B O N N E V I L L E   P O W E R   A D M I N I S T R A T I O N

Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project

Draft Environmental Assessment

July 2015

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Purpose of and Need for Action

1.1. INTRODUCTION

Bonneville Power Administration (BPA) is proposing to rebuild its 115-***kilovolt***[1] (kV) wood-pole Midway-Moxee transmission line and rebuild and upgrade its 115-kV wood-pole Midway-Grandview transmission line. The 34-mile-long Midway-Moxee transmission line and the 26-mile-long Midway-Grandview transmission line are in Benton and Yakima counties, Washington (see Figure 1-1). The transmission lines, including the wood-pole structures and other components, are aging and need to be replaced. BPA is also proposing to upgrade the Midway-Grandview line because local utilities served by this line require more power.

This Environmental Assessment (EA) was prepared by BPA pursuant to regulations implementing the National Environmental Policy Act (NEPA) (42 U.S. Government Code [U.S.C.] 4321 *et seq.*), which requires federal agencies to assess the impacts their actions may have on the environment. Major federal actions significantly affecting the quality of the human environment must be evaluated in an Environmental Impact Statement (EIS). BPA prepared this EA to determine if the proposed Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project (Proposed Action or Rebuild and Upgrade Project) would cause effects of a magnitude that would warrant preparing an EIS, or whether it is appropriate to prepare a Finding of No Significant Impact (FONSI).

1.2. BACKGROUND

BPA is a federal power marketing 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 improvements, additions, and replacements to its transmission system that are necessary to maintain electrical stability and reliability, and to provide service to BPA's customers (16 U.S.C. 838b[b-d]).

1.3. NEED FOR ACTION

BPA needs to take action to ensure the integrity and reliability of the existing Midway-Moxee and Midway-Grandview transmission lines. The lines are old, physically worn, and structurally unsound in places. The Midway-Moxee transmission line serves Benton Rural Electric Association (REA) and the Midway-Grandview transmission line serves Benton Public Utility

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[1] Technical terms that are in bold, italicized typeface are defined in Chapter 6, Glossary and Abbreviations, of this EA.

District (PUD) and Benton REA. The poor condition of the existing transmission lines could cause ***outages*** that would adversely affect power deliveries to BPA's customers in eastern Washington.

The transmission lines were originally built in the 1940s by BPA, and most of the structures and the ***conductors*** now exceed their service life and show normal deterioration due to age. In general, the wood poles used 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. The existing wood-pole structures in the project transmission lines show normal deterioration due to age. The original conductor has not been replaced and does not meet current standards. BPA also needs to replace the existing overhead fiber optic cable on the Midway-Moxee transmission line. It needs to be replaced because the outer fiber optic cable jacket deteriorated due to age.

In addition to structural issues, improved access to the transmission lines is needed. Some structures do not have permanent ***access roads*** to reach them, which makes normal and emergency maintenance difficult and at times unsafe. Other roads need to be improved to ensure that the transmission lines can be accessed year round.

The Midway-Grandview transmission line needs to be upgraded, because the local utilities served by this line require more power. Benton REA and Benton PUD have three connections to this transmission line. BPA delivers power to Benton PUD's Cold Creek Substation and Benton REA's Black Rock and Sunnyside Port substations. Replacing the conductor on this transmission line would add more electrical ***capacity***. The new conductor would increase electrical capacity, while maintaining Midway-Grandview as a 115-kV wood-pole transmission line.

Although the Midway-Moxee transmission line is considered a rebuild and the Midway-Grandview transmission line is considered an upgrade, the same work is proposed for both lines. The distinctions between a rebuild and an upgrade are the program funding source and the main reason for needing the project at this time. The main reason for the Midway-Moxee transmission line rebuild is to replace the aging line, whereas the main reason for the Midway-Grandview transmission line upgrade is to serve increased load.

1.4. PURPOSES OF ACTION

Purposes are defined here as goals to be achieved while meeting the need for the Proposed Action. BPA has identified the following purposes that it will use to evaluate the Proposed Action and No Action Alternative:

- Maintain or improve transmission system reliability to BPA and industry standards
- Continue to meet BPA's contractual and statutory obligations
- Minimize impacts on the human and natural environmental
- Improve safety for transmission line workers
- Demonstrate cost-effectiveness
- Use facilities and resources efficiently

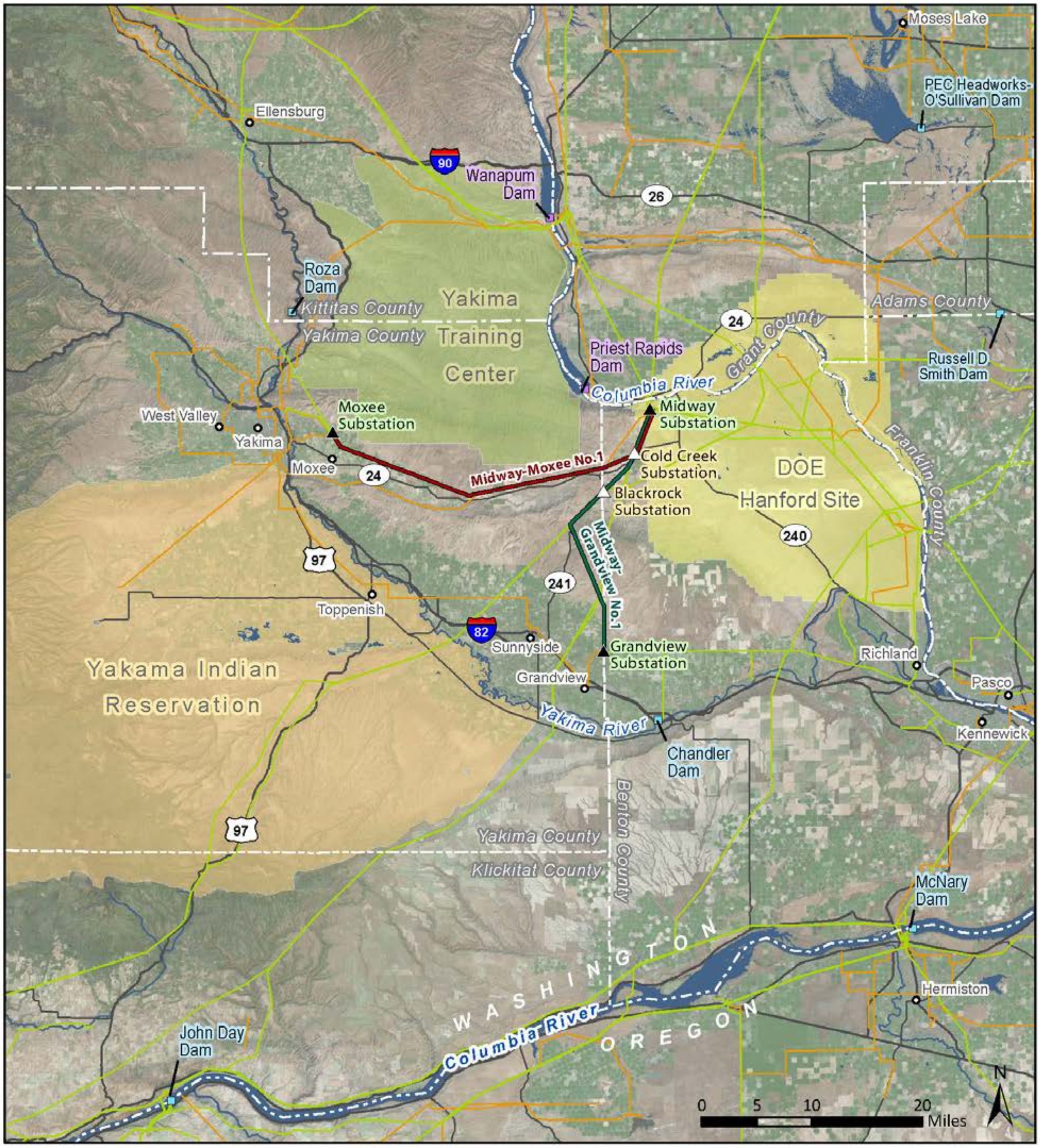

Figure 1-1. Project Vicinity Map

Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project
Yakima and Benton Counties, Washington

Transmission Lines
- Midway-Moxee No.1 115-kV
- Midway-Grandview No.1 115-kV
- Existing, BPA Owned
- Existing, Non-BPA Owned

- ▲ BPA Substation
- △ Non-BPA Substation
- Federal Hydroelectric Facility
- Non-federal Hydroelectric Facility
- Highway

1.5. AGENCY ROLES

1.5.1. Lead and Cooperating Agencies

BPA is the lead agency responsible for preparing this EA under NEPA. BPA will use the EA, along with comments from the public, other stakeholders, and interested and affected agencies to decide whether to rebuild the Midway-Moxee transmission line and rebuild and upgrade the Midway-Grandview transmission line.

The Council on Environmental Quality (CEQ) regulations implementing NEPA allow for the designation of other federal, state, and local agencies and Indian Tribes as cooperating agencies for an EA where appropriate. The Bureau of Land Management (BLM) is a cooperating agency for this EA. BLM has both special expertise and jurisdiction by law on BLM-administered lands affected by the Proposed Action. As a cooperating agency, BLM's role is to provide information, comments, and technical expertise to BPA regarding BLM-administered lands in the project area and the data and analyses supporting the analysis in the EA. BLM will also make realty decisions on the Proposed Action, including granting a permit that allows the use of BLM roads for transmission line access. Although BPA is the lead agency with responsibility for the completion of the EA, BLM will determine if the potential effects of the Proposed Action are significant and warrant preparation of an environmental impact statement or whether it is appropriate to complete its own FONSI. If BLM determines that a FONSI is warranted, the BLM FONSI will be posted on BPA's project website along with the BPA NEPA documents.

1.5.2. Other Agencies that may Use this Environmental Assessment

Chapter 4, Environmental Consultation, Review, and Permit Requirements, of this EA identifies other federal agencies that may have permitting, review, or other approval responsibilities related to certain aspects of the Proposed Action. Certain state, regional, and local agencies also may use all or part of this EA to fulfill their applicable environmental review requirements for any actions they may need to take for the proposed project (see Chapter 4).

BPA is working with federal and state agencies that own and manage lands affected by the Proposed Action. BPA coordinated with agency staff regarding resource surveys and provided information needed to meet their obligations as federal or state land managers. In addition to BLM, BPA coordinated with two other land-managing agencies within the project area. BPA is requesting rights to use and improve four roads on land owned by the Bureau of Reclamation, and BPA staff is coordinating with Bureau of Reclamation staff to discuss obtaining an ***easement***. Washington State Department of Natural Resources (WDNR) owns several parcels along both transmission lines. In areas on WDNR lands where BPA does not currently have an easement for access, BPA is coordinating with WDNR staff to discuss obtaining an easement.

1.6. PUBLIC INVOLVEMENT

1.6.1. Project Scoping Process

The scoping process began with BPA's proposal to rebuild the Midway-Moxee transmission line. The initial scoping period was followed by a second scoping period that included the Midway-Moxee rebuild along with BPA's proposal to rebuild and upgrade the Midway-Grandview transmission line. This two-part scoping process is described below.

On February 4, 2013, BPA began project scoping by sending a letter to people potentially interested in or affected by the Midway-Moxee Transmission Line Rebuild Project[2], including adjacent landowners, public interest groups, local governments, tribes, and state and federal agencies. The letter explained the proposal, the environmental process, how to participate, the scoping dates, and contact information for BPA project staff. BPA sent the letter to landowners with property located at or less than 0.25 mile from either side of the proposed centerline of the transmission line right-of-way and all access roads proposed for use. Along with the public letter, BPA sent a project vicinity map, a comment form, a reply card with options on how to receive project information, including document delivery options, and a postage-paid return envelope. This mailing marked the beginning of the public comment period for the Proposed Action.

BPA held a public scoping meeting for the Midway-Moxee Transmission Line Rebuild on February 20, 2013, in Moxee, Washington. During the public meeting, BPA staff members were available to listen to and record comments, suggestions, and concerns from the public. The public comment period for the Midway-Moxee Transmission Line Rebuild closed on March 8, 2013. Scoping comments were posted on the project website as they were received. During this public scoping period, BPA created a webpage specifically for the project, with information about the project and the EA process (http://efw.bpa.gov/environmental_services/Document_Library/Midway-Moxee). Information distributed to the public during the scoping process—including the letter, map, and comment form—and all comments received were posted on the project website.

Subsequently, BPA identified the need to rebuild the Midway-Grandview transmission line. BPA also became aware of the need to upgrade the Midway-Grandview transmission line in order to provide additional power to local utilities served by that line. During the spring of 2013, BPA decided that it would be more efficient and cost-effective to rebuild and upgrade the Midway-Grandview transmission line at the same time as rebuilding the Midway-Moxee line. BPA decided to combine these two projects into one proposal under NEPA, the Proposed Action.

BPA opened an additional scoping period beginning on September 27, 2013, and sent a letter to people and entities potentially interested in or affected by the Proposed Action. A public scoping meeting was held on October 16, 2013, in Grandview, Washington, to describe the addition of the Midway-Grandview transmission line rebuild and upgrade to the proposal, answer questions, and solicit comments from the public. BPA updated the project website with information and

[2] The Midway-Moxee Transmission Line Rebuild project was initially proposed prior to the Moxee-Grandview upgrade.

materials pertaining to the Midway-Grandview transmission line upgrade and rebuild and with information distributed during the second scoping period. Scoping comments were posted on the project website as they were received. The second public comment period closed on October 31, 2013.

Prior to each scoping meeting, BPA sent a press release to local media with information about the scoping period and public scoping meetings and placed paid advertisements in the following newspapers:

- Sunnyside Daily Sun: February 8 and 18, and October 11 and 13, 2013
- Yakima Herald Republic: February 9 and 18, and October 11 and 13, 2013
- Grandview Herald: October 9 and 16, 2013

BPA consulted with four tribes with a potential interest in the Proposed Action: the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes and Bands of the Yakama Nation, Nez Perce Tribe of Idaho, and the Wanapum Band. BPA requested information from these tribes on ***cultural resources*** in the project vicinity. BPA provided information about the Proposed Action to tribal representatives and solicited comments about the potential impacts of the Proposed Action on cultural resources. This information was used to shape the cultural resources field investigation for the Proposed Action. Throughout the project, BPA is consulting with tribes and the Washington State Historic Preservation Officer (SHPO) on the identification of cultural resources in the project area and any impacts on cultural resources that could result from the Proposed Action.

Table 1-1 summarizes the written and oral comments received on the Proposed Action from landowners, state agencies, and federal agencies during both scoping periods. Comment topics are addressed in appropriate sections in the EA. Comments received during both comment periods, both written and oral, were considered in the environmental analysis of the Proposed Action. Comments received after the comment periods ended were also considered in the environmental review.

Table 1-1. Summary of Scoping Comments and Input on the Proposed Action

Topic Area	Comment Summary
National Environmental Policy Act process	• Recommendation that an Environmental Impact Statement (EIS) be prepared for the Proposed Action to address potential impacts on greater sage-grouse • Recommendation that alternatives that prevent further impacts on greater sage-grouse be considered and analyzed • Comment that the proposed PacifiCorp Vantage-Pomona Heights transmission line and the Proposed Action are not separate and independent utility projects
Transmission line design and right-of-way	• Questions on the location, type, appearance, and capacity of the transmission lines • Question on whether any additional transmission line right-of-way would be acquired • Request to replace wood-pole structures with poles of the same size • Comments regarding the conversion of transmission line facilities to double circuit lines to reduce the number of separate transmission lines

Topic Area	Comment Summary
	• Recommendation to convert transmission line facilities to an underground transmission line in and near greater sage-grouse habitat • Questions on whether existing wood-pole structures that were recently replaced would need to be replaced again as part of the Proposed Action
Access roads	• Request that BPA keep transmission line access roads within the existing right-of-way as much as possible • Concern that the project description regarding access roads (improving existing access roads and creating new access roads if needed) is too broad
Agency requirements (see specific resource area comments below)	• Information on notification protocol and clean-up of toxics • Information on Washington State Department of Transportation requirements, permits, and staff contacts • Information on Section 7 consultation under the federal Endangered Species Act (ESA) • Comment that bald and golden eagles are potential residents in the project area and are both protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act
Transportation	• Comment that permits for oversized vehicles that travel county roads during the construction and maintenance of the line would be required • Questions regarding traffic interruptions and roads used during construction • Questions whether the transmission lines would cross state roads, if any wood-pole structures would be located within the publicly owned road rights-of-way, and where any approaches would need to be constructed off state roads
Public health and safety	• Requests to construct outside of the dry months because of the potential for equipment and workers to start wildfires • Request that herbicides be used at the base of wood-pole structures to kill vegetation, because growth at the base of poles can provide fuel for wildfires • Concern about the effect of noise and static on people and animals • Information on notification protocol and clean-up of toxics if soil or groundwater contamination is observed
Land use	• Question on whether the Proposed Action would affect the ability to construct or replace buildings on parcels crossed by the transmission line • Questions on whether locations of wood-pole structures would change and whether the width of the right-of-way would increase • Question on whether a hedge that is part of landowner's landscaping that is under the transmission line would need to be removed
Land use - agriculture	• Requests to move some wood-pole structures out of areas with crops and move them closer to existing farm roads • Concern about potential damage to fences during construction • Questions and concerns about how the project could affect present and future orchard operations, including access to crops, and if existing fruit trees would be affected

Topic Area	Comment Summary
	• Questions about the proposed construction schedule and if it could be timed in specific agricultural areas to avoid the harvest for fruits, hops, wheat, alfalfa, and other crops • Request that construction be done in cropland when the ground is frozen
Wildlife	• Information on wildlife species to survey for on Bureau of Land Management (BLM)-administered lands, survey protocol, and BLM information and reporting needs • Recommendation that the Proposed Action include best management practices to limit compaction and disruption of terrestrial habitats within the project footprint • Comment that the best alternative to minimize impacts on aquatic and terrestrial resources is to rebuild the lines in the current footprint • Concerns that impacts on wild lands, including raptor foraging areas, need to be avoided and that wildlife species and their habitat cannot be restored once they are gone • Comment that bald and golden eagles are potential residents in the project area and recommendation for the development of an eagle conservation plan • Recommendation for the development of a bird and bat conservation strategy to identify concerns of migratory birds and bats, with particular attention to Birds of Conservation Concern species • Request for voluntary reporting of migratory birds injured or killed in association with the Proposed Action • Comment on the importance of the Midway-Moxee project area to greater sage-grouse and comment that the area is in a U.S. Fish and Wildlife Service Priority Area for Conservation for greater sage-grouse • Comment that protection of greater sage-grouse, including conservation and population viability, and maintenance of habitat integrity and connectivity among remaining core habitat areas are needed to preclude the need for greater sage-grouse to be listed for protection under the ESA • Recommendation that a habitat assessment be conducted to identify suitable shrub-steppe habitat within the project area where additional line burial may benefit greater sage-grouse and other shrub-steppe obligate species • Recommendation for conservation measures for greater sage-grouse, including that segments of the transmission line within remaining viable habitat be buried • Recommendation regarding surveys for greater sage-grouse, ferruginous hawk, burrowing owls, ground squirrels, jackrabbits, and raptor nests • Concern that the Midway-Grandview transmission line is adjacent to important ferruginous hawk nesting and foraging habitat, and information is needed on specific habitat areas and nests • Recommendation for conservation measures for ferruginous hawks
Vegetation	• Information on plant species to survey for on BLM-administered lands, survey protocol, and BLM information and reporting needs • Concern about possible impacts on Umtanum desert buckwheat • Concern that species, including wildflowers, cannot be restored once they are gone

Topic Area	Comment Summary
	• Concern that impacts on wildflowers would result in the loss of pollinators • Concerns regarding noxious weed introduction and spread and recommendations for weed eradication and prevention of weed introduction • Recommendation that robust native plant communities should be reestablished to help prevent weed introduction and spread
Cultural resources	• Questions regarding the cultural resources consultation process • Comment on requirements for a cultural survey on BLM-administered lands
Visuals	• Request for evaluation and consideration of the visual impacts of the Proposed Action on BLM-administered lands
Air quality	• Concern regarding construction traffic dust on Duffield Road
Recreation	• Comment that the transmission line right-of-way is used as a walking path
Construction-related concerns	• Recommendation that one BPA contact person be designated for the project, rather than designating multiple BPA staff member contacts • Concern that landowner fences would be removed and damaged by construction contractors and left without being replaced and repaired • Comment that construction debris and old wood poles had been left behind on the right-of-way during a previous project and question whether the construction contractor would remove all construction-related debris when finished • Questions on the duration of construction
Other topics	• Comment supporting transmission infrastructure projects in general and this project in particular because of economic benefit • Requests by local residents to obtain the old wood-pole structures for use in various projects • Information on two rock quarries located near the Midway-Moxee transmission line that could provide materials for the project • Descriptions of positive interactions landowners had in the past with BPA crews conducting transmission line inspections or maintenance

BLM = Bureau of Land Management; EIS = Environmental Impact Statement; ESA = federal Endangered Species Act

In addition to BPA's public scoping meetings, project staff organized and attended various meetings related to the Proposed Action. Staff met regularly, in person and by conference call, with representatives of tribes with interests in the area. Staff also met with local landowners with questions and concerns.

BPA also engaged in coordination and consultation with federal and state agencies, as discussed in Chapter 4, Environmental Consultation, Review, and Permit Requirements, of this EA. Both the U.S. Fish and Wildlife Service (USFWS) and the Washington Department of Fish and Wildlife (WDFW) provided information on wildlife resources in the area. USFWS, BLM, and WDNR provided information on botanical resources. An interagency meeting was held in Wenatchee, Washington, on January 15, 2015, to update agencies on the project and to discuss concerns with USFWS, BLM, WDFW, and WDNR staff.

Tribal, federal, and state agency coordination and consultation are described in more detail in Chapter 4.

1.6.2. Distribution, Review, and Comment for the Draft Environmental Assessment

BPA is releasing this draft EA for review and comment. The 2-month comment period begins July 17, 2015, and ends September 17, 2015. Chapter 5, Persons, Tribes, and Agencies Receiving the Environmental Assessment, of this EA lists agencies, tribes, landowners, and other stakeholders who were sent a letter announcing the availability of the draft EA, information on how to receive or access a copy, and information on how to submit comments by phone, e-mail, or letter. The draft EA was mailed to persons and agencies who requested a hardcopy; an electronic copy was e-mailed to persons requesting an electronic copy. In addition to distributing the draft EA to interested parties, the draft EA, distribution letter, comment form, and information on how to comment are available on the project website at http://efw.bpa.gov/environmental_services/Document_Library/Midway-Moxee/.

During the public review period for the draft EA, BPA will accept comments orally, via e-mail, by letter, and at a public meeting in Moxee, Washington, on August 5, 2015. BPA will consider all comments received during the review period in preparing the final EA. The final EA will include responses to all substantive comments received. Based on the final EA, BPA will determine whether to prepare an EIS or a FONSI for the Proposed Action.

1.7. DRAFT ENVIRONMENTAL ASSESSMENT CONTENT AND ORGANIZATION

The remainder of this EA is organized as follows:

- Chapter 2, Proposed Action and Alternatives, describes the Proposed Action, the No Action Alternative, and alternatives eliminated from detailed consideration. This chapter also compares the Proposed Action and the No Action Alternative to the project purposes, and summarizes the potential environmental impacts of each of these alternatives. It includes the proposed construction sequence and schedule. A table provides a summary of the impacts on human and natural resources from the Proposed Action.
- Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, describes, for each type of resource, the existing environment that could be affected by the project, environmental consequences of the Proposed Action and the No Action Alternative, and mitigation measures that have been or would be implemented to minimize impacts on resources.
- Chapter 4, Environmental Consultation, Review, and Permit Requirements, discusses the consultation requirements and permits and other approvals that would need to be obtained to implement the Proposed Action and the consistency of the Proposed Action with state substantive standards.
- Chapter 5, Persons, Tribes, and Agencies Receiving the Environmental Assessment, lists the individuals, tribes, agencies, and organizations consulted and/or notified of the availability of the EA.

- Chapter 6, Glossary and Abbreviations, provides definitions of terms and abbreviations used in the EA.
- Chapter 7, References, provides references for sources of information used in development of this EA.
- Supporting technical information is provided in appendices or referenced on the project website.

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Chapter 2
Proposed Action and Alternatives

This chapter describes the Proposed Action, the No Action Alternative, and an alternative considered but eliminated from detailed study. This chapter also compares the Proposed Action and the No Action Alternative to the project purposes.

2.1. OVERVIEW OF THE PROPOSED ACTION AND NO ACTION ALTERNATIVES

BPA is proposing to rebuild the existing 34-mile-long Midway-Moxee transmission line and rebuild and upgrade the existing 26-mile-long Midway-Grandview transmission line in Washington state. Both 115-kV lines originate at the BPA Midway Substation, in Benton County, and terminate in Yakima County. The Midway-Moxee transmission line ends at the BPA Moxee Substation in Moxee, Washington, and the Midway-Grandview transmission line ends at the BPA Grandview Substation in Grandview, Washington (see Figure 2-1, Figure 2-2, and Figure 2-3). Both lines are within separate but adjacent rights-of-way for the first 5.3 miles after leaving the Midway Substation.

In addition to the Proposed Action, BPA is considering the No Action Alternative. Under the No Action Alternative, BPA would not rebuild either transmission line and would not upgrade the Midway-Grandview transmission line. BPA would continue to operate and maintain both of the deteriorating lines.

Table 2-1 provides a summary of the required components for the Proposed Action. The rebuilt transmission lines would be similar to the existing transmission lines in design and appearance. They would be along the same alignments and within the same transmission line corridors.

Table 2-1. Existing and Rebuilt Transmission Line Elements

Project Element	Existing Transmission Line	Rebuilt Transmission Line
Midway-Moxee Transmission Line		
Operating voltage	115 kilovolts	115 kilovolts
Wood-pole structures	224	229
Two-pole wood structures	213	214
Three-pole wood structures	11	15
Structure height range (above ground)	43 to 80 feet	38 to 113 feet
Conductor diameter	0.655 inch	0.835 inch
Fiber optic cable	0.75 inch	0.85 inch
Midway-Grandview Transmission Line		
Operating voltage	115 kilovolts	115 kilovolts
Wood-pole structures	177	180
Two-pole wood structures	167	164
Three-pole wood structures	10	16
Structure height range (above ground)	34 to 75 feet	34 to 113 feet
Conductor diameter	0.563 inch	0.951 inch

2.2. ELEMENTS OF THE PROPOSED ACTION

The Proposed Action includes the following activities, as shown in Table 2-2:

- Establishment of temporary ***staging areas*** for storage of materials
- Acquisition of some access road easements
- Access road work
- Vegetation removal in work areas and some tree removal adjacent to the rights-of-way
- Removal of existing structures, associated components, and conductors
- Installation of replacement structures and nine new structures and associated components
- Installation of conductors, ***ground wire***, and ***counterpoise***
- Replacement of the existing overhead fiber optic cable on the Midway-Moxee transmission line
- Removal of some trees scattered along the transmission line that are growing or are expected to grow (in the near future) too close to the conductors for safe operation
- Revegetation of areas disturbed by construction activities

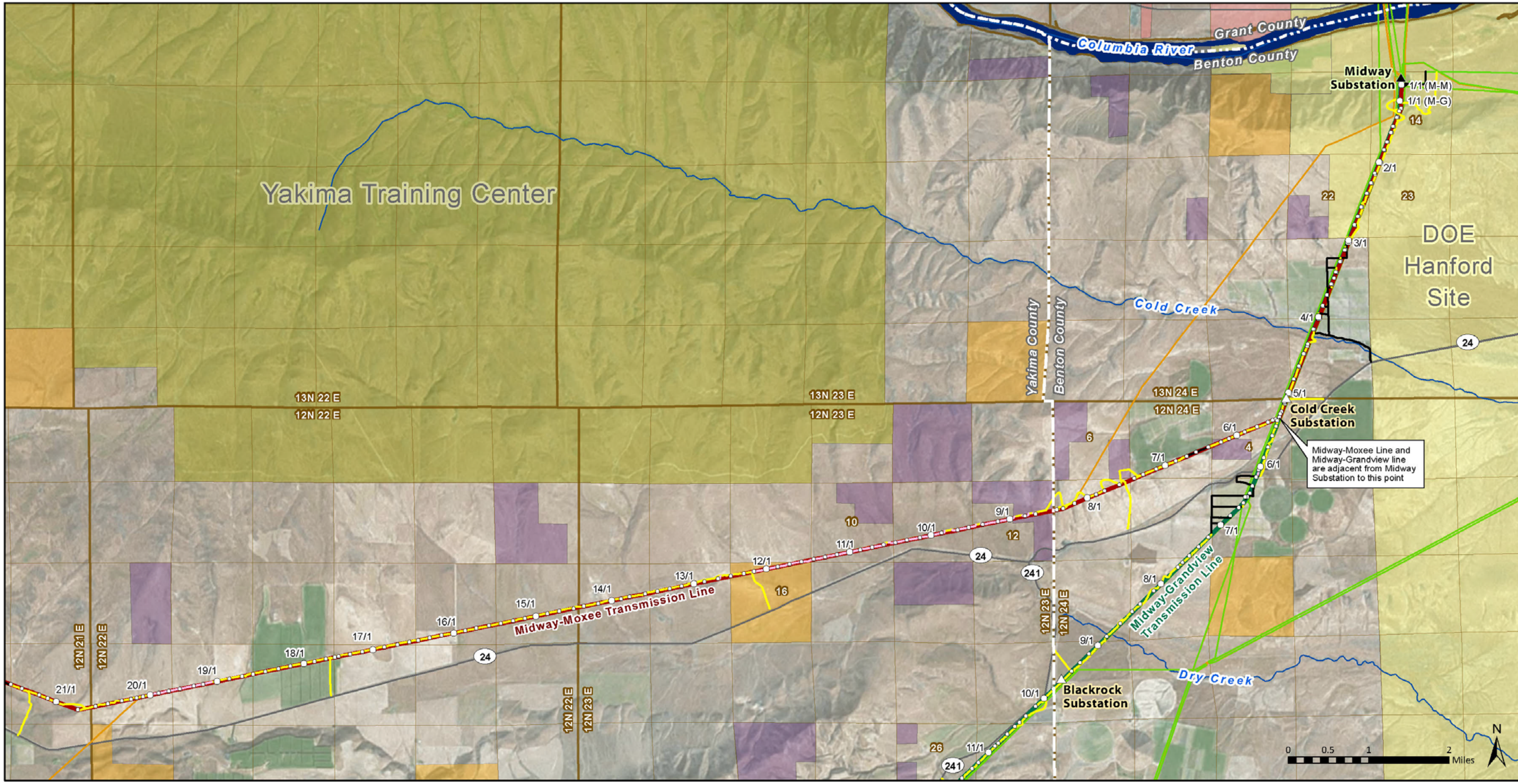


Figure 2-1. Project Features Map

Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project
Yakima and Benton Counties, Washington

Transmission Line Features
- Midway-Moxee No.1 115-kV
- Midway-Grandview No.1 115-kV
- Transmission Line Structure
- Existing Line, BPA Owned
- Existing Line, Non-BPA Owned

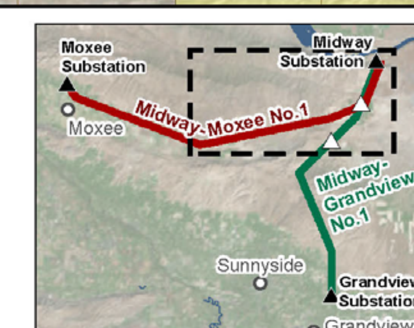
- BPA Substation
- Non-BPA Substation

Proposed or Existing Access Roads
- New Construction
- Improve/Reconstruct
- Access Road, No Proposed Work

Public Lands
- Washington State Department of Natural Resources
- US Bureau of Land Management
- US Bureau of Reclamation
- US Department of Defense
- US Department of Energy

Other Features
- Township, Range, Section
- Highway
- Waterway

Note: Map features may be obscured by overlapping features



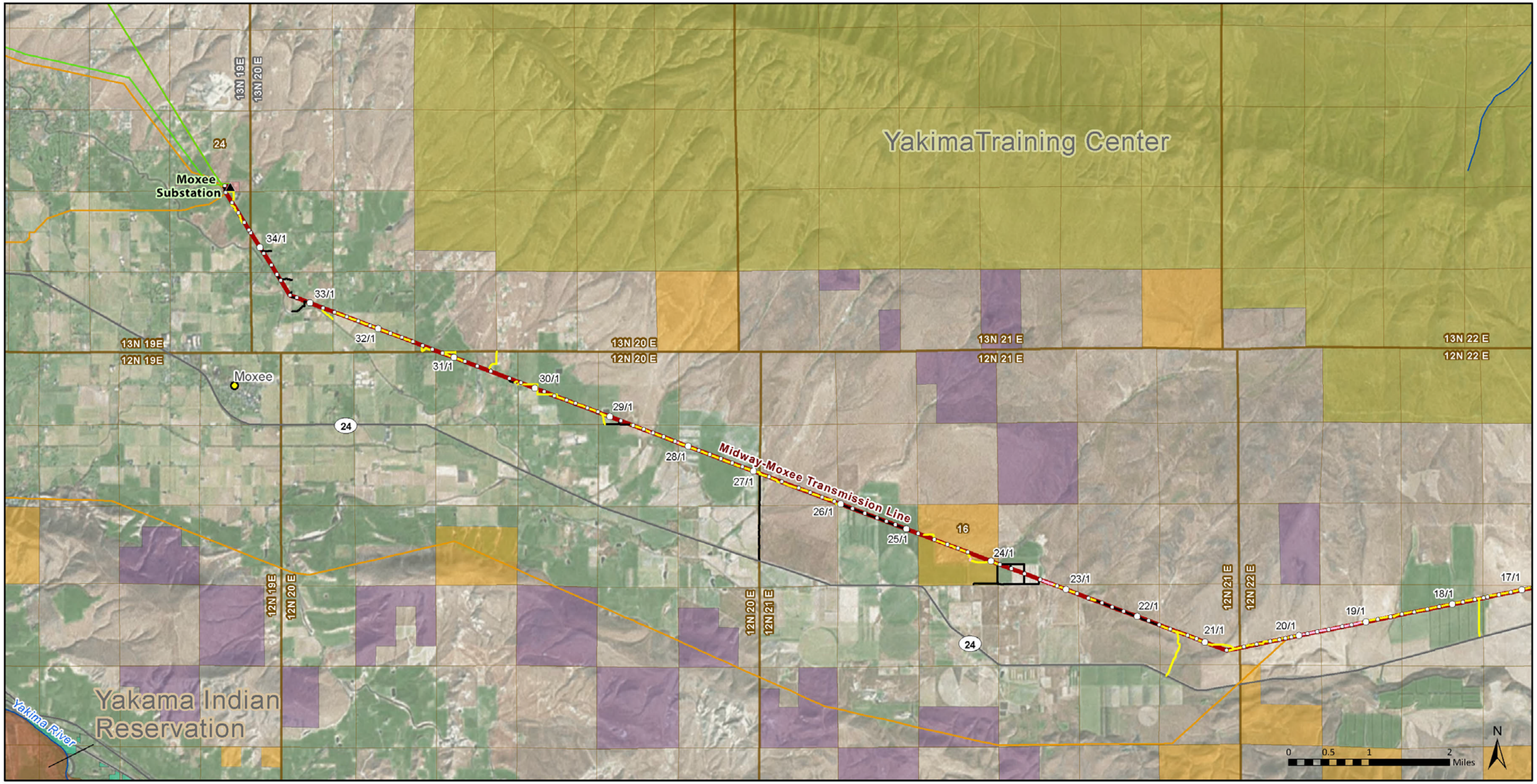


Figure 2-2. Project Features Map

Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project
Yakima and Benton Counties, Washington

Transmission Line Features
- Midway-Moxee No.1 115-kV
- Midway-Grandview No.1 115-kV
- Transmission Line Structure
- Existing Line, BPA Owned
- Existing Line, Non-BPA Owned

- BPA Substation
- Non-BPA Substation

Proposed or Existing Access Roads
- New Construction
- Improve/Reconstruct
- Access Road, No Proposed Work

Public Lands
- Washington State Department of Natural Resources
- US Fish and Wildlife Service
- US Bureau of Land Management
- US Bureau of Reclamation
- US Department of Defense

Other Features
- Township, Range, Section
- Highway
- Waterway

Note: Map features may be obscured by overlapping features

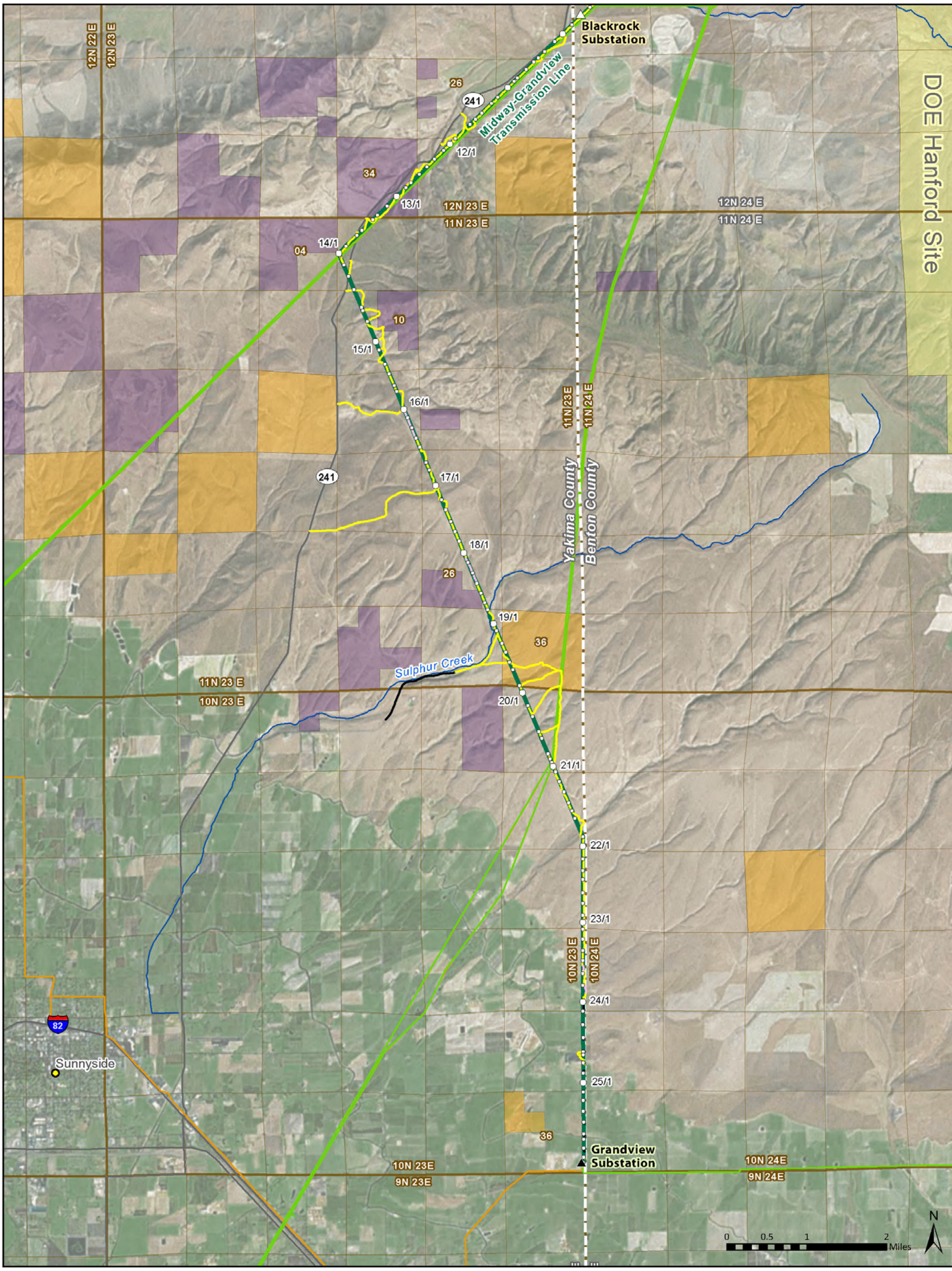


Figure 2-3. Project Features Map

Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project
Yakima and Benton Counties, Washington

Transmission Line Features
- Midway-Moxee No.1 115-kV
- Midway-Grandview No.1 115-kV
- Transmission Line Structure
- Existing Line, BPA Owned
- Existing Line, Non-BPA Owned

Substation
- BPA Substation
- Non-BPA Substation

Proposed or Existing Access Roads
- New Construction
- Improve/Reconstruct
- Access Road, No Proposed Work

Public Lands
- Washington State Department of Natural Resources
- US Bureau of Land Management
- US Department of Energy

Other Features
- Township, Range, Section
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Note: Map features may be obscured by overlapping features

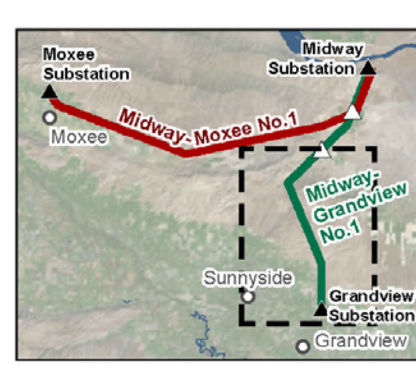

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Table 2-2. Proposed Transmission Line Rebuild and Upgrade Activities

Proposed Activity	Midway-Moxee Quantity	Midway-Grandview Quantity
Staging Areas (material storage)	3 to 4	3 to 4
Access Roads		
New access road construction	4.54 miles	1.04 miles
Within right-of-way	4.32 miles	0.94 mile
Outside right-of-way	0.22 mile	0.10 mile
Reconstruction[a] of existing access roads	2.31 miles	7.15 miles
Within right-of-way	0.83 mile	3.09 miles
Outside right-of-way	1.48 miles	4.06 miles
Improvements to existing access roads	27.52 miles	19.55 miles
Within right-of-way	18.62 miles	9.88 miles
Outside right-of-way	8.9 miles	9.67 miles
New culverts	3	1
Replacement culverts	1	3
Cross-drain culverts	As needed	As needed
New fords	4	3
Improvements to existing fords	13	10
Gate installation or replacement	As needed	As needed
Transmission Line Structures		
Removal of existing wood-pole structures	224 (213 two-pole structures and 11 three-pole structures)	177 (167 two-pole structures and 10 three-pole structures)
Installation of replacement and new structures	229 (214 two-pole structures and 15 three-pole structures)	180 (164 two-pole structures and 16 three-pole structures)
Removal and replacement of conductor (electrical wires)	Along the entire 34-mile length of the transmission line	Along the entire 26-mile length of the transmission line
Installation or removal of fiber optic cable	Installed along the entire transmission line	Removed along the transmission line where currently present
Vegetation Removal		
Removal of vegetation within right-of-way	As needed	As needed
Removal of trees adjacent to the right-of-way	Approximately 170 trees	2 trees
Removal of vegetation along existing access roadsides	As needed	As needed

[a] Road reconstruction includes more extensive work to the road base than road improvement, which includes road surface work

2.2.1. *Transmission Line Rights-of-Way*

Most of the rights-of-way for both transmission lines are located on privately owned lands. The land uses within and adjacent to the rights-of-way include a mix of ranching, agriculture (vineyards, hops, wheat, and orchards), undeveloped land, and rural residential areas in and near Moxee City and Grandview (Figure 2-4). The U.S. Department of the Army's Yakima Training Center (YTC) is located several miles to the north of the Midway-Moxee transmission line right-of-way.

