impacts in these previously-disturbed areas.

Permanent disturbance area for improving existing roads and constructing new roads would include expanding roads to standard 14-foot-wide roadbed and an additional 3 feet on each side where roadside vegetation would be controlled, including mechanical removal of sagebrush¹. To determine new disturbance area, existing road widths were measured on aerial photographs and determined to average 10 feet in existing disturbance. This previously cleared area was not included in the project vegetation impact calculations.

New permanent disturbance area from new structure locations in Segment 2 would include all ground within 10 feet of structures (the area where vegetation is controlled by herbicide and mechanical methods). This equates to 0.012 acre (503 square feet [sq ft]) for two-pole structures and 0.016 acre (691 sq ft) for three-pole structures. This previously cleared area was not included in the project vegetation impact calculations.

¹ Herbicide application is not allowed on gravel roads at the Hanford Site (DOE-RL 2011, DOE/CX-00020).

C.2 Wildlife

C.2.1 Typical Wildlife Species

Table C-3 contains a list of wildlife species likely to occur within the project area.

Table C-3. Wildlife Species Known or Likely to Occur within Project Area

Species Group	Species	Distribution in Vicinity of Existing and Proposed ROWs
Large, Wide-Ranging Mammals	Mule deer, Rocky Mountain elk, coyote, badger, bobcat and striped skunk.	Entire Hanford Site, though deer and elk concentration areas are located away (to the southwest) from the central portion of the Hanford Site.
Small Mammals	Great Basin pocket mice (the most abundant small mammal on the Hanford Site), deer mice, voles, western harvest mouse, bushytail woodrat, northern pocket gopher and cottontail.	All areas. Late-successional shrub-steppe and dunes habitats likely support greatest abundance and diversity. Most species dig burrows and all species use them. Many hibernate underground during winter.
Shrub-Steppe Associated Passerine Birds (Songbirds)	Western meadowlark, horned lark, Brewer's sparrow, loggerhead shrike, sage sparrow, lark sparrow and vesper sparrow.	Nest within shrub-steppe and dunes habitats. Sparrows are migratory and typically occur March through September. Loggerhead shrike may occur year round.
Hawks, Owls And Falcons	Ferruginous, Swainson's and red-tailed hawks; barn, great horned and burrowing owls; peregrine and prairie falcons; and American kestrel.	All areas. Ferruginous hawks and other species nest on steel-lattice transmission towers at the Hanford Site. Typically occur in the area from February through August.
Upland Game Birds	Chukar, grey partridge, California quail and ring-necked pheasant.	All areas. Shrub habitat is important for wintering. Chukar and partridge are associated with talus. Occur year round.
Bats	Western small-footed myotis, little brown myotis, Yuma myotis, silver-haired bat, pallid bat, western pipistrelle, and pallid bat.	All areas, but most common in areas adjacent to the Columbia River and in riparian zones around desert springs and lakes created by irrigation return. Roosting and breeding habitat associated with basalt outcrops and cliffs
Reptiles	Side-blotched lizards, gopher snakes, western yellow-bellied racers and northern Pacific rattlesnake.	All areas, though diversity is highest in talus and dunes habitat. Hibernate during winter. Snakes hibernate in talus areas.
Insects	More than 1,500 documented insect species, including butterfly and moth species (WDFW 2008).	Diversity tied to vegetation diversity and is highest in high-quality shrub steppe and dunes habitat.

Source: Duncan (2007) and TNC (1999)

C.2.2 Level II through IV Wildlife Species Descriptions

Many species and habitats listed on the WDFW PHS program list are known to occur at the Hanford Site, and such listings, together with federal listings, are tied to the *Hanford Site Biological Resources Management Plan* (DOE-RL 2001) habitat level of concern ratings (WDFW 2008). As discussed in Section 3.4, DOE-RL manages biological resources by level of concern, with level I being the lowest concern and level IV the highest.

Level IV Wildlife Species

The *Hanford Site Biological Resources Management Plan* designates three wildlife species as level of concern IV: the Aleutian Canada goose, the peregrine falcon and the bald eagle. Only the bald eagle is known to regularly occur in the area, but use of bald eagles is limited to within 0.25 mile of the Columbia River, primarily during winter (DOE-RL 2009). While bald eagles can be wide-ranging and may occasionally fly over any portion of the Hanford Site, no bald eagle foraging, perching or night roosting locations are located within the existing and proposed ROWs (DOE-RL 2009).

Level III Wildlife Species

Based on habitat conditions and known historic locations, eight state-listed species rated as level III resources are known to or are likely to occur within or near the existing and proposed ROWs. Below is a discussion of the potential presence of each species within the study area.

- **Golden Eagles.** Golden eagles have not been reported as nesting at the Hanford Site, so use is expected to be limited to wide-ranging wintering or foraging individuals, including migrants and dispersing young. Foraging habitat is suitable for this species.
- **Ferruginous and Swainson's Hawks.** Both the ferruginous and Swainson's hawks nest primarily on steel lattice transmission towers located throughout the Hanford Site, including the Midway-Benton No. 2 transmission line that parallels the Midway-Benton No. 1 and Othello-Benton No. 1 transmission lines proposed to be replaced. The highest density of ferruginous hawk nests is located along Segment 4, where at least four historic nest sites are located.

In addition, three historic Swainson's hawk nest sites are located on the portion of the DOE operated 230-kV line that would be followed by Segment 2.

- **Burrowing Owl.** Burrowing owls are known to nest near the proposed and existing ROWs. This species has been documented approximately 800 feet from Segment 2 and 3,000 feet west of Segment 4. Burrowing owls at the Hanford Site nest underground in badger holes and at holes associated with historic building locations.
- **Sage Sparrow and Loggerhead Shrike.** The sage sparrow and loggerhead shrike are shrub-steppe *obligates*. Both species are known to occur within low elevation shrub-steppe habitat such as occurs throughout the project area. These species are assumed to forage and nest within all level III habitats present within the existing and proposed ROWs.
- **Striped Whipsnake.** Striped Whipsnake is a state candidate that is extremely rare in Washington and is believed to occur at the Hanford Site in very small numbers. Based on a

summary report of the species' status in Washington, this species has been historically found near the Midway Substation and approximately 0.25 mile south of Segment 2, within the 200 area (Hallock 2006). The summary report found that the species likely hibernates in rocky habitats but, at the Hanford Site, active individuals were all located away from rocky habitats. Based on this information, scattered individuals of this species could be present within the project area, and hibernating habitat may be present in rocky and talus areas south of the western segment and near Gable Butte and Gable Mountain.

Level II Wildlife Species

The *Hanford Site Biological Resources Management Plan* (DOE-RL 2001) classifies all migratory birds and state monitor species as level II species. The following WDFW monitor species are known to be present within the project area.

- **Long-Billed Curlew.** Long-billed curlews are known to nest at the Hanford Site. The species nests in open habitats, including those mapped as level I vegetation at the Hanford Site. These areas occur in scattered patches throughout the existing and proposed ROWs, and all such areas are presumed to be suitable nesting habitat for this species.
- **Bats.** The Hanford Site is known to support several species of bats, the most common of which are of the genus "myotis." Five state monitor bat species are known to or suspected to be present at the Hanford Site. These species include:
 - Big brown bat (*Eptesicus fuscus*)
 - Long-legged myotis (*Myotis volans*)
 - Palid bat (*Antrozous pallidus*)
 - Small-footed myotis (*Myotis ciliolabrum*)
 - Western pipistrelle (*Pipistrellus hesperus*)
 - Yuma myotis (*Myotis yumanensis*)

The Townsend's big-eared bat, which is a federal species of concern and candidate for state listing as threatened or endangered, could be present on the Hanford Site, but this species presence has not been confirmed.

A study conducted at the Hanford Site in the late 1990s found bat use to be highest near riparian habitats, which are used for foraging, and cliff and abandoned human developments, which are used for roosting (Gitzen et al. 2002). The areas used least by bats are upland shrub-steppe (Gitzen et al 2002). The existing and proposed ROWs are likely used as foraging habitat, but the ROWs do not contain suitable roosting habitats.