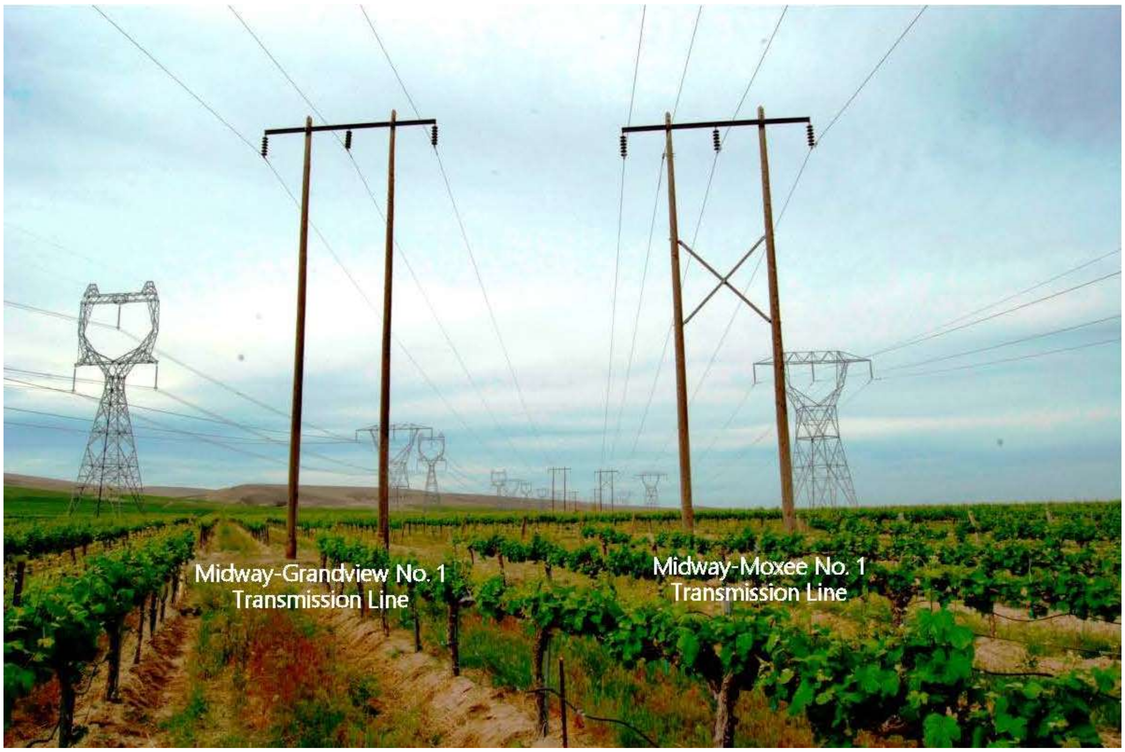


Figure 2-4. Existing Transmission Lines: Agricultural Area Near Midway-Moxee Structure 4/2 and Midway Grandview Structure 4/2

The Midway-Moxee and Midway-Grandview transmission lines are parallel and immediately adjacent to one another for about 5.3 miles after leaving the Midway Substation. In this area, the transmission corridor is up to 800 feet wide and includes multiple transmission lines (Figure 2-5). Transmission lines adjacent to various portions of the Midway-Moxee and Midway-Grandview transmission lines are listed in Table 2-3.

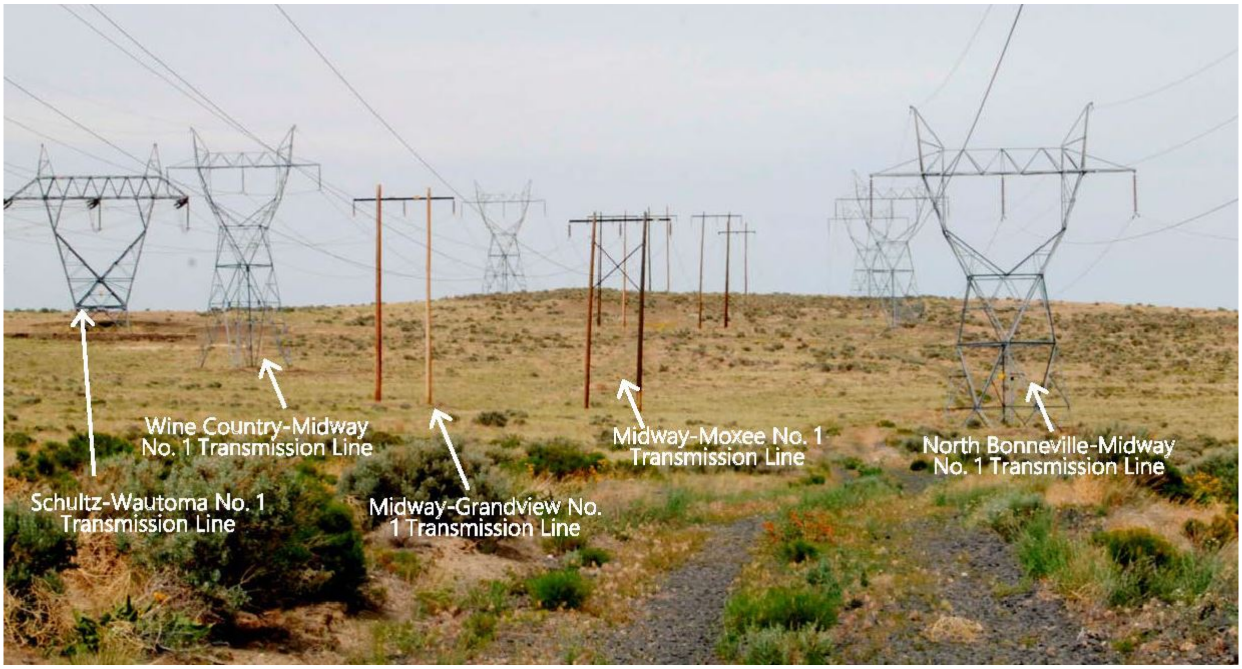


Figure 2-5. Existing Transmission Line Rights-of-Way: Lands Managed by the U.S. Department of Energy near the Midway Substation

Table 2-3. Transmission Lines Adjacent to the Midway-Moxee and Midway-Grandview Transmission Lines

Location Relative to Substations and Transmission Line Structures	Adjacent Transmission Lines (BPA-owned unless otherwise noted)
Midway-Moxee Transmission Line	
Midway Substation to Structure 1/8	230-kV Wine Country–Midway 115-kV Midway-Grandview 230-kV North Bonneville–Midway
Structure 1/8 to Structure 5/4	230-kV Wine Country–Midway 115-kV Midway-Grandview 230-kV North Bonneville–Midway 550-kV Schultz-Wautoma
Structure 5/4 to Structure 8/2	No adjacent transmission lines
Structure 8/2 to Structure 20/1	230-kV Union Gap-Midway (Pacific Power and Light)
Structure 20/1 to Structure 34/8 at the Moxee Substation	No adjacent transmission lines
Midway-Grandview Transmission Line	
Midway Substation to Structure 1/7	230-kV Wine Country–Midway 115-kV Midway-Moxee 230-kV North Bonneville–Midway
Structure 1/8 to Structure 5/4	230-kV Wine Country–Midway 115-kV Midway-Moxee 230-kV North Bonneville–Midway 550-kV Schultz-Wautoma

Location Relative to Substations and Transmission Line Structures	Adjacent Transmission Lines (BPA-owned unless otherwise noted)
Structure 5/4 to Structure 6/8	230-kV Wine Country–Midway 230-kV North Bonneville–Midway 550-kV Schultz-Wautoma
Structure 6/8 to Structure 9/3	230-kV North Bonneville–Midway
Structure 9/3 to Structure 14/2	500-kV Wautoma-Ostrander 230-kV North Bonneville–Midway
Structure 14/2 to Structure 25/9 at the Grandview Substation	No adjacent transmission lines

At some points along the Midway-Moxee and Midway-Grandview transmission lines, the right-of-way for each line is narrower, typically 100 feet, with fewer or no adjacent transmission lines. About 18 miles of the Midway-Moxee transmission line have no adjacent transmission lines, beginning in Line Mile 5 and extending to the Moxee Substation (Figure 2-6). About 12 miles of the Midway-Grandview transmission line beginning at Structure 14/2 and extending to the Grandview Substation have no parallel transmission lines.

Figure 2-6. Existing Midway-Moxee Transmission Line in Area Without Adjacent Transmission Lines: Residential Area Near the City of Moxee

Some portions of the transmission lines and associated access roads are on federal- and state-owned lands. Along the Midway-Moxee line, approximately 4.8 miles of the right-of-way are on public lands, including the following areas (line miles are the distance from the Midway Substation):

- About 2 miles of the right-of-way along Line Miles 1 and 2, including 15 structures, are within the U.S. Department of Energy's (DOE's) Hanford Site and the Rattlesnake Unit of the ***Hanford Reach*** National Monument.
- About 0.8 mile of the right-of-way along Line Miles 6 and 8, including four structures, is on two parcels of BLM-administered lands.
- About 2 miles of the right-of-way along Line Miles 11, 12, and 24, including 12 structures, are on two parcels of land managed by WDNR.

Along the Midway-Grandview transmission line, approximately 3.4 miles of the right-of-way are on public lands, including the following areas:

- About 2 miles of the right-of-way along Line Miles 1 and 2, including 15 structures, are on lands within the DOE Hanford Site.
- About 0.8 mile of the right-of-way along Line Miles 12, 13, and 18, including five structures, is on two parcels of BLM-administered lands.
- About 0.6 mile of the right-of-way along Line Mile 19, including four structures, is on one parcel of land managed by WDNR.

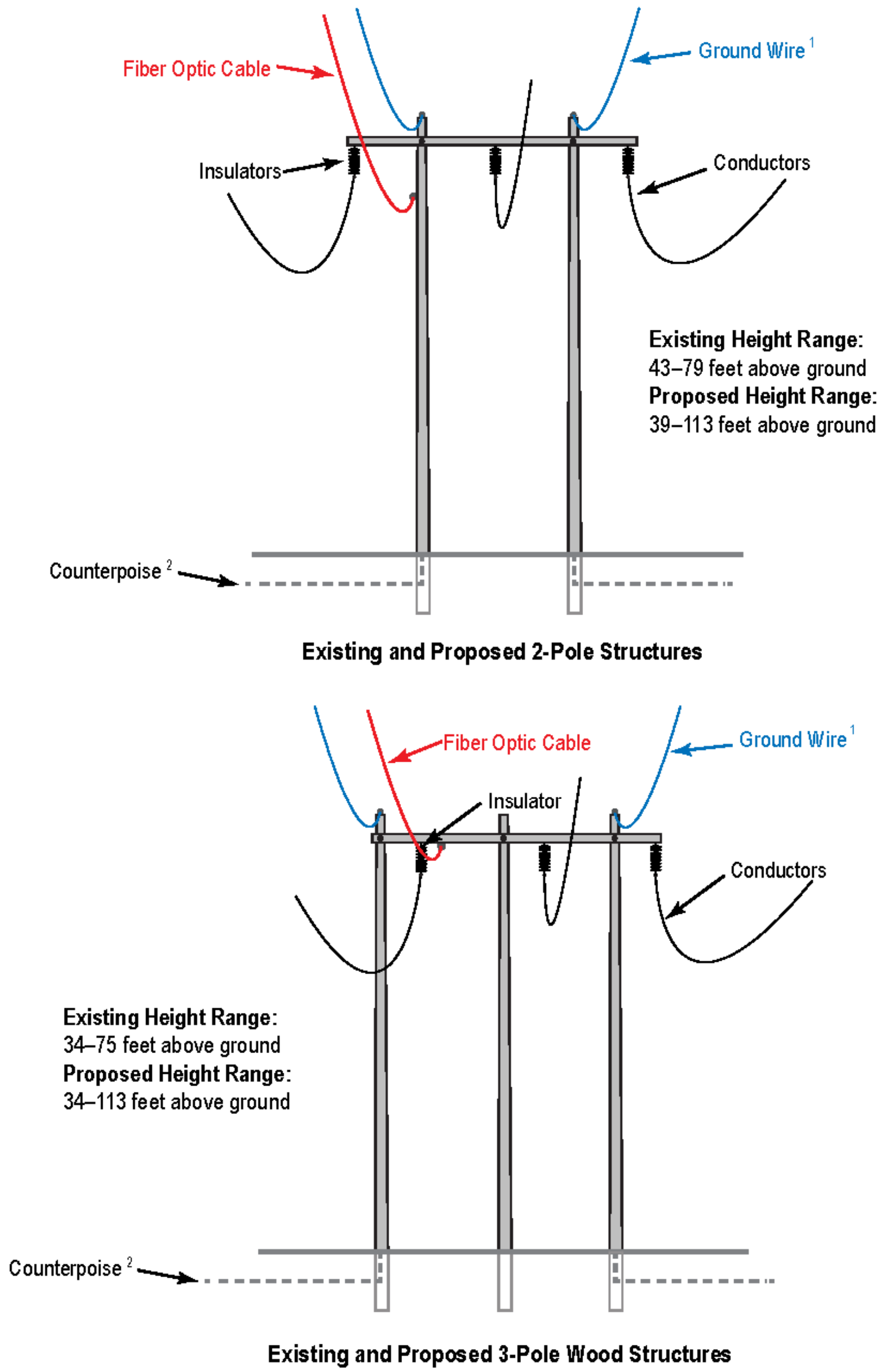
2.2.2. Transmission Line Structures

The Midway-Moxee transmission line consists of 224 wood-pole structures, and the Midway-Grandview transmission line consists of 177 wood-pole structures. Each structure is designated by a unique number based on the distance from the Midway Substation, the designated start point of both transmission lines. For example, in the first line mile (Line Mile 1) from the Midway Substation, there are eight structures in the Midway-Moxee transmission line. The first structure heading southwest from Midway Substation is Structure 1/1 and the second is Structure 1/2, up to the eighth structure, Structure 1/8. Numbering in the second line mile (Line Mile 2) begins with Structure 2/1 and ends with the last of seven structures, Structure 2/7. Midway-Moxee structures are numbered Structures 1/1 to 34/8, ending at the Moxee Substation; Midway-Grandview structures are numbered Structures 1/1 to 25/9, ending at the Grandview Substation.

All existing wood-pole structures, except for one structure, would be replaced with transmission line structures of similar design, made of either two or three wood poles (Figure 2-7). Most existing structures are two-pole structures and would be replaced with two-pole structures. Two-pole structures are used in straight alignments or where the transmission line turns at angles smaller than 15 degrees.

Three-pole structures are used where the transmission line changes direction at angles generally greater than 15 degrees. The existing three-pole structures would be replaced with three-pole structures, and some existing two-pole structures would be replaced with three-pole structures. Proposed Midway-Moxee three-pole structures include Structures 1/1, 1/3, 5/4, 5/6, 8/3, 12/2, 17/4, 17/5, 20/8, 24/1, 27/5, 33/3, 34/6, 34/7, and 34/8. Proposed Midway-Grandview three-pole structures include Structures 1/1, 1/2, 5/1, 5/4, 5/5, 6/5, 6/6, 6/7, 6/8, 13/3, 14/1, 14/2, 14/8, 21/8, 22/2, and 25/9.

Replacement structure components would be similar to existing components, including ***structure cross arms*** (made of steel), ***insulators,*** and ***dampers*** (Figure 2-7). During structure replacement, existing components would be inspected and, if in good condition, possibly reused.



NOTES:

1. Ground wire would be installed approximately 1.0 mile from each substation.
2. Counterpoise would be installed at the base of structures where ground wire is present.

Figure 2-7. Existing and Proposed Wood-Pole Structures

One existing three-pole structure, Midway-Grandview Structure 1/1, would be replaced with a three-pole structure made of steel poles, rather than wood poles. A metal pole is needed for structural reasons because it is located on the edge of a rocky cliff.

Nine new structures would be added to the transmission lines in areas where the current conductor can swing outside the existing right-of-way during high winds and where conductor can sag due to icy coating the conductor. New structures were added to shorten the distance between structures, decreasing the span length. Adding structures in these areas would enable BPA to not have to widen the right-of-way.

Five structures would be added to the Midway-Moxee transmission line—Structures 5/3, 5/5, 5/6, 20/2, and 20/4—using the new numbering system for the rebuilt transmission line. All these structures would be two-pole structures except for Structure 5/6, which would be a three-pole structure.

Four structures would be added to the Midway-Grandview transmission line—Structures 6/6, 11/5, 20/7, and 21/2—using the new numbering system. All these structures would be two-pole structures except for Structure 6/6, which would be a three-pole structure. One existing Midway-Grandview transmission line structure (existing Structure 8/2) would be removed and would not be replaced, due to the shifts in position of nearby structures.

Along the Midway-Moxee transmission line, most structures would be installed within 5 feet of their current location (Figure 2-8). Replacement poles would be installed before removing existing poles, in order to keep the existing fiber optic cable that is installed on the structures operational during pole replacement.

Because the existing fiber optic cable on the Midway-Grandview structures would be removed and not replaced, the fiber optic cable would not need to be operational during pole replacement. As a result, most wood poles would be installed within the hole of the removed structure. Equipment used for removing and installing wood poles and other structure components would include flatbed trucks, line trucks with boom cranes, backhoes, augers, and bucket trucks.

Figure 2-8. Installation of a Wood-Pole Structure

Some structures would be shifted ahead or behind their current location within the existing right-of-way. A total of 17 Midway-Moxee structures would shift more than 10 feet from their current locations, and a total of 14 Midway-Grandview structures would move 10 feet from their current locations.

Some structure positions would be shifted to maintain the correct distance between the conductors and the ground in order to maintain electrical clearance safety standards. Other structure locations would be shifted in some locations to accommodate landowner requests in agricultural areas. In one agricultural area along Line Mile 23 of the Midway-Moxee transmission line, four structures would be moved ahead of or behind their existing locations to avoid orchards and increase distance from existing farm roads. In another agricultural area (Line Miles 24 and 25 of the Midway-Moxee transmission line), seven structures would be moved to help the landowner irrigate crops more efficiently.

Figure 2-9. Augering a Hole for a Wood-Pole Structure

Removal of existing wood-pole structures requires excavating around the structure bases. A boom crane is used to pull the structures out and onto the ground to be hauled away on a line truck. Some vegetation in the right-of-way could be cleared to allow equipment and machinery to access the structures.

At most transmission line structure sites, structure removal activities could disturb an area up to 100 feet by 100 feet (0.2 acre). In sensitive areas, staking or flagging would be installed to restrict vehicles and equipment to designated work areas as topography allows.

Replacement structures would be brought to structure sites from staging areas by flatbed truck. New holes would be augered, or existing holes reaugered, to about 10 percent of the length of each wood pole plus 2 feet in depth with an auger on a drill rig (Figure 2-9). The structures would be lifted by crane into position and placed into the holes. Holes would be backfilled with excavated material and gravel. At most structure sites, any additional soil removed by the auger that is not used for backfilling would be spread evenly around the structure bases for stability. At structure sites within sensitive areas, the augered soil would be removed from the site and either used at the base of a nearby structure that is not in a sensitive area or disposed of in a landfill that is permitted to accept such material.

In addition to the replacement of Midway-Moxee and Midway-Grandview transmission line structures, work would be conducted on one existing wood-pole structure of the Midway-Benton transmission line. The Midway-Benton transmission line crosses under the Midway-Moxee and Midway-Grandview transmission lines near the Midway Substation. One wood pole of an existing three-pole structure (Midway-Benton Structure 1/1) would be replaced with a shorter wood pole to meet current clearance requirements between conductors of lines that cross. The existing wood pole would be replaced (within the same hole) with a wood pole that is 10 feet shorter. In addition, a short stretch of the Midway-Benton ***overhead ground wire*** would be removed to meet clearance requirements.

2.2.3. Guy Wires and Anchors

Guy wires and underground ***guy wire anchors*** would be used to support some new structures, where required. If guy wires are present at an existing structure site and need to be replaced, a hole would be excavated at the location of the guy wire anchor, and the old guy wire would be cut off. Depending on the location, the guy wire anchor would be left or removed. Holes for new guy wire anchors would be dug with either an auger or a backhoe, and a new guy wire and anchor would be placed in the same location. Guy wire anchors would be set in crushed rock, and the remainder of the hole would be backfilled with native material. In sensitive areas, it may be possible to use a type of guy wire anchor that screws into the ground to avoid excavation, depending on the type of soils.

2.2.4. Conductor, Overhead Ground Wire, Fiber Optic Cable, and Counterpoise

Conductor

Alternating current transmission lines like the Midway-Moxee and Midway-Grandview transmission lines require three conductors to make a complete ***circuit*** (Figure 2-7). The existing conductors on both lines would be replaced, because they do not meet current standards. The proposed conductor would be made of steel and would have a slightly higher electrical capacity. The existing Midway-Moxee conductor has a diameter of 0.655 inch; the proposed conductor would be larger, with a diameter of 0.835 inch. The existing Midway-Grandview conductor has a diameter of 0.563 inch; the proposed conductor would be larger, with a diameter of 0.951 inch. The new conductors would look very similar to the existing conductor and would not be more reflective because BPA uses non-lustrous (pre-dulled) conductor.

Although the Midway-Moxee transmission line is considered a rebuild and the Midway-Grandview transmission line is considered an upgrade, the same work is proposed for both lines. The distinctions between a rebuild and an upgrade are the program funding source and the main reason for needing the project at this time. The main reason for the Midway-Moxee transmission line rebuild is to replace the aging line, whereas the main reason for the Midway-Grandview transmission line upgrade is to serve increased load.

In areas where the conductor would cross existing ***distribution lines*** or transmission lines, public roads, and waterways, ***guard structures*** may be temporarily installed during construction to safely lower the conductor without hitting the underlying distribution line or road. Guard structures are two-pole wood structures similar to transmission line structures that are temporarily installed on either side of a road, power line, or waterway; after the existing conductor is removed and the new conductor is installed, they are removed. Holes are augered to install the guard structure poles, and the holes are back-filled when the guard structure is removed.

The conductor would be removed by reeling the wires onto large spools using a large truck called a puller. The removed conductor would be transported to a metal salvage facility for recycling. The new conductor would be attached to structures using non-ceramic insulators.

Insulators keep conductors a safe distance from other parts of the structure and prevent the electricity in the conductors from moving to other conductors, the structure, or the ground.

Conductor would be installed in segments, or pulling sections, along the length of the transmission line. Pulling sections are typically no more than 25 structures long. ***Pulling sites*** and ***tensioning sites*** are located at the beginning and end of each pulling section. These sites serve as staging areas for the equipment (i.e., puller and tensioner) used to install the conductor. A puller typically consists of reels to hold the segment of conductor wire that is being pulled through the structures. The tensioner is a large piece of equipment that also has many reels through which the conductor wire is fed to adjust it to the proper tension after it has been strung on the transmission line (Figure 2-10). Some pulling and tensioning sites would be within the right-of-way, but in other areas it could extend off the right-of-way, up to 400 feet from the transmission line structure.

The Midway-Moxee transmission line would require 18 pulling and tensioning sites; the Midway-Grandview transmission line would require 12 sites. There would also be four pulling and tensioning sites located in the transmission line corridor common to both the Midway-Moxee and Midway-Grandview transmission lines. The tensioner would occupy less than 0.1 acre (20 feet by 100 feet workspace). Depending on the terrain, the tensioner workspace would require mowing and may require light blading.

Figure 2-10. Tensioner Pulling Conductor

The conductor is typically installed through the structures in a sequential process with several stages. A helicopter is generally used to pull a ***sock line*** (a pulling rope) through the structures, which is then connected to a ***hard line***. The hard line is a stronger wire that is used to pull the conductor through the structures. Once the conductor is in place, the tensioner is used to set the proper tension in the conductor (Figure 2-10), which is then securely clipped into all the structures. Because the new conductor is a three-phase conductor (i.e., it consists of three phases or wires), the helicopter would need to visit each structure three times. Each visit would generally last less than 10 minutes. Therefore, stringing each line mile would take about 3 hours.

<u>Overhead Ground Wire</u>

Overhead ground wire is located on both transmission lines in the first and last line miles, just outside of substations (Figure 2-7). Overhead ground wires are attached to the top of certain structures to route electricity from lightning to the ground through the structure, preventing damage to the electrical equipment in the substations.

Overhead ground wires would be removed and replaced at the same time the conductor is replaced. Overhead ground wires would be removed by reeling the wires onto large spools using a puller. The removed ground wire would be transported to a metal salvage facility for recycling. Overhead ground wires would be installed using a similar process to that described above for installing conductor.

Fiber Optic Cable

Along the Midway-Moxee transmission line, fiber optic cable extends over the entire length of the line, attached to each wood-pole structure adjacent to the electrical conductors. The existing overhead 36-count fiber optic cable would be replaced with 72-count fiber optic cable. The 72-count fiber would provide 36 additional fibers for communication, if needed. The fiber optic cable needs to be replaced because the outer jacket of the existing fiber optic cable has deteriorated due to exposure to UV light and other weather conditions.

The new fiber optic cable would have the same color and finish of the current fiber optic cable. The existing fiber optic cable is about 0.56 inch in diameter, and the proposed fiber optic cable would be slightly larger at about 0.73 inch in diameter.

Fiber optic cable would be removed and replaced using methods similar to those used to remove and replace conductor. The fiber optic cable would be spliced together at intervals. Splices would be located in splice enclosures in concrete vaults. Eight new concrete vaults would need to be installed, primarily at dead-end wood-pole structures. Vaults typically are 4-foot-by-4-foot-by-4-foot-square concrete enclosures that are either placed on the ground or partially buried in the ground.

The pulling and tensioning of fiber optic cable is done using the same methods used to pull and tension conductor. Fiber optic cable pulling and tensioning would take place in the same locations used for pulling and tensioning sites.

The overhead fiber optic cable would end at the last structure outside the substations on each end of the line. Splices would again be located in concrete vaults located in the ground adjacent to the last structure outside the substations. The fiber optic cable would then be installed underground into the two substations from these splice vaults.

Counterpoise

Counterpoise is a system of underground wires attached to transmission line structures for additional lightning protection. The wires are laid out horizontally from the structure and buried in the ground. Counterpoise would be replaced as needed.

At most structures, counterpoise is typically located in the ground between the wood poles. Near substations, counterpoise wires are buried at the base of the structure, extending up to 50 feet on either side of the structure base. Near the Midway Substation, counterpoise extending from the structure could be replaced at the bases of Midway-Moxee Structures 1/1 to 1/7 and at the bases of Midway-Grandview Structures 1/1 to 1/6. Near the Moxee Substation, counterpoise extending from the structure could be replaced at the last five structures, Midway-Moxee Structures 34/4 to 34/8. Near the Grandview Substation, counterpoise extending from the structure could be replaced at the last five structures, Midway-Grandview Structures 25/5 to 25/9.

If replaced, the new counterpoise wires would be buried at the base of the structure. Generally, four wires are buried. The placement of counterpoise wires could be adjusted to avoid sensitive areas, if possible. The wires would be buried below the ground surface using a narrow-width trencher or a backhoe. In uncultivated areas, counterpoise is generally buried 18 inches in depth, but in cultivated areas it is buried about 36 inches in depth. If there are areas where bedrock is at or near the surface, the wires would be laid on the surface and buried with loose aggregate.

2.2.5. Access Road Work

Access road work would be needed to provide or improve access to structure sites during construction. Most of the existing transmission line structures are currently accessible by existing access roads located both within and outside of the transmission line rights-of-way. These access roads are generally multi-use roads, including residential access roads, county roads, and farm roads. Some access roads are on public lands, including BLM-administered lands and lands owned and managed by DOE Richland Operations Office (DOE-RL), the Bureau of Reclamation, and WDNR.

BPA has or is acquiring easements granting permission to use existing access roads to access the existing lines and would acquire easements from appropriate landowners for any new access roads. The easements on existing roads are generally 20 feet in width, and easements for new roads that would be constructed would be 50 feet in width. All access road work would occur within the easements.

The standard width of the travel surface of access roads would be established at 14 feet, although some areas could be wider to allow vehicles to negotiate curves or bends in the road. Approximately 3 feet on either side of the road may be used for drainage features such as ditches, side-casting of graded material, and other related road construction activities.

Proposed access road work would include new road construction, reconstruction of existing roads in poor condition, and improvement of existing access roads that need minor surface work. Work on existing access roads would ensure they are suitable for BPA transmission line equipment. Road work would also include gate installation or replacement, installation of drainage and ***erosion*** control features, and work associated with stream crossings. Work at stream crossings would include installation and replacement of ***culverts***, installation of new ***fords***, and improvements to existing fords. Gates would be installed or replaced, as needed, to discourage unauthorized access to the transmission line corridors. Table 2-4 contains a list of equipment that could be used for road work.

Table 2-4. Equipment Used in Access Road Work

Equipment Type	Equivalent Caterpillar Model	Fuel Type
Bulldozers	D5K	Diesel
Excavators (large and small)	328D LCR	Diesel
Dump trucks and other large trucks	N/A	Diesel
300,000-pound crane	N/A	Diesel
Road grader	12M	Diesel
Roller compacter	CP56	Diesel
Backhoe	450E	Diesel
Work trucks	N/A	Diesel/gas

Construction of New Access Roads

Approximately 4.54 miles of new access roads would be constructed along the Midway-Moxee transmission line and 1.04 miles along the Midway-Grandview transmission line. New road construction tends to progress slowly because of the amount of material that has to be imported. Construction of new roads involves clearing vegetation, forming and grading the road base, shaping and compacting the natural subgrade, and placing, shaping, and compacting rock on the road surface. Some areas may require drainage structures such as ***water bars***, ***cross-drain culverts***, ***drain dips***, and culverts to manage water. Depending on the type of water features and drainage patterns, roadway ditches may be needed and stream crossing structures installed.

Reconstruction of Existing Access Roads

Reconstruction of existing access roads would ensure access roads are suitable for BPA transmission line equipment. Approximately 2.31 miles of existing access roads would be reconstructed along the Midway-Moxee transmission line and 7.15 miles along the Midway-Grandview transmission line. Road reconstruction is required where a road prism is present but in poor condition and may be impassable, especially during wet weather. Road reconstruction also tends to progress slowly due to the amount of material that has to be imported. Road reconstruction involves reconstructing the road base and bed, similar to the construction of new access roads.

Improvements to Existing Access Roads

Approximately 27.52 miles of access roads would be improved along the Midway-Moxee transmission line and 19.55 miles along the Midway-Grandview transmission line. Road improvement is less extensive than road reconstruction and is needed when the existing road prism is in need of minor grading. Road improvement work tends to progress more quickly than road construction or reconstruction. Work may include vegetation removal at discrete locations, shaping and compacting the existing road base, and placement, shaping, and compacting of rock. Existing functioning culverts and ditches would be cleaned and drainage features such as water bars, drain dips, cross-drain culverts, and ditches installed, as needed.

Stream Crossing and Drainage Structures

In some areas, new culverts would be installed and existing culverts would be replaced. Three new culverts would be installed along the Midway-Moxee transmission line and one new culvert along the Midway-Grandview transmission line. One damaged culvert would be replaced along the Midway-Moxee transmission line and three damaged culverts would be replaced along the Midway-Grandview transmission line.

Because of the arid nature of the project area, some waterways are dry most of the year. In low-volume waterways that are shallow, fords are used to cross streams instead of installing culverts. Fords consist of a rocky road bed constructed within the stream channel. Along the Midway-Moxee transmission line, four new fords would be constructed and 13 existing fords improved, because they currently cannot support construction vehicles. Along the Midway-Grandview transmission line, three new fords would be constructed and 10 existing fords improved, because they currently cannot support construction vehicles.

Cross-drain culverts would be installed or replaced as needed to help channel water away from access roads and to provide adequate drainage, prevent road erosion, and reduce the chance of mass failure. Replacement cross-drain culverts would be installed where existing cross-drain culverts are damaged and/or not functioning and in other areas, as needed.

2.2.6. Vegetation Management During Construction

Vegetation Clearing

Due to the vegetation types present near transmission line structures, along access roads, and in areas where new access roads would be constructed, large mowers or brush cutters (i.e., brush hogs) would be used to remove vegetation. Along access roads, vegetation would be removed (brushing) from the access road prism (14-foot-wide) and access road shoulders (3-foot-wide on either side) to maintain a clear travel corridor of approximately 20 feet in width.

Some vegetation would be removed in the vicinity of structures to provide access to construction equipment used during structure removal and structure replacement. The rights-of-way for both transmission lines would not be cleared of vegetation; vegetation clearing would be limited to those areas where construction equipment and vehicles would require access for construction.

In some areas where a mower or brush cutter would not accomplish 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.

Prior to construction, BPA would conduct pretreatment of noxious weeds in compliance with BPA's Transmission System Vegetation Management Program EIS (Bonneville Power Association 2000). On all BLM-administered lands, BPA would conduct pretreatment of weeds in the existing access roads and transmission line rights-of-way prior to construction and in compliance with the measures listed in BLM's *Final Programmatic EIS, Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (Bureau of Land Management 2007). Where noxious weeds are present in project work areas after construction, post-construction treatment of noxious weeds would be conducted in compliance with BPA's Transmission System Vegetation Management Program EIS to minimize the introduction or spread of noxious weeds as a result of construction.

Tree Removal

Removal of tall vegetation ensures that conductors do not sag too close to vegetation. When vegetation comes too close to conductors, the electricity can jump (arc) from the conductor to the vegetation. This can be very dangerous to humans and wildlife in the surrounding area and can cause fires and outages. Depending on the terrain and the height of the conductor, trees and tall shrubs within and outside of the rights-of-way can pose a hazard and need to be removed.

A danger tree (Figure 2-11) is a tree located outside the transmission line right-of-way that is a current or future hazard to the transmission line. Some danger tree removal would occur as part of the Proposed Action. A tree would be identified as a danger tree if it is likely to make contact with BPA facilities if it were to fall, bend, or grow within the space that could be occupied by the conductor, either when at rest or when swinging as a result of winds.

Figure 2-11. Danger Trees Near Midway-Moxee Structure 30/3

Danger trees would be felled with a chainsaw, and branches would generally be lopped and either scattered or chipped. If chipped, the chips would be broadcast. How trees are felled and disposed of depends on the location of the trees and agreements with landowners. BPA coordinates with landowners regarding the removal of danger trees.

Along the Midway-Moxee transmission line, about 170 danger trees have been identified for removal. Danger trees occur in residential areas as part of the landscaping or in agricultural areas where Lombardy poplars (*Populus nigra*) serve as windbreaks. The size of the identified danger trees, measured in inches as ***diameter at breast height*** (dbh), varies from less than 8 inches dbh to 26 inches dbh. The following danger trees have been identified along the Midway-Moxee transmission line as needing removal:

- 33 Lombardy poplars in four areas (Line Miles 17, 23, 24, and 30)
- 45 cottonwoods (*Populus trichocarpa*) in Line Mile 30, including a large clump of 19 trees near a residence (Figure 2-11) and 26 others near Line Mile 34
- 92 trees, including pine (*Pinus* sp.), birch (*Betula* sp.), arborvitae (*Thuja* sp.), sweet gum (*Liquidambar styraciflua*), and various horticultural hardwood tree species in residential areas in Moxee (Line Miles 30 to 34)

Along the Midway-Grandview transmission line, two cottonwoods have been identified as danger trees. They are located in Line Mile 19 along Sulphur Creek and measure 14 to 20 inches dbh.

2.2.7. Staging Areas

About three to four temporary staging areas would be established along or near (within 10 miles, if possible) the rights-of-way of both transmission lines. Staging areas would be used to store and stockpile new and removed structure materials and conductor, trucks, and other 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 30 acres in size. The location of the staging areas would depend on the availability of suitable sites. Staging areas are generally existing large, level, paved sites in commercial or industrial areas. The construction contractor would identify potential areas for lease prior to construction. BPA would complete any site-specific environmental review needed once the locations are determined.

2.2.8. Revegetation of Areas Disturbed by Construction

Areas disturbed by construction activities would be reseeded, 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. The seed mixture would be a native seed mix in sensitive areas (i.e., areas containing sensitive vegetation or cultural resources), or a seed mix appropriate to the ***habitat*** being revegetated and as agreed to by the private land owner or public land manager. The original grade and drainage patterns in sensitive areas would be restored to the extent possible.

2.2.9. Waste Management

Solid waste and fuels or oils generated during construction would be disposed of in accordance with federal, state, and local requirements. On the DOE Hanford Site, required waste disposal protocol would be followed. All transmission line components removed from the DOE Hanford Site, including poles, conductors, and other hardware, would be staged within designated areas within the DOE Hanford Site. Components would be inspected for radiological contamination by the appropriate DOE Hanford staff. 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 Hanford personnel to identify appropriate treatment and disposal methods.

2.2.10. Proposed Construction Schedule

The schedule for project construction depends on the completion and outcome of the environmental review process. Assuming BPA determines that a FONSI can be prepared for the Proposed Action and a decision is made to proceed, project construction would likely begin in fall 2016.

The first 17 miles of the Midway-Moxee transmission line and the first 9 miles of the Midway-Grandview transmission line are expected to be rebuilt in fall 2016 through spring 2017. The first 5 miles of both transmission lines, where they run parallel and adjacent in a shared corridor, would be rebuilt at the same time. Because the structures of both lines are located in close proximity in this area, common work areas would be reached by the same access roads. Any road improvements needed for construction access would be constructed at the same time.

Equipment and materials would be staged at the same time by the same construction contractor to use resources efficiently.

During the 2017 fire season (late spring through summer), construction would cease. Construction is expected to resume in fall 2017 and the remainder of the Midway-Moxee transmission line (Line Mile 17 to the Moxee Substation), and the remainder of the Midway-Grandview transmission line (Line Mile 9 to the Grandview Substation) would be rebuilt by the spring of 2018.

It is expected that major construction activities would be completed in spring 2018, if construction begins in fall 2016. Ongoing stabilization of work areas, monitoring, clean up, and other project-related activities would continue in fall 2018 and in 2019, until completed. After construction, areas along both lines disturbed by construction would be revegetated, and subsequent monitoring would be implemented to ensure the plantings' success.

2.2.11. Ongoing Maintenance and Vegetation Management

BPA conducts periodic inspections, maintenance, and vegetation management of its 15,000-mile federal transmission system in the Pacific Northwest. BPA has operated and maintained the Midway-Moxee and Midway-Grandview transmission lines since the lines were built in the 1940s. Ongoing maintenance and vegetation management activities would continue regardless of whether the Proposed Action is implemented and would be essentially the same as conducted for the existing transmission lines.

Transmission Line Maintenance

Ongoing maintenance for the rebuilt transmission lines would include the same types of activities as for the existing transmission lines. Typical maintenance on wood-pole transmission lines involves replacing deteriorating structures and insulators. However, because the Proposed Action is essentially a comprehensive maintenance project and includes replacement of worn parts of the existing transmission line and improvements to the access road system, future maintenance and repairs would be required less frequently and on a smaller scale than under existing conditions.

Most maintenance activities are planned approximately a year in advance, but occasionally emergency repairs are required. These emergency repairs can be due to weather events, fires in the area, or vandalism. Although emergency repairs may be needed after the implementation of the Proposed Action, the rebuilt lines would likely require emergency maintenance less frequently and on a smaller scale than under current conditions.

Vegetation Management

BPA conducts periodic vegetation management activities within the existing Midway-Moxee and Midway-Grandview transmission line rights-of-way as part of routine maintenance. Vegetation is cleared periodically to maintain access to structures, control noxious weeds, and keep vegetation at a safe distance from the conductors.

Vegetation management is guided by the program identified in BPA's *Transmission System Vegetation Management Program Final Environmental Impact Statement/Record of Decision*

(ROD) (Bonneville Power Administration 2000). The BPA vegetation management program includes ongoing consultation with landowners or land managers and others concerning vegetation management activities. Depending on the vegetation type, environment, and landowner, a number of different vegetation management methods could be used: manual (e.g., hand-pulling, clippers, chainsaws), mechanical (e.g., roller-choppers, brush-hog), biological, or chemical (e.g., herbicides).

Vegetation management includes keeping tall-growing vegetation from growing within the transmission line right-of-way, controlling noxious weeds, and removing select danger trees adjacent to the right-of-way that have the potential to grow or fall into the line. Identifying danger trees includes determining tree height and growth potential, whether or how the trees lean, stability and health (e.g., root pathogen damage), and whether they are located in areas with severe storm damage potential. Although much of each of the transmission lines crosses agricultural fields and herb- or shrub-dominated vegetation types where there is no threat of danger trees, these lines also pass through residential areas and wind breaks at the edge of farm fields where danger trees have been identified.

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* (U.S. Department of Energy 2013a) and the *Final Environmental Assessment for Integrated Vegetation Management of the Hanford Site, Richland, WA* (U.S. Department of Energy 2012a), for the portion of the lines on the DOE Hanford Site. BPA would follow the vegetation management standards in the BPA-WDNR Memorandum of Agreement for WDNR parcels (Washington State Department of Natural Resources 2012). On all BLM-administered lands, BPA would conduct vegetation management in a manner that adheres to all applicable standards included in the *Final Programmatic EIS, Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (Bureau of Land Management 2007). BPA is engaged in coordinating with BLM on vegetation management standards for BLM-administered lands.

When transmission line and road maintenance or vegetation management is required for a BPA transmission line, BPA conducts environmental review for those site-specific maintenance activities as appropriate.

2.3. NO ACTION ALTERNATIVE

Under the No Action Alternative, BPA would not rebuild the Midway-Moxee and Midway-Grandview transmission lines and would not upgrade the Midway-Grandview transmission line. BPA would continue to operate and maintain the existing transmission lines. Construction activities associated with the Proposed Action would not occur, and the reliability and safety concerns that prompted it would persist. BPA would not be able to provide additional power to the local utilities served by the Midway-Grandview transmission line. Furthermore, without the additional reliability associated with the Proposed Action, there would be increased potential for more power outages.

Under the No Action Alternative, BPA would continue to conduct periodic vegetation management activities within the existing Midway-Moxee and Midway-Grandview transmission line rights-of-way as part of routine maintenance. Because of the deteriorated condition of the existing transmission lines, it is likely that the No Action Alternative would result in more frequent maintenance and that more frequent access would be required to maintain them as they continue to deteriorate and fail over time. 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. These activities could affect vegetation, wildlife, and soils, and any downed line resulting from structure failure would have the potential to start fires in the vicinity of the downed line.