- **Butterflies.** Insects, are recognized as critical components to the Hanford Site ecosystem (TNC 1999). An intensive survey of the Hanford Site for invertebrates conducted in the 1990s documented more than 1,500 invertebrate species, including 41 species new to science (WDFW 2008). Forty-nine species of butterfly and 318 species of moth were documented during the inventory. Ten of the butterflies are identified as "monitor" species by the WDFW (Duncan 2007), and these are protected as level II species at the Hanford Site. These species include:
 - Bonneville skipper (*Ochlodes sylvanoides bonnevilla*)
 - Canyon green hairstreak (*Callophrys sheridanii neoperplexa*)

- Coral hairstreak (*Harkenclenus titus immaculosus*)
- Juba skipper (*Hesperia juba*)
- Monarch (*Danaus plexippus*)
- Nevada skipper (*Hesperia nevada*)
- Northern checkerspot (*Chlosyne palla palla*)
- Persius' duskywing (*Erynnis persius*)
- Purplish copper (*Lycaena helloides*)
- Ruddy copper (*Lycaena rubida perkinsorum*)

All of these species are closely associated with shrub-steppe habitats and are presumed present within level II, III and IV vegetation types.

- **Sensitive Reptiles.** Three level II/state-monitor reptile species are likely present within the existing and proposed ROW, including Northern sagebrush lizards, short-horned lizards, and night snakes. Northern sagebrush lizards are most closely associated with sand dune habitats dominated by bitterbrush (a shrub species), and this species is assumed to be present within the eastern segment (Marr et al. 1988). Short-horned lizards occur at low densities across all habitat types at the Hanford Site (Hallock 1998). Night snakes are uncommon in Washington, but this species has been documented at the Hanford Site in the vicinity of the Midway Substation and Gable Butte (Hallock 1998). Night snakes occur primarily in talus but also within big sagebrush and rabbitbrush (a shrub species) (Weaver 2008), which is present in scattered stands throughout the existing and proposed ROWs (Weaver 2008). Based on these habitat associations, this species may be present in small numbers throughout the site, but the species is most likely to be found in the western and existing center segment, where talus is present near the ROW.
- **Black-tailed Jackrabbit.** This species is wide-ranging and occurs at the Hanford Site in areas of well-developed shrub cover (Rickard and Poole 1989).
- **Northern grasshopper mouse.** At the Hanford Site, this species is most closely associated with low elevation sandy areas and associated needle-and-thread grass that occurs in the eastern segment (Segment 4) within the 3.5-mile crossing of the Hanford Dunes (Gitzen et al. 2001).
- **Townsend's Ground Squirrel.** This species may occur along the existing and proposed ROWs. Documented colonies are located in the eastern sections near and within the Hanford Dunes.

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WNCWB See Washington State Noxious Weed Control Board

Appendix D

Greenhouse Gas Supplemental Information

Greenhouse gases (GHG) are chemical compounds found in the Earth's atmosphere that absorb and trap infrared radiation as heat. They are released both naturally and through human activities such as deforestation, soil disturbance, and burning of fossil fuels. These activities disrupt the natural cycle by increasing the GHG emission rate over the storage rate, which results in a net increase of GHGs in the atmosphere. The resulting build up of heat in the atmosphere due to increased GHG levels causes warming of the planet through a greenhouse-like effect (EIA 2009a). Increasing levels of GHGs could increase the Earth's temperature by up to 7.2 degrees Fahrenheit by the end of the twenty-first century (EPA 2010a).

The principal GHGs emitted into the atmosphere through human activities are CO₂, CH₄, N₂O, and fluorinated gases (EPA 2010a).

- **Carbon dioxide** is the major GHG emitted (EPA 2010a; Houghton 2010). CO₂ enters the atmosphere as a result of such activities as land use changes, the burning of fossil fuels (e.g., coal, natural gas, oil, and wood products), and the manufacturing of cement. CO₂ emissions resulting from the combustion of coal, oil, and gas constitute 81% of all U.S. GHG emissions (EIA 2009b). Before the industrial revolution, CO₂ concentrations in the atmosphere were roughly stable at 280 parts per million. By 2005, CO₂ levels had increased to 379 parts per million, a 36% increase, as a result of human activities (IPCC 2007).
- **Methane** is emitted during the processing and transport of fossil fuels, through intensive animal farming, and by the degradation of organic waste. Concentrations of CH₄ in the atmosphere have increased 148% above preindustrial levels (EPA 2010a).
- **Nitrous oxide** is emitted during agricultural and industrial activities and during the combustion of fossil fuels and solid waste. Atmospheric levels of N₂O have increased 18% since the beginning of industrial activities (EPA 2010a, b).
- **Fluorinated gases**, including HFCs, PFCs, and SF₆, are synthetic compounds emitted through industrial processes. They are replacing ozone-depleting compounds such as chlorofluorocarbons (CFCs) in insulating foams, refrigeration, and air conditioning. Although they are emitted in small quantities, fluorinated gases have the ability to trap more heat than CO₂ and are considered gases with a high **global warming potential**. Atmospheric concentrations of fluorinated gases have been increasing over the last 20 years and this trend is expected to continue (EPA 2010a).

While models predict that atmospheric concentrations of all GHGs will increase over the next century due to human activity, the extent and rate of change is difficult to predict, especially on a global scale. As a response to concerns over the predicted increase of global GHG levels, various federal and state mandates address the need to reduce GHG emissions, including those described below.

- The federal Clean Air Act (see Section 4.7.1).
- The EPA has issued the *Final Mandatory Reporting of Greenhouse Gases Rule* that requires reporting of GHG emissions from large sources. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHGs are required to submit annual reports to EPA (EPA 2010b), although no other action is required (40 CFR Parts98).
- Executive Orders 13423 and 13514 require federal agencies to measure, manage, and reduce GHG emissions by agency-defined target amounts and dates.
- In Washington State, Executive Orders 07-02 and 09-05 direct state agencies to work with western states and Canadian provinces to develop a regional emissions reduction program designed to reduce GHG emissions to 1990 levels by 2020 (Ecology 2010).

D.1 Activities that Would Contribute to Greenhouse Gas Emissions

The proposed project, either the Proposed Action or the Rebuild In-Place Alternative, would involve rebuilding the existing Midway-Benton No. 1 and Benton-Othello No. 1 transmission lines. Under the No Action Alternative, the transmission lines would not be rebuilt and ongoing operation and maintenance activities would continue. Implementation of either the Reroute Alternative or the Rebuild In-Place Alternative would contribute to an increase in GHG concentrations through the following activities, each discussed in more detail below:

- **construction:** use of gasoline and diesel-powered vehicles, including cars, trucks, construction equipment, and helicopters;
- **ongoing operation and maintenance:** use of gasoline and diesel-powered vehicles for routine patrols, maintenance project work (vegetation management and site-specific repairs of roads and transmission line structures and associated hardware), emergency maintenance, and resource review; and
- **ongoing operation and maintenance:** use of helicopters for aerial inspections of the transmission line corridor.

D.2 Methods used to Calculate Greenhouse Gas Emissions

D.2.1 Construction

While portions of the Reroute and the Rebuild In-Place Alternatives would result in construction in different locations, the number of anticipated construction vehicles, construction timing, and operational activities would be the same under both alternatives. For this reason, the same assumptions were used to calculate GHG contributions for both alternatives. Project construction

would take about 7 months (October 2012 through April 2013), with peak construction activity, including road and structure installation, occurring during a 6-month-long period. Non-peak construction activities would include installing and removing BMP measures, establishing staging areas, moving equipment and materials into and out of the project ROWs, access roads, material yards, and site preparation and restoration work.

The transportation components of GHG emissions were estimated for the Proposed Action and Rebuild In-Place Alternative based on the approximate number of vehicles that would be used during project construction and the approximate distance those vehicles would travel. GHG emissions were calculated for both the 6-month-long peak construction period and the 1-month-long non-peak period based on estimates of vehicle round trips per day.

Overestimating the number of round trips ensures that GHG emission estimates are conservatively high. The number of round trips was deliberately overestimated using the following assumptions.