Given the poor condition of some of the access roads and the necessity of access for reliability, it is possible that the access road work under the Proposed Action would be carried out as a maintenance project in the future, independent of rebuilding the transmission lines.

2.4. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Constructing portions of the transmission line underground was suggested as a possible alternative during the public scoping process. The WDFW recommended in its scoping comments that segments of the transmission line within viable greater sage-grouse (*Centrocercus urophasianus*) habitat be buried to improve or reestablish greater sage-grouse habitat connectivity and remove perches for avian predators that may prey on greater sage-grouse.

Placing lines underground requires continuous trenching or boring when open trenching is not feasible. In most cases underground cable requires a continuous access road system. The most common method used in the United States to install cable is in concrete encased ducts, resulting in more ground disturbance than overhead transmission line construction (Power Engineers 2012). Boring is typically more costly, but it enables a project alignment to cross sensitive or inaccessible areas without surface disturbance, minimizing surface impacts during construction.

Manholes are required along an underground transmission line to facilitate cable installation and access for future maintenance and repairs (Power Engineers 2012). The manhole size is determined by the space required for cable pulling, splicing, and supporting the cable in the manhole. The outside length of a manhole is generally at least 18 feet, and they typically vary from 10 to 12 feet in width. Various factors contribute to the final placement of manholes, but the spacing is generally about two or more per mile. Manholes are typically pre-cast and delivered to the site on a tractor trailer and set into place using a crane.

While some potential environmental impacts, such as avian collision and the visual impact of an overhead line, are avoided or reduced by constructing underground transmission lines, underground construction generally results in more environmental impacts (Power Engineers 2012). Undergrounding would result in substantially more ground disturbance than rebuilding an overhead line, likely resulting in considerably more environmental impacts. With overhead lines, transmission line structures can typically be sited to span sensitive natural areas such as streams and native plant communities, or human landscape elements such as cultural resources sites and roads or orchards. Ground disturbance is localized to structure locations and the access roads needed to access structures. The magnetic field of an overhead line is generally less than an equivalent underground line because the distance of the conductors from the ground is greater with overhead than with buried lines (Power Engineers 2012).

With underground lines, sensitive areas within the right-of-way cannot be avoided, although it may be possible to bore under sensitive areas. Constructing underground transmission lines requires the mobilization of large pieces of equipment, including concrete trucks for continuous trench methods.

Constructing underground lines is more expensive than constructing overhead lines and is likely at least three times or more the cost, although it is difficult to estimate due to the number of factors that affect cost (Power Engineers 2012). In the project area, steep or hilly topography and numerous ephemeral and intermittent drainageways and a few wetlands and perennial waterways would need to be crossed, increasing costs. The access road system is not currently continuous along the transmission line rights-of-way and new roads would need to be constructed in some areas for an underground transmission line.

The maintenance of underground transmission lines can be more difficult and time-consuming than maintaining overhead transmission lines. When a failure occurs that affects transmission line operation, it is necessary to determine where the damage has occurred and the length of damaged cable. While unintentional short circuits (faults) in an overhead line are relatively easy to visually assess, underground lines are out of sight and require specialized fault locating methods. Underground line faults can take technicians from 1 day to 1 week to locate, depending on the type of fault, type of fault locating equipment, and experience of the personnel operating the equipment.

Uncovering and replacing the buried cable is a specialized process and can take much longer than repairing an overhead line. Once the fault is located in a cable, a contractor who specializes in underground cable repair is needed to make the necessary repairs. This contractor may be the cable manufacturer. The type of failure determines the material needed to repair the faulted cable. Repairs may involve installing additional manholes, repairing a damaged splice or termination, and replacing the cables. If multiple cables are damaged, sections of new cable may need to be replaced. The time required to repair a cable depends primarily on the cable type and failure location. Failures can be repaired in only a few days but can take several months when new cable or accessories are needed.

Because of the difficulties in conducting maintenance, operating costs can be higher for buried transmission lines than for overhead transmission lines. Additional environmental impacts from the trenching and backfilling needed to maintain or replace buried cable, which also result in additional costs.

The main reliability issue with underground cable circuits compared to overhead circuits is the length of the outages in the event of circuit failures (Power Engineers 2012). With an overhead circuit, the line can generally be placed back into service in a relatively short amount of time, typically less than a day. Faults in underground circuits often lead to significantly longer outages of 2 weeks and up to 6 months, depending on the type of failure and how quickly it can be located and repaired. For these reasons, outages on underground cables tend to be much longer and can compromise the reliability of the system. Because the Midway-Moxee and Midway-Grandview transmission lines serve the local load, the amount of time that repairs would require could mean that these areas would be without reliable electricity for longer periods of time if the line was underground, compared to an overhead circuit.

Because of the increased cost, higher level of environmental impacts, and operational challenges, building portions of the transmission lines underground was considered but eliminated from further study.

2.5. COMPARISON OF ALTERNATIVES

Table 2-5 compares how the Proposed Action and No Action Alternative meet the purposes of the project as defined in Chapter 1, Purpose of and Need for Action, of this EA. Detailed analysis of the environmental impacts of the two alternatives is presented in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, of this EA.

Table 2-5. Comparison of How the Proposed Action and No Action Alternative Respond to the Project Purpose

Purpose	Proposed Action	No Action
Maintain or improve transmission system reliability to BPA and industry standards	Would meet public safety standards (conductor distance from ground), improve reliability by reducing scheduled and emergency repairs and outages, and help meet service standards by enabling prompt maintenance during outages through improved access.	Due to poor access to some transmission line structures, outages could be more frequent, and maintaining electrical service during outages could take longer.
Provide needed additional power to local utilities	Upgrading the Midway-Grandview transmission line would allow BPA to provide additional capacity to the Benton Rural Electric Association and the Benton Public Utility District.	BPA would not be able to provide the additional power requested by the Benton Rural Electric Association or the Benton Public Utility District to meet their loads.
Continue to meet BPA's contractual and statutory obligations	Improvements in the reliability of the rebuilt/upgraded transmission lines would allow BPA to meet its contractual and statutory obligations to deliver power to its customers in eastern Washington.	Existing transmission lines would continue to deteriorate and threaten system reliability and subsequent power delivery to local utilities served by these transmission lines.

Purpose	Proposed Action	No Action
Minimize impacts on the human and natural environment	Construction impacts would be low to moderate, primarily temporary, and could mostly be minimized through implementation and appropriate use of best management practices and mitigation measures described for each resource area in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures (Sections 3.2 to 3.14). See Table 2-6 for a summary of environmental impacts on various resources.	Would avoid construction impacts; however, maintenance impacts would increase as existing transmission line structures and access roads continued to deteriorate. Impacts could occur during emergency maintenance without the benefit of planned environmental review and mitigation. Emergency repairs could affect cultural resources, vegetation, wildlife, soils, and other resources. See Table 2-6 for a summary of environmental impacts on various resources.
Improve safety for transmission line workers	Rebuilding the lines would reduce much of the need for maintenance during severe weather conditions, and replace deteriorating transmission line structures with new structures.	Would continue risks to worker safety from maintenance during severe weather conditions and the existence of deteriorating transmission line structures.
Demonstrate cost effectiveness	Environmental review, design and engineering, and construction costs are estimated at $15 million; would reduce maintenance costs.	Would avoid construction costs, but would incur maintenance costs which, over time, could be higher than under the Proposed Action.
Use facilities and resources efficiently	Would avoid continued use of financial and human resources on maintenance of unsound transmission line structures and access roads in poor condition.	Existing deteriorating transmission line structures and access roads in poor condition would continue to deteriorate and require more maintenance, an inefficient use of resources.

2.6. SUMMARY OF IMPACTS TABLE

Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, of this EA, describes potential impacts on human and natural resources from the Proposed Action and the No Action Alternative. Potential environmental impacts are summarized by resource in Table 2-6 to enable comparison between the Proposed Action and the No Action Alternative. This table represents the level of impact that would be expected to result after implementation of the mitigation measures and ***best management practices*** (BMPs) listed in each resource section.

Table 2-6. Summary of Impacts of the Proposed Action and No Action Alternative with Implementation of Appropriate Mitigation

Type of Resource	Proposed Action	No Action Alternative
Land Use and Recreation	• Temporary impacts on crop lands from construction such as crop damage and soil compaction, a low impact • Inconvenience to farmers during construction, including potential temporary delays in access to crop lands, a low impact • Conversion of crop lands (vineyards) for one new transmission structure, a low impact • Permanent conversion of approximately 0.02 acre of orchard and 0.39 acre of land designated as crop land for access roads, a low impact • Beneficial impacts on orchards from moving four existing transmission structures out of orchards to existing farm roads • Permanent conversion of ranch lands for eight new transmission structures, a low impact • Temporary impacts on ranch lands from disturbance of soils and livestock during construction, including potential temporary delays in access to ranch lands, a low impact • Permanent conversion of approximately 12.9 acres of lands suitable for grazing to access roads, a low impact • Temporary displacement of game animals by construction activities, a low impact on hunting • Temporary and localized impacts on residential land uses during construction activities and danger tree removal from increased noise, temporary and localized impacts from restricted use of properties, and potential temporary delays in access to residences, a low to moderate impact • No direct conflicts with land use plans and policies	Ongoing transmission line maintenance activities would increase as facilities age and deteriorate, resulting in temporary and localized impacts from maintenance activities, a low to moderate impact on land use and recreation from disruptions of existing land uses.

Type of Resource	Proposed Action	No Action Alternative
Transportation	• Increased traffic generated by construction workers, construction material deliveries, construction vehicles, and equipment representing a low increase in daily traffic volumes on highways and county roads, but not expected to substantially affect the roadway capacity and traffic operation, a low impact • Temporary lane closures at a few locations resulting in temporary traffic delays for residents and farm and ranch vehicles, but not expected to substantially impact traffic operation because of their short duration, a low impact	Ongoing transmission line maintenance activities would increase as facilities age and deteriorate, resulting in more frequent temporary and localized impacts from maintenance activities, and a slight increase in traffic during maintenance activities, a low impact.
Socioeconomics, Environmental Justice, and Public Services	• Temporary increased demand for housing, a low impact • No permanent changes in population or housing • Temporary and minor beneficial impact on the local economy from construction spending • Long-term beneficial impact on regional stability and economic growth from reliably meeting power demands • Some minimal disturbance of and possible temporary interference with agricultural and ranching operations and conversion of cultivated land, a low impact • Some beneficial impacts on agricultural operations resulting from moving 11 structures to avoid crops and for more efficient irrigation • Possible temporary negative impacts on property values and salability during construction, a low impact • No disproportionate adverse impacts on environmental justice populations • Temporary and localized construction-related effects on public services, a low impact	Ongoing transmission line maintenance activities would increase as facilities age and deteriorate, resulting in temporary and localized impacts from maintenance activities. Access road maintenance similar to that described for the Proposed Action would likely occur. Maintenance activities would result in socioeconomic and public services impacts associated with temporary construction-related disturbances similar to, but likely less than, those described for the Proposed Action. Utilities served by the Midway-Grandview transmission line may not be able to satisfy their need for additional power to meet their loads.
Noise	• Temporary and intermittent noise during daylight hours from construction equipment, truck traffic, and occasional use of helicopters would occur, a low to moderate impact depending on the proximity of the receptor • Transmission line corona noise from operation is expected to decrease and would be consistent with all applicable noise limits, resulting in no or beneficial impacts on nearby noise-sensitive receptors	Ongoing transmission line maintenance activities would increase as facilities age and deteriorate, resulting in temporary and localized impacts from maintenance activities and associated noise level increases, a low impact.

Type of Resource	Proposed Action	No Action Alternative
Public Health and Safety	• Temporary increased risk to public and workers from high-voltage equipment, construction equipment, hazardous materials, and increased roadway traffic that would be minimized or avoided through implementation of appropriate safety procedures and mitigation measures, a low impact • Electric field levels of rebuilt transmission lines the same as the existing line, no impact • Magnetic field levels of the rebuilt Midway-Moxee transmission line the same as the existing line • Magnetic field levels of the rebuilt Midway-Grandview transmission line on the right-of-way would be slightly higher than the existing line • Electromagnetic interference (EMI) with electrical equipment not expected to change, remaining very low, no to low impact	Operation would continue and public health and safety impacts related to electromagnetic field and EMI exposure would be similar to existing conditions. Increased impacts from maintenance of the aging and deteriorating transmission line would have low impacts on public health and safety.
Geology and Soils	• Temporary construction disturbance of approximately 92 acres of soils during transmission structure installation resulting in topsoil removal, increased erosion, compaction of soils, and decreasing soil productivity, a low to moderate impact • Permanent disturbance of approximately 0.5 acre of soils to install transmission structures that would be more than 10 feet from the existing structures and for nine new structures, a low to moderate permanent impact • Disturbance of 82.2 acres of soils for new, reconstructed, and improved access roads, a low to moderate temporary impact and a low permanent impact after revegetation and stabilization • Disturbance of soils at pulling and tensioning sites, a low to moderate impact	Ongoing transmission line maintenance activities would increase as facilities age and deteriorate, resulting in temporary and localized maintenance, and would result in impacts on soils. The general soil impacts from localized impacts from maintenance activities would be similar to the Proposed Action although spread over a longer time.

Type of Resource	Proposed Action	No Action Alternative
Vegetation	• Temporary clearing, crushing, or disturbance of about 131.4 acres of vegetation communities of varying quality (including <0.05 acre of high-quality shrub-steppe) from construction activities, a low impact • Permanent removal of about 143.4 acres of vegetation of varying quality (including about 3.0 acres of high-quality habitat) for access road work and installation of nine new transmission line structures, a moderate impact • Umtanum desert buckwheat (ESA-listed as threatened, state-listed as endangered, and BLM sensitive species): no impacts on individual plants, but permanent disturbance of approximately 0.93 acre and temporary disturbance of approximately 1.14 acres of designated critical habitat a moderate impact. • Columbia milk-vetch (a federal species of concern, state sensitive species, and BLM sensitive species): permanent disturbance of 0.49 acre and temporary disturbance of 33.6 acres of habitat and removal of about 13,000 individuals, a moderate impact. • Piper's daisy (a state sensitive and BLM sensitive species): permanent disturbance of 0.08 acre and temporary disturbance of 10.93 acres of habitat and removal of about 1,618 individuals, a moderate impact Soil disturbance in construction work areas could result in the introduction or spread of noxious weeds, a moderate impact with implementation of weed control measures • Removal of 172 danger trees, mainly in residential and farmed areas, a low impact	Maintenance activities would result in low impacts on vegetation resources except where aging and deteriorating structures require increased maintenance activities that could lead to moderate vegetation impacts. If it were necessary to perform repairs on an emergency basis, it would likely not be possible to plan or time these activities to minimize impacts on vegetation, including special-status species. Because potential impacts resulting from emergency repairs would be temporary and localized, impacts would be low to moderate.

Type of Resource	Proposed Action	No Action Alternative
Wildlife	• Temporary disturbance of 131.3 acres and permanent disturbance of 143.1 acres of wildlife habitat, a low impact considering the prevalence of similar habitats in the region • Permanent loss of 29.8 acres of shrub-steppe habitat and temporary disturbance of 36.5 acres of shrub-steppe habitat, a moderate impact on shrub-steppe habitat and greater sage-grouse and sage sparrow (shrub-steppe obligate species) • Wildlife habitats affected for a number of special-status wildlife species, a low impact because of availability of suitable habitat in the region (with the exception of shrub-steppe obligate species above) and with implementation of mitigation measures • Disturbance of nesting ferruginous hawks would be avoided through site specific timing restrictions (March 1 through August 1) and buffers (0.6 mile) around identified hawk nests, a low impact • Potential introduction and spread of noxious weeds reduced through the implementation of weed control measures, a moderate impact	Ongoing transmission line maintenance activities would increase as facilities age and deteriorate, resulting in temporary and localized impacts from maintenance activities. Increased intermittent maintenance could result in periodic temporary displacement of wildlife and increased long-term habitat disturbance or loss. The removal of danger trees and other tall-growing vegetation would likely need to take place and would continue to modify wildlife habitat. 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 on wildlife, including special-status species, and their habitats. Because impacts would be temporary and localized, impacts would be low to moderate.

Type of Resource	Proposed Action	No Action Alternative
Waterways and Water Quality	• No impact on groundwater resources • Removal of 25 structures and installation of 27 structures within 200 feet of waterways, resulting in vegetation removal and soil excavation that could increase erosion and sedimentation, a low impact • Access road crossing of waterways including requiring the improvement or repair of 22 existing fords, the construction of seven new fords, the replacement of three existing culverts, and the construction of two new culverts, in streams that flow infrequently or at a low volume, a low impact • Two danger trees topped and left as snags within 200 feet of Sulphur Creek, a low impact • Temporary and localized disturbance from three pulling and tensioning sites within 200 feet of waterways, including potential indirect impacts on surface waters and surface water quality as a result of the potential for sediments reaching waters, a low impact	Ongoing transmission line maintenance activities would increase as facilities age and deteriorate, resulting in temporary and localized impacts from maintenance activities. Maintenance activities would likely result in low impacts on waterways and water quality similar to the impacts described under the Proposed Action. If it were necessary to perform repairs on an emergency basis, it would likely not be possible to plan or time these activities to minimize impacts on waterways and water quality. Because potential impacts resulting from emergency repairs would be temporary and localized, impacts would be low to moderate.

Type of Resource	Proposed Action	No Action Alternative
Wetlands and Floodplains	• No existing or proposed structures located within 100 feet of the boundaries of the identified wetlands in the study area, therefore no impacts on wetlands from structure removal and installation • Two wetlands crossed by access roads that would be improved, resulting in placement of fill in less than 0.01 acre of wetlands which could affect wetland hydrology, water quality, and habitat functions, a low impact • One pulling and tensioning site within 200 feet of a wetland which could result in wetland buffer vegetation removal, soil compaction, the potential for increased erosion, or the reduction in wetland buffer function, a low impact • Construction work in localized areas within Dry Creek floodplain, including the replacement of one structure, the installation of a gate, and the improvement of 978 feet of existing access roads would minimally affect floodplain function and not affect floodplain capacity, a low impact	Structure and access road work in wetlands and floodplains would occur but would be limited because most structures and access roads are located outside of these resources. Ongoing maintenance activities would result in low impacts on wetlands and floodplains, similar to the impacts described under the Proposed Action. If it were necessary to perform repairs on an emergency basis, it would likely not be possible to plan or time these activities to minimize impacts on wetlands and floodplains. Because potential impacts resulting from emergency repairs would be temporary and localized, and because most work would occur outside of wetlands and floodplains, impacts would be low.
Visual Quality	• Temporary visual impacts associated with construction activities could affect sensitive viewer groups, including motorists, residents, and recreationists depending on viewer location and proximity, a low to moderate impact. • Permanent visual impacts associated with installation of nine new structures, taller replacement structures, larger diameter conductor, resurfaced access roads, and new access roads could affect sensitive viewer groups depending on viewer location and proximity, a low to moderate impact.	Maintenance and repair of structures and access roads and vegetation clearing, including danger tree removal, would have the potential for low to moderate temporary visual impacts depending on the proximity of these activities to sensitive viewer groups and the duration of the disturbance.

Type of Resource	Proposed Action	No Action Alternative
Cultural Resources	• If cultural sites eligible for listing in the National Register of Historic Places cannot be avoided, then BPA would work with consulting parties to determine appropriate mitigation to address effects under the National Historic Preservation Act (NHPA) • Project-related ground disturbance on as-yet undocumented cultural resources, a low to moderate impact depending on the nature of the activity, the character-defining features of the resource, and implementation of mitigation measures	Ongoing transmission line maintenance activities would increase as facilities age and deteriorate, resulting in temporary and localized maintenance. The maintenance activities would result in low to moderate impacts on cultural resources, depending on the level and amount of disturbance, similar to the impacts under the Proposed Action. If it were necessary to perform repairs on an emergency basis, it would not be possible to work with Section 106 consulting parties prior to the activities to determine appropriate mitigation to address effects under the NHPA.
Air Quality and Greenhouse Gases	• Temporary, localized increases in criteria pollutants from vehicle and equipment use, a low impact • Temporary, localized increases in dust and particulates during construction, initially a moderate impact and then a low impact after soils are stabilized by revegetation • Low total direct greenhouse gas (GHG) emissions during construction from use of vehicles and equipment, increased worker traffic, and vegetation removal would be below the U.S. Environmental Protection Agency's mandatory reporting threshold for large emission sources of GHGs, a low impact	Ongoing transmission line maintenance activities would increase as facilities age and deteriorate, resulting in temporary and localized impacts from maintenance activities, resulting in small increases in criteria pollutants and GHG emissions, a low impact.

Chapter 3
Affected Environment, Environmental Consequences, and Mitigation Measures

3.1. INTRODUCTION

This chapter includes an analysis of the potential impacts that could result from the Proposed Action and the No Action Alternative on the environment. Each section of this chapter describes the environment that could be affected for a specific resource, analyzes the potential impacts on that resource, and identifies mitigation measures to reduce or avoid impacts. Each resource section includes the following primary subsections:

- Affected Environment
- Environmental Consequences – Proposed Action
- Mitigation Measures – Proposed Action
- Unavoidable Impacts Remaining After Mitigation – Proposed Action
- Environmental Consequences – No Action Alternative

To identify potential impacts on each resource, a defined area is considered, referred to as the study area. The term project area is used to describe the area in the immediate vicinity of the project. The location of potentially affected resources are identified by local landmarks, route alternatives, route alternative segments, or proposed transmission line structure numbers. For some resources, the study area includes locations where direct physical impacts could occur as a result of project activities and is the same as or very similar to the project area. Because the project could result in impacts on resources that are geographically removed from the project area (e.g., airborne emissions may result in measurable air pollution miles from a project location), the study area for some resources extends beyond the project area.

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 result when the impacts on resources from the Proposed Action are added to impacts that have occurred or could occur to that resource from other actions, including past, ongoing, or reasonably foreseeable future actions. Other such actions within the project vicinity, that are considered in the cumulative impact analysis, including actions conducted or proposed by BPA in addition to the Proposed Action, are identified and discussed in Section 3.15, Cumulative Impacts, of this EA.

Impact levels are characterized as high, moderate, low, or no impact. High impacts are considered to be significant impacts, whereas moderate and low impacts are not. Beneficial impacts are discussed where applicable. Table 2-6 compares and summarizes the environmental impacts, by resource, of the Proposed Action and the No Action Alternative. This table represents the level of impact that would be expected to result after implementation of the mitigation measures and BMPs listed in each resource section.

3.2. LAND USE AND RECREATION

3.2.1. Affected Environment

The study area for land use and recreation includes the existing and proposed rights-of-way and associated access roads and lands that extend 0.25 mile beyond project work areas. This includes areas where landowners and the public could be affected by nearby project activities. Land uses within the study area generally consist of agriculture and ranching, recreation, residences, and undeveloped lands, as shown in Figure 3.2-1. These land uses are discussed below and information on applicable land use plans is included in Section 4.4, Federal, State, Areawide, and Local Plan and Program Consistency, of this EA.

Agriculture and Ranching

The predominant land uses in the study area consist of undeveloped rangeland, dryland agriculture, and irrigated crops. Agriculture is an important industry in both Yakima and Benton counties. In 2012, approximately 51 percent of the total land in Yakima County was cropland and 31 percent was pastureland (U.S. Department of Agriculture 2014a). Approximately 74 percent of land in Benton County was in cropland with 16 percent in pastureland (U.S. Department of Agriculture 2014b).

Ranchlands occur primarily within the steeper northeast portions of the study area and continue into the sloping portions of the arid foothills as both transmission line rights-of-way descend in elevation. Ranchland consists mainly of arid shrub/scrub habitat in the higher elevations, transitioning to annual grasslands in the lower foothills.

Ranching and some dairy farming occur primarily on private lands; however, a large portion of Yakima County is in public land ownership. Approximately 1.6 miles of the rights-of-way of both transmission lines are located on BLM-administered lands (Midway-Moxee Line Miles 6 and 8 and Midway-Grandview Line Miles 12 and 13). Approximately 2.6 miles of the rights-of-way of both transmission lines are located on lands managed by WDNR (Midway-Moxee Line Miles 11, 12, and 24 and Midway-Grandview Line Mile 19). Lands within these areas are undeveloped with some WDNR portions under lease for ranching and grazing activities (Frohmerz pers. comm.).

Near the cities of Moxee and Grandview, the predominant land use shifts into cultivated crop production around Midway-Moxee Line Mile 11 and Midway-Grandview Line Mile 23. Cultivated crops within the study area include vineyards, hops, wheat, and orchard lands. In some areas, cultivated crops have been planted within the transmission line right-of-way (Figure 3.2-2).

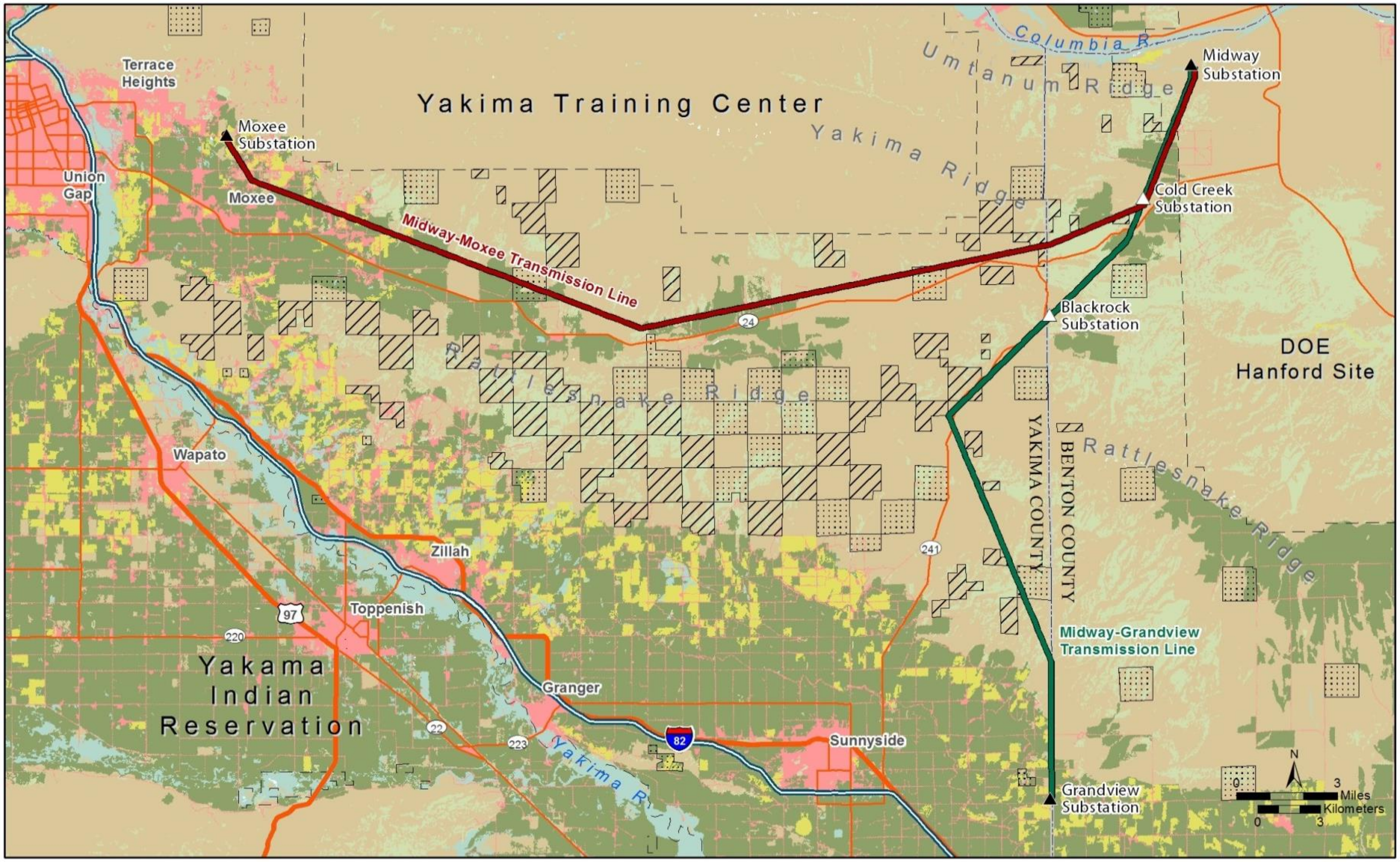


Figure 3.2-1. Project Area Land Use Designations

Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project
Yakima and Benton Counties, Washington

Transmission Line Features
- Midway-Grandview No.1 115-kV
- Midway-Moxee No.1 115-kV

Public Lands
- Washington State Department of Natural Resources
- US Bureau of Land Management

Land Use (NLCD 2011)
- Barren Land
- Cultivated Crops
- Developed
- Wetland/Open Water
- Hay/Pasture
- Herbaceous
- Shrub-Steppe

BONNEVILLE POWER ADMINISTRATION

Figure 3.2-2. Representative Photograph of Crops Planted Within the Midway-Moxee Transmission Line Right-of-Way

Recreation

There are no designated parks or recreational areas within the study area. Although the Hanford Reach National Monument is located near the study area, the transmission line rights-of-way occur entirely within the DOE Hanford Site managed by the DOE-RL, where public access is not allowed without permission. Some hunting occurs within the study area on private lands. Yakima County owns, but does not operate, the Sun Valley Shooting Park, located south of State Route (SR) 24 near Midway-Moxee Line Mile 25. Yakima County has adopted a County Trails Plan, which indicates future and existing trails within the county, but none are located within or proposed for the two transmission line rights-of-way (Yakima County 2008).

Residential Use

Residences are scattered throughout the study area, with more dense residential development near and within Moxee and Grandview. Scattered rural residences are located along the Midway-Moxee transmission line near Line Miles 5, 6, 14, 16, 23, and 25, with increasing density from Line Mile 29 into Moxee. Scattered rural residences also are located near Line Mile 5 of the Midway-Grandview transmission line right-of-way and with increasing density from Line Mile 24 into Grandview. In larger parcels in the study area, rural residences are often associated with agricultural operations.

Plans and Policies Affecting Land Use

The Midway Substation and approximately the first 2 miles of both transmission lines are located within the DOE Hanford Site and the Rattlesnake Unit of the Hanford Reach National Monument. 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 the Proposed Action.

The *Hanford Comprehensive Land-Use Plan* provides guidance for future use of the site's lands and resources (U.S. Department of Energy 1999, 2008). Lands within the study area are designated Preservation, as is most of the Hanford Site. Lands under this designation are managed to protect archaeological, cultural, ecological, and natural resources, with public access restricted to nonintrusive research or game-management activities. No new consumptive uses (e.g., mining) are allowed.

The *Hanford Reach National Monument Comprehensive Conservation* Plan (U.S. Fish and Wildlife Service 2008) provides guidance for management of the national monument consistent with the Presidential Proclamation that established the monument (3 Code of Federal Regulation [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.

After leaving the Hanford Reach National Monument lands, the two transmission lines continue to share the same corridor until approximately Line Mile 5. The Midway-Moxee transmission line continues within Benton County lands until Line Mile 8 after which it enters Yakima County. The Midway-Grandview transmission line continues within Benton County until Line Mile 9 after which it enters Yakima County.

As noted above, both the Midway-Moxee and the Midway-Grandview transmission lines would cross BLM-administered lands. BLM's land use plans are called resource management plans (RMPs). The planning decisions contained in an RMP are the basis for every on-the-ground action BLM undertakes. The BLM Spokane District developed and approved a land use plan for eastern Washington in 1987, called the Spokane RMP (Bureau of Land Management 1987). In 1992, the District prepared a major amendment to that plan (Bureau of Land Management 1992).

BLM is in the process of updating these documents and is preparing the Eastern Washington and San Juan Resource Management Plan. It published the document *Analysis of the Management Situation for the Eastern Washington and San Juan Resource Management Plan* in March 2011 (Bureau of Land Management 2011a). This document summarizes existing conditions, trends, and management guidance for the planning area.

Lands within unincorporated portions of Yakima County are subject to the Yakima County (2007) comprehensive plan, entitled *Plan 2015 – A Blueprint for Yakima County Progress*, and zoned either Agriculture or Valley Rural. Per the Yakima County Code, certain activities are allowed pending a consistency review by the administrative official.

Lands within the unincorporated areas of Benton County are subject to the *Benton County Comprehensive Land Use Plan* and are zoned Agriculture (Benton County 2006). These lands are to be preserved and maintained to encourage their use for agricultural production.

3.2.2. Environmental Consequences – Proposed Action

Agriculture and Ranching

The Proposed Action has the potential to result in temporary impacts on ranching lands from disturbance of soils and livestock and inconvenience to ranchers during construction. Construction activities could pose a danger to livestock, including increased risk of escape and frightened animals.

The Proposed Action also has the potential to result in temporary impacts on croplands from disturbance of soils and inconvenience to farmers during construction. Construction activities could also result in the temporary disruption of access to existing croplands in the vicinity of each structure and access road corridors.

In some areas, crops were planted within the rights-of-way of the Midway-Moxee and Midway-Grandview transmission lines. Some crops would need to be removed and the area converted to access roads to existing and proposed wood-pole structure locations; however, most construction activities could be completed without resulting in the removal of existing crops. One new wood pole structure in Line Mile 5 of the Midway-Grandview transmission line would be located in a vineyard within the right-of-way. Installation of the structure would require the removal of some grape plants.

BPA worked with farmers to determine if the design could be done in such a way as to accommodate some crops and irrigation lines. Thirty-three structures would be replaced with taller structures to accommodate tall crops, including orchards and hops. In one agricultural area along Line Mile 23 of the Midway-Moxee transmission line, four structures would be removed and replaced ahead of or behind their existing locations to move structures out of orchards and close to existing farm roads to minimize impacts on existing agricultural land uses.

Removal of some tall-growing vegetation, including some crops, may be required to provide for safe operation of the transmission lines consistent with BPA's Transmission System Vegetation Management Program (Bonneville Power Administration 2000). However, vegetation maintenance activities would be required for safe operation of the lines regardless of the Proposed Action.

Eight of the nine new wood pole structures proposed for the Midway-Moxee and Midway-Grandview transmission lines would be on lands used for ranching. Installation of these eight structures would remove a small amount of land at the base of the structures from use as ranch lands.

Permanent conversion of agricultural land would occur as a result of new access road construction. New access roads would occur primarily in steeper, dry areas where the underlying land use designated by the National Land Cover Database is shrub/scrub, herbaceous, or hay/pasture (Jin *et al*. 2013). Approximately 4.7 of the 5.5 miles of the new access roads would be constructed on these cover types, resulting in 11.5 acres of disturbed area that is considered to be more suitable for grazing than crop cultivation. In addition, approximately 0.39 acre of land designated as cultivated crops would be permanently removed by construction of 0.2 mile of a new access road.

Disruption to agricultural and ranching lands caused by construction activities would be limited to localized areas such as the base of wood-pole structures. Only a short period of time would be spent working in each location. Although new access road construction would result in the loss of some agricultural lands, the predominant existing land use in these areas consists of grazing, which could continue once access road construction was complete. Therefore, the impacts on agriculture and ranching would be low to moderate depending on the specific location.

Recreation

No designated public parks or recreational areas are located within the study area. If construction and the hunting season coincide, construction activity would displace game and discourage hunting in the vicinity of construction work areas. Because potential impacts on recreation would be limited to temporary disruption of hunting during construction activities, impacts from the Proposed Action would be low.

Residential Use

The Proposed Action has the potential to result in temporary impacts on residential land uses during construction activities associated with rebuilding and upgrading the transmission lines, conducting access road work, and danger tree removal. Construction activities could temporarily increase noise levels. Where construction was occurring near homes, pets could need to be restrained and children would need to be prevented from playing near work areas. Access to some residences and local roadways may be temporarily blocked by increased construction traffic or use of construction equipment.

Disturbance to residents from construction activities would be limited to brief periods and would occur within the existing transmission line rights-of-way and along access roads. Therefore, these temporary impacts would be low to moderate, depending on the proximity of the construction activities to the homes.

Plans and Policies Affecting Land Use

The Proposed Action would be consistent with the general policies set forth in the *Hanford Comprehensive Land-Use Plan* (U.S. Department of Energy 1999). Specifically, General Policy 2 requires that, wherever possible, new development should be located in previously disturbed areas. The Proposed Action involves rebuilding and upgrading the transmission lines within the existing corridor to minimize disturbance in new areas. Existing access roads would be used.

General Policy 3 requires that natural and cultural resources be preserved and protected. BPA would also adhere to vegetation management measures outlined in the *Hanford Site Biological Resources Management Plan* (U.S. Department of Energy 2013a) and *Final Environmental Assessment for Integrated Vegetation Management of the Hanford Site, Richland, WA* (U.S. Department of Energy 2012a). BPA would follow the vegetation management standards in the BPA-WDNR Memorandum of Agreement for WDNR parcels. BPA is coordinating with BLM on vegetation management standards for BLM-administered lands. Additional mitigation measures to address these impacts are included in Section 3.8, Vegetation, of this EA.

BPA, as a federal agency, is not required to comply with the requirements associated with obtaining state and local land use approvals or permits, because Congress has not waived federal sovereign immunity over these areas. As a federal agency, BPA only obtains those state and local permits for which Congress has clearly and unambiguously waived sovereign immunity. However, BPA would, to the maximum extent practicable, strive to meet or exceed the substantive standards and policies set forth in the Yakima and Benton county comprehensive plans, including consistency with the allowable land uses and minimizing impacts on agricultural land uses. Therefore, the Proposed Action would be consistent with the applicable land use plans and policies.

3.2.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would implement the following mitigation measures to avoid or minimize impacts from the Proposed Action on residents and local land uses. For additional mitigation measures that relate to land use, see Section 3.4, Socioeconomics, Environmental Justice, and Public Services, and Section 3.5, Noise, of this EA.

- Coordinate the routing and scheduling of construction traffic with the Washington State Department of Transportation and Yakima and Benton county road staff to minimize interruptions to local traffic.
- Coordinate the routing and scheduling of construction traffic with DOE-RL staff.
- Conduct a preconstruction public meeting and invite landowners to meet with construction contractors and BPA staff responsible for project implementation to receive information and discuss concerns and provide contact information for construction contractor liaisons and BPA staff to local residents.
- Develop and distribute a schedule of construction activities, including potential lane closures, to potentially affected landowners along the transmission line corridors to inform residents, including farm and grazing operations, when they may be affected by construction activities.
- Explain land-use-related mitigation measures to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.
- Keep construction activities and equipment clear of residential driveways and farm and ranching roads, to the greatest extent possible.
- Employ traffic control flaggers and post signs along roads warning of construction activity and merging traffic for temporary interruptions of traffic, where needed.
- Instruct construction contractors to promptly close all gates after entry, avoid frightening or endangering livestock, and to contact landowners immediately if problems with livestock occur.
- Reseed disturbed areas after construction activities are complete, at the appropriate time period for germination, with a native seed mix, a seed mix recommended by WDFW, or a seed mix identified in the *Stormwater Management Manual for Eastern Washington*, or as agreed upon with landowners for use on their property (Washington State Department of Ecology 2004).
- Monitor seed germination of seeded areas until site stabilization is achieved (defined by an appropriate level of cover by native or acceptable non-native species for this geographic

area) and implement contingency measures and reseed to ensure adequate revegetation of disturbed soils if vegetative cover is inadequate.

3.2.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

Approximately 13 acres of land would be converted to new access roads from their current use, a permanent impact on the existing land use of that area. About 0.39 acre of land designated as crop land would be permanently converted to new access roads, a permanent impact on the potential land use of that acreage. During construction, potential unavoidable impacts would consist of minor delays and localized interruptions of traffic, temporary generation of noise and some restrictions on land uses in or near residential areas, and temporary interference with agricultural and ranching activities. These temporary and localized impacts would cease once construction is completed.

3.2.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, BPA would not rebuild or upgrade the Midway-Moxee and Midway-Grandview transmission lines. Because construction activities associated with the Proposed Action would not occur, impacts on land use and recreation from construction would not occur. Because of the deteriorated condition of the transmission lines, it is likely that the No Action Alternative would result in more frequent maintenance than under the Proposed Action, and maintenance activities would result in temporary and low impacts on land use due to disturbance of existing uses similar to that described above for the Proposed Action. If access road work was eventually carried out as a maintenance project, then the road impacts on land use and recreation would likely be the same as described for the Proposed Action.

3.3. TRANSPORTATION

3.3.1. Affected Environment

The study area for transportation includes the public roadway system and access roads that extend outside of the rights-of-way in the vicinity of project work areas. This includes areas where residents and the public could be affected by nearby project activities.

Local roadway access to the study area is mostly provided by SR 24 and SR 241. Regional highway access to the study area is provided by Interstate (I-) 82, SR 240, and SR 243, which connect the study area to SR 24 and SR 241 (Figure 1-1).

Local access highways and county roads in the study area are two lane roads. The ***annual average daily traffic*** volumes in the study area range from 1,600 to 6,900 vehicles for SR 24 (between the city of Moxee and SR 240) and from 1,400 to 4,600 vehicles for SR 241 (between I-82 and SR 24) (Washington State Department of Transportation 2013).

The Midway-Moxee transmission line generally parallels SR 24 and does not cross any major roads although it does cross some county roads near Moxee City. Depending on the location, the right-of-way is about 1 to 2 miles north of SR 24.

The Midway-Grandview transmission line crosses SR 24 (between Structures 5/6 and 5/7) and SR 241 (between Structures 13/5 and 14/4). Both SR 24 and SR 241 are primarily used by local residents, ranchers, and farm workers in the study area.

3.3.2. Environmental Consequences – Proposed Action

The Proposed Action would have the potential to result in temporary impacts on transportation, from increased traffic generated by construction vehicles and equipment. During the construction period, an average of 30 workers per day would commute to various work sites in the project area. In addition, construction equipment would travel to work sites and trucks would deliver construction equipment and materials to work sites. Construction traffic generated by workers and equipment deliveries would represent a low increase in daily traffic volumes on highways and county roads in the study area.

Construction traffic could delay traffic within the study area when construction equipment and workers enter and leave access roads from various turnouts along SR 24, SR 241, and local county roads. However, it is not expected to substantially impact traffic operation in the study area, because ingress and egress of construction vehicles from public roads would occur briefly and traffic operation on study area roads is generally good due to low traffic volumes.

At a few locations where the Midway-Grandview transmission line crosses over SR 24 and SR 241 and in locations where the Midway-Moxee transmission line crosses over local roads, removing and replacing conductors could require single-lane closures for short periods, which would not generally not exceed 10 minutes. Temporary lane closures could result in temporary traffic delays; however, they are not expected to substantially impact traffic operation at these locations because of their short duration. Therefore, construction traffic impacts on traffic operation would be low due to their short duration.

Some portions of the study area include apple orchards, vineyards, hop fields, and other agricultural crops. Traffic levels are higher during the peak harvest season in the summer and early fall, with the increase in fruit delivery trucks during this period. Temporary delays on the roadways caused by construction-related traffic from the Proposed Action could slow or delay farm vehicles and deliveries.

Potential conflicts with study area traffic would be addressed through implementation of mitigation measures identified below and in Section 3.2, Land Use and Recreation. Because the small temporary increase in construction traffic is not expected to substantially affect the roadway capacity and traffic operation of the access roadways and any road closures would be brief, impacts on transportation would be low.

3.3.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would implement the following mitigation measures to avoid or minimize impacts on transportation.

- Coordinate the routing and scheduling of construction traffic with the Washington State Department of Transportation and Yakima and Benton county road staff to minimize interruptions to local traffic.

- Coordinate the routing and scheduling of construction traffic with DOE-RL staff.
- Develop and distribute a schedule of construction activities, including potential lane closures, to potentially affected landowners along the transmission line corridors to inform residents, including farm and grazing operations, when they may be affected by construction activities.
- Explain transportation-related mitigation measures to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.
- Employ traffic control flaggers and post signs along roads warning of construction activity and merging traffic for temporary interruptions of traffic, where needed.
- Install temporary guard structures (wood-pole structures) over local utility lines and public roadways, where needed, to ensure continued service and safe passage when the conductor line is replaced, or, if guard structures are not used along some roadways, employ flaggers to ensure safe passage.
- Keep construction activities and equipment clear of residential driveways and farm and ranching roads, to the greatest extent possible.

3.3.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

During construction, potential unavoidable impacts, including potential one-lane closures at line crossing locations, would consist of temporary delays and interruptions to local traffic in the study area. These temporary impacts would cease once construction is completed.

3.3.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, the existing transmission lines would not be rebuilt or upgraded; therefore, the impacts on transportation related to construction of the Proposed Action would not occur. Because of the deteriorated condition of the transmission lines, it is likely that the No Action Alternative would result in more frequent maintenance than under the Proposed Action, and maintenance activities would result in temporary and low impacts on transportation due to temporary delays and interruptions to traffic. If access road work was eventually carried out as a maintenance project, then the road impacts on transportation would likely be the same as described for the Proposed Action.

3.4. SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND PUBLIC SERVICES

3.4.1. Affected Environment

The study area for socioeconomics, environmental justice, and public services consists of Benton and Yakima counties, the counties in which the Proposed Action would occur.

Population and Housing

In 2013, the estimated populations of Benton and Yakima counties were 184,486 and 247,044, respectively (U.S. Census Bureau 2014a, 2014b). During 2008 to 2012, Grandview, located in Benton County, had a population of 10,763, while Moxee, located in Yakima County, had a population of 3,268.

Property

Within the study area, private residences are located along some areas of the rights-of-way. Most of these homes were constructed after the construction of the Midway-Moxee and Midway-Grandview transmission lines in the 1940s. Scattered rural residences are located along the Midway-Moxee transmission line near Line Miles 5, 6, 14, 16, 23, and 25, with increasing density from Line Mile 29 into Moxee. Scattered rural residences also are located near Line Mile 5 of the Midway-Grandview transmission line right-of-way and with increasing density from Line Mile 24 into Grandview. Many of the project access roads cross residential property and are existing residential driveways, farm roads, and ranch roads. For more information on existing residential, farm, and ranching uses, see Section 3.2, Land Use and Recreation, of this EA.

Employment and Income

The economic sectors that accounted for the most employment in Benton County in 2013 were the professional and business services sector and the trade, transportation, and utilities sector (Table 3.4-1). In Yakima County, the natural resources and mining and trade, transportation, and utilities sectors led employment.

Table 3.4-1. 2013 Employment by Sector in Benton and Yakima Counties

Sector	Benton County		Yakima County	
	Jobs	Percentage	Jobs	Percentage
Natural resources[a] and mining	5,553	8.38	27,128	31.21
Construction	4,156	6.27	2,752	3.17
Manufacturing	4,114	6.21	8,222	9.46
Trade, transportation, and utilities	10,812	16.31	17,596	20.24
Information	715	1.08	797	0.92
Financial activities	3,021	4.56	2,374	2.73
Professional and business services	18,897	28.51	3,737	4.30
Education and health services	9,926	14.97	16,171	17.89
Leisure and hospitality	7,413	11.18	6,597	12.57
Other	1,676	2.53	1,560	3.67
Total	66,285	100.00	86,934	100.00

[a] Includes agriculture
Source: U.S. Bureau of Labor Statistics 2014

Government statistics for the year 2010 indicate that 15 percent of the civilian labor force in Yakima County was employed in agriculture-related jobs, earning over $51 million (U.S. Census Bureau 2014a, 2014c) and 4 percent of the labor force in Benton County was employed in agriculture-related jobs, earning over $2 million (U.S. Census Bureau 2014b, 2014d). As noted in Section 3.2, Land Use and Recreation, of this EA, the predominant land use along the transmission lines near the cities of Moxee and Grandview is cultivated crop production including vineyards, hops, wheat, and orchard lands. In some areas, cultivated crops have been planted within the transmission line rights-of-way along with irrigation lines.

Livestock ranching also accounts for a significant part of the economy of Yakima County where livestock represented $2.6 billion in sales in 2012[1]. As noted in Section 3.2, Land Use and Recreation, of this EA, ranchlands occur primarily within the steeper northeast portions of the study area and continue into the sloping portions of the arid foothills as both transmission line rights-of-way descend in elevation.

During 2008 through 2012, per capita and median household incomes in Benton County were about the same as the state average while per capita and median household incomes in Yakima County were less than the state average (Table 3.4-2).

Table 3.4-2. County and State Income Levels (2008 to 2012)

Income Metric	Benton County	Yakima County	Washington State
Per capita	$28,171	$19,610	$30,661
Median household	$60,300	$44,256	$59,374

Source: U.S. Census Bureau 2014a, 2014b, 2014e

Environmental Justice Populations

All projects involving a federal action (i.e., 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 disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law.

For this analysis, minority populations were defined to include persons describing themselves as non-white of one race, of more than one race, or white and Hispanic or Latino.

The low-income population was based on the U.S. Department of Health and Human Services poverty guidelines. For 2014, this was set at $23,850 for a family of four (U.S. Department of Health and Human Services 2014). Communities in the study area for which the minority or low-income population component exceeded the corresponding statewide component by at least 10 percent were identified as potential environmental justice populations. Minority and low-income population components are shown in Table 3.4-3.

[1] Data for Benton County was withheld to avoid disclosing data for individual operations (U.S. Department of Agriculture 2014b).

Table 3.4-3. Minority and Low-Income Population Components in Grandview, Moxee, and Washington State (percentage)

Area	One Race, Non-White	More Than One Race	White and Hispanic/Latino	Total Minority	Low Income
Grandview	15.8	6.9	57.2	79.9	29.1
Moxee	25.4	3.8	19.0	48.2	5.6
Yakima County	25.9	2.7	28.0	56.6	22.3
Benton County	22.8	3.8	4.5	31.1	12.9
Washington	16.7	5.0	6.2	27.9	12.9

Source: U.S. Census Bureau 2014e; U.S. Department of Health and Human Services 2014

The minority population component of Grandview and Moxee substantially exceed the statewide minority percentage. The majority of Grandview's population and nearly half of Moxee's population consist of individuals from a minority population defined above. The minority population component of Benton County is slightly higher than the statewide percentage, while the minority population component of Yakima County is over twice that of the state. In addition, the low-income population component for Grandview substantially exceeds the statewide low-income population component. Thus, Grandview and Moxee are both areas with potential environmental justice populations.

Public Services

Grandview and Moxee are both incorporated cities that provide residents with most public services including water, sewer, solid waste disposal, parks, and police protection (City of Grandview 2014; Adams pers. comm.). Grandview has a fire department, while fire protection is provided to Moxee by Yakima County Fire District #4. Electrical service is provided to both communities by Pacific Power. Both communities are served by public school districts.

Portions of the project area in unincorporated Benton County receive police services from the county sheriff's department, fire suppression services from County Fire District #3, and water supplies from the Sunnyside and Roza Irrigation Districts. Public schools serving this area are in the Sunnyside, Grandview, and Prosser School Districts, and electricity is provided to it by Benton REA and Benton PUD. These agencies do not serve the portions of the project area in the Hanford Reach National Monument or Hanford Nuclear Reservation (Shuttleworth pers. comm.).

Benton REA and Benton PUD have three connections to the Midway-Grandview transmission line, which delivers power to Benton PUD's Cold Creek Substation and Benton REA's Black Rock and Sunnyside Port Substations. Benton REA and Benton PUD require more power from the Midway-Grandview transmission line to meet their demand, which is why this line needs to be upgraded (as described in Section 1.3, Need for Action, of this EA).

In Yakima County's portion of the project area, key service providers are the sheriff's department, County Fire District #4, Pacific Power, and the East Valley and Sunnyside School Districts (Madera pers. comm.).

3.4.2. Environmental Consequences – Proposed Action

Population and Housing

Approximately 30 workers would be employed during the construction phase, most of whom are likely to permanently reside outside of Benton and Yakima counties. The origin of the work force is not known at this time and would depend on where the construction contractor is based. Because construction would be completed within a 2-year period with little to no construction during the summer months, non-local workers might, but are not expected to relocate their households to the study area.

If workers (and possibly some dependents) are from out of the area they would require temporary lodging in the local area during construction. Construction workers might rent parking for RVs or other live-in vehicles. Although only a few motels are located near Grandview and Moxee, other lodging is located between 35 miles and 65 miles away in the Tri-Cities area (Richland, Pasco, and Kennewick) and between 8 miles and 43 miles away in Yakima. Motels are located within reasonable commuting distance of the project area. Because increased demand for housing would be temporary under the Proposed Action, the impact on the regional population and demand for housing would be low.

Employment and Income

The Proposed Action would temporarily stimulate the local economy through some material purchases in the area, payroll to construction workers, and related indirect or multiplier effects. Multiplier effects occur when money that is spent continues to filter through the local economy, resulting in secondary benefits. For example, money paid to a temporary construction worker is spent at a local grocery store. In turn, sales at the store increase, resulting in increased profits, which in turn are spent elsewhere in the community.

Based on BPA experience with many similar projects, most of the workers are likely to reside outside of Yakima and Benton counties. Such workers typically reside temporarily near the construction site with or without their families, using motels or other lodging. They would purchase meals, groceries, gasoline, and other necessities from local restaurants and stores.

An economic model of the region comprising Benton and Yakima counties was developed using IMPLAN. When a project such as the Proposed Action is constructed, its direct effects are usually defined as those associated with the construction activities, such as hiring of construction workers and purchasing of construction materials, supplies, and equipment. Because most purchases would occur outside of Benton and Yakima counties, the economic impact analysis for this EA focused on the income earned by construction workers. As planned, the Proposed Action would employ approximately 30 full-time construction workers for a 14-month peak construction period, followed by a 6-month off-peak construction period during which fewer workers would be employed. The key assumptions for this analysis were as follows:

- 30 full-time construction workers would be employed for 1 year
- Workers would be recruited from outside the two-county region but would reside temporarily in the region
- Each worker would spend $100 per day in the region, including $25 on groceries, $25 on restaurants, $40 on lodging, and $10 on fuel

The results from analyzing this scenario with the IMPLAN model show that the projected spending by construction workers would result in 6.4 new jobs in the region's retail trade, restaurant, and motel industries; these jobs would account for an estimated $171,000 in new regional income. As a result of these increased sales and income, the affected businesses and their employees would increase their spending within the region, which would generate an additional 1.6 new jobs and approximately $66,000 in regional income. The additional spending by these businesses and their employees is referred to by economists as the project's indirect and induced effects, respectively. Combining the project's direct, indirect, and induced effects, the total employment and income effects of construction worker spending in the region are estimated at eight jobs and $237,000, respectively, for the year in which most construction activities would occur. Similar but smaller effects would occur in the subsequent year, as construction activity tapers off. The temporary increased employment and income resulting from the Proposed Action would constitute a minor, but beneficial impact on the regional economy.

After construction, the new transmission line would not affect economic activity in the area; however, the rebuilt transmission line would indirectly contribute to regional stability and economic growth by reliably meeting power demands. This would be a long-term beneficial impact.

Some minimal disturbance of and possible temporary interference with agricultural and ranching operations along the rights-of-way could occur. Impacts on farm and ranch operations could result from the improvement and use of roads by construction-related vehicles and equipment, which could result in some delays to vehicles and trucks used in agriculture and ranching operations. Because the disruptions would be temporary, the economic impact would be low.

A total length of about 5.5 miles of new access roads would be constructed to access both transmission lines. Farming would be permanently converted to non-farm use within the 20-foot-wide access road, wherever new roads would cross farmlands. Approximately 0.02 acre of an apple orchard, 0.39 acre of land designated as crop land, and 12.9 acres of unimproved grazing land would be permanently converted to access roads under the Proposed Action.

The average 2013 farm-gate value[2] for apple orchards in Washington was $13,235 per acre (U.S. Department of Agriculture 2013), while a recent environmental impact statement for a similar project in adjacent Klickitat County estimated the annual production value of unimproved rangeland at $50 per acre (Bonneville Power Administration 2011). At these prices for unimproved rangeland and apple orchard, the annual production value of the farmland that would be displaced under the Proposed Action would be $929.00. This displacement would constitute a minimal reduction in both the quantity of productive agricultural land as well as the annual crop production in the study area. Furthermore, to compensate farmers for possible loss of income related to the displacement of agricultural lands for access roads, BPA expects to buy easements to all private lands for access roads for which it does not currently hold easements. Such easement purchases are expected to fully compensate farmers and ranchers for possible project-related income loss. As such, the impact of the conversion of farmland and ranchland due to

[2] The farm gate value of a cultivated product is the net value of the product when it leaves the farm, after marketing costs have been subtracted. Since many farms do not have significant marketing costs, it is often understood as the price of the product at which it is sold by the farm.

construction of access roads associated with the Proposed Action would result in no to low impacts on agricultural activity.

In addition, some permanent removal of crops planted within the Midway-Moxee or Midway-Grandview rights-of-way may be necessary. BPA has worked with farmers in the design of the Proposed Action to identify wood pole structures that can be relocated in a manner to place them closer to existing farm roads and thereby minimize the amount of crops that would need to be removed within the rights-of-way to enable access to structure locations. The overall impacts of the Proposed Action on agricultural activity would be low.

Property Taxes

The Proposed Action would not affect the amount of property tax collected by the counties crossed by the transmission lines. Although BPA would purchase easements on some properties for new access roads, the underlying land ownership would not change. Property owners would continue to pay property taxes in accordance with assessed valuations and property devaluations would be unlikely to occur.

Sales Taxes

States cannot tax direct purchases by the federal government; however, Washington State would tax local purchases by construction contractors building the line (Excise Tax Bulletin 316.08.193 and Washington Administrative Code [WAC] 458-20-17001). Workers would also be taxed on all local purchases of goods in the state, unless those individuals' permanent residences are within states or other jurisdictions that are exempt from paying a local sales or "use tax" within the state. State sales tax in Washington is 6.5%. Benton County has an effective local sales tax rate of 1.2%, and Yakima County has a local sales tax of 1.4%. Taxes generated as a result of local purchases by construction contractors would not result in a considerable change in state tax revenues collected. Therefore, the minor beneficial impact on state sales tax revenues would be low.

Property Values

Some temporary negative impacts on property values (and salability) could occur on an individual basis as a result of the transmission line and access road construction. However, these impacts would be highly variable, individualized, and unpredictable. These temporary impacts on property value and salability could occur on an individual basis during construction. This could occur as a result of construction-related disturbance from construction noise and increased activity. However, because construction-related disturbance would be temporary and would likely last in any one location for no more than a few days, this impact would be low.

The construction of new access roads would require BPA to acquire easements from some landowners in the study area. To compensate for possible diminished property values related to the displacement of lands for access roads, BPA expects to buy easements to all private lands in the rights-of-way for which it does not currently hold easements. Such easement purchases are expected to fully compensate landowners for possible project-related diminished property value. Furthermore, the underlying land ownership would not change where easements are purchased.

Environmental Justice Populations

An impact that affects a potential environmental justice community is considered an environmental justice impact only if it disproportionately affects the minority or low-income members of the community. Impacts affecting potential environmental justice populations are likely to be environmental justice impacts if the minority or low-income members of the community are more sensitive to the impact than the general population, or if the affected community is predominantly minority or low income, so that the impact is borne primarily by minority or low-income individuals. Environmental justice impacts tend to be geographically localized near project activities, such as noise or visual impacts associated with construction activities in or adjacent to neighborhoods in which minority or low-income households are concentrated.

Although minority and low-income populations do occur in the study area, no known minority communities near the transmission line rights-of-way were identified. The impacts of the Proposed Action would persist only during construction and therefore would be temporary. Furthermore, impacts would occur mostly within the existing rights-of-way and existing roads and would be borne equally along the rights-of-way. Therefore, potential impacts of the Proposed Action are not expected to disproportionately affect environmental justice populations; therefore, there would be no environmental justice impacts.

Public Services

The Proposed Action could impact public services during construction. Rebuilding of the transmission line would be done in sections to avoid power outages during construction. Construction would require the use of water for dust suppression. Water for trucks would be provided by local sources. Water use would not be substantial enough to affect local water supply. Construction waste would be recycled or taken to a local waste disposal site with adequate capacity. Construction equipment traffic would result in minimal localized delays of only a few minutes but would not disrupt the ability of emergency service personnel to operate. Because most of the construction would occur from the fall through spring, it would overlap with the school year and could delay school bus transportation. However, since construction-related impacts on public services would be temporary and would result in minimal localized effects, they would be considered low.

3.4.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would also implement the following mitigation measures to avoid, minimize, or compensate for socioeconomic or public service impacts. Because there would be no impact on environmental justice populations, no mitigation is proposed. See Section 3.2, Land Use and Recreation, of this EA for additional mitigation measures that relate to public services.

- During project design, re-locate some structures in cropland, orchards, and vineyards to nearby farm roads, in order to minimize the amount of cropland removed from production for access road construction, where possible.

- Coordinate the routing and scheduling of construction traffic with the Washington State Department of Transportation and Yakima and Benton county road staff to minimize interruptions to local traffic.
- Develop and distribute a schedule of construction activities, including potential lane closures, to potentially affected landowners along the transmission line corridors to inform residents, including farm and grazing operations, when they may be affected by construction activities.
- Require the construction contractor to employ a lands liaison, who would be available to provide information, answer questions, and address concerns during project construction.
- Explain mitigation measures related to socioeconomics, environmental justice, and public services to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.

3.4.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

Implementation of the mitigation measures described above would reduce, but not eliminate, economic disruptions associated with the proposed construction activities, such as brief travel delays on access roads. However, impacts associated with minimal disturbance and possible temporary interference with agricultural and ranching operations, disruption of travel along some construction access roads, conversion of some farmland and ranchland to access roads, and temporary negative impacts on the property values and salability would still remain after mitigation. There could also be temporary impacts on housing availability during construction.

3.4.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, the existing transmission lines would not be rebuilt or upgraded. BPA would not be able to provide the additional power required by Benton REA or the Benton PUD to meet their load. Because of the deteriorated condition of the transmission lines, it is likely that the No Action Alternative would result in more frequent maintenance than under the Proposed Action, and maintenance activities would result in socioeconomic and public services impacts associated with temporary construction-related disturbances similar to, but likely less than, those described for the Proposed Action. If access road work was eventually carried out as a maintenance project, then the road impacts to transportation would likely be the same as described for the Proposed Action. Utilities served by the Midway-Grandview transmission line may not be able to satisfy their need for additional power to meet their load.

3.5. NOISE

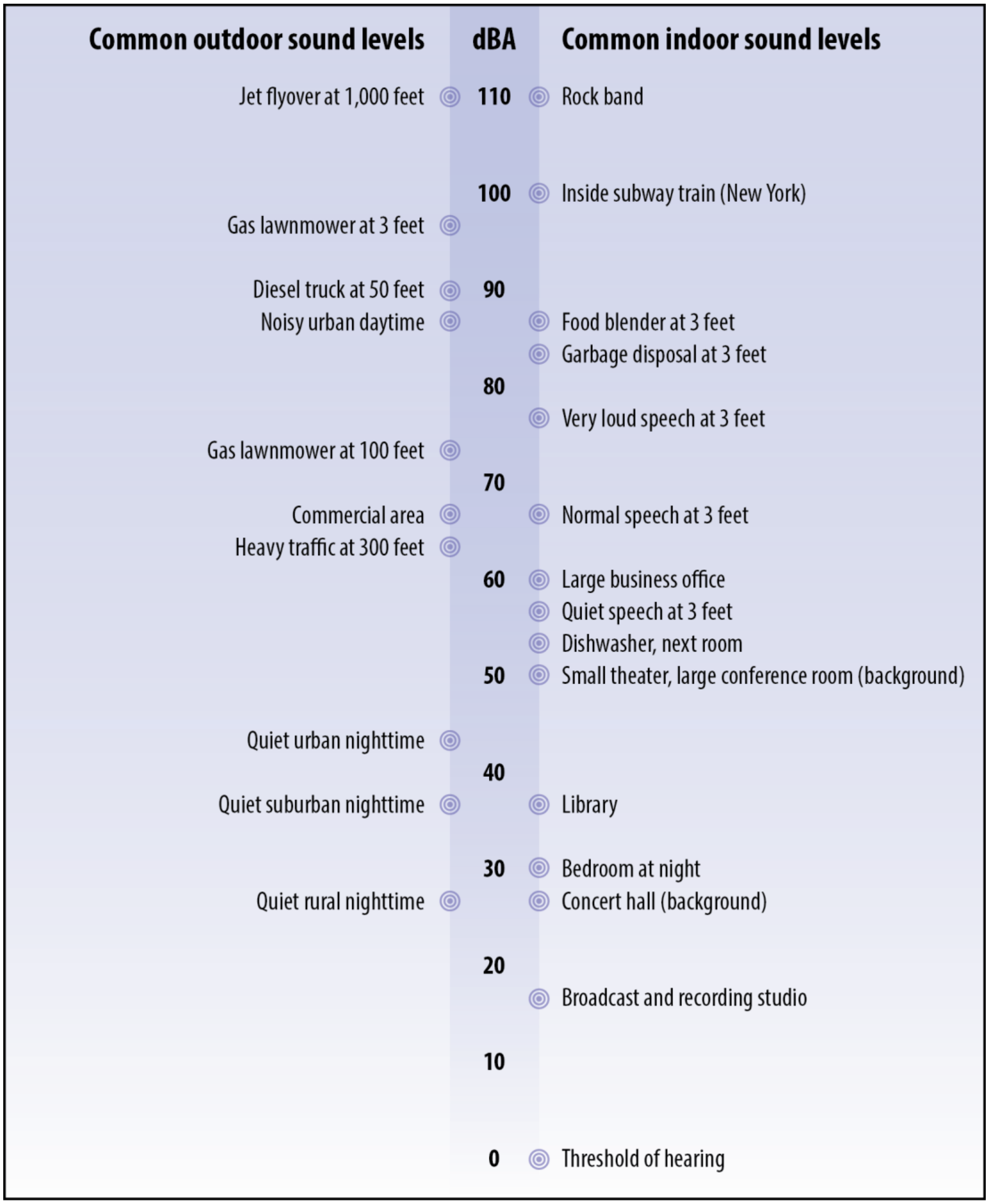
3.5.1. Affected Environment

The study area for the noise analysis includes the area within 1,000 feet of the transmission line rights-of-way and within 500 feet of project area roadways (i.e., any road that could be subject to increases in traffic volume from construction vehicles and worker trips).

Noise is generally considered as sound that is loud, disruptive, unexpected, or otherwise undesirable. Environmental noise is commonly quantified in terms of ***A-weighted decibels*** (dBA), an overall frequency-weighted sound level that approximates the frequency response of the human ear. Figure 3.5-1 contains examples of common activities and their associated noise levels in dBA.

Ambient noise at any one location includes all noise generated by typical sources such as traffic, people talking, neighboring businesses or industries, and natural noises such as the sound created by the movement of trees, the sound of waterways and weather (wind or rain), and animal noises, including birdsong. The ambient noise level is typically a mix of noise from natural and human-made sources that may be near or distant.

Audible noise corresponds to how humans hear sound. The ability to perceive a new noise source intruding onto background conditions depends on the nature of the intruding sound and the background sound. For situations where the nature of the new sound is similar to the background sound (e.g., new traffic noise added to background traffic noise) a change of 3 dBA is just noticeable, a change of 5 dBA is clearly noticeable, and a change of 10 dBA is perceived as doubling or halving sound level. For situations where the nature of the new intruding sound is different from background sound (e.g., construction noise in an otherwise quiet setting), the new sound (including sporadic “clanks” from construction equipment) can be perceived even if it only raises the overall noise level by less than 1 dBA.



Source: U.S. Department of Energy 2011a

Figure 3.5-1. Common Activities and Associated Noise Levels

Noise-Sensitive Land Uses

Land uses most sensitive to noise typically include areas where people reside, work, (e.g., businesses, hospitals, and schools), and locations where the presence of unwanted noise could adversely affect the use of the land. As described in Section 3.2, Land Use and Recreation, of this EA, the land uses in the study area generally consist of agriculture and ranching, recreation, residences, and undeveloped lands. Noise-sensitive land uses in the study area are primarily rural residences.

Ambient Noise Environment

Within the study area, ambient noise levels vary with the proximity of the transmission line corridor to roadways and other noise-generating activities. Most of the transmission line corridor is located in rural, undeveloped areas where noise levels are generally very low. In these areas, the predominant sources of noise are agricultural equipment operation and some vehicular traffic. An infrequent source of noise includes maintenance activities along the transmission line corridor and project roadways.

The dBA is an instantaneous measurement of sound pressure. A person's perception of sound can be affected by the spatial distribution of the sound source, the duration of the sound, the time pattern of the sound, the time of day of the sound, and other factors (California Department of Transportation 2009). The day-night noise level (L_{DN}) is a measure of the average dBA over a 24-hour period and imposes an additional 10-dBA weighting for sounds occurring during the night. Table 3.5-1 below shows examples of outdoor L_{DN}.

Table 3.5-1. Examples of Outdoor Noise Levels

Outdoor Location	Noise Levels (L_{DN} in dBA)
Wooded residential	51.0
Agricultural cropland	44.0
Rural residential	39.0
Open space (wetland, forest, openland, abandoned land)	35.0

Source: U.S. Environmental Protection Agency 1978; Caswell and Jakus 1977

Abbreviations:

dBA = A-weighted decibel
L_{DN} = day-night sound level, expressed in dBA

Audible noise from high-voltage transmission lines (generally 345-kV and above) occurs as a result of conductor corona activity (i.e., the electrical breakdown of air molecules in the vicinity of high-voltage conductors). This corona activity produces a hissing, crackling, popping sound, particularly during wet conditions such as rain or fog. Generally, 115-kV transmission lines generate a low level of corona activity, and the related audible noise is so low that it is not noticeable and is usually well below other ambient noise levels in the area. Historically, public complaints/inquiries related to transmission line audible noise at this voltage level are extremely rare. Audible noise levels at the existing BPA substations in the study area are a result of corona noise from incoming and outgoing transmission lines during rain and other wet weather.

Noise within the study area is regulated by local jurisdictions (Yakima and Benton counties) for compliance with WAC 173-60. These regulations specify noise limits according to the type of property where the noise would be heard (receiving property) as well as land use designation for the area where the noise would be generated (noise source). Transmission lines are classified as industrial sources for purposes of establishing allowable noise levels at receiving properties. The nighttime noise limit in residential neighborhoods is 50 dBA; and the daytime noise limit for residences is 60 dBA.

Construction noise and sounds created by the installation or repair of essential utility services are exempted from state noise regulations in accordance with WAC Section 173-60-050. For more information on applicable noise regulations, see Section 4.10, Noise, of this EA.

3.5.2. Environmental Consequences – Proposed Action

Construction Noise

Construction activities would result in temporary and intermittent noise impacts during daylight hours as construction progresses along the transmission line corridor. No construction activities would take place outside of daylight hours. Noise would come from the use of construction equipment and vehicles used for structure and conductor removal and replacement and access road work. Noise from truck traffic and increased worker trips would temporarily contribute to existing traffic noise on local roads, but is not expected to result in a substantial increase in average traffic noise levels. Noise impacts from construction traffic along local roads would be considered low.

Helicopters may be used to install conductors at structures. 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 would likely exceed noise thresholds at some residences near the transmission line corridor, the noise impacts from helicopters would be considered moderate because of the short duration of the elevated noise.

Table 3.5-2 summarizes noise levels generated by typical equipment that would likely be used to construct the Rebuild and Upgrade Project. Maximum noise levels at 50 feet from a construction site would range from 80 to 89 dBA. Noise produced by point sources (i.e., construction equipment) would typically decrease with distance at a rate of about 6 dBA per doubling of distance from the site. Based on this assumed rate of decrease in sound, residences located within 800 feet of construction sites could be exposed to daytime noise levels higher than the applicable noise threshold for residences (60 dBA).

Table 3.5-2. 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: Federal Transit Administration 2006

In most areas, the transmission line rights-of-way and access roads are located away from population centers and they border mostly undeveloped land. Noise impacts from helicopters and construction equipment would be limited to a few residences located near the transmission line rights-of-way and to residents in portions of Moxee and Grandview. As noted in Section 3.2, Land Use and Recreation, of this EA, scattered rural residences are located along the Midway-Moxee transmission line near Line Miles 5, 6, 14, 16, 23, and 25, with increasing density from Line Mile 29 into Moxee. Scattered rural residences also are located near Line Mile 5 of the Midway-Grandview transmission line and with increasing density from Line Mile 24 into Grandview. Although construction activities could exceed applicable noise thresholds for some residences, the impact would be considered moderate, because construction activities at any given location are expected to be relatively short in duration (approximately 1 to 2 days) and limited to daylight hours.

Operational Noise

Applicable noise thresholds used to assess the noise impacts from operation of the rebuilt lines include thresholds established under WAC Section 173-60 and U.S. Environmental Protection Agency (EPA) noise guidance for public health and welfare. Noise thresholds are described in Section 4.10, Noise, of this EA. Daytime noise thresholds for Class C noise sources (industrial) in the State of Washington are 60 dBA, 65 dBA, and 70 dBA for residential areas, commercial areas, and industrial areas, respectively. At the federal level, EPA has established a guideline of 55 dBA for an average L_{DN} in outdoor areas (U.S. Environmental Protection Agency 1978).

During transmission line operation, the impact of corona-generated audible noise depends on the level of corona noise, the level of ambient noise, and proximity to the transmission line. Corona noise itself depends on voltage, line configuration, the number of transmission lines sharing the right-of-way, and weather. Also, for a few months after construction, residual grease or oil can cause water to bead on the surface of the new conductors, producing temporarily higher levels of audible noise. Though wet or foul weather may induce corona noise, it can also mask it by increasing ambient noise (due to wind or heavy rain hitting foliage). Also during such conditions, people are more likely to be indoors where sound from nearby transmission lines would be reduced. Both these factors reduce corona-generated noise even in populated areas, where ambient noise levels tend to be higher.

For this project, the operating line voltage of the transmission lines would not change. BPA calculated existing audible noise levels for wet conditions and those expected as a result of the Proposed Action (see Table 3.5-3). Modeling was conducted within the areas where the two transmission lines are not adjacent to other existing transmission lines, such as in the more populated areas near Moxee and Grandview.

During wet and foul weather, corona from the Proposed Action could generate a maximum of 17 dBA at the right-of-way's edge, well below the State of Washington's thresholds. In the areas where modeling was conducted, audible noise from operation is expected to decrease. The operation of the Midway-Moxee and Midway-Grandview transmission lines would be consistent with all applicable noise limits. Therefore, no impact or beneficial impacts would occur on the nearest noise-sensitive receptors from operational noise of the transmission lines.

Table 3.5-3. Calculated Audible Noise from Corona during Transmission Line Operations

Transmission Line		Northern Right-of-Way Edge (dBA)	Maximum on Right-of-Way (dBA)	Western Right-of-Way Edge (dBA)
Midway-Moxee	Before Action	21.7	24.3	21.7
	After Action	17.0	19.6	17.0
Midway-Grandview	Before Action	24.7	27.3	24.7
	After Action	17.0	19.6	17.0

3.5.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would implement the following mitigation measures to avoid or minimize impacts on noise:

- Schedule all construction work during daylight hours to avoid noise and the use of nighttime illumination of work areas.
- Develop and distribute a schedule of construction activities, including potential lane closures, to potentially affected landowners along the transmission line corridors to inform residents, including farm and grazing operations, when they may be affected by construction activities.
- Explain noise-related mitigation measures to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.
- Require sound control devices on all construction equipment powered by gasoline or diesel engines that are at least as effective as those originally provided by the manufacturer.
- Maintain all construction equipment in good condition in order to minimize noise generation.
- Locate construction equipment as far away as is practicable from noise-sensitive land uses.

3.5.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

Noise generated by construction activities during daylight hours would result in a temporary and localized increase over existing ambient noise levels after implementation of mitigation measures.

3.5.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, BPA would not rebuild or upgrade the existing transmission lines and impacts on noise from construction of the Proposed Action would not occur. Because of the deteriorated condition of the transmission lines, it is likely that the No Action Alternative would result in more frequent maintenance than under the Proposed Action, and maintenance activities would result in noise impacts associated with temporary construction-related disturbances similar to, but likely less than, those described for the Proposed Action. If access road work was eventually carried out as a maintenance project, then the noise impacts from access road work would likely be the same as described for the Proposed Action. Continued operation of the existing transmission line would result in low impacts from corona-generated noise.

3.6. PUBLIC HEALTH AND SAFETY

3.6.1. Affected Environment

The study area for public health and safety includes the existing rights-of-way and associated access roads, danger tree removal area, and public roadways that could be affected by construction traffic.

General Health and Safety

Transmission facilities provide electricity for heating, lighting, and other services essential for public health and safety. These facilities could pose risks to humans, including electrocution, fire, and exposure to toxic and hazardous substances, if they are not constructed, operated, or maintained properly. Most of the Midway-Moxee and Midway-Grandview transmission lines and associated substations are located in rural, sparsely populated areas. Transmission facilities can become a target for vandalism, sabotage, and terrorism.

Transmission lines, like all electrical wiring, can cause serious electric shocks if certain precautions are not taken. All BPA lines are designed and built to meet or exceed the National Energy Safety Code (NESC), which specifies the minimum allowable distance between conductors and the ground or other objects. These requirements determine the minimum distance to the edge of the right-of-way and the minimum height of the line – that is, the closest point that houses, other buildings, and vehicles are allowed to the line. These clearances are specified to prevent harmful shocks to workers and the public.

Besides serious shocks, transmission lines can also cause nuisance shocks when a grounded person touches an ungrounded object under or near a line, or when an ungrounded person touches a grounded object. Shocks may also be experienced beneath a transmission line, but they are not in and of themselves dangerous as they are only momentary and are similar to "carpet" shocks. BPA publications, such as the booklet *Living and Working Safely Around High-Voltage Power Lines*, present safety practices to avoid and mitigate such shocks and also include recommendations for activity restriction on and around a high-voltage transmission line right-of-way (Bonneville Power Administration 2007).

Wildland fires can pose a safety hazard to the public and to project components. Wildland fire hazards in the study area include both natural and human-caused fires. In the study area, fire danger is generally the highest in the summer months.

Electric and Magnetic Fields

All electrical wires, from transmission lines to household wiring, produce ***electric and magnetic fields*** (EMF). Current (the flow of electric charge in a wire) produces the ***magnetic field***. Voltage (the force that drives the current) is the source of the ***electric field***. Throughout a home, the electric field strength from wiring and appliances is typically less than 0.01 kV per meter. However, fields of 0.1 kV per meter and higher can be found very close to electrical appliances.

The strength of the electric field from transmission lines depends on the design of the transmission line and on the distance the electric field is measured from the transmission line. Electric field strength decreases rapidly with distance.

The State of Washington has no regulations regarding transmission line electric fields. There are no nationally recognized regulatory standards/limits for electric fields from transmission lines except those inferred from the NESC 5-milliampere criterion for maximum allowable steady-state current in vehicles due to electrostatic effects. BPA designs transmission line projects to meet the NESC exposure criteria within and outside the transmission line right-of-way.

As noted above, 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 or milligauss. The strength of an average magnetic field in most homes (away from electrical appliances and home wiring) is typically less than 2 milligauss. Magnetic fields of tens or hundreds of milligauss are present very close to appliances that carry a high current. 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 a 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.

After decades of research, the issue of whether any long-term health effects are associated with magnetic fields from transmission lines remains inconclusive. Magnetic fields are most in question as possible sources of long-term effects, although studies sometimes lump electric and magnetic fields together. For the latest information, BPA looks to the determinations of the National Institute of Environmental Health Science. Scientific reviews of the research on EMF health effects have found that evidence is insufficient to conclude that EMF exposures lead to long-term health effects. However, some uncertainties remain for childhood exposures at levels above 4 milligauss (National Institute of Environmental Health Sciences 1998, 1999, 2002).

Electromagnetic Interference

Electromagnetic fields can also interfere with electrical equipment, including causing radio and television interference. ***Electromagnetic interference*** (EMI) can occur from corona activity or as a result of the discharge of sparks from aging hardware. Conductor 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 causing small spark-gaps).

As with corona audible noise, corona EMI is generally associated with lines operating at voltages of 345 kV or higher. Spark-discharge EMI associated with aging hardware can occur at any operating voltage. Historically, public complaints of radio and television interference from BPA transmission lines operating at 115 kV are rare.

Electromagnetic interference does not apply to reception via cable or satellite TV or radio, or frequency modulated (FM) radio frequencies. The switch from analog to digital TV technology began in 1996 and is expected to be complete by September 1, 2015. After the switch to digital TV is complete, electromagnetic interference is not expected to affect TV reception.

In the United States, electromagnetic interference from transmission systems is governed by the Federal Communications Commission, which requires that transmission lines be operated so that radio and television reception would not be seriously degraded or repeatedly interrupted. Further, the Federal Communications Commission regulations require that impacts on reception, if they occur, be mitigated by the operator of the interference-causing device. No state limits for electromagnetic interference exist.

<u>Intentional Destructive Acts</u>

Intentional destructive acts – that is, acts of sabotage, terrorism, vandalism, and theft – sometimes occur at power facilities, including transmission lines and substations. Vandalism and theft are most common, especially theft of metal and other materials that can be sold. BPA has seen a substantial increase in metal theft from its facilities over the past few years. Thefts increase when the price of metal is high on the salvage market. In the last 10 years, BPA has experienced over 200 thefts or burglaries. BPA estimates that the average monetary damage for each crime is $150,000, but the actual amount is likely much higher since this number does not factor in all the labor-related costs associated with repairing the damage. The impacts on the transmission system from vandalism and theft, though expensive, have not generally caused service disruptions to BPA's service area.

Acts of sabotage or terrorism on electrical facilities in the Pacific Northwest are rare, though some have occurred. In the past, these acts generally focused on attempts to destroy large steel transmission line towers. For example, in 1999, a large transmission line steel tower in Bend, Oregon, was toppled. In June 2011, at BPA's Alvey Substation near Eugene, Oregon, almost $1 million in damages was incurred when unknown individuals breached a security fence and damaged equipment in the substation yard during an attempt to disrupt transmission service.

Federal and other utilities use physical deterrents such as fencing, cameras, warning signs, rewards, etc., to help deter theft, vandalism, and unauthorized access to facilities. BPA is in the process of replacing much of its solid copper wire with copper-coated steel wire, posting signage that indicates a trade has been made, and installing surveillance cameras to deter future break-ins. Transmission structures and overhead transmission conductors, however, are mostly on unfenced utility rights-of-way. Although transmission line structures are difficult to dislodge, they remain vulnerable to potential vandalism. In an effort to help prevent intentional destructive acts, BPA established a Crime Witness Program that offers up to $25,000 for information that leads to the arrest and conviction of individuals committing crimes against BPA facilities. Anyone having such information can call BPA's Crime Witness Hotline at 1-800-437-2744. The hotline is confidential, and rewards are issued in such a way that the caller remains anonymous.

Depending on the size and voltage of the line, destroying transmission line structures or other equipment could cause electrical service to be disrupted to utility customers and other end-users. The effects of these acts would be as varied as those from the occasional sudden storm, accident, or blackout and would depend on the particular configuration of the transmission system in the area. For example, when a storm affects transmission lines, residential customers can lose power for heating, cooking, refrigeration, lighting, etc. and can experience impacts related to those activities unless they have backup generators. Similarly, commercial, industrial, and municipal customers can experience impacts when infrastructure such as machinery, traffic signals, light rail, or elevators stops functioning.

3.6.2. Environmental Consequences – Proposed Action

General Health and Safety

Health and safety risks associated with the construction of the Rebuild and Upgrade Project could include increased risk of electrical shocks or fires from high-voltage equipment and increased risk of fires and injury from the use of heavy equipment and hazardous materials, such as fuels, cranes, helicopters, and other activities associated with working near high-voltage lines. In addition, there are potential safety issues with more traffic on the highways and roads in the study area during construction. BPA does not permit any uses within rights-of-way that are unsafe or might interfere with safely constructing, operating, or maintaining the transmission facilities. These restrictions are part of the legal rights BPA acquires for its transmission line easements. People working or living near transmission lines must also take certain precautions. In general, when under a transmission line, a person should never put themselves or any object higher than 14 feet above ground. For example, it is important never to bring conductive materials, including TV antennas, irrigation pipes, or water streams from an irrigation sprinkler, too close to the conductors as serious shocks or electrocution can occur. Also, vehicles should not be refueled under or near conductors.

BPA designs its facilities to meet safety requirements to prevent or reduce safety risks such as electrical shocks. These measures include maintaining proper clearances between transmission lines and the ground, roadways, and vegetation, installing gates to prevent unauthorized access, providing fencing and lighting at substations, and preventing inappropriate use of transmission line rights-of-way. In addition, BPA conducts annual inspections by helicopter and by ground crews.

The general public would not be allowed in construction areas while work is ongoing and therefore would not be at risk of injury. By following all safety requirements and implementing the mitigation measures described below in Section 3.6.3, Mitigation Measures – Proposed Action, construction activities would create temporary, low impacts on the health and safety of workers and the public.

Electric and Magnetic Field Impacts

The primary parameters that affect EMF levels produced by a transmission line include line voltage, current loading, line configuration, and line routing. Using models and based on expected operation of the transmission lines, BPA calculated the EMF levels for the Proposed Action, as shown in Table 3.6-1 and Table 3.6-2, respectively. Calculations were done on the portions of the transmission line where they are not adjacent to other transmission lines and are in a 100-foot-wide transmission line right-of-way. These are the most populated portions of the project area.

Electric Fields – As shown in Table 3.6-1, the small increase in electric fields predicted within the right-of-way would be negligible. In addition, where structure heights would increase, ground-level electric fields would decrease slightly within the right-of-way. No changes are expected beyond the right-of-way. For these reasons, there would be no impacts on public health and safety from electric fields associated with the Proposed Action.