- All workers would travel in separate vehicles to and within the project area each day.
- A maximum number of workers would be required to construct the project.
- The round-trip distance to the project area is the distance from Richland, Washington, to the Midway Substation and back (about 68 miles round trip).
- All workers would travel the full length of the project area each day. Although this is true for some workers such as inspectors, other workers could be localized.
- Fuel consumption is based on the average fuel economy for standard pickup trucks of 18 miles per gallon. Again, this is likely an overestimation as more efficient vehicles may be used.
- Average helicopter fuel consumption is estimated by BPA pilots at 1.0 mile per gallon.

Up to 40 construction workers would be at work on the transmission line during the peak construction period (6 months) and an estimated 10 workers could be present during the non-peak construction period (1 month).

BPA staff would travel to the transmission line for various purposes, such as road inspection, work inspection, staff meetings, environmental compliance monitoring, and meetings with landowners. An estimated two round trips per week from the Pasco, Washington, BPA offices during the 7-month-long construction period would result in a total of 56 round trips at an estimated 100 miles per trip.

Helicopters may be used to replace the conductor. After the equipment (puller and tensioner) is positioned, a sock line (usually a rope) is strung through all of the structures using a helicopter. It was assumed that the helicopter would be used for approximately 1 month (20 work days) to conduct this work. An estimated two round trips from the Richland Airport each day would result in a total of 40 round trips at an estimated 68 miles per trip.

Fuel consumption and GHG emissions would also result from operation of on-site heavy construction equipment. Heavy construction equipment may include augers, bulldozers, excavators, graders, heavy-duty trucks, and front-end-loaders. Increased use of heavy construction equipment would occur during peak construction.

Although it is difficult to develop an accurate estimation of total fuel consumption associated with heavy construction equipment operation, the following assumptions were used.

- A maximum of 40 equipment machines would be in operation during peak construction and 10 equipment machines would be in operation during off-peak construction.
- The average size of the equipment would not exceed 250 horsepower. All equipment would operate at maximum power for 8 hours per day and 5 days per week throughout the construction phase. This is an overestimation because equipment commonly operates in idle or at reduced power.
- Equipment would operate at approximately 35% efficiency, representing the percentage of productive energy extracted from the diesel fuel relative to the maximum potential energy within the fuel (i.e., 138,000 British thermal units per gallon of diesel) (DOE and EPA 2011).

GHG emissions associated with equipment operation were overestimated to account for all potential construction activities and associated material deliveries to and from the construction site. They are also expected to account for the low levels of GHG emissions related to temporary soil disruption and damaged vegetation from construction activities, which were not estimated separately in this analysis. GHG emissions that result from soil disturbance are short-lived and return to background levels within several hours (Kessavalou et al. 1998). Emissions from decomposing vegetation would also be relatively short-lived where vegetation would be allowed to reestablish following construction.

D.2.2 Operations and Maintenance

During operation and maintenance of the transmission line, the following annual activities would result in GHG emissions:

- routine patrols (access road, structure, and vegetation inspections): 1 round trip per year, from the BPA Pasco office, 100 miles round trip;
- maintenance of roads and structures and associated hardware: 1 round trip per year, from the BPA Pasco office, 100 miles;
- emergency maintenance to address line outages, landslides, and other unpredicted events: 0.25 round trips per year (approximately 1 trip every 4 years), from BPA Pasco office, 100 miles round trip;
- natural resource review: 0.25 round trips per year (approximately 1 trip every 4 years), from the BPA Portland office, 520 miles round trip; and
- aerial inspections by helicopter: 2 round trips from Richland Airport to Midway Substation, 68 miles round trip.

Vegetation management activities, including mowing along roadsides and weed control, would be conducted during most years. Because vegetation management does not include permanent vegetation removal, this activity was not included in GHG calculations.

Calculations of GHG emissions include operations and maintenance work for the estimated 50-year life span of the rebuilt transmission line.

D.3 Results

GHG emissions were calculated using the estimated values described above for two types of activities: construction of the Reroute or Rebuild In-Place Alternatives and ongoing annual operations and maintenance for the estimated 50-year life span of the transmission lines. Each type of activity is discussed separately below.