Table 3.6-1. Representative Right-of-Way Electric Field[a]

Transmission Line	Before/After Proposed Action	Northern Right-of-way Edge (kV/m)	Maximum on Right-of-way (kV/m)	Southern Right-of-way Edge (kV/m)
Midway-Moxee	Before Action	0.4	1.4	0.4
	After Action	0.4	1.5	0.4
Midway-Grandview	Before Action	0.4	1.4	0.4
	After Action	0.4	1.5	0.4

[a] Values developed from BPA modeling programs, based on projected annual line loading for 2019
kV/m = kilovolts per meter

Magnetic Fields – Long-term magnetic field exposure is related to average levels. Actual magnetic fields at any particular time depend on line loading at that time. Loading varies throughout the day and year. The predicted field levels are only indicators of how the Proposed Action may affect the magnetic field environment; they are not measures of risk or impacts on health.

As indicated in Table 3.6-2, magnetic fields on and at the edges of the Midway-Moxee transmission line right-of-way would stay the same as a result of the Proposed Action. For this reason, there would be no impacts on public health and safety from magnetic fields associated with rebuilding the Midway-Moxee transmission line.

Magnetic fields on and at the edges of the Midway-Grandview transmission line right-of-way would increase slightly as a result of the Proposed Action. Where structure heights would increase, ground-level magnetic fields would decrease slightly within the right-of-way.

Electromagnetic Interference

Recent conversion to digital TV technology has made TV reception much less susceptible to corona-generated EMI. Because of this conversion, the lower-channel stations (Channels 2 to 6), where interference could occur, now transmit at higher frequencies where corona-generated interference has not been a problem. The likelihood of TV interference due to corona is greatly reduced from just a few years ago and is anticipated to occur very rarely, if at all, along the rights-of-way. In the event interference does occur, BPA has a mitigation program to correct it and would restore reception to the same or better quality.

Table 3.6-2. Representative Right-of-Way Magnetic Field[a]

Transmission Line	Before/After Proposed Action	Northern Right-of-Way Edge (milligauss)		Maximum on Right-of-Way (milligauss)		Southern Right-of-Way Edge (milligauss)	
		Annual Average	Annual Peak	Annual Average	Annual Peak	Annual Average	Annual Peak
Midway-Moxee	Before Action	4.8	9.5	12.1	46.7	4.8	9.5
	After Action	4.8	9.5	12.1	46.7	4.8	9.5
Midway-Grandview	Before Action	4.5	16.1	11.5	79.0	4.5	16.1
	After Action	5.1	18.1	13.0	88.7	5.1	18.1

[a] Values developed from BPA modeling programs, based on annual 2013 to 2014 line load statistics

Corona-generated interference can conceivably cause disruption on other communications bands. However, interference is unlikely with newer devices (cell phones and Global Positioning System, or GPS, units) that operate with digital signals and at frequencies well above those where corona-generated interference is prevalent. Mobile-radio communications are not susceptible to transmission-line interference because they are generally FM. In the unlikely event that interference occurs with these or other communications, mitigation can be achieved with the same techniques used for TV and AM radio interference. To comply with Federal Communications Commission (FCC) regulations, BPA would work with owners and operators of communications facilities in the study area to identify and implement mitigation measures in the event of interference from the rebuilt electrical facilities.

Magnetic fields can also distort images on older video display monitors with cathode ray tubes. This distortion is unlikely to occur at magnetic field levels found very close to (within about 100 feet of) the transmission line rights-of-way. If these effects occur, such interference can be remedied by moving the monitor to another location or replacing it with a contemporary flat-panel device such as a liquid-crystal or plasma display, which are not affected by magnetic fields.

Corona-generated EMI is not expected to change under the Proposed Action. Because the transmission line would continue to operate at 115 kV under the Proposed Action and because new, properly installed connecting hardware would reduce any risk associated with aging hardware spark-discharge activity, the Proposed Action is expected to either not change or possibly slightly reduce radio and television interference along the rights-of-way from EMI. Based on past performance, no EMI complaints are expected. In any case, 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, there would be no to low impacts associated with EMI.

<u>Intentional Destructive Acts</u>

It is difficult to predict the likelihood of, and increased risk for, terrorist or sabotage acts. However, given the security measures that BPA, public and private utilities, energy resource developers, and federal agencies such as the U.S. Department of Homeland Security have implemented and are continuing to implement to help prevent such acts and protect their facilities, along with the inherent difficulty in significantly affecting such large and well-constructed facilities as transmission structures and substation sites, it is considered unlikely that a significant terrorist or sabotage act would occur.

If such acts did occur, the problem area would be isolated quickly and electricity rerouted as much as possible to keep the system functioning. In some situations, intentional destructive acts would have no noticeable effect on electrical service as power can be rerouted around an area because of redundancies built into the transmission system. In other situations, service could be disrupted in the local area, or, if an intentional destructive act damaged a major piece of transmission system equipment or a large part of the transmission system, a much greater area could be left without power.

In addition, it is expected that federal, state, and local agencies would respond quickly if any such act posing any human or natural resource risks were to occur. Accordingly, because both transmission lines already exist and the rebuilt and upgraded lines would be in the same rights-of-way and similar in appearance to the existing transmission lines, it is unlikely that there would be an incremental increase in risk from intentional destructive acts associated with the Proposed Action.

3.6.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would implement the following mitigation measures to avoid or minimize impacts on public health and safety.

- Prepare a site-specific Safety Plan before starting construction; specify how to manage hazardous materials, such as fuel and any toxic materials found in work sites; include a Fire Prevention and Suppression Plan and detail how to respond to emergency situations; keep the Safety Plan on site during construction and maintain and update, as needed.
- Implement a Spill Prevention, Control, and Countermeasures (SPCC) Plan in accordance with federal, state, and local requirements that addresses fuel and chemical storage, spill containment and cleanup, construction contractor training, and proper spilled material disposal activities. For activities within the DOE Hanford Site, prepare and implement spill prevention and response procedures in coordination with DOE-RL staff.
- Coordinate the routing and scheduling of construction traffic with the Washington State Department of Transportation and Yakima and Benton county road staff to minimize interruptions to local traffic.
- Coordinate the routing and scheduling of construction traffic with DOE-RL staff.
- For all activities within the DOE Hanford Site, coordinate activities with the Hanford Patrol and Hanford Fire Department.
- Develop and distribute a schedule of construction activities, including potential lane closures, to potentially affected landowners along the transmission line corridors to inform residents, including farm and grazing operations, when they may be affected by construction activities.
- Explain public health and safety-related mitigation measures to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.

- Require the construction contractor to employ a lands liaison, who would be available to provide information, answer questions, and address concerns during project construction.
- Require the construction contractor to hold safety meetings with workers at the start of each work week during construction to review potential safety issues and concerns.
- Require monthly meetings, attended by the construction contractor and BPA staff, to discuss safety issues.
- Employ traffic control flaggers and post signs along roads warning of construction activity and merging traffic for temporary interruptions of traffic, where needed.
- Limit vehicle speeds on unpaved roads and surfaces to 15 miles per hour.
- Design, construct, and operate the transmission lines to meet the NESC standards.
- Install temporary guard structures (wood-pole structures) over local utility lines and public roadways, where needed, to ensure continued service and safe passage when the conductor line is replaced, or, if guard structures are not used along some roadways, employ flaggers to ensure safe passage.
- Ground fences and other metal structures on and near the transmission line rights-of-way during construction to limit the potential for nuisance shocks.
- Store, fuel, and maintain vehicles and equipment in designated vehicle staging areas located a minimum of 200 feet from any streams, water bodies, and wetlands, and during fueling or service, use pumps, funnels, absorbent pads, and drip pans.
- Report possible hazardous materials, toxic substances, or petroleum products discovered during construction that would pose an immediate threat to human health or the environment, including large dump sites, drums of unknown substances, suspicious odors, and stained soil.
- Secure the work area at the end of each workday, as much as possible, to protect the general public and to safeguard equipment.
- Restore reception quality if transmission lines cause radio or television interference.

3.6.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

Health and safety risks associated with the project construction could include increased risk of electrical shocks or fires from high-voltage equipment and increased risk of fires and injury from the use of heavy equipment and hazardous materials. In addition, the rebuilding and upgrading of the Midway-Grandview transmission line would result in a slight increase in the magnetic field during operation.

3.6.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, BPA would not rebuild or upgrade the existing transmission lines. Because construction of the Proposed Action would not occur, impacts on public health and safety associated with project construction would not occur. Operation would continue and public health and safety impacts related to electric and magnetic fields and EMI would be similar to or slightly greater than existing conditions. Continued operation and maintenance of the existing transmission lines would have low impacts on public health and safety.

3.7. GEOLOGY AND SOILS

3.7.1. Affected Environment

The study area for geology and soils consists of the existing rights-of-way and associated access roads, work areas, and material storage yards. Unless otherwise noted, the information presented in this section is based on the Natural Resources Conservation Service web soil survey (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm), the Washington State Geologic Information Portal Interactive Geologic Map (www.dnr.wa.gov/researchscience/topics/geosciencesdata/pages/geology_portal.aspx), and for the portions of the project on the DOE Hanford Site, information in this section is based on DOE-RL's *Hanford Site National Environmental Policy Act (NEPA) Characterization* report (Duncan 2007).

Geology

The study area lies within the Pasco Basin and Yakima Fold Belt subprovinces of the Columbia Basin geographic province (Duncan 2007). The Midway Substation is near the western boundary of the Pasco Basin and the majority of the Midway-Moxee and Midway-Grandview transmission lines and associated access roads are within the Yakima Fold Belt. The Pasco Basin is relatively level and is underlain by thick layers of basalt. The Yakima Fold Belt is also underlain by thick basalt layers, which have been folded into linear ridges and hills with river valleys between the ranges. Most of the ridges and hills trend approximately east-west, but this varies slightly.

The two transmission lines cross some of the ridges and hills and associated valleys of the Yakima Fold Belt. The Midway-Moxee transmission line crosses Umtanum Ridge and Yakima Ridge before turning west into the Moxee Valley–Black Rock Valley. The Midway-Grandview transmission line crosses the Black Rock Valley and continues south across the Rattlesnake Hills to Grandview.

Catastrophic floods during the last ice age greatly altered the surface geology and soils in the study area. Floods eroded some areas and deposited sands and other glacial deposits in the main valleys (Moxee Valley–Black Rock Valley and Yakima River Valley). The slopes above the valleys are variably blanketed with ***loess***, glacial-age windblown silt. Locally, on both hillsides and within the main valleys, streams and rivers have eroded into the underlying materials (basalt, catastrophic flood sands, and loess) and redeposited them as floodplain deposits along the main valleys or as ***alluvial fans*** deposited along the valley sides.

The majority of both transmission lines cross low to moderate gradient slopes of less than 10 percent slope or up to 20 percent slope. These lower-gradient areas include the Moxee Valley–Black Rock Valley and the areas crossing the Rattlesnake Hills and into the Yakima River Valley. The steepest segments, up to 40 percent slope and greater are at the start of both transmission lines, where they ascend Umtanum Ridge. The access roads that ascend Umtanum Ridge are as steep as 40 percent. In other areas, steeper slopes are encountered for very short stretches where the transmission lines or access roads cross stream valleys that are eroded into the sides of the mountain slopes.

The Washington Interactive Geologic Map indicates several landslides within the study area (Washington State Department of Natural Resources 2014). No active or historic landslides are crossed by the transmission lines and are in locations where they are unlikely to affect the transmission lines. There are several ***faults*** within the study area and earthquakes have occurred in the area, though the rate and magnitude of earthquakes in the region is relatively low compared with that of other regions in the Pacific Northwest, and earthquake hazards are not typically considered a major concern for transmission lines (Duncan 2007). Consequently, landslides and earthquakes are not addressed further in this EA. Moreover, because the Proposed Action would not affect geologic resources, geologic impacts are not discussed further in this EA.

Soils

Soils in the study area include rocky soils, sandy ***loams***, and silt loams. Rocky soils formed on basalt outcrops, ***talus***, and basalt ***scree*** (although often mixed with some amount of loess) are the least abundant soils crossed by the transmission lines and access roads. Rocky soils occur on Umtanum Ridge, Yakima Ridge, and the Rattlesnake Hills. Thin, rocky soils known as ***lithosols*** are also present in the study area.

Sandy loams and silt loams are the most abundant soil type in the study area. Sandy and silt loams are composed of a mix of fine-grained sand, silt, and clay. When sand is more dominant than silt, soils are termed sandy loams, and when silt is more dominant than sand, soils are termed silt loams. They are found along the Moxee Valley–Black Rock Valley and the slopes of the Rattlesnake Hills leading into the Yakima River Valley. Due to dry and windy conditions in the study area, these fine-grained soils are at risk of erosion by wind, particularly when protective vegetation cover is removed.

Much of the soils in work areas have already been disturbed by the initial construction of the existing transmission lines, access road work, and other land uses that disturbed soils. Soils near transmission line structures and within roadbeds have been compacted and are mostly unvegetated, making them generally unproductive and vulnerable to erosion.

Relatively undisturbed areas may contain cryptogamic crusts, a thin (less than 0.2 inch) consolidated layer of soil particles on the soil surface, bound together by algae, lichens, and mosses (Duncan 2007). These crusts are important to soil stability and protection from erosion (Root *et al.* 2011).

3.7.2. Environmental Consequences – Proposed Action

Impacts on soils from the Proposed Action would occur as a result of removal of existing structures and installation of new structures; improvements to existing access roads and construction of new access roads; use of access roads by heavy equipment and trucks; establishment of staging areas and pulling and tensioning sites; and removal and installation of conductors, overhead ground wires, and counterpoise. These activities could remove topsoil and increase erosion and would cause compaction of all soil types, decreasing soil productivity. Indirect impacts on soils could occur as a result of vegetation removal that could lead to increased erosion over time.

Due to the dry conditions and high summer temperatures in the study area, soils in the study area are prone to wind erosion. Soils that would be permanently compacted within road beds 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 could take several years to fully stabilize. Erosion potential for disturbed soils would be greatest during and immediately after ground disturbance and soils would stabilize as they settle and as vegetation becomes reestablished. Soils would be disturbed and revegetation would be slow and difficult to accomplish following disturbance (Feng *et al.* 2011). With implementation of mitigation measures described below in Section 3.7.3, Mitigation Measures – Proposed Action, the impacts on soils as a result of the Proposed Action described below would be low to moderate in the short term and, upon successful revegetation, low in the long term.

Structure Removal and Installation

Removing and installing transmission line structures would require the use of trucks and other heavy equipment that would disturb soils through removing vegetation, damaging cryptogamic crusts, and compacting soils. Approximately 92 acres of soils would be temporarily disturbed during structure installation (including the installation of guy wires and counterpoise). Because most structures would be rebuilt in the same location, or within 5 feet of the current location, where soils have already been disturbed, impacts on soils from structure construction would be low. Soil from these holes would be piled and then used for backfilling the holes when the poles are put in place.

New holes would be augered for the nine new transmission line structures and for structures that would shift in location away from their existing holes. The installation of these structures would result in about 0.5 acre of permanent impact on soils, a low to moderate impact.

Access Road Work

Access road work would cause soil disturbance through grading, shaping, and compacting road beds, and placement of crushed rock as a road base. About 5.6 miles of new access roads would be constructed, 9.5 miles of existing access road would be reconstructed, and 47.1 miles of existing access roads would be improved.

Disturbance of soils from access road work was based on an estimated 20-foot-wide disturbance area for access roads (14 feet of road bed and 3 feet of roadside vegetation clearing on each side). Existing access roads that would be improved or reconstructed vary in width. For the purposes of calculating the disturbance area, roads were assumed to have a minimum 10-foot existing road width because quite a few existing access roads consist of dirt tracks. Access road construction, reconstruction, and improvement would disturb a total of approximately 82.1 acres of soils, which would include the following:

- Approximately 13.6 acres of soils would be cleared, graded, and compacted to construct 5.6 miles of new access roads
- Approximately 11.5 acres of soils would be disturbed adjacent to 9.5 miles of existing road beds that would be reconstructed

- Approximately 57.1 acres of soils would be disturbed adjacent to 47.1 miles of existing road beds that would be improved

The use of proper road design to minimize erosion and the implementation of BMPs during construction would reduce the potential for construction-related erosion and impacts on soils.

Pulling and Tensioning Sites

Soils at pulling and tensioning sites would be compacted by the trucks that bring the new conductor and fiber optic cable to the site and haul away the old conductor and fiber optic cable and by the puller and tensioner equipment used to tension the conductor and fiber optic cable. Existing vegetation could also need to be cleared, resulting in some exposed and disturbed soil.

3.7.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, the following mitigation measures would avoid and minimize impacts from the Proposed Action on geology and soils. Other mitigation measures relevant to geology and soils are in Section 3.8, Vegetation, and Section 3.10, Waterways and Water Quality, of this EA.

- Design and construct access roads to minimize drainage from the road surface directly into surface waters, size new and replacement culverts large enough to accommodate predicted flows, and size and space cross drains and water bars properly to accommodate flows and direct sediment-laden waters into vegetated areas.
- Develop a Revegetation Plan for areas of disturbance within the DOE Hanford Site, including soil preparation as necessary, using site-specific methods developed for use within the DOE Hanford Site and approved by DOE-RL staff.
- Explain geology and soil-related mitigation measures, and BMPs, to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.
- Locate staging areas in previously disturbed or graveled areas to minimize soil and vegetation disturbance, where practicable.
- Minimize ground disturbance, particularly in areas prone to erosion (i.e., slopes steeper than 20 percent).
- Manage sediment as specified in the Stormwater Pollution Prevention Plan, with an approved method that meets the *Stormwater Management Manual for Eastern Washington* erosion and stormwater control BMPs, to eliminate sediment discharge into waterways and wetlands, minimize the size of construction disturbance areas, and minimize removal of vegetation, to the greatest extent possible (Washington State Department of Ecology 2004).
- Inspect and maintain access roads, fords, and other facilities after construction to ensure proper function and nominal erosion levels.
- Reseed disturbed areas after construction activities are complete, at the appropriate time period for germination, with a native seed mix, a seed mix recommended by WDFW, or a seed mix identified in the *Stormwater Management Manual for Eastern Washington,* or as agreed upon with landowners for use on their property (Washington State Department of Ecology 2004).
- Monitor seed germination of seeded areas until site stabilization is achieved (defined by an appropriate level of cover by native or acceptable non-native species for this geographic

area) and implement contingency measures and reseed to ensure adequate revegetation of disturbed soils if vegetative cover is inadequate.

3.7.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

Although mitigation measures and construction BMPs would reduce the potential for temporary increases in erosion, some increased erosion levels would be expected. Due to the dry conditions and high summer temperatures, soils in the study area are prone to wind erosion, and vegetation is difficult to establish following disturbance. Construction activities could remove topsoil and increase erosion and would cause compaction of all soil types, decreasing soil productivity. 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. Long-term impacts remaining after construction would be limited to localized soil compaction, minor erosion, and loss or elimination of natural biological functions in areas that were formerly undisturbed. However, only about 92 acres of soils would be disturbed by structure installation and 82 acres of soils would be permanently disturbed in construction work areas for both transmission lines.

3.7.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, BPA would not rebuild or upgrade the two transmission lines. Because construction activities associated with the Proposed Action would not occur, impacts on soils from rebuilding the transmission lines would not occur. BPA would continue to operate and maintain the existing transmission lines. Because of the aging and deteriorated condition of the transmission lines, it is likely that the No Action Alternative would result in more frequent maintenance than under the Proposed Action and maintenance activities would result in impacts on soils.

The general soil impacts from localized maintenance activities under the No Action Alternative would be similar to the Proposed Action although spread over a longer time (multiple years) rather than the 2-year construction period. If access road work was eventually carried out as a maintenance project, then the road impacts would likely be the same as described for the Proposed Action.

3.8. VEGETATION

3.8.1. Affected Environment

The study area for vegetation includes all areas within 500 feet of the existing and proposed transmission line rights-of-way and access roads. This includes areas where vegetation could be directly affected by project work and areas where vegetation could be indirectly affected by adjacent project activities. Vegetation field surveys were conducted within a smaller subset of the study area that included the full width of the transmission line rights-of-way and within and along existing and proposed access roads where work is proposed. Vegetation field surveys were conducted in spring 2013 and spring 2014 to document general vegetation types and vegetation communities, document priority vegetation communities, survey for and document special-status species occurrences and habitat, and create an inventory of plant species observed within the survey area (Tetra Tech 2014a). Additional field surveys were conducted in spring 2015 to document vegetation resources and conditions that are present in project work areas that were not surveyed in 2013 and 2014 (Tetra Tech 2015). A survey was conducted in 2014 to identify and map noxious weed occurrences (BFI Native Seed 2014).

Overview

Vegetation in the study area has been extensively altered by agricultural conversion, grazing, residential development, and road and utility infrastructure construction. Most of the residential development impacts have occurred in and around the cities of Moxee and Grandview. Agricultural areas are concentrated near the outskirts of these cities although some large agricultural operations are located in other portions of the project area. The least disturbed (i.e., highest quality) vegetation communities are located on lands managed by the U.S. Department of Energy as part of the DOE Hanford Site (Tetra Tech 2014a). These lands occur within the first 2 miles of the transmission line corridor extending from the Midway Substation.

Vegetation Communities

The study area is located in the shrub-steppe vegetation zone of the Columbia Basin physiographic province, which is considered the driest of the steppe and shrub-steppe vegetation zones in Washington (Franklin and Dyrness 1988). Wildfires are a natural part of the shrub-steppe community and historically maintained a patchy distribution of shrubs and a predominance of grasses. Habitat alteration from grazing and other activities has altered the natural fire regime in this region, such that wildfires currently tend to burn more frequently, intensively, and over larger areas than under historic conditions (Azerrad *et al.* 2011).

Vegetation communities in the study area include developed land with landscaped, mowed, paved, or otherwise disturbed areas; agricultural land; annual grassland; Conservation Reserve Program (CRP) land; lithosol; perennial grassland; shrub-steppe; and riparian communities. Lithosol vegetation types are characterized by areas with soils that are stony and extremely shallow to the underlying bedrock and that have a characteristic assemblage of native plant species. Mosaics of shrub-steppe and lithosol and shrub-steppe and perennial grassland also occur. Table 3.8-1 shows the area and percentage of each vegetation community in the surveyed areas, which include areas where direct impacts on vegetation could occur during construction.

Table 3.8-1. Area of Existing Vegetation Communities within the Midway-Moxee and Midway-Grandview Vegetation Survey Areas

Vegetation Community	Midway-Moxee Survey Area[a]		Midway-Grandview Survey Area[a]	
	Area (acres)	Percent of Survey Area	Area (acres)	Percent of Survey Area
Developed Land	113.5	12.7	84.4	8.1
Agriculture Land	221.1	24.7	177.8	17.1
Annual Grassland	174.8	19.5	148.7	14.3
Conservation Reserve Program Land[b]	59.0	6.6	173.7	16.7
Lithosol[c]	8.3	0.9	0.0[c]	0.0
Perennial Grassland	36.8	4.1	69.2	6.6
Shrub-steppe[d]	282.9	31.6	388.1	37.2
Riparian and Wetland	0.1	<0.01	0.5	<0.1
Total	**896.5**	**100.1**	**1,042.4**	**100.0**

Source: Data obtained during 2013, 2014, and 2015 vegetation survey of transmission line rights-of-way and access roads (Tetra Tech 2014a, 2015)

[a] Vegetation communities in the corridor shared by both lines are included under both transmission lines

[b] Areas classified as CRP lands were assumed to be CRP based on dominant vegetation characteristics

[c] All lithosol communities in the Midway-Grandview survey area occur as part of a shrub-steppe/lithosol mosaic

[d] Includes areas of shrub-steppe/perennial grassland mosaic

Developed Land

Developed lands are primarily found along the western portion of the Midway-Moxee transmission line, along the southern portion of the Midway-Grandview transmission line, and associated with the substations in the study area. Developed lands include rural residential parcels and paved, gravel, and unpaved roads. Developed areas are highly altered and either lack vegetation or are dominated by a high abundance of non-native invasive plant species or landscaped vegetation.

Agricultural Land

Agricultural lands are the dominant vegetation communities along the western portion of the Midway-Moxee transmission line and the southern portion of the Midway-Grandview transmission line. Large agricultural operations also occur to the south of the Midway Substation and along the central portions of both transmission lines. Agricultural land includes irrigated and dryland agricultural fields supporting vineyards, orchards, hops, wheat, and other row crops, as well as small areas of farmland and pastures associated with rural residences. Agricultural lands that were not being actively farmed (fallow) were also considered agricultural lands. Figure 3.8-1 shows the typical conditions present in one type of agricultural land (vineyards) common to the study area.

Figure 3.8-1. Photograph of Annual Grassland (foreground) and Low-quality Shrub-steppe (mid-photo) with Extensive Vineyards in the Background (Midway-Moxee Structures 4/3, looking back-on-line toward Midway-Moxee Structure 4/2) (Source: Tetra Tech 2014a)

Annual Grassland

Annual grassland occurs along portions of both transmission lines with the highest concentrations along the east-central portion of the Midway-Moxee transmission line and north-central and southern portions of the Midway-Grandview transmission line. Annual grassland consists of areas where native vegetation was removed or disturbed by land use activities such as grazing and past agricultural practices. Dominant vegetation in this community is primarily non-native grasses and forbs including cheatgrass (*Bromus tectorum*), bulbous bluegrass (*Poa bulbosa*), tall tumble mustard (*Sisymbrium altissimum*), Russian thistle (*Salsola tragus*), herb sophia (*Descurainia sophia*), redstem stork's bill (*Erodium cicutarium*), and blue mustard (*Chorispora tenella*). Native species, such as Sandberg bluegrass (*Poa secunda*), western tansymustard (*Descurainia pinnata*), and long-leaf phlox (*Phlox longifolia*) were often observed in this vegetation community, along with fiddleneck (*Amsinckia* spp.) and nodding microseris (*Microseris nutans*). Scattered native shrubs, primarily rubber rabbitbrush (*Ericameria nauseosa*) and green rabbitbrush (*Chrysothamnus viscidiflorus*), were occasionally observed and sometimes locally abundant in annual grassland. Figure 3.8-2 shows the typical conditions present in this vegetation community.

Figure 3.8-2. Photograph of Annual Grassland Dominated by Cheatgrass Between Midway-Moxee Structures 6/4 and 6/5 (Source: Tetra Tech 2014a)

Conservation Reserve Program Land

CRP lands include those areas assumed to be enrolled in the federal CRP program administered by the U.S. Department of Agriculture's Farm Service Agency. Such areas are typically seeded with a mix of native and non-native grasses, forbs, and shrubs specified by the Farm Service Agency. Because data on the location of lands enrolled in the CRP are confidential, lands were assumed to be enrolled in the CRP if the surveyors observed a predominance of crested wheatgrass (*Agropyron cristatum*) or obviously planted bluebunch wheatgrass (*Pseudoroegneria spicata*), two species commonly included in CRP seed mixes. Other common plants observed in areas classified as CRP land include Sandberg bluegrass, cheatgrass, bulbous bluegrass, herb sophia, western tansymustard, fiddleneck, and tall tumble mustard. Representative conditions of crested wheatgrass dominated CRP lands within the study area are depicted in Figure 3.8-3.

CRP land occurs primarily along the central portions of both transmission lines. The northern portion of the Midway-Grandview transmission line also contains small areas of CRP land interspersed with shrub-steppe.

Figure 3.8-3. Photograph Depicting Abundant Cover of Crested Wheatgrass in Apparent CRP Land Between Midway-Moxee Structures 20/4 and 20/5 (Source: Tetra Tech 2014a)

Lithosol

Lithosols do not cover large contiguous patches within the study area but form a patchy mosaic within shrub-steppe and perennial grassland. Shrub-steppe/lithosol mosaic vegetation communities are primarily found on the DOE Hanford Site. A few areas of the most extensive lithosol vegetation communities occur along the east-central portion of Midway-Moxee transmission line.

Lithosol vegetation communities are characterized by soils that are stony and extremely shallow to bedrock, and a characteristic assemblage of native plant species. They are typically dominated by Sandberg bluegrass interspersed with a crust of mosses and lichens and a taller layer of herbs or shrubs that commonly include various species of wild buckwheat (*Eriogonum* spp.) and other herbs or scabland sagebrush (*Artemisia rigida*) (Franklin and Dyrness 1988). Dominant native species present in lithosol vegetation communities in the study area include Sandberg bluegrass, woolly sunflower (*Eriophyllum lanatum*), thread-leaf fleabane (*Erigeron filifolius*), large-fruit desert-parsley (*Lomatium macrocarpum*), several species of buckwheat, narrowleaf mock goldenweed (*Nestotus stenophyllus*), woolly-pod milk-vetch (*Astragalus purshii*), and low pussytoes (*Antennaria dimorpha*). Non-native cheatgrass also occurs within lithosol communities. Figure 3.8-4 shows the typical conditions of the lithosol vegetation communities in the study area.

Figure 3.8-4. Photograph of Lithosol Vegetation Community Near Midway-Moxee Structures 8/4 and 8/5 (Source: Tetra Tech 2014a)

Perennial Grassland

Perennial grassland occurs on the DOE Hanford Site and along the south-central and southern portions of the Midway-Grandview transmission line. Perennial grassland is characterized by a dominance of native bunchgrass species and a lack of shrub cover, although perennial grasslands are often interspersed with shrub-steppe vegetation communities, creating a mosaic of these two community types. Dominant native bunchgrass species observed in this community included bluebunch wheatgrass, squirreltail (*Elymus elymoides*), Indian ricegrass (*Achnatherum hymenoides*), and Sandberg bluegrass. Commonly observed native herbaceous species included long-leaf phlox, thread-leaf phacelia (*Phacelia linearis*), buckwheat milk-vetch (*Astragalus caricinus*), purple cushion fleabane (*Erigeron poliospermus*), low pussytoes, nodding microseris, large-fruit desert-parsley, and Carey's balsamroot (*Balsamorhiza careyana*). Non-native invasive species, such as cheatgrass, bulbous bluegrass, and tall tumble mustard are also found in this plant community. The typical conditions present in high-quality perennial grassland communities at the DOE Hanford Site are depicted in Figure 3.8-5.

Figure 3.8-5. Photograph of High-quality Perennial Grassland Between Midway-Moxee Structures 1/1 and 1/2 (Source: Tetra Tech 2014a)

Shrub-Steppe

In the study area, shrub-steppe occurs interspersed with annual grassland and perennial grassland communities, and occasionally with patches of lithosols. Shrub-steppe is most abundant on the DOE Hanford Site and along the central portions of both transmission lines.

Shrub-steppe is designated by the WDFW as a priority habitat for conservation and management (Washington Department of Fish and Wildlife 2008). Shrub-steppe priority habitat is mapped in the study area within and along the rights-of-way of both transmission lines in the following locations:

- Within both transmission line rights-of-way between Midway-Moxee Structures 1/3 and 3/3 and Midway-Grandview Structures 1/4 to 3/3 on the DOE Hanford Site
- Near, but outside the Midway-Moxee transmission line right-of-way between Line Miles 9 and 10
- Within the Midway-Grandview transmission line right-of-way between Structures 11/5 and 12/6, 14/5 and 15/4, and 18/6 and 19/4
- Near the Midway-Grandview transmission line right-of-way between Structures 21/7 and 24/2

Shrub-steppe within the study area is dominated by big sagebrush (*Artemisia tridentata*), commonly associated with rubber rabbitbrush. On the DOE Hanford Site, other shrubs in shrub-steppe include scabland sagebrush, spiny hopsage (*Grayia spinosa*), winterfat

(*Krascheninnikovia lanata*), and purple sage (*Salvia dorrii*). Bunchgrass species observed in shrub-steppe vegetation communities include squirreltail, Indian ricegrass, bluebunch wheatgrass, needle-and-thread grass (*Hesperostipa comata*), and Sandberg bluegrass. Native forbs include buckwheat, purple cushion fleabane, large-fruit desert-parsley, long-leaf phlox, several species of milk-vetch (*Astragalus* spp.), low pussytoes, and desert yellow fleabane (*Erigeron linearis*). Non-native herbaceous species such as cheatgrass, bulbous bluegrass, herb sophia, tall tumble mustard, hornseed buttercup (*Ceratocephala testiculata*), and jagged chickweed (*Holosteum umbellatum*) also commonly occur in this vegetation community. Figures 3.8-6 and 3.8-7 show the typical conditions present in the low- and high-quality shrub-steppe communities of the study area.

Figure 3.8-6. Photograph of Low-quality Shrub-steppe Near the Midway Substation; the Understory is Dominated by Cheatgrass (Source: Tetra Tech 2014a)

Figure 3.8-7. Photograph of High-quality Shrub-steppe Between Midway-Moxee Structures 1/3 and 1/4 (Source: Tetra Tech 2014a)

Riparian

Riparian vegetation communities within the study area are composed of vegetation that is associated with perennial and intermittent streams. They typically include plant species adapted to grow along the banks of waterways and in adjacent wetlands. Although there are numerous intermittent and ephemeral streams and a few perennial streams in the study area, well-developed riparian vegetation communities are not typically found associated with these waterways. One small area of riparian plant community occurs along Sulphur Creek between Midway-Grandview Structures 18/7 and 19/1.

Plant species observed in the riparian community along Sulphur Creek include a mix of scrub-shrub and herbaceous vegetation including narrow-leaf willow (*Salix exigua*), golden currant (*Ribes aureum*), Russian thistle, fringed willowherb (*Epilobium ciliatum*), western white clematis (*Clematis ligusticifolia*), cursed buttercup (*Ranunculus sceleratus*), saltgrass (*Distichlis spicata*), and common spikerush (*Eleocharis palustris*). A few black cottonwood trees are also present. The typical conditions of this vegetation community are shown in Figure 3.8-8.

Figure 3.8-8. Photograph of Riparian Vegetation Along Sulphur Creek Near Midway-Grandview Structure 18/6 (Source: Tetra Tech 2014a)

Special-Status Plant Species

Special-status plant species include species that have been identified for protection under the ESA (16 U.S.C. 1531 *et seq.*), including species ***ESA-listed*** as ***endangered species*** or ***threatened species***, species proposed for federal listing, and federal species of concern. ***State-listed*** special-status plant species also include ***state endangered species*** or ***state threatened species.*** Species designated as ***state sensitive species*** by the Washington Natural Heritage Program are state special-status species. Special-status plant species on BLM-administered lands include those species designated by BLM as sensitive species for the State of Washington.

As part of the vegetation survey for the project, 35 special-status species from the above sources were evaluated for their potential to occur in the study area (Appendix A, Table A-1). Of these species, the following nine plants are known to occur within 3 miles of the survey area:

- Umtanum desert buckwheat (*Eriogonum codium*) – ESA-listed as threatened, state-listed as endangered, designated by BLM as sensitive
- Columbia milk-vetch (*Astragalus columbianus*) – federal species of concern, state sensitive, BLM Sensitive
- Hoover’s desert parsley (*Lomatium tuberosum*) – federal species of concern, state sensitive, BLM sensitive
- Great Basin gilia (*Aliciella leptomeria*) – state-listed as threatened
- Piper’s daisy (*Erigeron piperianus*) – state sensitive, BLM sensitive
- Small-flower evening primrose (*Camissonia minor*) – state sensitive

- Hoover's tauschia (*Tauschia hooveri*) – federal species of concern, state threatened, BLM sensitive
- Suksdorf's monkey flower (*Mimulus suksdorfii*) – state sensitive, BLM sensitive
- Snake River cryptantha (*Cryptantha spiculifera*) – state sensitive, BLM sensitive

Endangered Species Act–listed Plant Species

Based on county and project-specific species lists provided by USFWS, two ESA-listed threatened species are known to occur or considered to have the potential to occur in the study area. These species are the Umtanum desert buckwheat, known to occur in Benton County, and Ute ladies'-tresses (*Spiranthes diluvialis*), which has the potential to occur in both Benton and Yakima counties (U.S. Fish and Wildlife Service, 2014a, 2014b, 2014c, 2014d, 2015).

Umtanum desert buckwheat, an ESA-listed threatened plant, is the only ESA-listed plant species known to be present in the study area. It is endemic to south-central Washington, with its only known population occurring on the DOE Hanford Site (Washington Natural Heritage Program undated[a]).

Umtanum desert buckwheat is found in areas of shrub-steppe vegetation, where the overall vegetation cover is relatively low and it is associated with native shrubs, forbs, and grasses. Threats to Umtanum desert buckwheat include fire, introduction of non-native plants, seed predation, trampling and crushing from livestock grazing, off-road vehicles, and other recreational uses, small population size, limited geographic range, and low recruitment (Camp and Gamon 2011, U.S. Fish and Wildlife Service 2013a). The DOE Hanford Site contains some of the largest remnant areas of ungrazed and undeveloped shrub-steppe in the region; this site is largely protected from public access, and livestock grazing is not permitted (Center for Plant Conservation 2010).

Although individuals of Umtanum desert buckwheat do not occur in the Midway-Moxee and Midway-Grandview rights-of-way nor within any of the project access roads, these project features are located within ***designated critical habitat*** for this species. Approximately 344 acres of shrub-steppe habitat occurring on the DOE Hanford Site in Benton County are designated as critical habitat for Umtanum desert buckwheat. Designated critical habitat for the species includes native vegetation communities with native species that are associated with Umtanum desert buckwheat individuals. It serves as a buffer area and also as an area to support the pollinators of Umtanum desert buckwheat.

Ute ladies'-tresses, an orchid that is ESA-listed as threatened, is known to occur in moist meadows associated with perennial stream terraces, floodplains, and oxbows; seasonally flooded river terraces; sub-irrigated or spring-fed abandoned stream channels and valleys; and along lakeshores (U.S. Fish and Wildlife Service 2014e). It has also been found along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside borrow pits, reservoirs, and other human modified wetlands. Although a few areas with these types of wetland habitats are present in the study area, no individuals of Ute ladies'-tresses were found in the survey area during the 2013 and 2014 field surveys.

Other Federal and State Special-Status Species

During the vegetation field surveys conducted in 2013 and 2014, three federal and state special-status species were observed on private and public lands in the survey area: Columbia milk-vetch, Piper's daisy, and woven-spore lichen (*Texosporium sancti-jacobi*). A brief description of each of these species and their distribution in the survey area is provided below. No occurrences of any other special-status plant species were found in the survey area during the 2013 and 2014 vegetation field surveys.

Columbia Milk-Vetch – Columbia milk-vetch is a federal species of concern, a state sensitive species, and a BLM sensitive species. It occurs in an approximately 25- by 5-mile area in Yakima, Kittitas, and Benton counties along the west side of the Columbia River (Washington Natural Heritage Program undated[b]). Known populations of Columbia milk-vetch are found growing on deep sandy loams, gravelly loams, and lithosols in shrub-steppe vegetation (Washington Natural Heritage Program undated[b]). Columbia milk-vetch is adapted to low intensity fires and can colonize disturbed areas such as along unpaved roads.

Three populations of Columbia milk-vetch were observed in the study area during the 2013, 2014, and 2015 vegetation field surveys (Tetra Tech 2014a, 2015). Two of these populations are located in the corridor shared by both transmission lines, and the third occurs only along the Midway-Grandview transmission line. One population occurs on the DOE Hanford Site, another occurs on both private and BLM-administered land, and the third population occurs on private land.

Observations of Columbia milk-vetch in the Midway-Moxee survey area were restricted to the eastern portion of the survey area in the Midway-Moxee right-of-way and along access roads outside of the Midway-Moxee right-of-way. Observations of Columbia milk-vetch in the Midway-Grandview survey area were restricted to the northeastern portion of the survey area in the right-of-way and along access roads outside of the Midway-Grandview right-of-way.

Piper's Daisy – Piper's daisy is a state sensitive and BLM sensitive species restricted to south-central Washington (Washington Natural Heritage Program undated[c]). Most commonly found in undisturbed areas of shrub-steppe vegetation, this species has also been found growing in grazed and burned sites (Washington Natural Heritage Program undated[c]).

Three populations of Piper's daisy were observed in the study area during the 2013, 2014, and 2014 vegetation field survey (Tetra Tech 2014a, 2015). Two of these populations are located in the corridor shared by both transmission lines and the other is located along the Midway-Grandview transmission line. One of these populations occurs on the DOE Hanford Site, one occurs on private and BLM-administered land, and one occurs on private land only. Observations of Piper's daisy in the Midway-Moxee survey area were restricted to the eastern portion of the survey area and occurred in two segments of the Midway-Moxee right-of-way. Observations of Piper's daisy in the Midway-Grandview survey area were restricted to the northeastern portion of the survey area and occurred in three segments of the right-of-way.

Woven-Spore Lichen – Woven-spore lichen is a federal species of concern, state-listed threatened species, and BLM strategic species that is found in California, eastern Oregon, eastern Washington, and southwestern Idaho (Washington Natural Heritage Program undated[d]).

Habitat for woven-spore lichen includes arid to semi-arid shrub-steppe, grassland, biscuit scabland, or savannah communities up to 3,300 feet in elevation (Washington Natural Heritage Program undated[d]).

One population of woven-spore lichen was observed on private land in the Midway-Grandview portion of the study area (Tetra Tech 2014a). Six individuals were observed in this area. The individuals are very small and consequently difficult to detect; therefore, it is likely that more individuals may be in the area (Tetra Tech 2014a).

Bureau of Land Management Special-Status Plant Species

The Oregon/Washington BLM maintains a list of special-status and sensitive species via an interagency program with the Pacific Northwest Regional (Region 6) Office of the U.S. Forest Service. This program, known as the Interagency Special-Status/Sensitive Species Program, focuses on the conservation and management of rare species at the regional level, including those species that may or may not have a federal status under the ESA (U.S. Forest Service and Bureau of Land Management 2014). Under this program, BLM special-status plants include those that are ESA-listed as threatened, endangered, and proposed; and other species determined to be sensitive by BLM. BLM sensitive species include those that are not ESA-listed but which include state-listed and ***state candidate species*** and those designated by the BLM state director for special management consideration. BLM also maintains a list of strategic species whose populations are being assessed and tracked by BLM, but that are not subject to ground management.

Umtanum desert buckwheat, Columbia milk-vetch, and Piper's daisy are BLM sensitive species that occur in the project study area (Bureau of Land Management 2011b). Of these species, Columbia milk-vetch and Piper's daisy were observed on BLM-administered land in the survey area during the 2013, 2014, and 2015 field surveys. Numerous individuals of Columbia milk-vetch were observed near transmission line structures and access roads on BLM-administered land along both the Midway-Moxee and Midway-Grandview transmission lines. Only one individual of Piper's daisy was observed on BLM-administered land along the Midway-Moxee transmission line. Woven-spore lichen is listed as a BLM strategic plant species and was found on private land in the Midway-Grandview survey area.