D.3.1 Construction Emissions

Table D-1 displays the results of calculations for the construction activities that would contribute to GHG emissions. Construction of the proposed project (either Reroute or Rebuild In-Place Alternatives) would result in an estimated 6,924.3 metric tons of CO₂e¹ (equivalent carbon dioxide) emissions. All GHG emissions associated with construction activities would occur in the first year. The project's contribution to GHG emissions during construction would be *low* (see Section 3.10).

Table D-1. Estimated Greenhouse Gas Emissions from Project Construction

Estimated GHG Emissions of Construction Activities	CO₂¹ (metric tons)	CH₄ (CO₂e)^{1, 2} (metric tons)	N₂O (CO₂e)^{1, 2} (metric tons)	Total CO₂e (metric tons)³
Peak construction transportation	174.5	121.0	723.5	1,019.0
Off-peak construction transportation	7.3	5.0	30.1	42.5
BPA employee transportation	3.0	2.1	12.4	17.5
Helicopter operation	6.1	0.1	<0.1	6.3
Peak construction: equipment operation	5,562.1	5.9	37.4	5,605.4
Off-peak construction: equipment operation	231.8	0.2	1.6	233.6
TOTAL³	5,984.8	134.4	805.0	6,924.3

¹ CO₂ emission factors calculated from DOE and EIA (2005). CH₄ and N₂O emission factors from EPA (2007).

² CH₄ and N₂O emissions have been converted into units of CO₂e) using the IPCC global warming potential (GWP) factors of 21 GWP for CH₄ and 310 GWP for N₂O (ICBE 2000).

³ The sum of the individual entries may not sum to the total depicted due to rounding.

¹ CO₂e is a unit of measure used by the Intergovernmental Panel on Climate Change that takes into account the global warming potential of each of the emitted GHGs using global warming potential factors. See Table D-1.

D.3.2 Operation and Maintenance Emissions

Table D-2 displays the contribution to GHG emissions that would result from operation and maintenance activities. Proposed project (either Reroute or Rebuild In-Place Alternatives) operation and maintenance would result in an estimated 62 metric tons of CO₂e emissions over the life of the project. Given this estimate, the impact of operations and maintenance activities on GHG emissions would be *low* (see Section 3.10).

Table D-2. Estimated Greenhouse Gas Emissions from Operations and Maintenance for the Life of the Project

Type of Operation and Maintenance Activity	CO ₂ (metric tons)	CH ₄ (CO ₂ e) ¹ (metric tons)	N ₂ O (CO ₂ e) ¹ (metric tons)	Total CO ₂ e (metric tons) ³
Routine patrols	2.5	0.7	10.2	13.4
Maintenance work	2.5	0.7	10.2	13.4
Emergency maintenance	0.6	0.2	2.6	3.3
Natural resource review	3.2	0.9	13.3	17.4
Helicopter surveys	14.2	0.3	0.1	14.5
TOTAL³	22.9	2.7	36.4	62.0

¹ CO₂ emission factors calculated from DOE and EIA 2005. CH₄ and N₂O emission factors from EPA (2007).

² CH₄ and N₂O emissions have been converted into units of CO₂e using the IPCC global warming potential (GWP) factors of 21 GWP for CH₄ and 310 GWP for N₂O (ICBE 2000).

³ The sum of the individual entries may not sum to the total depicted due to rounding.

D.4 Summary of Results

To summarize, either the Proposed Action or Rebuild In-Place Alternative would result in an estimated total of 6,924 metric tons of CO₂e emissions during the construction phase, and an estimated 62 metric tons of CO₂e emissions from ongoing operation and maintenance activities over the life of the project.

To provide context for this level of emissions, EPA’s mandatory reporting threshold for annual CO₂ emissions is 25,000 metric tons of CO₂e, roughly the amount of CO₂ generated by 4,400 passenger vehicles per year. The project construction emissions would be equivalent to the emissions from approximately 1,219 passenger vehicles per year. Project operation and maintenance emissions would be equivalent to the emissions from approximately 11 passenger vehicles per year. All levels of GHG emissions are significant in that they contribute to global GHG concentrations and climate change, but given the small anticipated contribution from the proposed project, the impact on GHG concentrations would be *low*.

D.5 References

DOE and EIA See U.S. Department of Energy and Energy Information Administration

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