<u>DOE Hanford Site</u>

Vegetation and other biological resources on the DOE Hanford Site are managed by the DOE-RL in accordance with the *Hanford Site Biological Resources Management Plan* (U.S. Department of Energy 2013a). This plan classifies the biological resources of the DOE Hanford Site into six resource priority levels ranging from Level 0 (lowest priority) to Level 5 (highest priority) based on the relative value of both the species and habitats present. Each priority level has differing management goals, levels of protection, monitoring requirements, and mitigation obligations. Typically, Level 2 through Level 4 require mitigation at varying replacement ratios. For Level 5 resources, compensatory mitigation is determined on a case-by-case basis.

The portion of the transmission line corridor located on the DOE Hanford Site crosses areas with the following resource levels:

- Level 3 priority resources associated with conservation corridors and unique plant communities
- Level 4 priority resources associated with high-quality scrub-steppe habitats and unique plant communities
- Level 5 priority resources associated with rare cliff and talus slope habitats (Umtanum Ridge) and the known presence plant species that are ESA-listed as threatened and state-listed as endangered (U.S. Department of Energy 2013a)

Noxious Weeds

Noxious weeds are non-native plants that have been designated as undesirable plants by federal and state laws. Weeds displace native species, decrease plant species diversity, degrade habitat for rare species and wildlife, increase the potential for wildfire, decrease productivity of farms, rangelands, and forests, create unattractive areas dominated by single species, and impair full use of the landscape by wildlife and humans. As weed infestations spread, private landowners and public land managers spend increasing amounts of money, time, and resources conducting weed control activities.

The Washington State Noxious Weed Control Board maintains the state's official list of noxious weeds that landowners may be required to control. As defined in Table 3.8-2, noxious weeds on the statewide list are separated into three classes based on their distribution in the state and their control requirements under both federal and state law (Washington State Noxious Weed Control Board 2010). Local noxious weed boards use the statewide list and classifications to identify noxious weed problems in their jurisdictions and to implement and prioritize control efforts. Both the Benton and Yakima County Noxious Weed Boards maintain county-specific noxious weed lists and assign their own classifications based on the distribution of these weeds in their respective jurisdictions.

Table 3.8-2. Washington State Noxious Weed Classification

Class	Definition
A	Non-native native plants whose distribution in Washington State is still limited. Eradicating existing infestations and preventing new infestations are the highest priorities. Eradication of all A-classified weeds is required by law.
B	Non-native plants whose distribution is limited to portions of Washington State. Species are designated for control in state regions where they are not yet widespread. Prevention of new infestations in these areas is the primary goal. In regions where a B-classified species is already abundant, control is decided at the local level, with containment of these weeds being the primary goal so that they do not spread into un-infested regions. B-classified weeds can be designated for mandatory control by the Washington State Noxious Weed Control Board.
C	Non-native plants that are either already widespread in Washington or are of special interest to the agricultural industry. Counties can choose to enforce control of these weeds if it is beneficial to that county. They can also choose to provide education or technical support to residents for the removal or control of these weeds.

Source: Washington State Noxious Weed Control Board 2014

A noxious weed survey of the transmission line corridors and associated access roads was conducted in June 2014 for all noxious weeds on the Washington State Noxious Weed Control

Board's class A and B lists and weeds of concern identified by the Benton and Yakima County Noxious Weed Boards. During this survey, 10 state-listed noxious weed species were found in the survey area (BFI Native Seed 2014). These include seven state-listed B-class weeds and three C-class weeds (Table 3.8-3). Of these, Benton County considers four to be class B noxious weeds and three to be class C noxious weeds. Three of the state-listed weeds found in the field – perennial pepperweed (*Lepidium latifolium*), field bindweed (*Convolvulus arvensis*), and hoary cress (*Cardaria draba*) – are not included on Benton County's 2014 weed list because they are not currently a priority in that county (Vowels pers. comm.). Yakima County classifies six of these species as class B noxious weeds and two as class C noxious weeds. Both kochia (*Kochia scoparia*) and field bindweed have been removed from the Yakima County list due to their widespread abundance (BFI Native Seed 2014; Shinn pers. comm.).

Table 3.8-3. Noxious Weeds Identified in the Vegetation Study Area

Noxious Weed Species		Location Found		Classification		
Common Name	**Scientific Name**	**Transmission Line**	**County**	**State[a]**	**Benton County[b]**	**Yakima County[c]**
Diffuse knapweed	*Centaurea diffusa*	MM, MG	Benton, Yakima	B	B	B
Perennial pepperweed	*Lepidium latifolium*	MM, MG	Yakima	B	N/A[d]	B
Puncturevine	*Tribulus terrestris*	MM, MG	Benton, Yakima	B	C	B
Rush skeletonweed	*Chondrilla juncea*	MG	Benton, Yakima	B	B	B
Russian knapweed	*Acroptilon repens*	MM, MG	Benton, Yakima	B	B	B
Scotch thistle	*Onopordum acanthium*	MM, MG	Yakima	B	B	B
Kochia	*Kochia scoparia*	MM, MG	Benton, Yakima	B	C	N/A[e]
Canada thistle	*Cirsium arvense*	MM, MG	Yakima	C	C	C
Field bindweed	*Convolvulus arvensis*	MM, MG	Yakima	C	N/A[d]	N/A[e]
Hoary cress	*Cardaria draba*	MM, MG	Yakima	C	N/A[d]	C

[a] State noxious weed classification based on Washington State Noxious Weed Control Board 2014 Noxious Weed List

[b] Benton County noxious weed classification based on 2014 Benton County Noxious Weed List

[c] Yakima County noxious weed classifications based on 2014 Yakima County Noxious Weed List and Control Policy

[d] Removed from local noxious weed list because it is not currently a priority in Benton County (Vowels pers. comm.)

[e] Removed from local noxious weed list because its abundance and wide distribution in the county make control impracticable (BFI Native Seed 2014; Shinn pers. comm.)

The following sections provide a brief description[3] for each of these species, including their classification, biology, and observed occurrence in the Midway-Moxee and Midway-Grandview project areas.

Diffuse Knapweed

Diffuse knapweed is an aggressive annual, biennial, or a short-lived perennial that grows from a long taproot and is capable of forming dense stands on any open ground. Reproduction is primarily by seed, with a single flower stalk capable of producing up to 1,200 seeds. It fits into the class of plants known as tumbleweeds, which spread their seeds annually after the growing season through transport of the plant tops by wind. Diffuse knapweed is highly adaptable and capable of establishing in a variety of habitats, including river shores, rangeland, and pastures. It thrives in disturbed habitats such as gravel pits, roadsides, railroad tracks, vacant lots, airports, trails, and heavily grazed pasture. Diffuse knapweed is considered a noxious weed because infestations increase production costs for ranchers, decrease plant diversity and wildlife habitat, increase soil erosion rates, and pose wildfire hazards.

Diffuse knapweed is well established within the rights-of-way both transmission lines in Benton and Yakima counties. It is by far the most abundant of the weed species recorded during the 2014 survey. Diffuse knapweed is considered a class B weed in both Benton and Yakima counties.

Perennial Pepperweed

Perennial pepperweed is a deep-rooted, long-lived perennial that has multiple stems extending from a woody base. Plants are normally 1 to 3 feet tall, but can reach up to 6 feet in height. It primarily spreads by creeping rhizomes and root fragments, but can also reproduce from seed, which can be dispersed by wind and water. Perennial pepperweed is found in a variety of places, including waste areas, wet areas, ditches, roadsides, croplands, and dry habitats. It is considered a noxious weed because it forms dense infestations that can turn into monocultures. The dense monocultures of semi-woody stems accumulate, degrading wildlife habitat and displacing more desirable species.

Scattered occurrences of perennial pepperweed are present within the rights-of-way of both transmission lines in both Benton and Yakima counties. It is common in irrigated agricultural areas, lowland swales, depressions, and drainage features. While infrequent in the survey area it is quite capable of developing extensive and difficult to eradicate infestations in suitable sites. Perennial pepperweed is considered a class B weed in Yakima County. It is not included on Benton County's 2014 noxious weed list because it is not a currently a priority in that county (Vowels pers. comm.).

[3] Unless otherwise noted, the following species descriptions were obtained from the noxious weed fact sheets available on Washington's Noxious Weed Control Board website (Washington State Noxious Weed Control Board 2010) and *Undesirable Plant Survey Report for the BPA Midway-Moxee Transmission Line Rebuild and Midway-Grandview Transmission Line Upgrade Project* (BFI Native Seed 2014).

Puncturevine

Puncturevine is a summer annual that grows prostrate to the ground from a taproot, often forming dense mats across the ground surface. It is found in pastures, roadsides, waste places, parks, and agricultural areas, and can also grow in gravel roads and parking lots. It reproduces entirely from seeds, which are borne in woody burs that at maturity break into tack-like structures with sharp, ridged spines. When run over or stepped on, the spiny seeds frequently penetrate or lodge in the surface of tires, shoes, and hooves, allowing dispersal to new areas. Burs can be injurious to wildlife, domestic animals, and humans. Puncturevine is also toxic to livestock.

Puncturevine occurs within the rights-of-way of both transmission lines in irrigated agricultural areas, associated access roads, and on the portion of Lewandowski Road that crosses the Midway-Grandview transmission line. It occurs in both Benton and Yakima counties. In Benton County, it is considered a class C weed. In Yakima County, it is considered a class B weed.

Rush Skeletonweed

Rush skeletonweed is an aggressive, deep-rooted perennial weed that generally inhabits well-drained, light-textured soils along roadsides in rangelands, grain fields, and pastures (Whitson *et al.* 2002). It ranges from 1 to 4 feet in height, with a taproot reaching down 7 feet or more. It spreads primarily from seeds but can also grow from shoot buds along lateral roots or at the top of the main root. Once established in croplands, cultivation and related soil disturbance are the major factors of spread. Infestations of rush skeletonweed can reduce crop yields and forage availability due to competition, and create harvest difficulties associated with the plant's wiry stems and latex sap, which can bind or gum up harvesting machinery.

Rush skeletonweed occurs in rangeland areas and dry creek beds, exclusively in the Benton County portion of the Midway-Grandview right-of-way. It is not found in the Midway-Moxee project area.

Russian Knapweed

Russian knapweed is a bushy, branched perennial that can grow up to 3 feet tall. It forms colonies that arise from vigorous, deep, spreading rhizomes. It is also capable of reproducing from seed, though the seed does not have a mass dispersal mechanism (such as water- or wind-borne dispersal). Found growing in pastures, hayfields, grain fields, irrigation ditches, and roadsides, Russian knapweed is considered a noxious weed because it is an aggressive invader of pastures, non-crop areas, grain fields, and other cultivated fields. It is also poisonous to horses.

Russian knapweed occurs infrequently in the Midway-Moxee and Midway-Grandview transmission line rights-of-way. When present, it commonly occurs in areas with deeper soils in dry uplands and agricultural lowlands. It was found in both Benton and Yakima counties where it is classified as a class B weed.

Scotch Thistle

Scotch thistle is a spiny biennial or annual weed that can grow up to 8 feet or more in height and 6 feet or more in width. It reproduces exclusively by seed, with each plant capable of producing

8,400 to 40,000 seeds with numerous fine, barbed plumes that enable them to be dispersed locally by wind or spread by attaching to the coats of animals or to clothing. Scotch thistle generally inhabits moist sites or drainages in dry locations but can also be found in dry pastures and rangelands. It is primarily a problem in rangeland where infestations can reduce forage production. Dense stands can also prohibit livestock from accessing grazing areas and water sources.

Scotch thistle occurs infrequently in the Yakima County portions of the Midway-Moxee and Midway-Grandview transmission line rights-of-way. It is typically located in lowland agricultural areas and upland rangelands. Scotch thistle is listed as a class B noxious weed by Yakima County.

Kochia

Kochia is an annual weed that grows from a deep taproot. It is a multi-branched, spreading plant that can reach heights of 2 to 5 feet. Kochia invades a wide variety of habitats, including cultivated fields, gardens, roadsides, ditch banks, and waste areas (Whitson *et al.* 2002:270–271). It primarily spreads by seed, which is wind dispersed. It is considered a noxious weed because it is an effective competitor for light, nutrients, and soil moisture, and can reduce crop yields, especially those related to late-maturing crops.

Kochia is abundant throughout both the Midway-Moxee and Midway-Grandview transmission lines' rights-of-way, occurring in irrigated lowlands, fallow dryland agricultural fields, structure sites, and access roads in both Benton and Yakima counties. Benton County considers kochia to be a class C weed. Because of its abundance and wide distribution, the Yakima County Noxious Weed Board considers kochia to be well beyond any reasonable control and has removed it from its noxious weed list (BFI Native Seed 2014; Shinn pers. comm.).

Canada Thistle

Canada thistle is an aggressive colony-forming perennial weed with a deep root system characterized by extensive horizontal spreading roots (Whitson *et al.* 2002:110–111). Infestation can be spread by seed but most often occurs when roots are redistributed by tillage and other agricultural practices. Canada thistle occurs in cultivated fields, riparian areas, pastures, rangeland, forests, lawns, gardens, roadsides, and waste areas. It is considered a noxious weed because it can significantly reduce crop yields.

Canada thistle is found in in both the Benton County and Yakima County portions of the Midway-Moxee and Midway-Grandview transmission line rights-of-way in areas of higher soil moisture, including irrigated agricultural areas, moist depressions, and deep-soiled lowlands. It occurs at multiple structure locations along the Midway-Moxee transmission line and in irrigated fields. Canada thistle is considered a class C noxious weed by both Benton and Yakima counties.

Field Bindweed

Field bindweed is a long-lived perennial weed with a root system that can extend to a depth of up to 20 feet. It spreads aggressively and extensively through rhizomes, often climbing on other vegetation or structures or forming dense tangled mats on the ground surface. It also spreads by seeds, which can remain viable for up to 50 years. Field bindweed is capable of growing on a wide variety of sites from mesic deep soil lowlands to drier rangelands at a variety of elevations.

Field bindweed is abundant in many of the irrigated agricultural portions of both the Midway-Moxee and Midway-Grandview transmission line rights-of-way, usually occurring along roads. Outside of these areas, it is found in disturbed uplands along both transmission lines. It occurs in both Benton and Yakima counties. Field bindweed is not on the 2014 Benton County weed list because it is not currently a priority in that county (Vowels pers. comm.). This species has been removed from the Yakima County noxious weed lists because it is considered to be so widespread that it is beyond any reasonable means of control (Shinn pers. comm.).

Hoary Cress

Hoary cress, or whitetop, as it is commonly known in this area, is a deep-rooted, long-lived perennial weed that spreads vegetatively through rhizomes extending from established plants. It also reproduces from seed, which can be spread by wind. It commonly occurs on alkaline, disturbed soils and is highly competitive with native plants and agricultural crops once it becomes established (Whitson *et al.* 2002:220–221).

Hoary cress occurs predominantly in irrigated lowlands crossed by the Midway-Moxee transmission line right-of-way, with infrequent occurrences in mesic depressions and swales. It also occurs in scattered locations in the Midway-Grandview transmission line right-of-way. Hoary cress occurs in both Benton and Yakima counties. It is not on the 2014 Benton County weed list because it is not currently a priority in that county (Vowels pers. comm.). Yakima County considers hoary cress to be a class C noxious weed.

3.8.2. Environmental Consequences – Proposed Action

Direct impacts on vegetation communities, including areas of shrub-steppe identified as WDFW priority habitat, would result from construction of the Proposed Action. Transmission line structure removal and installation, access road work, pulling and tensioning, and danger tree removal would directly impact vegetation through the removal of plants and disturbance of the ground surface. Clearing and grading activities would remove vegetation and the upper, most biologically active portion of the soil. Heavy equipment would crush vegetation and compact soils, potentially damaging plant roots. New structure installation and access road work would permanently remove vegetated areas. In lithosol areas, removal of the upper layer of the soil would change the substrate, impacting the vegetation associated with these rocky areas. Loss of plant cover and disturbance of soil from these activities would disrupt biological functions, including nutrient retention and recycling, and thus degrade plant habitat, at least temporarily. In addition, such activities could alter native plant communities by increasing the potential for the introduction and spread of non-native plant species and noxious weeds. Although many of these impacts could be partially mitigated by replanting disturbed areas after construction, revegetation can be slow or difficult in this arid area.

Indirect impacts on vegetation communities could occur where project construction activities result in degradation of nearby vegetation or in construction areas after the initial disturbance. Indirect impacts could include the introduction and spread of noxious weed species into disturbed areas by construction equipment, vehicles, workers, and materials contaminated with seeds, roots, and other weed parts. Bare, disturbed, and compacted soils are also vulnerable to weed invasion through natural dispersal, such as wind-blown seeds. Weeds could displace native plants and degrade vegetation communities, whether natural or managed, and could alter the natural fire regime by increasing the frequency of wildfires. Indirect impacts from construction activities could also include minor ***sheet erosion*** and the formation of some small channels, which could degrade downslope vegetation communities. The risk of erosion would be highest on steep slopes and during heavy rainfall. The implementation of BMPs and mitigation measures described below in Section 3.8.3, Mitigation Measures – Proposed Action, would help prevent or minimize indirect impacts on vegetation communities.

Construction of the Proposed Action would cause both direct and indirect impacts on special-status species and their habitats through many of the same impact mechanisms discussed above. Potential impacts specific to vegetation communities, special-status species, and vegetation resources on public lands that could result from the Proposed Action are described in detail below. Additional information on vegetation impacts is provided in Appendix A.

Vegetation Communities

Structure Removal and Installation

The extent of direct impacts on vegetation at each transmission line structure removal and installation site would depend on the quality of existing vegetation, soils, topography, and the number of poles per structure. Work at each structure site could remove or crush vegetation (including special-status plant species, if present), damage soil crusts, disturb seed banks, and compact topsoil. Most of these vegetation impacts would be temporary and could be reduced by implementation of the mitigation measures identified below in Section 3.8.3, Mitigation Measures – Proposed Action.

Construction-related ground disturbance for structure removal and installation (including counterpoise and guy wires) would be limited to areas in and around individual structure sites and would not affect the entire right-of-way for both transmission lines. Work would primarily occur within an area measuring 100 feet by 100 feet around each structure site.

The permanent disturbance area associated with structure removal and installation would primarily occur within a 10-foot radius around each wood pole and is estimated at 0.012 acre (503 square feet) for two-pole structures and 0.016 acre (691 square feet) for three-pole structures. This includes the area occupied by the pole, as well as the area where vegetation would be controlled on a long-term basis using mechanical methods and herbicides. Since most replacement poles would be installed either in the same location or within 5 feet of existing poles, this permanent disturbance area would generally include areas that were previously disturbed by pole installation and vegetation management.

The temporary disturbance area associated with structure removal and installation would primarily occur outside of the permanent disturbance area mentioned above and could vary between 0.1 and 0.2 acre depending on the number of poles and the size of the associated work area.

Structure removal and installation would result in 105.2 acres of temporary impacts and 5.5 acres of permanent impacts on vegetation communities along both transmission lines. Temporary impacts are those that result in the disturbance of vegetation but do not prevent the reestablishment of vegetation communities similar to the preconstruction vegetation community within 5 years. Permanent impacts result in the modification of a vegetation community to the extent that it would not return to preconstruction conditions during the life of the project.

Structure removal and installation for the Midway-Moxee transmission line could result in temporary and permanent impacts on a total of 67.5 acres of existing vegetation communities in the study area, including:

- Temporary impacts on 64.2 acres in construction work areas, which include 48.1 acres of very low-quality, predominantly non-native vegetation communities (i.e., agricultural land, annual grassland, CRP land, and disturbed and developed area), and 16.1 acres of low- to high-quality native vegetation communities (i.e., lithosol, perennial grassland, shrub-steppe, and the various mosaics of these communities)
- Permanent impacts on 3.3 acres, which consists mainly of low-quality, predominantly non-native vegetation communities, and 0.7 acre of low- to medium-quality native vegetation communities

No permanent impacts on high-quality vegetation communities from structure removal and installation would occur for the Midway-Moxee transmission line. Temporary impacts on high-quality vegetation communities from structure removal and installation would occur, but would be limited to less than 0.05 acre of high-quality shrub-steppe community on the DOE Hanford Site.

Structure removal and installation for the Midway-Grandview transmission line would result in temporary and permanent impacts on a total of 43.2 acres of impacts on vegetation communities, including:

- Temporary impacts on 41.0 acres, which include 22.9 acres of very low-quality, predominantly non-native vegetation communities, and 18.1 acres of very low- to medium-quality native plant communities
- Permanent impacts on 2.2 acres, which include 1.2 acres of very low-quality, predominantly non-native vegetation communities, and 1.0 acre of low- to medium-quality native vegetation

No temporary or permanent impacts on high-quality vegetation communities from structure removal and installation would occur along the Midway-Grandview transmission line. Because structure removal and replacement for both the Midway-Moxee and Midway-Grandview transmission lines under the Proposed Action would result in the permanent removal or disturbance of moderate-quality native vegetation communities, these impacts are considered moderate.

Access Road Work

About 137.9 acres of vegetation would be permanently impacted from new access road construction, and reconstruction and improvement of existing access roads. Access road construction would require grubbing and clearing of existing vegetation; excavating, grading, and compacting existing soils; and placing and manipulating new fill material and aggregate and installing drainage features. Many of these activities would permanently or temporarily replace vegetated areas with unvegetated roadbeds and associated features. Some orchard trees would need to be removed to access structures in orchards. Because most areas along existing roads consist of lower quality vegetation, impacts would be low. In some areas, creation of new roads would disturb areas that have not been subject to much disturbance in the past.

Access roads in the corridor shared by both the Midway-Moxee and Midway-Grandview transmission lines (i.e., Midway Substation to Midway-Moxee Structure 5/3) provide access to both lines. To avoid double counting the impacts from proposed work on these roads, all access road impacts on vegetation in the common corridor are included below under the discussion of impacts from the Midway-Moxee transmission line. Approximately 13.0 acres of the impacts to vegetation communities summarized below are common to both the Midway-Moxee and Midway-Grandview transmission lines.

Midway-Moxee access road construction and improvement work would permanently impact approximately 75.3 acres of vegetation communities in the study area, including 60.1 acres of very low-quality, predominantly non-native vegetation communities and 15.2 acres of very low- to high-quality native vegetation communities. High-quality vegetation communities that would be permanently impacted by access road work include 0.9 acre of high-quality shrub-steppe, 0.6 acre of high-quality perennial grassland, and 1.5 acres of high-quality shrub-steppe/perennial grassland mosaic. All remaining impacts would occur in very low-, low-, and medium-quality native vegetation communities.

Access road construction and improvement work within the portion of the Midway-Grandview transmission line located outside of the corridor shared by both lines would permanently impact about 62.6 acres of vegetation communities in the study area, including 45.8 acres of very low-quality, predominantly non-native vegetation communities and 16.8 acres of very low- to medium-quality native vegetation communities. This includes 0.1 acre of low-quality riparian vegetation community, a community type that occurs infrequently in the project area.

Because the Proposed Action would result in the permanent removal or disturbance of moderate-quality native vegetation communities along both transmission lines and small areas of high-quality vegetation communities along the Midway-Moxee transmission line, vegetation community impacts associated with access road work are considered moderate.

Pulling and Tensioning Sites

Vegetation impacts at the portions of 34 pulling and tensioning sites outside of the structure work areas could include the clearing and crushing of vegetation, damage of plant roots from soil compaction, and soil crust disturbance. Pulling and tensioning sites include construction areas for structures and access roads, which would have already experienced disturbance prior to conductor installation. Most of the impacts from pulling and tensioning activities would be temporary and could be reduced by implementing the mitigation measures presented below in Section 3.8.3, Mitigation Measures – Proposed Action.

The impact intensity and duration of pulling and tensioning activities is considerably less than structure removal and installation and access road construction, reconstruction, and improvement work. Pulling and tensioning activities involves driving and parking equipment for a short period of time, without digging or other ground disturbance. Workers would set up equipment once to pull and tension in the correct position to tension, so the entire pulling and tensioning site would not be disturbed.

Four pulling and tensioning sites would be located in and along the transmission line corridor common to both the Midway-Moxee and Midway-Grandview transmission lines, while 18 would be located along only the Midway-Moxee line and 12 would be located along only the Midway-Grandview line. Three of the pulling and tensioning sites that are located in the common corridor would be located on the DOE Hanford Site. One of the pulling and tensioning sites along the Midway-Moxee line would be located on WDNR lands. The remaining 30 pulling and tensioning sites would be located on private lands.

Temporary impacts on 26.2 acres of vegetation communities from pulling and tensioning activities could include disturbance within:

- 7.7 acres of agricultural lands
- 5.8 acres of annual grasslands
- 3.0 acres presumed to be CRP lands
- 1.5 acres of low-quality perennial grassland
- 6.0 acres of low- to medium-quality shrub-steppe
- 0.3 acre of low quality lithosol

Pulling and tensioning would cause temporary impacts on a variety of vegetation communities, including some low- and medium-quality native shrub-steppe, low-quality perennial grassland, and low-quality lithosol communities. Because these activities are shorter in duration and intensity that other construction activities, disturbed areas would be expected to recover fairly rapidly. When coupled with the applicable mitigation measures listed below in Section 3.8.3, Mitigation Measures – Proposed Action, these impacts would be low.

Vegetation Communities – Public Land Impacts

Vegetation community impacts on the DOE Hanford Site, BLM-administered lands, U.S. Bureau of Reclamation (BoR) land, and WDNR lands would occur from construction activities. Table 3.8-4 summarizes the impacts on vegetation communities from Midway-Moxee and Midway-Grandview structure installation and removal, access road work, and pulling and tensioning, but does not include staging areas, because locations have not been identified. Staging areas would not be located on BLM-administered lands, BoR land, and WDNR lands, but could be in a disturbed and developed area around the BPA Midway Substation on the DOE Hanford Site.

Table 3.8-4 does not include impacts on developed lands. Developed lands include rural residential parcels and access roads. Developed areas are highly altered and either lack vegetation or are dominated by a high abundance of non-native invasive plant species or landscaped vegetation.

On the DOE Hanford Site, impacts on about 12.2 acres of vegetation communities could occur from construction activities, as detailed in Table 3.8-4. Of these acres of impact on vegetation communities, 7.6 acres could be temporarily impacted and 4.6 acres could be permanently impacted.

On BLM-administered lands, impacts on about 5.3 acres of vegetation communities could occur from construction activities, as detailed in Table 3.8-4. Pulling and tensioning sites would not be located on BLM-administered lands. Of these acres of impact, 3.3 acres could be permanently impacted and 2.0 acres could be temporarily impacted.

On BoR land that would be impacted, vegetation communities have been degraded by land use activities, such as grazing or past cultivation, and are classified as very low-quality annual grassland. The annual grassland communities are dominated by non-native species, including invasive annual grass and forb species. The acreage that would be impacted was not quantified due to the low-quality vegetative community.

On WDNR lands, impacts on about 12.1 acres of vegetation communities could occur from construction activities, as detailed in Table 3.8-4. Of these acres of impact, 6.2 acres could be permanently impacted and 5.9 acres could be temporarily impacted.

Table 3.8-4 Potential Vegetation Community Impacts from Midway-Moxee and Midway-Grandview Construction Activities on Public Lands

Vegetation Community	Acres of Temporary (Temp) and Permanent (Perm) Impacts on Public Lands					
	DOE Hanford Site (Temp)	DOE Hanford Site (Perm)	BLM (Temp)	BLM (Perm)	WDNR (Temp)	WDNR (Perm)
Agricultural land	–	–	–	–	<0.05	0.4
Annual grassland	–	–	0.4	1.3	4.3	3.8
CRP	–	–	0.1	<0.05	–	<0.05
Perennial grassland – *high quality*	–	0.6	–	–	–	–
Perennial grassland – *medium quality*	1.4	<0.05	–	–	–	–
Shrub-steppe-perennial grassland – *high quality*	–	1.5	–	–	–	–
Shrub-steppe-perennial grassland – *medium quality*	3.5	1.1	–	–	–	–
Shrub-steppe-perennial grassland – *low quality*	0.5	0	–	–	–	–
Shrub-steppe-lithosol mosaic – *medium quality*	0.9	0.3	–	–	–	–
Shrub-steppe – *high quality*	–	0.9	–	–	–	–
Shrub-steppe – *medium quality*	1.3	0.2	1.1	1.1	–	–
Shrub-steppe – *-low quality*	–	–	0.4	0.9	1.6	2.0
TOTAL	**7.6**	**4.6**	**2.0**	**3.3**	**5.9**	**6.2**

Special-Status Species

Impacts from structure removal and replacement on special-status species from the Proposed Action were determined using results from field surveys and Geographic Information System (GIS) analysis. Analysis of impacts includes the acreage of occupied habitat for each species that could be impacted by construction. It also includes the number of individuals of special-status species observed during the 2013, 2014, and 2015 field surveys in the 100-foot by 100-foot construction work areas for all proposed transmission line structures and along off-right-of-way access roads where work would occur.

Analysis of impacts on special-status species from structure removal and replacement includes an estimate of the acres of occupied habitat that could be impacted. If individuals of special-status plant species were observed around a structure site during field surveys, or within the right-of-way of a span where a new structure would be constructed, the entire 100-foot by 100-foot area around these structure locations, with the exception of areas not considered potential habitat (i.e., agricultural or developed land), was considered occupied habitat.

Impacts on special-status plant species from access road work includes an estimate of the acres of occupied habitat that would be impacted both within and outside the rights-of-way. If individuals of special-status plant species were observed along an off-right-of-way access road or within the right-of-way of a span where access road work would occur, the area was considered occupied habitat. Acreage for impacts on occupied habitat from access road work was based on a 20-foot-wide disturbance area for all road categories (i.e., new road, improved road, reconstructed road). The entire 20-foot-wide disturbance area, including the estimated 10 feet of existing road beds of access roads to be improved or reconstructed, was used because special-status species were commonly seen growing within and along existing road beds.

Analysis of impacts from access road work also includes an estimate of individuals impacted by work on off-right-of-way access roads. Estimates of special-status plant individuals were collected for each individual span within the entire width of the rights-of-way of both transmission lines, including within-right-of-way access roads. However, the number of individuals observed was not estimated separately for the structure spans within the rights-of-way and individual access roads within the rights-of-way. Therefore, the number of individuals of special-status species impacted from access road work within the rights-of-way was not estimated. All impacts on special-status species from access road work are considered temporary because the two special-status species (Columbia milk-vetch and Piper’s daisy) were commonly seen growing within the existing road beds within the project area and are likely to recolonize the new, reconstructed, and improved road beds once construction is complete.

Endangered Species Act–-Listed Species and Designated Critical Habitat

Umtanum desert buckwheat is the only ESA-listed plant species in the project area, located only the DOE Hanford Site. Because the Umtanum desert buckwheat individuals closest to transmission line structures occur about 400 feet from a structure construction work area, direct impacts on individuals of this species would not occur from structure removal or installation. Umtanum desert buckwheat individuals occur about 60 feet from the edge of an existing access road that would be improved. To avoid direct impacts on this species, individuals of Umtanum desert buckwheat within 200 feet of construction work areas would be fenced or flagged (including a minimum 25-foot buffer area), and this area would be designated a sensitive area to be avoided by construction personnel and equipment. A monitor would be present during work in the DOE Hanford Site to ensure that construction work and workers remain in designated work areas.

Indirect effects on Umtanum desert buckwheat from construction activities could potentially occur through degradation of preferred pollinator habitat, which would be avoided by mitigation measures. Construction on the DOE Hanford Site would occur during the winter months to minimize impacts on pollinators and above-ground portions of native plants and to minimize effects on native seed production. BPA construction disturbance areas would be minimized, to the extent possible, to minimize degradation of preferred pollinator habitat. BPA is working with DOE-RL staff to develop a Revegetation Plan to mitigate for impacts on native vegetation. Only native species acceptable for restoration and revegetation on the DOE Hanford Site would be planted in disturbed areas.

Indirect effects on Umtanum desert buckwheat from construction activities could potentially occur through the introduction and spread of non-native plants and noxious weeds, which would be avoided or minimized by mitigation measures. Mitigation measures include washing of construction vehicles prior to entry and revegetation of areas temporarily disturbed by construction. A post-construction noxious weed survey would be conducted to locate any or expanded weed infestations, followed by implementation of noxious weed control, to minimize the spread of noxious weeds after construction.

Indirect effects on Umtanum desert buckwheat from construction activities could potentially occur from increased fire risk. Construction on the DOE Hanford Site would occur during the winter months, and this would minimize the risk of construction-related fire by avoiding work during fire season. Should a fire break out in the area in the future, improved access roads could act as a fire break and provide quick access to fire fighters and firefighting equipment, a beneficial impact.

Designated critical habitat for Umtanum desert buckwheat overlaps with approximately 23.1 acres of the Midway-Moxee and Midway-Grandview transmission line rights-of-way and with some access roads. In total, about 0.93 acre of the 344 acres of designated critical habitat for Umtanum desert buckwheat could be permanently impacted and about 1.14 acres could be temporarily impacted. Accordingly, about 0.6 percent of the area designated as critical habitat could be impacted by the Proposed Action. These impacts would occur in areas where access roads and transmission lines currently exist. Pulling and tensioning sites and staging areas would not be located in designated critical habitat for Umtanum desert buckwheat.

Impacts on designated critical habitat could include alteration of habitat, including removal of native vegetation, introduction of non-native invasive plants, disturbance of suitable habitat for native pollinators, and an increase in the risk of fire. The implementation of revegetation approved by DOE-RL and USFWS biologists, mitigation measures, and BMPs would help minimize these impacts.

Because the Proposed Action would primarily occur in areas that have previously been disturbed for construction of transmission lines and access roads and mitigation would minimize impacts, the Proposed Action would have no effect on Umtanum desert buckwheat individuals and would not destroy or adversely modify designated critical habitat for this species. However, about 0.93 acre of the 344 acres of designated critical habitat for Umtanum desert buckwheat could be permanently impacted and about 1.14 acres could be temporarily impacted. Because structure removal and installation and access road work would cause disturbance to designated critical habitat for an ESA-listed species, these impacts are considered moderate, after mitigation to minimize impacts and restore habitat.

Other Federal and State Special-Status Species

Columbia milk-vetch – Three populations of Columbia milk-vetch are present on the DOE Hanford Site, BLM-administered lands, and private lands along both the Midway-Moxee and Midway-Grandview transmission lines. About 34.06 acres of habitat for Columbia milk-vetch could be disturbed by construction activities. Of these acres of impact, 0.49 acre could be permanently impacted and 33.57 acres could be temporarily impacted.

About 13,000 Columbia milk-vetch individuals could be impacted by structure replacement activities, access road work, and pulling and tensioning along the Midway-Moxee and Midway-Grandview transmission lines. This number likely underestimates the number of Columbia milk-vetch that could be impacted because individuals that occur on access roads within the right-of-way, but outside of structure work areas, were not counted. Because many Columbia milk-vetch individuals currently grow in access roads, they may recolonize disturbed areas, such as access roads, after construction.

Because the three Columbia milk-vetch populations contain a very large number of individuals, extending in a large area across the landscape, there would be no opportunities to avoid this species by changing the location of project components. Mitigation measures would be implemented to help minimize impacts on Columbia milk-vetch. Construction activities would be restricted to the minimum work area needed to work effectively to limit disturbance of special-status species, including reducing road widths in special-status species population habitat, where possible. Construction in Columbia milk-vetch habitat on the DOE Hanford Site would occur in winter when Columbia milk-vetch is dormant and below-ground. Soils from augered holes would not be spread in Columbia milk-vetch habitat. BPA would coordinate with public land managers to implement mitigation for impacts on Columbia milk-vetch, consistent with their policies.

Construction would cause mostly temporary impacts on Columbia milk-vetch habitat and permanently impact about 0.5 acre of habitat. Because these impacts are not expected to put the populations of Columbia milk-vetch or viability of this special-status species at risk, these impacts are considered moderate.

Piper's daisy – Three populations of Piper's daisy are present on the DOE Hanford Site, BLM-administered lands, and private lands along both the Midway-Moxee and Midway-Grandview transmission lines. About 11.01 acres of habitat for Piper's daisy could be disturbed by construction activities. Of these acres of impact, 0.08 acre could be permanently impacted and 10.93 acres could be temporarily impacted.

About 1,618 Piper's daisy individuals could be impacted by structure installation, access road work, and pulling and tensioning along the Midway-Moxee and Midway-Grandview transmission lines. This number likely underestimates the number of Piper's daisy that could be impacted because individuals that occur on access roads within the right-of-way, but outside of structure work areas, were not counted.

Because the three Piper's daisy populations contain a large number of individuals, extending in a large area across the landscape, there would be no opportunities to avoid this species by changing the location of project components. Mitigation measures would be implemented to help minimize impacts on Piper's daisy. Construction activities would be restricted to the minimum work area needed to work effectively to limit disturbance of special-status species, including reducing road widths in special-status species population habitats, where possible. Construction in Piper's daisy habitat on the DOE Hanford Site would occur in winter when Piper's daisy is dormant. Soils from augered holes would not be spread in Piper's daisy habitat. BPA would coordinate with public land managers to implement mitigation for impacts on Piper's daisy consistent with their policies.

Construction would cause mostly temporary impacts on Piper's daisy habitat and permanently impact about 0.08 acre of habitat. Because these impacts are not expected to put the populations of Piper's daisy or viability of this special-status species at risk, these impacts are considered moderate.

Woven-spore lichen – One population of woven-spore lichen was observed on private land in the Midway-Grandview transmission line survey area during 2013 and 2014 field surveys. This population is not located in or near any areas that would be disturbed by structure removal or installation, access road work, or pulling and tensioning activities. Therefore, no impacts are expected on woven-spore lichen as a result of the Proposed Action.

Special-status Plant Species – Department of Energy Hanford Site

Construction activities for the Midway-Moxee and Midway-Grandview transmission lines would result in the temporary and permanent impacts on vegetation located in areas mapped as Level 3, 4, and 5 priority resources, including special-status plant species, by the *Hanford Site Biological Resources Management Plan* (U.S. Department of Energy 2013a).

Umtanum desert buckwheat – This is the only ESA-listed plant species in the project area, located only on the DOE Hanford Site. Impacts on individuals of this species would be avoided by implementing mitigation, as discussed above. About 0.93 acre of the 344 acres of designated critical habitat for Umtanum desert buckwheat could be permanently impacted and about 1.14 acres could be temporarily impacted. Accordingly, about 0.6 percent of the area designated as critical habitat could be impacted by the Proposed Action. These impacts would occur in areas where access roads and transmission lines currently exist. Pulling and tensioning sites and staging areas would not be located in designated critical habitat for Umtanum desert buckwheat.

Columbia milk-vetch – Impacts on 9.12 acres of habitat occupied by Columbia milk-vetch on the DOE Hanford Site could include about 0.14 acre of permanent impacts and 8.98 acres of temporary impacts. About 786 individuals of Columbia milk-vetch located on the DOE Hanford Site could be impacted by the Proposed Action. Estimates of the number of individuals of Columbia milk-vetch occurring along proposed access roads within the rights-of-way were not collected. Therefore, the number of individuals of Columbia milk-vetch impacted by access road work on the DOE Hanford Site is expected to be higher than stated above.

Piper's daisy **-** Impacts to 7.32 acres of habitat occupied by Piper's daisy includes 0.08 acre of permanent and 7.24 acres of temporary impacts. About 1,618 individuals of Piper's daisy located on the DOE Hanford Site could be impacted by the Proposed Action. Estimates of the number of individuals of Piper's daisy occurring along proposed access roads within the right-of-way were not collected. Therefore, the number of individuals of Piper's daisy impacted by access road work on the DOE Hanford Site is expected to be higher than stated above.

Because BPA would provide appropriate mitigation including the development of a site-specific Revegetation Plan and the reduction of construction area footprints, where possible, impacts on the DOE Hanford Site priority resources, including special-status species, are considered moderate.

Special-status Plant Species – Bureau of Land Management–Administered Lands

Approximately 2.47 acres of habitat occupied by Columbia milk-vetch, a BLM sensitive species, could be impacted by construction on BLM-administered lands. This includes about 2.45 acres of temporary impacts and 0.02 acre of permanent impacts. Approximately 394 individuals of Columbia milk-vetch on BLM-administered lands could be impacted by the Proposed Action. Because about 28,500 Columbia milk-vetch individuals are estimated to occur in the BLM-administered parcels where construction activities would occur, less than 0.02 percent of the population would be impacted by the Proposed Action (Tetra Tech 2015).

Within the project area, only one individual of Piper's daisy was observed on BLM-administered lands. This individual did not occur in a proposed structure construction or removal area or along a proposed access road; therefore, no impacts on Piper's daisy are anticipated to occur on BLM-administered land from the Proposed Action.

Special-status Plant Species – Bureau of Reclamation Lands

No individuals of special-status species or their potential habitat were observed on BoR land within the project area, thus no impacts on individuals of special-status species or their habitat are expected to occur on BoR land from the Proposed Action.

Special-status Plants Species – Washington Department of Natural Resources

No individuals of special-status species or their potential habitat were observed on WDNR land within the project area, thus no impacts on individuals of special-status species or their habitat are expected to occur on WDNR land from the Proposed Action.

Noxious Weeds

Because multiple species of noxious weeds occur frequently along both transmission lines and access roads, ground-disturbing activities associated with construction could open up new areas for potential weed infestation. Impacts on vegetation from noxious weed introduction and spread are considered moderate and would be minimized by implementing the mitigation measures identified below in Section 3.8.3, Mitigation Measures – Proposed Action.

Prior to construction, BPA would conduct pretreatment of noxious weeds in compliance with BPA's Transmission System Vegetation Management Program EIS (Bonneville Power Administration 2000). On all BLM-administered lands, BPA would conduct vegetation management in a manner that adheres to all applicable standards included in the *Final Programmatic EIS, Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (Bureau of Land Management 2007). This would include the pretreatment of weeds along the rights-of-way and the existing access roads prior to construction and in compliance with the measures listed in the Final Programmatic EIS. Where noxious weeds are present in project work areas after construction, post-construction treatment of noxious weeds would be conducted in compliance with BPA's Transmission System Vegetation Management Program EIS to minimize the introduction or spread of noxious weeds as a result of construction. For an analysis of potential effects associated with the pretreatment of weeds on BLM-administered lands, see the Final Programmatic EIS (Bureau of Land Management 2007).

Danger Tree Removal

BPA identified 172 danger trees in the study area that would be removed, including 170 trees of various species along the Midway-Moxee transmission line and 2 black cottonwoods along the Midway-Grandview transmission line. Danger tree species along the Midway-Moxee transmission line include Lombardy poplar, black cottonwood, sweet gum, pine, birch, arborvitae, and various other unidentified hardwoods, many of which are non-native. Many of these trees, especially Lombardy poplar, occur at the edge of agricultural lands where they serve as wind breaks. Tree sizes range from less than 8 inches to 26 inches in dbh. Depending on their locations and landowner agreements, these trees will either be completely removed or topped and allowed to remain as snags.

Because danger tree removal would not result in impacts on medium- or high-quality vegetation communities, special-status plant species and habitat, or priority habitats on the DOE Hanford Site, impacts would be low.

3.8.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would implement the following mitigation measures to avoid or minimize impacts from the Proposed Action on vegetation resources. Other mitigation measures relevant to vegetation are found in Section 3.7, Geology and Soils; Section 3.10, Waterways and Water Quality; and Section 3.11, Wetlands and Floodplains, of this EA.

- Prepare a site-specific Safety Plan before starting construction; specify how to manage hazardous materials, such as fuel and any toxic materials found in work sites; include a Fire Prevention and Suppression Plan and detail how to respond to emergency situations; keep the Safety Plan on site during construction and maintain and update, as needed
- Develop a Revegetation Plan for areas of disturbance within the DOE Hanford Site, including soil preparation as necessary, using site-specific methods developed for use within the DOE Hanford Site and approved by DOE-RL staff.
- Minimize disturbance to special-status plant populations by reducing access road widths in populations, where possible.

- Coordinate with public land managers to implement mitigation measures consistent with their policies.
- Explain vegetation-related mitigation measures and BMPs to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.
- Follow the provisions of the Memorandum of Agreement between the WDNR and BPA for managing impacts on state lands from BPA transmission line and access road easements (Washington State Department of Natural Resources 2012).
- Ensure that all hay, hay cubes, straw, and mulch possessed, used, or stored on BLM-administered lands has proof of weed-free certification that meet or exceed North American Weed Management Association Weed-Free Forage certification standards.
- Identify known special-status plant populations, including a 25-foot buffer, as sensitive areas to be avoided, if possible, in construction documents and maps used by construction contractors.
- Avoid locating staging areas on the DOE Hanford Site, except in developed areas at the Midway Substation, at the base of the Umtanum Ridge.
- Employ an on-site monitor during construction to ensure all mitigation measures and BMPs are correctly implemented during construction on the DOE Hanford Site to ensure construction equipment and personnel remain within designated construction areas.
- Restrict construction activities to the minimum work area needed to work effectively to limit disturbance of native vegetation communities.
- Equip all vehicles with basic fire-fighting equipment, including extinguishers and shovels to prevent fires that could harm native vegetation and result in disturbed areas that could be vulnerable to colonization by noxious weeds.
- Avoid spreading augered soils in high-quality plant communities and special-status species habitat (sensitive areas); replace augered soils in structure holes, remove from sensitive areas, and either deposit at the base of a nearby transmission line structure that is not in a sensitive area or dispose of off-site.
- Avoid conducting pulling and tensioning within designated critical habitat for Umtanum desert buckwheat.
- Install “Sensitive Area” signage on or near fencing or flagging indicating where construction activities and entry of any kind are prohibited.
- Install signage, fences, or flagging to restrict vehicles and equipment to designated routes and work areas in areas with high-quality plant communities and special-status species.
- Install protective fencing, staking, or flagging around areas (including 25-foot buffer) with Umtanum desert buckwheat individuals that occur within 200 feet of construction work areas prior to initiation of construction activities.
- Install screw guy anchors at transmission structures with guy wires in designated critical habitat for Umtanum desert buckwheat, if possible.
- Conduct construction activities in designated critical habitat for Umtanum desert buckwheat during the winter to minimize impacts on pollinators and above-ground portions of native plants, to minimize the effect on native plant seed production, and to minimize the risk of construction-related fire.
- Use vehicle and equipment cleaning stations to minimize the introduction and spread of weeds during construction by cleaning vehicles and equipment prior to entering and as soon as possible after leaving each work area.

- Use weed-free mulch on public lands.
- Use local sources of rock for road construction, if possible, and obtain road fill materials from noxious weed–free quarries.
- Cut or crush vegetation rather than blading or clearing areas that would remain vegetated.
- Control noxious weeds manually, mechanically, and/or chemically as recommended for each species, prior to construction, if needed, with a focus on species with small, contained infestations to reduce the potential for widespread establishment and the need for long-term management.
- Reseed disturbed areas after construction activities are complete, at the appropriate time period for germination, using a native seed mix, a seed mix recommended by WDFW, a seed mix identified in the *Stormwater Management Manual for Eastern Washington*, or as agreed upon with landowners for use on their property (Washington State Department of Ecology 2004).
- Monitor seed germination of seeded areas until site stabilization is achieved (defined by an appropriate level of cover by native or acceptable non-native species for this geographic area) and implement contingency measures and reseed to ensure adequate revegetation of disturbed soils if vegetative cover is inadequate.
- Conduct a post-construction noxious weed survey approximately 1 year after construction of all areas disturbed by construction activities to determine if there are new noxious weed infestations; implement appropriate control measures of noxious weed infestations.

3.8.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

The Proposed Action would directly impact and permanently remove some areas with medium-quality vegetation communities that are predominantly composed of native plant species. This would include priority resources, including special-status plant species, and native plant communities, within the DOE Hanford Site, and would include removal of some state sensitive and BLM sensitive species. Implementation of the mitigation measures identified above in Section 3.8.3, Mitigation Measures – Proposed Action, including off-site restoration, would reduce impacts on these plant populations. Therefore, impacts are anticipated to be temporary, with unavoidable adverse impacts occurring during the lag-time between the on-site losses and achievement of successful restoration of areas disturbed by construction.

Construction-related ground disturbance could result in noxious weeds colonizing disturbed areas. Due to the difficulty of controlling weeds in disturbed areas, the project could result in some increases in noxious weeds within areas disturbed by project construction.

3.8.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, the existing transmission lines would not be rebuilt or upgraded. Therefore, the impacts related to construction of the Proposed Action would not occur. Operation and maintenance activities would continue and would be similar to existing conditions, as described in Section 2.2.11, Ongoing Maintenance and Vegetation Management, of this EA. Maintenance activities would likely increase as existing structures deteriorate, and more structure repair and replacement could be required compared to existing conditions. Maintenance of access roads would be needed and road work proposed under the Proposed Action would likely need to take place as a maintenance activity. This could result in periodic disturbance to vegetation such as trampling by vehicles and equipment to access structures. Maintenance activities would result in low impacts on vegetation resources except where deteriorating structures require increased maintenance activities that could lead to moderate vegetation impacts. If it were necessary to perform repairs on an emergency basis, it would likely not be possible to plan or time these activities to minimize impacts on vegetation, including special-status species. Because potential impacts resulting from emergency repairs would be localized, and depending on the species and habitat impacted, impacts would be low to moderate.

3.9. WILDLIFE

3.9.1. Affected Environment

The study area for wildlife species and habitats includes terrestrial habitats in the right-of-way for both transmission lines and access roads within 0.6 mile of the transmission line. For greater sage-grouse and raptor species, the study area extends 1 mile beyond the rights-of-way because WDFW suggested this distance as an appropriate area within which to conduct aerial surveys.

In addition to more common wildlife species, some less common wildlife species with federal or state status are known to occur or could potentially occur in the study area. Information on wildlife in the study area was obtained from WDFW and USFWS biologists, as well as from published literature and databases, including USFWS species lists for Benton and Yakima counties, the WDFW Priority Habitats and Species (PHS) database, and the Washington Natural Heritage Program data. To determine which wildlife species could potentially occur in the study area, all species known to occur within 1 mile of the right-of-way of both transmission lines and access roads were considered.

Wildlife surveys were conducted along the Midway-Moxee transmission line in April, May, and June 2013, and along the Midway-Grandview transmission line in May and June 2014. These included aerial surveys of up to 1 mile from the transmission lines and access roads to look for greater sage-grouse and raptors (Tetra Tech 2014b). Additional field surveys were conducted in spring 2015 to document wildlife species and habitat conditions that are present in project work areas that were not surveyed in 2013 and 2014 (Tetra Tech 2015). Ground-based surveys were conducted to inventory wildlife species occurrences and wildlife habitat conditions. On privately owned lands, the ground-based survey area included the full width of the transmission line right-of-way and a 50-foot-wide area centered on access roads. Areas off right-of-way were viewed from the right-of-way and from access roads and during aerial surveys of the project area. On publicly owned lands—including the DOE Hanford Site, BLM-administered lands, and WDNR lands—the ground-based survey area extended 0.6 mile from the transmission line right-of-way and access roads because surveyors had permission to access public lands off-right-of-way.

Wildlife and Their Habitats

Wildlife species in the study area are associated with at least one of the six general habitat types identified within the survey area during the ground-based wildlife survey: shrub-steppe, perennial grassland, annual grasslands, agriculture, developed, and riparian. In addition, one area mapped as PHS cliff habitat is present along both transmission lines near the Midway

Substation on the DOE Hanford Site, within areas of grassland and shrub-steppe vegetation (Washington Department of Fish and Wildlife 2014). An estimate of the amount of each type of wildlife habitat in the project study area is shown in Table 3.9-1.

Shrub-Steppe Habitat

Shrub-steppe is considered a priority habitat because of its relative scarcity in the state and its importance to several state-listed wildlife species (Washington Department of Fish and Wildlife 2008). Shrub-steppe wildlife habitat in the study area sometimes includes some areas of lithosol mosaic and shrub-steppe habitat as well as perennial grassland habitat. Shrub-steppe is designated by WDFW as a priority habitat for conservation and management (Washington Department of Fish and Wildlife 2008). Shrub-steppe priority habitat is mapped in the study area within and along the right-of-way of both transmission lines in the following locations:

- Within both transmission line rights-of-way between Midway-Moxee Structures 1/3 and 3/3 and Midway-Grandview Structures 1/4 to 3/3 on the DOE Hanford Site
- Near, but outside the Midway-Moxee right-of-way between Line Miles 9 and 10
- Within the Midway-Grandview transmission line right-of-way between Structures 11/5 and 12/6, 14/5 and 15/4, and 18/6 and 19/4
- Near the Midway-Grandview transmission line right-of-way between Structures 21/7 and 24/2

Table 3.9-1. Area of Existing Habitat Types within the Midway-Moxee and Midway-Grandview Wildlife Survey Areas

Wildlife Habitat	Midway-Moxee Survey Area[a]		Midway-Grandview Survey Area[a]	
	Area (acres)	Percent of Survey Area	Area (acres)	Percent of Survey Area
Shrub-steppe	291.2	32.5	388.2	37.2
Perennial Grassland	95.7	10.7	242.9	23.3
Annual Grassland	174.9	19.5	148.7	14.3
Agriculture	221.2	24.7	177.8	17.1
Developed	113.4	12.7	84.4	8.1
Riparian/Wetland	0.1	0.0	0.5	0.0
Total	**896.4**	**100[b]**	**1,042.5**	**100[b]**

Source: Data obtained during 2013 and 2014 wildlife survey of transmission line rights-of-way and access roads (Tetra Tech 2014b)

[a] Wildlife habitats in the corridor shared by both lines are included under both transmission lines

[b] Total may not reflect sum on column due to rounding

Approximately 16 miles of the eastern portion of the Midway-Moxee transmission line (primarily within Line Miles 1 to 8 and Line Miles 19 to 26) cross shrub-steppe habitat, although much of it is fragmented and interspersed with lands disturbed by various land uses, resulting in moderate wildlife habitat quality. Some patches of shrub-steppe, such as those found within the DOE Hanford Site, are higher in quality due to being relatively large and having lower densities of cheat grass. Approximately 13 miles of the central portion of the Midway-Grandview transmission line corridor (primarily within Line Miles 1 to 5 and Line Miles 10 to 19) cross shrub-steppe habitat. The highest quality shrub-steppe habitat in the Midway-Grandview portion of the study area occurs between SR 241 and the right-of-way at Structure 17/1.

Shrub-steppe habitat accounts for approximately 291 acres (or 33 percent) of the wildlife habitat surveyed along the Midway-Moxee transmission line (Table 3.9-1). It accounts for 388 acres or 37 percent of the wildlife habitat surveyed along the Midway-Grandview transmission line.

Shrub-steppe habitat supports the widest diversity of wildlife species in the study area. Game species observed in the study area included Rocky Mountain elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), California quail (*Callipepla californica*), and chukar (*Alectoris chukar*). Other wildlife species observed in shrub-steppe within the study area include native mammals such as the coyote (*Canis latrans*), and American badger (*Taxidea taxus*); migratory birds such as the western meadowlark (*Sturnella neglecta*) and gray flycatcher (*Empidonax wrightii*); and reptiles such as the sagebrush lizard (*Sceloporus graciosus*) and side-blotched lizard (*Uta stansburiana*).

Some special-status species are also strongly associated with shrub-steppe habitat. Townsend's ground squirrel (*Urocitellus townsendii nancyae*), black-tailed jackrabbit (*Lepus californicus*), loggerhead shrike (*Lanius ludovicianus*), and sage sparrow (*Amphispiza belli*) were observed within the study area in shrub-steppe habitat areas along both transmission line rights-of-way. In addition, the sharp-tailed snake (*Contia tenuis*), racer (*Coluber constrictor*), white-tailed jackrabbit (*Lepus townsendii*), ferruginous hawk (*Buteo regalis*), greater sage-grouse, prairie falcon (*Falco mexicanus*), striped whipsnake (*Masticophis taeniatus*), and night snake (*Hypsiglena torquata*), bobcat (*Lynx rufus*) could also be present within the shrub-steppe habitats in the study area, but were not observed during the surveys.

Perennial and Annual Grassland Habitat

Perennial grassland wildlife habitat includes perennial grasslands with a predominance of native species and all areas that were assumed to be CRP lands because the perennial grasses appeared to have been planted. Native perennial grassland is characterized by the predominance of native bunchgrasses and a lack of shrub cover. It generally provides high-quality habitat, unless disturbed by too much grazing or dominated by non-native plant species. While CRP does not provide as high-quality wildlife habitat, studies have shown it does provide habitat for birds, including greater sage-grouse, as well as for mule deer, jackrabbit, and other species (Schroeder and Vander Haegen 2006). Perennial grassland habitats in the study area are often interspersed with shrub-steppe vegetation communities, creating a mosaic of these two community types.

Perennial grassland wildlife habitat accounts for approximately 96 acres (or 11 percent) of the wildlife habitat surveyed along the Midway-Moxee transmission line (Table 3.9-1). It accounts for approximately 243 acres (or 23 percent) of the wildlife habitat surveyed along the Midway-Grandview transmission line.

Perennial grassland habitat supports a similar diversity of wildlife species as shrub-steppe habitat. Perennial grassland habitat is found scattered along the first 5 miles of the Midway-Moxee and Midway-Grandview transmission lines. This area includes the DOE Hanford Site, where the highest quality perennial grasslands occur. Large areas of perennial grasslands are also present in the study area between Midway-Moxee Structures 12/4 and 14/1 and Structures 16/4 and 17/4. Scattered areas are present between Midway-Moxee Structures 18/6 and 20/6. Areas of perennial grasslands are present in the study area in the south-central and southern portions of the Midway-Grandview transmission line.

Perennial grasslands, such as those that occur within CRP lands, are considered lower quality wildlife habitat due to dominance by crested wheatgrass, which is more tolerant of both grazing and fire than native grasses. CRP lands, which are generally characterized by a lack of native plant diversity, occur primarily near the central portions of both transmission lines (Franklin and Dyrness 1988). The northern portion of the Midway-Grandview transmission line also crosses some small areas of CRP lands interspersed with shrub-steppe areas.

Annual grassland is generally characterized as low-quality wildlife habitat because it is dominated by non-native species, has been degraded by land use activities such as grazing and past agricultural practices, and lacks habitat structure. As a result, annual grassland habitat supports a low diversity of wildlife species, compared to other wildlife habitats in the study area.

Annual grassland occurs throughout both transmission line corridors, with the highest concentrations in the east-central portion of the Midway-Moxee transmission line right-of-way between Structures 8/4 and 12/4, and north-central and southern portions of the Midway-Grandview line. Annual grassland wildlife habitat accounts for approximately 175 acres (or 20 percent) of the wildlife habitat surveyed along the Midway-Moxee transmission line (Table 3.9-1). It accounts for approximately 149 acres (or 14 percent) of the wildlife habitat surveyed along the Midway-Grandview transmission line.

Some special-status wildlife species are associated with grassland habitats. Long-billed curlews (*Numenius americanus*) were observed in low-quality mixed annual and perennial grassland habitats in the study area along both transmission line corridors. Burrowing owl (*Athene cunicularia*), Townsend's ground squirrel, white-tailed jackrabbit, and black-tailed jackrabbit were also observed during the surveys. Loggerhead shrikes, ferruginous hawks, and Swainson's hawks (*Buteo swainsoni*) often forage in grassland habitats and were observed in the study area. Prairie falcons, sharp-tailed snakes, and racers, although not observed during the surveys, could also be present in grassland habitats.

Riparian Habitat

Riparian vegetation is associated with perennial and intermittent streams. Riparian habitat supports a wide diversity of wildlife species due to the presence of water and wetlands, as well as a generally high degree of habitat structure. Less than 1.0 acre of riparian habitat occurs in one location along the Midway-Grandview transmission line, associated with Sulphur Creek between Midway-Grandview Structures 18/7 and 19/1. Vegetation in this area was considered low quality due to the past disturbance to the stream and adjacent vegetation communities. However, given the rarity of this habitat type within the survey area, it is considered to be high-quality wildlife habitat. Nesting ferruginous hawks were observed on a rock outcrop along Sulphur Creek, in proximity to riparian habitat. Sharp-tailed snake, racer, white-tailed jackrabbit, black-tailed jackrabbit, Swainson's hawk, and great blue heron (*Ardea herodias*) could also be present within riparian habitats in the study area, but only Swainson's hawk was observed in riparian habitat during the surveys.

Agricultural and Developed Habitats

Wildlife habitats in the developed and agricultural portions of the study area have been extensively modified by a variety of human land uses including road and utility corridor construction, residential development, farming, and grazing. Vegetation communities and wildlife habitats in areas outside of these land uses are less modified and have more intact native vegetation communities and typically have higher quality wildlife habitats.

Agricultural land includes irrigated and dryland agricultural fields, as well as small areas of farmland and pastures associated with rural residences, and fallow areas that appeared to have been cultivated in the recent past. These areas generally provide low-quality wildlife habitat, but the presence of irrigation water can create lush vegetation and areas of occasionally ponded water and wetland habitat. These moist habitats increase the value of agricultural areas for those wildlife species adapted to human-altered and frequently disturbed habitats.

Agricultural habitats are present near the western portion of the Midway-Moxee transmission line and southern portion of the Midway-Grandview transmission line. Large agricultural operations occur to the south of the Midway Substation, immediately south of where the Midway-Grandview transmission line crosses SR 24, and in the central portions of both transmission line rights-of-way.

Agricultural land accounts for approximately 221 acres (or 25 percent) of the wildlife habitat surveyed along the Midway-Moxee transmission line (Table 3.9-1). It accounts for approximately 178 acres (or 17 percent) of the wildlife habitat surveyed along the Midway-Grandview transmission line.

Agricultural habitats support a diversity of wildlife species that are adapted to living in disturbed environments. Common species observed in agricultural habitats along the Midway-Moxee transmission line right-of-way include great blue heron, northern harrier (*Circus cyaneus*), and savanna sparrow (*Passerculus sandwichensis*). Special-status species including Townsend's ground squirrel, long-billed curlew, prairie falcon, Swainson's hawk, burrowing owl, great blue heron, and black-tailed jackrabbit were recorded in or in immediate proximity to irrigated fields and vineyards in the study area. The sharp-tailed snake, racer, white-tailed jackrabbit, ferruginous hawk, and loggerhead shrike could also be present in agricultural habitats in the study area, but were not observed during the surveys.

Developed lands include areas occupied by rural residential development, paved and gravel roads, areas developed in association with agricultural production, and the Midway, Cold Creek, Moxee, and Grandview substations. Developed areas are highly altered and are classified as low-quality wildlife habitats. Developed lands are primarily found along the western portion of the Midway-Moxee transmission line and southern portion of the Midway-Grandview transmission line, and at all four of the substations listed above.

Common species observed in developed areas along the Midway-Moxee transmission line right-of-way included the American crow (*Corvus brachyrhynchos*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), rock dove (*Columba livia*), and house finch

(*Carpodacus mexicanus*). Special-status species, including prairie falcon and Swainson's hawk, were commonly observed perched or hunting over the lands surrounding the Grandview Substation. Swainson's hawks were also observed nesting in large trees near agricultural fields, vineyards, and private residences along the Midway-Moxee transmission line corridor, and on structures within the Grandview Substation. The white-tailed jackrabbit and black-tailed jackrabbit could also be present in developed habitats in the study area, but were not observed during the surveys.

Cliff Habitat

Additional habitats important to wildlife found within and near the study area include cliffs and rock outcrops, which provide habitat for several species of bats, reptiles, and raptors. Cliffs greater than 25 feet high that occur below 5,000 feet in elevation are considered a priority habitat feature[4] because of their uniqueness and value as breeding and rearing habitat for various special-status bat species and as nesting habitat for special-status raptors such as the prairie falcon and the peregrine falcon (*Falco peregrinus*) (Washington Department of Fish and Wildlife 2008). The cliffs along Umtanum Ridge, just south of the Midway Substation, are mapped as priority habitat.

Large basalt rock outcrops, and areas with talus and lithosols commonly occur within shrub-steppe in the DOE Hanford Site and contribute substantially to its biodiversity. These areas provide nesting habitat for prairie falcon, peregrine falcon , various hawks, cliff swallows (*Petrochelidon pyrrhonota*), and rock wrens (*Salpinctes obsoletus*), as well as places for reptile and bat species to hibernate. Extensive talus slopes are found on and near the cliffs that form Umtanum Ridge.

<u>**Special-Status Species**</u>

Terrestrial wildlife species are regulated by USFWS as threatened, endangered, and proposed, or species under the ESA. USFWS designates other species as candidates for listing and as Species of Concern. Some species are regulated or tracked by the state including species on WDFW's PHS program list; state threatened, endangered, candidate, and game species; as well as animal aggregations and species of recreational, commercial, or tribal importance that are considered vulnerable. Special-status species include state monitor species which are not considered Species of Concern, but are monitored for status and distribution. They are managed by WDFW, as needed, to prevent them from becoming endangered, threatened, or sensitive.

Special-status species with the potential to occur in the study area are listed in Table B-1 (Appendix B). Special-status species observed in and near the study area and those that may occur in the study area because of suitable habitat are described below.

Endangered Species Act–listed, Proposed, and Candidate Species

Eight ESA-listed wildlife species are known to occur or have the potential to occur in the project area (U.S. Fish and Wildlife Service 2015). These species are the Columbia Basin Distinct Population Segment (DPS) of the pygmy rabbit (*Brachylagus idahoensis*), gray wolf (*Canis*

[4] Priority habitats are habitat types or elements with unique or significant value to a diverse assemblage of species (Washington Department of Fish and Wildlife 2008).

lupus), Columbia River DPS of the bull trout (*Salvelinus confluentus*), marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis caurina*), grizzly bear (*Ursus arctos horribilis*), Canada lynx (*Lynx Canadensis*), and yellow-billed cuckoo (*Coccyzus americanus*). The only species proposed for listing on the USFWS project list is the fisher (*Martes pennant*). Habitat features that would support these species are currently rare or absent in the study area, and few or no historical occurrences of these species in the study area have been documented.

One USFWS candidate wildlife species has the potential to occur in the proposed study area. The Columbia Basin DPS of the greater sage-grouse is a candidate species under the ESA. The greater sage-grouse is also state-listed as threatened and a Priority Species by WDFW. The Columbia Basin DPS of greater sage-grouse has an estimated population size of approximately 1,000 individuals; however, WDFW considers this to be a conservative estimate (Stinson *et al.* 2004). The state-wide population of greater sage-grouse is considered to be mostly located in two isolated populations, one in Douglas and Grant counties and one in Kittitas and Yakima counties (Stinson *et al.* 2004). These populations have shown reduced genetic diversity and are not considered large enough for long-term viability, and will likely require recovery efforts to persist (Stinson *et al.* 2004).

The population in Kittitas and Yakima counties is associated with the U.S. Army's YTC where contiguous shrub-steppe habitat exists (Stinson *et al.* 2004). The southern boundary of the YTC is approximately 1 mile north of the Midway-Moxee transmission line at its closest point. Contiguous shrub-steppe habitats in and adjacent to the YTC are designated as a Priority Area of Conservation (PAC) by USFWS (U.S. Fish and Wildlife Service 2013b). The PAC is located within the study area from approximately Structure 3/3 of the Midway-Moxee and Midway-Grandview lines, extending to SR 24, and west to the Moxee Substation. The study area in the DOE Hanford Site from Midway Substation to Midway-Moxee Structure 3/1 is part of the Hanford Reach National Monument, which is managed as part of the Mid-Columbia River National Wildlife Refuge Complex, and is not included in the PAC. The portion of the study area in the DOE Hanford Site contains shrub-steppe habitats that are likely utilized by greater sage-grouse (Tetra Tech 2014b).

The U.S. Army conducts ongoing telemetry studies of the YTC greater sage-grouse populations. Telemetry studies conducted between 2012 and 2014 identified limited use of the wildlife study area by greater sage-grouse in the eastern half of the Midway-Moxee transmission line right-of-way between Line Miles 12 and 14. There were also two reported incidental sightings of greater sage-grouse between 2001 and 2010 in the western half of the study area near Midway-Moxee Line Miles 29 and 30 (Bureau of Land Management 2015). PHS data also show late summer and early fall use 2 miles from the north of the Midway-Moxee transmission line. No greater sage-grouse or signs of greater sage-grouse were observed in the study area during the wildlife surveys in spring 2013 and spring 2014. Late summer and early fall use of the study area indicates that greater sage-grouse are potentially using the area for late brood rearing and fall habitat (Tetra Tech 2014b). Typically, greater sage-grouse hens will move to higher elevations during brood rearing to find flowering plants and insects that the brood needs to survive. Alternatively, greater sage-grouse hens guide broods to meadows and agricultural fields adjacent to sagebrush stands at lower elevations.

Other Federal and State Special-Status Species

- **Ferruginous hawk** is a federal Species of Concern, state-listed as a threatened species, and on the WDFW PHS list. Three active nests were documented in the study area during the wildlife surveys.
- **Peregrine falcon** is a federal Species of Concern, a state sensitive species, and on the WDFW PHS list. The species could use the habitats of the study area, particularly the cliffs of the Umtanum Ridge in the DOE Hanford Site. However, no individuals of this species were observed in the study area, and active breeding pairs are not common in the Columbia Basin (Hayes and Buchanan 2002).
- **Loggerhead shrike** is a federal Species of Concern, a state candidate species, and on the WDFW PHS list. Nesting pairs and individuals of this species have been documented in the eastern half of the study area. Because suitable hunting perches such as poles, wires, or fence posts are an important part of their habitat, it is likely that additional individuals use the study area.
- **Sage sparrow** is a state candidate species on the WDFW PHS list with breeding pairs documented in areas of large, mostly uninterrupted expanses of sagebrush in the study area. They are a common breeding bird in tall and dense shrub-steppe habitats dominated by sagebrush.
- **Burrowing owl** is a federal Species of Concern, a state candidate species, and on the WDFW PHS list. This species could use badger holes in the study area and has the highest likelihood of occurring on the DOE Hanford Site. Three observations of a burrowing owl were recorded in the study area including one on the edge of agricultural lands near the southern end of the Midway-Grandview transmission line right-of-way, one in undeveloped land near Midway-Grandview Line Mile 9, and one near Midway-Moxee Line Mile 12. Several more observations of burrowing owl have been documented within and just outside the study area (Washington Department of Fish and Wildlife 2014).
- **Prairie falcon** is a state monitor species on the WDFW PHS list with an active nest documented in the study area on the basalt cliffs in the DOE Hanford Site. During surveys, prairie falcons were also commonly observed perched or hunting over the agricultural land surrounding the Grandview Substation.
- **Swainson's hawk** is a state monitor species with one active nest documented in the study area in the DOE Hanford Site. Swainson's hawks were also observed nesting in large trees near agricultural fields, vineyards, and private residences along the Midway-Moxee transmission line corridor and were commonly observed perched or hunting over the agricultural land surrounding the Grandview Substation. A total of six active Swainson's hawk nests were observed during surveys. Two of the nests are within 0.5 mile of a construction work area.
- **Great blue heron** is a state monitor species observed in the western half of the study area along the Midway-Moxee transmission line, primarily in association with irrigated agricultural areas.
- **Long-billed curlew** is a state monitor species that was observed during the wildlife survey in irrigated agricultural areas and mixed annual and perennial grasslands in the western half of

the study area along the Midway-Moxee transmission line, and in concentrations between Midway-Grandview Structures 16/1 to 22/6 that may indicate a nesting area. Long-billed curlews were also heard in the irrigated agricultural fields near Midway-Moxee Structures 14/4 and 25/6.

- **Sharp-tailed snake** is a federal Species of Concern and a state candidate species on the WDFW PHS list. There are documented occurrences of this species approximately 5 miles from the study area (Washington Department of Fish and Wildlife 2014). Potential habitat exists in the study area near water sources and drainages and in irrigated areas; however, sharp-tailed snake were not observed during wildlife surveys and are expected to have a low likelihood of occurrence within the study area.
- **Striped whipsnake** is a state candidate species on the WDFW PHS list. The species was historically found in the vicinity of the Midway Substation and is believed to occur in the DOE Hanford Site in very small numbers. Scattered individuals could be present in the shrub-steppe and grasslands of the study area, and hibernating habitat may be present in rocky and talus areas.
- **Racer**, a snake that is a state monitor species, has not been documented in the study area. Scattered individuals could be present along habitat edges and wet or irrigated portions of the study area.
- **Night snake** is a state monitor species that has been documented in the eastern part of the study area. Scattered individuals could be present throughout shrub-steppe portions of the study area, particularly where talus is present.
- **White-tailed jackrabbit** is a state candidate species that may be occasionally present in the study area in open grasslands and sagebrush plains.
- **Black-tailed jackrabbit** is a state candidate species on the WDFW PHS list with an observation made during the wildlife survey in edge areas between agricultural and shrub-steppe habitat along an access road.
- **Townsend’s ground squirrel** is a federal Species of Concern on the WDFW PHS list. Individuals and colonies were observed in the western portion of the Midway-Moxee transmission line near agricultural areas and in the southern third of the Midway-Grandview transmission line associated with active rangeland and agricultural areas near the Grandview Substation. Distributions ranged from diffuse and sporadic to high-density concentrations. Areas of highest density appear to correspond to edges of human-disturbed soil, primarily agricultural areas.

DOE Hanford Site Priority Level Resources

Within the DOE Hanford Site, priority levels are applied to wildlife resources – including habitats and species –in accordance with the *Hanford Site Biological Resources Management Plan* (U.S. Department of Energy 2013a). This plan classifies the biological resources in the DOE Hanford Site into six resource priority levels ranging from Level 5 (highest priority) to Level 0 (lowest priority) based on the relative value of both the species and habitats present. For wildlife species, priority levels are similar to special-status species designations of the PHS program (Washington Department of Fish and Wildlife 2008). The following resource levels are present in the study area within the DOE Hanford Site and are not applied to the wildlife study area outside the DOE Hanford Site:

- **Level 5 resources** include the cliff habitats of the Umtanum Ridge (U.S. Department of Energy 2013a); Level 5 wildlife species are not known to occur in the study area.
- **Level 4 resources** include high-quality sagebrush steppe habitat and other Level 4 vegetation cover types that are within the study area (U.S. Department of Energy 2013a). No Level 4 wildlife species were observed; however, Level 4 wildlife species such as the greater sage-grouse and ferruginous hawk have the potential to utilize habitat within the study area.
- **Level 3 resources** include conservation corridors and vegetation cover types that are within the study area (U.S. Department of Energy 2013a). Level 3 wildlife species observed on the DOE Hanford portion of the study area include prairie falcon, loggerhead shrike, sage sparrow, and the black-tailed jackrabbit. Level 3 wildlife species that could be present but were not observed include striped whipsnake, burrowing owl, peregrine falcon, and white-tailed jackrabbit.
- **Level 2 resources** include some mid-successional habitat within the study area (U.S. Department of Energy 2013a). Level 2 wildlife species include all migratory bird species. Other Level 2 wildlife species that could be present but were not observed include racer and night snake.
- **Level 1 wildlife species** that could occur in the study area include common native wildlife species such as the Great Basin pocket mouse and common raven.

3.9.2. Environmental Consequences – Proposed Action

The Proposed Action has the potential to impact wildlife, including special-status species, and their habitats in the study area. Project activities that could cause direct impacts on wildlife and their habitats include the removal and installation of structures, access road work, pulling and tensioning, and the removal of danger trees. Potential direct impacts associated with these activities include the modification and loss of habitat or incidental mortality of wildlife. Indirect impacts would include displacement of wildlife near work areas where noise and increased activity are present during construction. Degradation of habitat could result from the introduction of noxious weeds. The amount of aggregated temporary and permanent disturbance of wildlife habitats resulting from the Proposed Action is presented in Table 3.9-2 below.

Estimated impacts on wildlife and their habitats, including special-status species and wildlife within the DOE Hanford Site from the Proposed Action are summarized below. Additional information on wildlife impacts is provided in Appendix B.

Table 3.9-2. Aggregate Wildlife Habitat Impacts by Habitat Type for Both Transmission Lines

Wildlife Habitat Type	Area of Disturbance		Total Disturbance (acres)
	Temporary (acres)[a]	Permanent (acres)[b]	
Agriculture	37.9	6.9	44.8
Shrub-steppe	36.6	29.8	66.4
Perennial Grassland	22.4	18.5	40.9
Annual Grassland	28.0	21.2	19.2
Riparian	–	0.1	0.1
Developed[c]	6.6	66.7	73.3
Total[a]	**131.5**	**143.1**	**274.6**

Dash indicates zero

[a] Acres of temporary impact based on an assumed 100-foot by 100-foot potential disturbance area (excluding the area of permanent disturbance) around each new structure, which would include areas of equipment movement, and similar area for removing existing structures where location has been shifted for new structures; actual disturbance area would depend on site-specific conditions at each structure and whether the work area can be reduced, thus temporary impacts would likely be less than indicated

[b] Acres of permanent disturbance based on an assumed area of 0.012 acre around each two-pole structure and 0.016 acre for each three-pole structure

[c] Existing transmission line access roads proposed for improvement or reconstruction are classified as developed habitat

<u>Wildlife and Their Habitats</u>

A total of 274.5 acres of wildlife habitat could be impacted by the Proposed Action, including 131.3 acres of temporary impacts and 143.2 acres of permanent impacts.

Construction activities associated with the Midway-Moxee transmission line would result in approximately 158.6 acres of impacts on wildlife habitat, including 78.4 acres of permanent impacts and 80.2 acres of temporary impacts. The acreage total includes about 35.2 acres of impacts on shrub-steppe wildlife habitat (19.1 acres of medium- and high-quality habitat) which would result in the long-term loss of this habitat type. The majority of impacts (134.0 acres or 84 percent) would occur in low-quality wildlife habitat.

Construction activities associated with the Midway-Grandview transmission line would result in approximately 115.9 acres of impacts on wildlife habitat, including 64.8 acres of permanent impacts and 51.1 acres of temporary impacts. The acreage total includes approximately 31.1 acres of impacts on shrub-steppe wildlife habitat (10.7 acres of medium- and high-quality habitat) which would result in the long-term loss of this habitat type. The majority of impacts (103.5 acres or 89 percent) would occur in low-quality wildlife habitat.

Structure Removal and Installation

The removal and installation of structures under the Proposed Action could have about 105.1 acres of temporary impacts and 5.5 acres of permanent impacts on wildlife and their habitats in the study area. The acreages of habitat disturbance during construction and permanent habitat removal from these activities are summarized below, and detailed tables are included in Appendix B.

Potential impacts on wildlife and their habitats from the removal and installation of structures on the Midway-Moxee transmission line would occur on approximately 68 acres, including 24.8 acres of agricultural land, 16.2 acres of shrub-steppe, 6.5 acres of perennial grassland, 15.7 acres of annual grassland, and 4.4 acres of developed wildlife habitat types. Approximately 51.2 acres of impacts would occur in wildlife habitats described as being of low quality, and most of these impacts would be temporary in nature. The remaining impacts on wildlife habitat would occur on 10.4 acres of medium-quality shrub-steppe and 2.5 acres of high-quality shrub-steppe habitat for a total of 12.9 acres of impact on shrub-steppe. In addition, 0.7 acre of high-quality perennial grassland habitat would be impacted. While most of these impacts would be temporary in nature, the length of time required and difficulty in restoring these habitats would result in long-term disturbances in these habitat types. The 2.5 acres of high-quality shrub-steppe and 0.7 acre of high-quality perennial grassland that would be impacted occur within the mapped PHS shrub-steppe habitat.

Potential impacts on wildlife habitats from the removal and installation of structures on the Midway-Grandview transmission line would occur on approximately 43 acres, including 6.9 acres of agricultural land, 14.6 acres of shrub-steppe, 12.2 acres of perennial grassland, 7.8 acres of annual grassland, and 1.7 acres of developed habitat (see Appendix B). Approximately 36 acres of impacts would occur in wildlife habitats described as being of low quality, and most of these impacts would be temporary in nature. The remaining impacts would occur on 6.3 acres of medium- and high-quality shrub-steppe habitat and 0.7 acre of medium-quality perennial grassland habitat. While most of these impacts would be temporary in nature, the length of time required and difficulty in restoring these habitats would result in long-term disturbances in these habitat types.

Medium- and high-quality shrub-steppe and medium-quality perennial grassland habitat types are considered limited within portions of the study area. PHS-mapped shrub-steppe habitat supports wildlife species that require sagebrush for some part of their life cycle (sagebrush-obligate species). Impacts on these habitat types would result in the long-term decline of habitat quality and quantity, and, therefore, these impacts would be considered moderate. Temporary and permanent impacts on low-quality habitats identified above are not expected to have a detrimental effect on local wildlife resources and would result in low impacts.

Within all habitat areas, removal and installation of transmission structures would require use of trucks and other construction equipment (e.g., boom cranes, backhoes, and line trucks) that could temporarily reduce the value of the habitat in these areas for wildlife. Individual animals or important habitat features, such as burrows, could be crushed by equipment during construction. Incidental mortality from these activities would be avoided for most wildlife species, because the species are typically highly mobile and would quickly flee if startled by construction equipment. However, small mammals and reptiles that take refuge and hibernate underground could be harmed or killed during construction. Incidents of wildlife mortality are expected to be rare. These impacts would occur at the level of the individual(s) and would not result in local or regional population level impacts. Therefore, incidental mortality impacts from construction activities related to removal of existing structures and installation of new structures would be low.

Increased noise and activity levels from heavy equipment used to remove and install structures and from helicopters used to string the new conductors would result in temporary disturbance and displacement of wildlife near work areas. The increase in noise over ambient conditions and resulting wildlife disturbance and displacement would be temporary; no permanent habitat degradation or disturbance would occur. Therefore, impacts on wildlife from construction noise would be low. Increased noise and activity levels during structure removal and installation activities can also cause the displacement of birds during the nesting period, resulting in failed nesting attempts. Construction activities would occur mostly outside of the nesting period for migratory bird species, generally from March 1 to August 31, and mitigation measures to reduce impacts on nesting birds would be implemented (see Section 3.9.3, Mitigation Measures – Proposed Action, below). Therefore, impacts on nesting migratory birds from construction noise would be low.

Permanent removal or temporary disturbance of these habitats would result in the loss of opportunities for movement, foraging, nesting, and denning by wildlife. These impacts would occur at the level of the individual(s) and would not result in population level impacts in the region; therefore, this impact on wildlife species would be low.

Indirect impacts on wildlife that could result from transmission structure removal and installation work could include degradation of habitat as a result of the introduction and spread of noxious weeds into disturbed areas by workers and equipment. The potential for the introduction and spread of noxious weeds would be reduced through the implementation of weed control measures discussed in Section 3.8, Vegetation, of this EA. With implementation of these mitigation measures, degradation of habitat from noxious weeds would be moderate.

Access Road Work

The construction of new access roads and the reconstruction or improvement of existing access roads would have temporary and permanent impacts on wildlife and permanent impacts on about 137.7 acres of their habitats in the study area. The acreages of habitat disturbance during construction and permanent habitat removal from these activities are summarized below, and detailed tables are included in Appendix B.

Potential long-term impacts on wildlife and their habitats from the construction, reconstruction, and improvement of access roads for the Midway-Moxee transmission line would occur on approximately 75 acres of habitat. A majority (35 acres) of the long-term impacts associated with access roads would occur in habitat classified as developed. The remaining total (40 acres) includes 5.0 acres of agricultural land, 14.4 acres of shrub-steppe, 6.3 acres of perennial grassland, 14.1 acres of annual grassland, and 35.1 acres of developed wildlife habitat types. Over 86 percent (65 acres) of the impacts would occur in wildlife habitat described as being of low quality, 9.2 acres would occur in medium- and high-quality shrub-steppe habitat, and 1.1 acres would occur in medium- and high-quality perennial grassland habitat.

Potential long-term impacts on wildlife and their habitats from access road work to serve the Midway-Grandview transmission line would occur on approximately 63 acres of habitat. A majority (31 acres) of the long-term impacts associated with access roads would occur in habitat classified as developed. The remaining total (32 acres) includes 0.6 acre of agricultural land, 13.9 acres of shrub-steppe, 11.2 acres of perennial grassland, 5.8 acres of annual grassland, and 0.1 acre of riparian. Over 90 percent (57.4 acres) of the impacts would occur in wildlife habitat described as being of low quality, 4.1 acres would occur in medium-quality shrub-steppe habitat, and 1.0 acre would occur in medium-quality perennial grassland habitat. Impacts on 0.1 acre of high-quality riparian habitat would occur within the Sulphur Creek drainage. While the vegetation composition within this riparian area is disturbed and of low quality, the function provided is limited on the landscape.

Medium- and high-quality shrub-steppe and medium- and high-quality perennial grassland habitat types are considered limited within portions of the study area. PHS-mapped shrub-steppe habitat supports sagebrush-obligate wildlife. Impacts on these habitat types would result in the long-term decline of habitat quality and quantity; therefore, these impacts would be considered moderate. Temporary and permanent impacts on low-quality habitats identified above are not expected to have a detrimental effect on local wildlife resources and would result in low impacts.

Within these areas, access road work would require use of trucks and other construction equipment (e.g., boom cranes, backhoes, and line trucks) that could temporarily reduce the value of the habitat in these areas for wildlife. Impacts from the use of this equipment in access road work would be similar to those described above for *Structure Removal and Installation*. Because access roads would be dispersed along the transmission line corridors and disturbance related to these activities would be temporary (often less than a few hours at any one location), the impact of these activities on wildlife and their habitats would be low.

Indirect impacts from noise and increased activity related to these construction activities and from the potential spread of noxious weeds would also be similar to those described above for *Structure Removal and Installation*. For the reasons described in that section, these indirect impacts on wildlife from access road work would also be low.

Pulling and Tensioning Sites

Pulling and tensioning activities along both transmission lines could result in 26.2 acres of temporary impacts on wildlife habitat due to the clearing and crushing of vegetation, damage of plant roots from soil compaction, and soil crust disturbance. Noise and the presence of equipment and humans during pulling and tensioning would cause temporary disturbance to wildlife in the vicinity.

Danger Tree Removal

Habitat disturbance and potential loss of habitat could also result from danger tree removal. Trees of various sizes and species would be removed under the Proposed Action and would include orchard trees and wind break trees. Tree species that would be removed include Lombardy poplar, cottonwood, pine, arborvitae, sweet gum, and various horticultural hardwood tree species. However, only two of the trees that would be removed are within riparian areas.

Wildlife, especially nesting birds, could be temporarily displaced by the removal of trees. Removal of danger trees would permanently remove perching, foraging, and nesting habitat for bird species. As mitigation, trees in riparian areas would be cut as snags and tree removal would occur outside of the typical nesting period for migratory birds. Because there are few available trees in the study area for nesting, impacts on wildlife species from tree removal would be moderate.

<u>Special-Status Species</u>

Increased noise and activity levels from heavy equipment used to remove and install structures and conduct access road work and from helicopters used to string the new conductors would result in temporary disturbance and displacement of special-status species that occur near work areas. Increased noise and activity levels during structure removal and installation activities can also cause the displacement of birds during the nesting period (including special-status bird species), resulting in failed nesting attempts. Although construction would start in the fall, it would extend into spring and could impact nesting activity of special-status species.

The temporary establishment of pulling and tensioning sites along the transmission line corridors within the existing transmission line rights-of-way would cause temporary disturbance to special-status species from construction noise and activity. Because pulling and tensioning sites would result in impacts on shrub-steppe habitat, the potential exists for impacts on shrub-steppe obligate species.

Removal of danger trees, including some in riparian areas, could result in temporary displacement of and loss of habitat for special-status species. However, because most tree removal activities would occur outside the typical nesting period for birds, and because of the availability of trees in the study area, impacts on special-status species would be low.

Potential impacts on specific special-status species that could result from the Proposed Action are discussed below.

Endangered Species Act–listed, Proposed, and Candidate Species

As identified above, eight ESA-listed wildlife species are known to occur or have the potential to occur in the project area (U.S. Fish and Wildlife Service 2015). BPA determined the Proposed Action would have No Effect on all wildlife species listed or proposed for listing at the time by the USFWS as endangered or threatened in the project area. Habitat features that would support these species are currently rare or absent in the study area, and few or no historical occurrences of these species in the study area have been documented.

<u>Greater Sage-Grouse</u> – The Proposed Action could disturb (degrade or remove) up to 64.4 acres of shrub-steppe habitat. Of these 64.4 acres, 29.8 acres are within the YTC PAC.

Ground-disturbing activities within shrub-steppe habitat could result in temporary displacement of greater sage-grouse if they are present during construction. Greater sage-grouse have only been documented within the study area during the late summer and early fall, when they are more mobile (i.e., not dancing or drumming on a lek or on a nest). They are not likely to be present in the study area during construction activity, which would start in the fall after the fire season. Therefore, temporary impacts on greater sage-grouse resulting from temporary displacement during Proposed Action construction activities would be low.

The long-term disturbance of 29.8 acres of shrub-steppe habitat within the YTC PAC would reduce the overall availability of shrub-steppe habitat for greater sage-grouse in the YTC PAC. Disturbance to shrub-steppe habitat could also increase habitat fragmentation. Providing habitat connectivity for greater sage-grouse is a goal of the Washington Wildlife Habitat Connectivity Working Group (U.S. Fish and Wildlife Service 2014f). Because the impacts on shrub-steppe habitat would be relatively small and widely-dispersed within the YTC PAC, it is unlikely that the Proposed Action would have a detrimental effect on the use of the project area by greater sage-grouse. In addition, project construction would not occur in greater sage-grouse habitat during most of the time when greater sage-grouse are known to forage in the project area. Although 29.8 acres of shrub-steppe habitat within the YTC PAC would be degraded or removed, this amount is insignificant given the total amount of shrub-steppe habitat within the YTC PAC. Therefore, the Proposed Action could have low to moderate impacts on greater sage-grouse.

Other Federal and State Special-Status Species

Ferruginous Hawk – Ferruginous hawks are highly mobile and would be able to adequately avoid construction activity and any potential for incidental mortality associated with those activities. Ground-disturbing impacts would reduce available foraging habitat for this species. However, given the large home range of ferruginous hawk, this loss of habitat would be a low impact.

Construction activities could result in the temporary displacement of non-breeding ferruginous hawks in the vicinity. Under some circumstances, noise disturbance may lead nesting ferruginous hawks to desert their nests. To avoid impacts on active ferruginous hawk nests in the study area, construction activities would not occur within 0.6 mile of active nests during the March–August nesting period (see Section 3.9.3, Mitigation Measures – Proposed Action). The Proposed Action could result in the temporary disturbance to ferruginous hawk individuals, without injury or mortality, resulting in a low impact.

Peregrine Falcon – Peregrine falcons were not identified during surveys, and active breeding pairs are not common in the Columbia Basin (Hayes and Buchanan 2002). Given that the most favorable nesting habitat near the study area (cliff habitat overlooking Priest Rapids Dam) is within an active prairie falcon territory, it is unlikely that peregrine falcons would nest within the same territory due to competitive exclusion (Orahoske 1999). Therefore, the loss of wildlife habitat would be considered negligible for peregrine falcons, and the Proposed Action would have no impact on the species.

Loggerhead Shrike – Impacts on loggerhead shrike from the disturbance of shrub-steppe habitat would be similar to those discussed for sage-grouse. Disturbance in shrub-steppe wildlife habitats would reduce the overall availability of shrub-steppe habitat but would not be likely to result in injury or mortality. Loggerhead shrikes could also be affected by the human presence and associated construction activity, and they would likely be displaced by construction activities. Impacts on loggerhead shrike would result from the temporary reduction in the quantity and quality of shrub-steppe habitat, a low to moderate impact.

Sage Sparrow – Disturbance in shrub-steppe wildlife habitats would reduce the overall availability of shrub-steppe habitat used by sage sparrow but would not be likely to result in injury or mortality. Sage sparrows could also be affected by human presence and associated construction activity, and they would likely be displaced by construction activities. Impacts on sage sparrow would result from the temporary reduction in the quantity and quality of shrub-steppe habitat, a low to moderate impact.

Burrowing Owl – Likely impacts on burrowing owl would include the avoidance of human activity and the loss of burrows and incidental mortality associated with construction activities. Impacts on prey items and loss of foraging habitat utilized by this species would be considered negligible because of the relatively small amount of ground disturbance compared to available prey habitat within and adjacent to study area due to the low level of development in the project area. The Proposed Action could result in the temporary disturbance of burrowing owl individuals, with a possibility of incidental mortality that would not be expected to affect the viability of this species, a low to moderate impact.

Prairie Falcon – Prairie falcons are highly mobile and would be able to adequately avoid construction activity and any potential for incidental mortality associated with those activities. Ground-disturbing impacts would reduce available foraging habitat for this species. However, given the large home range of prairie falcon, this loss of habitat would be a low impact.

Construction activities could result in the temporary displacement of non-breeding prairie falcons in the vicinity. Under some circumstances, noise disturbance may lead nesting prairie falcons to desert their nests; however, nesting habitat for this species would not be affected. The Proposed Action could result in temporary disturbance to prairie falcon individuals, without injury or mortality, resulting in a low impact.

Swainson's Hawk – A total of six active Swainson's hawk nests were observed during surveys, with two of the nests observed within 0.5 mile of a construction work area. Swainson's hawks are highly mobile and would be able to adequately avoid construction activity and any potential for incidental mortality associated with those activities. Ground-disturbing impacts would reduce available foraging habitat for this species. However, given the large home range of Swainson's hawk, this loss of habitat would be a low impact.

Construction activities could result in the temporary displacement of non-breeding Swainson's hawks in the vicinity. Under some circumstances, noise disturbance may lead nesting Swainson's hawks to desert their nests. To avoid impacts on active Swainson's hawk nests in the study area, construction activities would not occur within 0.6 mile of active nests during the March–August nesting period (see Section 3.9.3, Mitigation Measures – Proposed Action). The Proposed Action could result in temporary disturbance to Swainson's hawk individuals, without injury or mortality, resulting in a low impact.

Great Blue Heron – Ground-disturbing activities are not expected to impact the availability of foraging habitat for this species and impacts would be limited to the temporary displacement of individuals from construction activity. Because great blue herons are mobile enough to avoid any incidental injury or mortality from construction activities, the Proposed Action could result in temporary disturbance of individuals of this species without causing injury or mortality, a low impact.

Long-Billed Curlew – Both nesting and foraging habitat for this species occurs within areas that would be affected by the Proposed Action. Impacts from the loss of foraging habitat would be considered negligible because of the relatively small amount of ground disturbance compared to the available foraging habitat within and adjacent to the study area due to the low level of development in the project area. Because long-billed curlews are mobile enough to avoid any incidental injury or mortality from construction activities, the Proposed Action could result in temporary disturbance of individuals of this species without causing injury or mortality, a low impact.

Sharp-Tailed Snake – Sharp-tailed snakes were not observed during wildlife surveys and are expected to have a low likelihood of occurrence within the study area. The most likely impact on sharp-tailed snakes would be the incidental mortality that might occur while the species is taking refuge or hibernating under rocks, logs, or in burrows. The Proposed Action could result in the injury or mortality of individuals of this species during construction, but because sharp-tailed snakes are expected to have a low likelihood of occurrence within the study area, impacts on this species would be low to moderate.

Striped Whipsnake – Striped whipsnakes were not observed during wildlife surveys and are expected to have a low likelihood of occurrence within the study area, though individuals may occur within the portion of the study area within the DOE Hanford Site. If they occur, the most likely impact on striped whipsnake would be the incidental mortality that might occur while the species is taking refuge or hibernating under rocks, logs, or in burrows. The Proposed Action could result in the injury or mortality of striped whipsnake individuals, a low to moderate impact on this species.

Racer – This species can be expected to occur in all habitats within the study area. The most likely impact on the racer would be the incidental mortality that might occur while the species is taking refuge or hibernating under rocks or logs or in burrows. The Proposed Action could result in the injury or mortality of racer individuals, a low to moderate impact on this species.

Night Snake – This species is likely to occur in shrub-steppe habitats within the project area. The most likely impact on the night snake would be the incidental mortality that might occur while the species is taking refuge or hibernating under rocks, logs, or in burrows. The Proposed Action could result in the injury or mortality of night snake individuals, a low to moderate impact on this species.

White-Tailed Jackrabbit – Ground-disturbing activities in moderate- and high-quality perennial grassland and shrub-steppe habitat would result in the loss of foraging and cover habitat for white-tailed jackrabbit. The species is highly mobile and can avoid construction activity and any incidental injury or mortality from these activities; however, the activity would result in temporary displacement of individuals. The Proposed Action could temporarily disturb white-tailed jackrabbit individuals without resulting in injury or mortality, resulting in a low impact on this species.

Black-Tailed Jackrabbit – Ground-disturbing activities in shrub-steppe habitat and, to a lesser extent, moderate- and high-quality perennial grassland would result in the loss of foraging and cover habitat for black-tailed jackrabbit. The species is highly mobile and can avoid construction activity and any incidental injury or mortality from these activities; however, the activity would result in temporary displacement of individuals. The Proposed Action could temporarily disturb black-tailed jackrabbit individuals without resulting in injury or mortality, resulting in a low impact on this species.

Townsend's Ground Squirrel – Ground-disturbing activities are likely to disrupt burrow systems and displace Townsend's ground squirrel individuals. However, incidental mortality is expected due to the abundance of this species and its likely occurrence in areas where ground disturbance cannot be avoided. The impact of the Proposed Action would be low to moderate as it could result in the mortality or injury of Townsend's ground squirrel individuals, but at a level that would not be expected to affect the viability of the species due to the abundance of this species in the project area.

Wildlife and Wildlife Habitat – Public Lands

Wildlife impacts on the DOE Hanford Site, BLM-administered lands, BoR land, and WDNR lands would occur from construction activities. Table 3.9-3 summarizes the impacts on wildlife habitat from Midway-Moxee and Midway-Grandview structure installation and removal, access road work, and pulling and tensioning, but does not include staging areas, because locations have not been identified. Staging areas would not be located on BLM-administered lands, BoR land, and WDNR lands, but could be in a disturbed and developed area around the BPA Midway Substation on the DOE Hanford Site.

Impacts on wildlife target species on public lands would be similar to those discussed above, when that species is known or expected to occur on those public lands. Table 3.9-4 lists the wildlife target species which are known to occur, have the potential to occur, or are unlikely to occur on public lands that would be impacted by the Proposed Action. If a species is unlikely to occur on a public land parcel, it is because of a lack of suitable habitat, and impacts are not expected to occur. For raptors, a lack of suitable habitat results from the absence of suitable nesting substrates such as cliff/rock outcrops, trees, or shrubs.

Table 3.9-3. Potential Impacts on Wildlife Habitat from Midway-Moxee and Midway-Grandview Construction Activities on Public Lands

Wildlife Habitat Type	Disturbance						Total Disturbance (Acres)[1]	
	Temporary (Acres)[2]			Permanent (Acres)[3]				
	Low Quality	Medium Quality	High Quality	Low Quality	Medium Quality	High Quality	Temporary	Permanent
Department of Energy Hanford Site								
Perennial grassland	–	–	1.3	–	–	0.7	1.3	0.7
Shrub-steppe	0.5	0.3	5.4	–	0.2	3.8	6.2	4.0
Developed[4]	–	–	–	4.1	–	–	–	4.1
Total[1]	0.5	0.3	6.7	4.1	0.2	4.5	**7.5**	**8.8**
Bureau of Land Management								
Annual grassland	0.4	–	–	1.3	–	–	0.4	1.3
Perennial grassland	0.1	–	–	<0.05	–	–	0.1	<0.05
Shrub-steppe	0.1	1.4	–	0.7	1.3	–	1.5	2.0
Developed[4]	–	–	–	2.2	–	–	–	2.2
Total[1]	0.6	1.4	–	4.2	1.3	**–**	**2.0**	**5.5**
Washington Department of Natural Resources								
Agriculture	<0.05	–	–	0.4	–	–	<0.05	0.4
Annual grassland	4.3	–	–	3.9	–	–	4.3	3.9
Perennial grassland	<0.05	–	–	<0.05	–	–	<0.05	<0.05
Shrub-steppe	1.6	–	–	2.1	–	–	1.6	2.1
Developed[4]	0.1	–	–	3.1	–	–	0.1	3.1
Total[1]	6.0	–	–	9.5	–	–	**6.0**	**9.5**

Dash indicates zero

[1] Total may not equal the sum of rows or columns due to rounding. Total includes 0.6 acre of temporary impacts and 0.04 acre of permanent impacts on shrub-steppe habitat within mapped Priority Habitats and Species cliff habitat.

[2] Acres of temporary impact based on an assumed 100-foot by 100-foot potential disturbance area (excluding the area of permanent impacts) around each structure, which would include areas of equipment movement for removing existing structures and installing new structures; actual disturbance area would depend on site-specific conditions at each structure and whether the work area can be reduced, thus temporary impacts would likely be less than indicated

[3] Acres of permanent impact based on an assumed area of 0.012 acre around each two-pole structure and 0.016 acre for each three-pole structure

[4] Existing transmission line access roads proposed for improvement or reconstruction are considered to be developed habitat

Table 3.9-4. Wildlife Target Species – Likelihood of Occurrence on Public Lands Crossed by the Project

Wildlife Target Species	Public Lands		
	DOE Hanford Site	BLM	WDNR
Greater sage-grouse	P	U	K
Sharp-tailed snake	P	P	P
Burrowing owl	P	P	P
Loggerhead shrike	K	P	K
Peregrine falcon	P	U	U
Ferruginous hawk	P	P	P
Townsend's ground squirrel	K	K	K
Striped whipsnake	P	P	P
Racer	P	P	P
Night snake	P	P	P
Great blue heron	U	U	P
Long-billed curlew	K	K	P
Prairie falcon	K	U	U
Swainson's hawk	K	U	P
Sage sparrow	K	P	K
White-tailed jackrabbit	P	U	U
Black-tailed jackrabbit	K	P	P

K = Known to occur through existing data or documented during project surveys

P= Potential to occur

U = Unlikely to occur

DOE Hanford Site – Construction activities would result in the temporary and permanent impacts on wildlife located in areas mapped as Level 3, 4, and 5 priority resources, including special-status animal species, by the *Hanford Site Biological Resources Management Plan* (U.S. Department of Energy 2013a).

On the DOE Hanford Site, impacts on about 16.3 acres of wildlife habitats could occur from construction activities, as detailed in Table 3.9-3. Of these acres of impact, 8.8 acres could be permanently impacted and 7.5 acres could be temporarily impacted. A total of 10.2 acres of shrub-steppe could be impacted, most of which is high-quality or medium-quality shrub-steppe, with 4.0 acres of permanent impacts and 6.2 acres of temporary impacts. A total of 2.0 acres of high-quality perennial grassland could be impacted, with 1.3 acres of permanent impacts and 0.7 acre of temporary impacts. The remaining 4.1 acres of permanent impacts would be on developed areas, including existing access roads.

While some of the impacts on high-quality shrub-steppe and perennial grasslands would be temporary in nature, the length of time required and difficulty in restoring these habitats would result in long-term disturbances in these habitat types. High-quality shrub-steppe and high-quality perennial grassland habitat types are considered limited within some portions of the study area. Impacts on high-quality shrub-steppe and high-quality perennial grassland habitat would occur within mapped PHS shrub-steppe habitat within the DOE Hanford Site that supports sagebrush-obligate wildlife species. This mapped PHS habitat within the DOE Hanford Site crossed by the Midway-Moxee and Midway-Grandview transmission lines, is identified as Resource Level 5, Level 4, and Level 3 by the DOE for planning purposes (U.S. Department of Energy 2013a). Therefore the disturbance of impacts on high-quality shrub-steppe and high-quality perennial grassland habitat types within the DOE Hanford Site would be a moderate impact, after mitigation to restore the areas not permanently impacted.

As required under the *Hanford Site Biological Resources Management, Plan*, direct loss of late-successional shrub-steppe habitat requires on site restoration and/or off-site compensatory mitigation to achieve no net loss of habitat values (U.S. Department of Energy 2013a). Section 3.9.3, Mitigation Measures – Proposed Action, below identifies specific measures that would mitigate for impacts on late-successional shrub-steppe and associated wildlife habitat. The permanent removal of shrub-steppe habitat would be considered a moderate impact; however, with implementation of mitigation measures requiring no net-loss of habitat values, impacts on shrub-steppe habitat on the DOE Hanford Site would be reduced.

Pulling and tensioning in three locations on the DOE Hanford Site could temporarily disturb about 1.3 acres of shrub-steppe wildlife habitat. Of this total number of acres of shrub-steppe that could be impacted, 0.6 acre are high-quality, 0.3 acre are medium-quality, and 0.3 acre are low-quality. As noted above, impacts on shrub-steppe habitat are considered to be long term.

Because construction sites associated with the Proposed Action within the DOE Hanford Site would disturb high-quality and moderate-quality shrub-steppe habitat, impacts would be moderate after implementation of mitigation.

<u>BLM-Administered Land</u> – Impacts on about 7.5 acres of wildlife habitats could occur from construction activities, as detailed in Table 3.9-3. Of these acres of impact, 5.5 acres could be permanently impacted and 2.0 acres could be temporarily impacted. A total of 3.5 acres of shrub-steppe could be impacted, with 2.0 acres of permanent impacts and 1.5 acres of temporary impacts. About 1.7 acres of annual grassland could be impacted, with 1.3 acres of permanent impacts and 0.4 acre of temporary impacts. The remaining permanent impacts would include 2.2 acres of developed areas, including existing access roads, and less than 0.05 acre of impacts on perennial grasslands. Pulling and tensioning sites would not be located on BLM-administered lands.

Because construction sites associated with the Proposed Action within BLM-administered land would disturb low-quality and moderate-quality wildlife habitats, including shrub-steppe, impacts would be moderate after implementation of mitigation.

<u>BoR Land</u> – On BoR land that would be impacted, wildlife habitat has been degraded by land use activities, such as grazing or past cultivation, and is classified as very low-quality annual grassland. The annual grassland communities are dominated by non-native species, including

invasive annual grass and forb species. The acreage that would be impacted was not quantified due to the low-quality wildlife habitat.

No individuals of special-status wildlife species or their potential habitat were observed on BoR land within the project area, thus no impacts on individuals of special-status species or their habitat are expected to occur on BOR land from the Proposed Action.

Because construction sites associated with the Proposed Action within the BoR would disturb low-quality wildlife habitat and no shrub-steppe would be impacted, impacts would be low.

<u>WDNR Land</u> – On WDNR lands, a total of about 15.5 acres of wildlife habitat could be impacted from construction activities, as detailed in Table 3.9-3. Of these acres of impact, 9.5 acres could be permanently impacted and 6.0 acres could be temporarily impacted. A total of 3.7 acres of shrub-steppe could be impacted, with 1.6 acres of permanent impacts and 2.1 acres of temporary impacts. About 8.2 acres of annual grassland could be impacted, with 3.9 acres of permanent impacts and 4.3 acres of temporary impacts. The remaining impacted areas would include 3.2 acres of developed areas, including existing access roads, 0.4 acre of agricultural land, and less than 0.05 acre of impacts on perennial grasslands.

Because construction sites associated with the Proposed Action within WDNR lands would be low-quality habitat for wildlife, including some low-quality shrub-steppe, impacts would be low to moderate.

Pulling and tensioning on WDNR land could temporarily disturb about 2.4 acres of wildlife habitat. Of the total number of acres that could be impacted by pulling and tensioning, 0.8 acre is low-quality shrub-steppe, 1.5 acres are annual grassland, and 0.1 acre is developed land. As noted above, impacts on shrub-steppe habitat are considered to be long term.

Because pulling and tensioning sites associated with the Proposed Action within WDNR would disturb low-quality shrub-steppe habitat, impacts would be low to moderate.

Operation

During operation, birds could collide with the transmission line structures, conductor, and overhead ground wire. Eagles, herons, and vultures have been identified as bird types that may have a higher susceptibility for collision with power lines, as they have large wing spans, heavy bodies, and generally poor maneuverability (Avian Power Line Interaction Committee 2012). Portions of the study area with a higher potential for avian collisions include areas where there would be long spans of conductors over canyons and waterways.

Most of the new structures would be taller and conductor would be higher than existing conductor. Because resident birds may already be accustomed to avoiding the existing transmission lines, the change in conductor position may not increase the risk of avian collision. The new conductor would be larger diameter than the existing conductor and would be more visible to birds, which could help to avoid collisions.

Birds are not electrocuted by contact with the conductors of high-voltage transmission lines. The typical conductor-to-conductor spacing for the proposed transmission line structure would be too wide for any bird species to contact two conductors at the same time. Electrocution of birds is more commonly a problem with lower voltage distribution lines (the lines feeding residences and businesses) that have conductors generally spaced 2 to 6 feet apart.

3.9.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would implement the following mitigation measures to avoid or minimize impacts from the Proposed Action on wildlife. Other mitigation measures in Section 3.8, Vegetation, of this EA, are relevant to mitigation of impacts on wildlife habitat.

- Prepare a site-specific Safety Plan before starting construction; specify how to manage hazardous materials, such as fuel and any toxic materials found in work sites; include a Fire Prevention and Suppression Plan and detail how to respond to emergency situations; keep the Safety Plan on site during construction and maintain and update, as needed.
- Explain wildlife-related mitigation measures to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.
- Ensure that all hay, hay cubes, straw, and mulch possessed, used, or stored on BLM-administered lands has proof of weed-free certification that meets or exceeds the North American Weed Management Association Weed-Free Forage certification standards.
- For activities taking place in the DOE Hanford Site, reduce structure removal and installation construction footprint to 50-feet by 100-feet in Level 3, 4, and 5 habitat types, as much as possible.
- Coordinate with DOE-RL staff if Townsend’s ground squirrels are encountered on the DOE Hanford Site, to determine what, if any, specific protections or administrative controls need to be implemented.
- Control noxious weeds either manually, mechanically, and/or chemically as recommended for each species, prior to construction, with a focus on species with small, contained infestations to reduce the potential for widespread establishment and the need for long-term management.
- Conduct a post-construction noxious weed survey approximately 1 year after construction of all areas disturbed by construction activities to determine if there are new noxious weed infestations; implement appropriate control measures of noxious weed infestations.
- Enforce speed limits for construction vehicles of 15 miles per hour on unpaved access roads to reduce the likelihood of collision with wildlife.
- Cut danger trees in riparian areas as snags.
- Cut danger trees between September 1 and March 1 to avoid the typical nesting period for migratory birds.
- Avoid construction or other disturbance within 0.6 mile of active or potentially active ferruginous hawk nest sites, between March 1 and August 31.

3.9.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

Some incidental mortality of small mammal and reptile species that hibernate or take refuge underground would be potentially unavoidable.

Temporary displacement of wildlife would result from increased noise and activity levels during construction, but because adequate habitat is available adjacent to construction work areas wildlife would be expected to return after construction.

The Proposed Action would also result in the loss of 6.9 acres of agricultural habitat, 29.8 acres of shrub-steppe habitat, 18.5 acres of perennial grassland habitat, 21.2 acres of annual grassland habitat, 66.7 acres of developed habitat, and 0.1 acre of riparian habitat.

Although disturbed shrub-steppe habitat would be reseeded, there would be a loss in habitat function until newly planted shrub-steppe habitat matures. Loss of medium- and high-quality shrub-steppe habitat would result in impacts on shrub-steppe dependent species, including sage sparrow and greater sage-grouse.

3.9.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, the existing transmission lines would not be rebuilt or upgraded. Therefore, the impacts related to construction of the Proposed Action would not occur. Maintenance activities would likely increase as existing structures age and deteriorate, and more structure repair and replacement could be required compared to existing conditions. Maintenance of access roads would be needed and road work proposed under the Proposed Action would likely need to take place as a maintenance activity. Increased intermittent maintenance could result in periodic temporary displacement of wildlife and increased long-term habitat disturbance or loss. The removal of danger trees and other tall-growing vegetation would likely need to take place and would continue to modify wildlife habitat. 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 on wildlife, including special-status species, and their habitats. Because impacts of the No Action Alternative on wildlife and their habitats, including special-status species, would be temporary and localized, impacts would be low to moderate, depending on the type of habitats impacted.

3.10. WATERWAYS AND WATER QUALITY

The study area for waterways and water quality includes the existing right-of-way for both transmission lines and access roads that extend outside the rights-of-way where work would be conducted. This includes areas where waterways and water quality could be directly affected by project work. It also includes adjacent areas that extend 500 feet beyond the project work areas to include consideration of water features that could be indirectly affected by nearby project activities.

3.10.1. Affected Environment

Groundwater

Groundwater in the study area generally occurs in aquifers that are recharged by precipitation and infiltration of irrigation water (Kahle *et al.* 2011).

Groundwater usage in the vicinity of the study area includes irrigation, livestock watering, and domestic and municipal water supply. Individual domestic wells typically tap permeable portions of the overburden aquifer, while most municipal and agricultural wells tap the deeper basalt-rock aquifer (Pacific Groundwater Group 2011). A number of wells are located in and around Moxee, Grandview, and in the agricultural areas adjacent to each transmission line. Wells generally vary in depth from around 60 to over 2,400 feet deep (Washington State Department of Ecology 2014a).

Water quality data indicate that nitrate contamination of groundwater exists in the region and at least in some portions of the study area (Washington State Department of Ecology 2010). Much of the southern portions of the Midway-Grandview transmission line are within the Lower Yakima Valley Groundwater Management Area (Washington State Department of Ecology 2014b). This groundwater management area was established in 2011 under WAC 173-100 to address widespread nitrate contamination in drinking water wells throughout the valley (Washington State Department of Ecology 2014c). A Ground Water Advisory Committee consisting of multiple stakeholders developed a *Nitrate Treatment Pilot Program* to address this issue (Yakima County Public Services 2011).

Surface Water

The majority of the study area is located in the Lower Yakima Watershed, which is identified by the Washington State Department of Ecology (Ecology) as Water Resource Inventory Area (WRIA) 37 (Washington State Department of Ecology 2014d). Exceptions include the first line mile of both transmission lines, including the Midway Substation, which are located in the Alkali/Squilchuck Watershed (WRIA 40).

Surface waters in the study area were identified by using National Wetlands Inventory and National Hydrography Dataset digital maps. Identified water features in the transmission line rights-of-way and along access roads were verified in the field during spring and summer field visits in 2014. Unless otherwise indicated, information collected during these visits was used to provide the information on water features presented below (Tetra Tech 2014c).

A total of 92 surface-water features that are not wetlands were identified in the survey area: 46 along the Midway-Moxee transmission line and 46 along the Midway-Grandview transmission line. The majority (80) of these features were classified as ephemeral streams, which are streams that flow only during and immediately after rainfall events and convey flow from direct precipitation and overland flow (Nadeau 2011). As a result, they often lack the biological, hydrological, and physical characteristics commonly associated with the intermittent or continuous conveyance of water (perennial water bodies). Ephemeral streams are often located on relatively steep slopes in the upper portions of the watershed. Because these streams did not show evidence of recent surface flows at the time of the field survey, it is assumed that they only rarely convey water. These ephemeral streams of the survey area are similar in appearance and typically consist of dry, incised channels that support varying amounts of upland shrubs, grasses, and weeds (Tetra Tech 2014c). Historically, most of these drainages connected to an intermittent or perennial stream that eventually flowed to the Yakima River (U.S. Geological Survey 1965a, 1965b, 1974, 1978a, 1978b, 1979). Many have since been routed into small impoundments for stock watering or excavated canals/ditches for agricultural irrigation.

Sulphur Creek was the only stream classified as intermittent in the survey area. Intermittent streams contain water for only part of the year (typically during winter and spring) and convey flow from multiple sources including direct precipitation, overland runoff, groundwater seepage, and snowmelt. Intermittent streams may or may not have a well-defined channel, can occur both above and below the water table, and may lack the biological and hydrological characteristics commonly associated with the continuous conveyance of water (Nadeau 2011). Intermittent streams are typically found on more moderate slopes in the middle and lower portions of the watershed. Sulphur Creek crosses the Midway-Grandview line between Structures 18/7 and 19/1. It has an adjacent wetland and a vegetated riparian corridor, including a few large black cottonwood trees, both danger trees that would be cut as snags. Based on field observations, Sulphur Creek is no longer connected to downstream waterways. Its natural flow has been disrupted by impoundments that capture surface waters and shunt them into an irrigation canal system. In some areas the natural streambed has been converted to agricultural land.

Eleven streams were classified as perennial streams. Perennial streams contain water throughout the year, with groundwater supplying the baseflow supplemented by direct precipitation, runoff, and snowmelt, among other sources. They exhibit well-defined channels and the biological, hydrological, and physical characteristics associated with the continuous conveyance of water (Nadeau 2011). Perennial streams typically occur on moderate to low slopes in the middle to lower portions of the watershed. Ten of the perennial streams identified in the survey area are constructed agricultural irrigation canals or ditches of various sizes and one is a stream with natural characteristics. None of these features is considered to be a regulated shoreline of the state by Ecology.

Irrigation canals and ditches typically consist of excavated channels ranging in width from 5 to 25 feet, with mud or cobble-gravel substrates and occasional patches of emergent plants lining the banks. One exception is Roza Canal, a major irrigation canal that is approximately 40 feet wide and concrete-lined.

The one perennial unnamed stream with an intact stream channel in the survey area crosses the Midway-Moxee transmission line between Structures 30/5 and 30/6. It is likely the water in this stream originates from a constructed reservoir located approximately 950 feet upstream to the north. The stream channel is well-defined, shallow, and approximately 5 feet wide, with a natural substrate of mud and cobble. This unnamed stream is highly degraded and provides only limited plant and animal habitat. The stream crosses an existing access road within a culvert. The access road is used for agricultural equipment and BPA transmission line access.

The surface waters present in the survey or study areas are not identified as water quality impaired by Ecology (2012).

3.10.2. Environmental Consequences – Proposed Action

Ground disturbing activities associated with the Proposed Action would not be expected to affect groundwater quantity or quality, because these activities would not result in deep excavations that would directly reach groundwater resources. The potential to impact groundwater recharge is extremely small because the area where construction would occur is very small compared to the surrounding landscape where groundwater is recharged. Therefore, there would be no impact on groundwater.

Construction disturbance associated with transmission structure removal and installation and access road work has the potential to affect surface waterways and water quality. Construction activities within 200 feet of waterways could require vegetation removal and cause soil compaction, erosion, and the deposition of soil within waterways. The locations of proposed construction work areas within 200 feet of waterway features are discussed below and summarized in Tables C-1 through C-3 in Appendix C.

Construction work would occur between early fall and late spring to avoid the fire season. During that time of year, both rain and snowfall events would occur and the streams and drainages of the study area could be actively flowing. Most of the streams in the study area are ephemeral and it is not known when and for how long water flows in them, but it is likely that they contain water on an infrequent basis.

Indirect impacts on water quality could occur when sediment-laden runoff from construction work areas enters streams and results in increased turbidity. Ground disturbing activities more than 200 feet away from streams is not expected to result in any impacts on water quality. Vegetated areas between the disturbance area and the surface water act as a vegetative filter, intercepting sediments before being discharged into surface waters. Approved erosion and stormwater control BMPs would be implemented to eliminate sediment discharge into waterways, minimize the size of construction disturbance areas, and minimize removal of vegetation, to the greatest extent possible.

Structure Removal and Installation

Both the Midway-Moxee and Midway-Grandview transmission lines span streams in the study area and although some structures are near waterways, they are not located in active stream channels. As summarized below, some structures would be installed near perennial streams, intermittent and ephemeral streams.

Eight of the existing Midway-Moxee transmission line structures that would be removed are within 200 feet of streams (Table C-1, Appendix C). One of the waterways is a perennial stream and the other seven are ephemeral streams. One of the structures that would be removed is within 50 feet of a perennial waterway. Eleven of the proposed Midway-Moxee transmission line structures that would be installed are within 200 feet of waterways (Table C-1, Appendix C). One of the waterways is a perennial stream and the other ten are ephemeral streams. One of the structures that would be installed is within 50 feet of a perennial waterway.

Seventeen of the existing Midway-Grandview transmission structures that would be removed are within 200 feet of waterways (Table C-1, Appendix C). Two of the waterways are perennial streams, one is an intermittent stream, and the other 14 are ephemeral streams. Of these structures, two are within 50 feet of perennial waterways. Seventeen of the proposed Midway-Grandview transmission line structures that would be installed are within 200 feet of waterways (Table C-1, Appendix C). Two of the waterways are perennial streams, 1 is an intermittent stream, and the other 14 are ephemeral streams. Of the two structures that would be installed within 200 feet of a perennial waterway, one would be installed within 53 feet and the other would be installed within 137 feet of a perennial waterway.

Structure removal and installation would have no direct impacts on surface waters. Vegetation removal and soil excavation associated with structure construction within 200 feet of streams could indirectly affect surface water quality by increasing the potential for soil erosion into downstream surface waters. The use of construction equipment in these areas would also increase the potential for leaks and spills of vehicle fluids to enter downslope surface waters. Since almost all waterways are dry for most of the year, the potential for downstream transport of sediments or chemicals would be low.

Potential indirect impacts on surface waters by structure construction would be mitigated by implementing the measures identified below in Section 3.10.3, Mitigation Measures – Proposed Action. With the implementation of these measures, impacts of structure removal and installation on surface water and surface-water quality would be low.

Access Road Work

Under the Proposed Action, access road work along both the Midway-Moxee and Midway-Grandview transmission lines would include the improvement and reconstruction of existing access roads and the construction of new access roads. These activities would require vegetation removal, excavation, and the placement of fill material for roadbed improvement and construction. Where these roads cross waterways, instream work, including the improvement or repair of existing fords and culverts and the installation of new fords and culverts, would be required. Estimated impacts associated with new access road construction, including fords and culverts, is summarized for each transmission line in Tables 3.10-1 and 3.10-2.

Along the Midway-Moxee transmission line, a total of 37 waterways are crossed by existing access roads that would be improved or reconstructed. These include 34 ephemeral streams and 2 perennial streams; of these crossings, 1 would require installation of a new culvert, 1 would require the replacement of an existing culvert, 12 would require the improvement or repair of existing fords, and 4 would require the construction of new fords (Table C-2, Appendix C). In addition to waterways, access roads for the Midway-Moxee transmission line also cross 3 ***ephemeral draws*** and 3 roadside ditches that were not identified as waterways during the field survey. These crossings would require the repair of 3 existing fords, replacement of 1 existing culvert, and installation of 2 new culverts.

Table 3.10-1. Estimated Access Road Impacts on Waterways in the Midway-Moxee Transmission Line

Waterway Type	Estimated Impact (acres)
Ephemeral	0.12
Intermittent	--
Perennial	<0.001
Total	**0.12**

Table 3.10-2. Estimated Access Road Impacts on Waterways in the Midway-Grandview Transmission Line

Waterway Type	Estimated Impact (acres)
Ephemeral	0.10
Intermittent	0.01
Perennial	0.01
Total	**0.12**

Along the Midway-Grandview transmission line, a total of 40 waterways are crossed by existing access roads that would be improved or reconstructed. These include 37 ephemeral streams, 1 intermittent stream, and 2 perennial streams. Of these, 1 requires the installation of a new culvert, 2 require the repair of existing culverts, 3 require the replacement of existing culverts, 10 require the improvement or repair of existing fords, and 3 require the construction of new fords (Table C-3, Appendix C).

New Access Road Construction

In the Midway-Moxee transmission line, a total of 8 new access roads would be constructed over ephemeral streams (Table C-2, Appendix C). Of these, 4 would require the installation of new instream fords, one would require the installation of a new culvert, and 2 would require the repair of existing fords. Along the Midway-Grandview transmission line, 2 new access roads would be constructed over ephemeral streams and one new access road would be constructed over a perennial stream (Table C-3, Appendix C). Of these, only one of the access road crossings over ephemeral streams would require the installation of a new ford. The crossing over the perennial stream would require the installation of a new culvert.

Fords

Along the Midway-Moxee transmission line, the Proposed Action would require work on 17 fords in various locations, 14 of which are within ephemeral waterways and 3 that were not identified as waterways during the field survey (Table C-2, Appendix C). Of these, 4 new fords would be installed and 13 existing fords would be improved or repaired. Along the Midway-Grandview transmission line, the Proposed Action would require work on 13 fords in various locations, 12 in ephemeral waterways and 1 in an intermittent waterway (Table C-3, Appendix C). Of these, 3 new fords would be installed and 10 existing fords would be improved or repaired. Sulphur Creek is the intermittent waterway where an existing ford would be improved in Line Mile 18 (Figure 3.10-1).

Figure 3.10-1. Photograph shows existing access road and ford in Sulphur Creek between Midway-Grandview Structures 18/7 and 19/1 in Line Mile 18 that would be improved under the Proposed Action. Sulphur Creek (location depicted by dashed line) is identified as an intermittent stream. (Source: Tetra Tech 2014d)

Culverts – A total of 3 new culverts and 1 replacement culvert would be installed along the Midway-Moxee transmission line (Table C-2, Appendix C). Of these, 1 new culvert would be installed in a waterway. This culvert would be installed in an ephemeral stream located between Structures 23/2 and 23/3 in Line Mile 23 (Figure 3.10-2). The other 3 culverts would function as surface drainage features in areas with no waterways. A total of 1 new culvert and 5 replacement culverts would be installed along the Midway-Grandview transmission line (Table C-3, Appendix C). The new culvert would be installed in an irrigation ditch that was identified as a perennial waterway located between Structure 23/5 and 23/6 in Line Mile 23 (Figure 3.10-3). One of the replacement culverts would be installed in an ephemeral stream between Structures 12/3 and 12/4 in Line Mile 12 (Figure 3.10-4), 1 would be in an ephemeral stream between Structures 12/7 and 13/1, 1 would be in an ephemeral stream between Structures 13/4 and 13/5, 1 would be in an ephemeral stream east of Structure 20/3, and 1 would be in an irrigation ditch that has been identified as a perennial waterway between Structures 23/7 and 24/1 in Line Mile 23 (Figure 3.10-5).

Figure 3.10-2. Photograph shows an ephemeral stream between Midway-Moxee Structures 23/2 and 23/3 in Line Mile 23 where a culvert would be installed for a new access road crossing. (Source: Tetra Tech 2014d)

Figure 3.10-3. Photograph shows an irrigation ditch between Midway-Grandview Structures 23/5 and 23/6 in Line Mile 23 where a culvert would be installed for a new access road crossing. This ditch has been identified as a perennial waterway. (Source: Tetra Tech 2014d)

Figure 3.10-4. Photograph shows an existing culvert in an ephemeral stream between Midway-Grandview Structures 12/3 and 12/4 in Line Mile 12 that would be replaced. (Source: Tetra Tech 2014d)

Figure 3.10-5. Photograph shows an existing culvert in an irrigation ditch between Structures 23/7 and 24/1 in Line Mile 23 that would be replaced. This ditch has been identified as a perennial waterway. (Source: Tetra Tech 2014d)

Direct impacts on waterways could include increased instream turbidity, increased bank erosion, drainage pattern modification, and increased flow velocities. Because most of the affected streams flow infrequently or at a low volume, direct impacts are expected to be low.

Direct impacts from access road construction activities would be reduced through implementation of the mitigation measures identified below in Section 3.10.3, Mitigation Measures – Proposed Action. Any increases in turbidity that might occur during culvert or ford replacement or installation would be temporary and would meet the conditions of any in-water work permits (e.g., Clean Water Act Section 404 Permit) that would be required. Indirect impacts would be minimized by implementing the erosion and spill control measures listed below in Section 3.10.3, Mitigation Measures – Proposed Action. Given the predominance of ephemeral drainages in the study area and the implementation of these mitigation measures, overall impacts on surface waters and surface-water quality from access road work would be low.

Danger Tree Removal

No danger trees within 200 feet of waterways would be removed along the Midway-Moxee transmission line. Along the Midway-Grandview, two black cottonwood trees would be topped along Sulphur Creek, an intermittent stream located between Structures 18/7 and 19/1 in Line Mile 18. These trees would be left as snags for use by wildlife, resulting in minimal disturbance to waterways.

Danger tree removal would not directly impact surface waters because all trees removed from riparian areas would be cut without disturbing the tree roots. Given the limited amount of shading typically present along the surface waters in the study area, the removal of these trees would have a low effect on surface-water temperature. Consequently, impacts on surface waters and surface-water quality from danger tree removal would be low.

Pulling and Tensioning Sites

Three areas that would be used for pulling and tensioning sites are located near waterways. Positioning pulling and tensioning within 200 feet of waterways could cause some indirect impacts associated with vegetation damage and removal, primarily increased erosion potential. Such impacts would be temporary and localized. Pulling and tensioning sites are not expected to have direct impacts on surface waters because equipment would not be located within 50 feet of active stream channels. Indirect impacts on surface waters and surface water quality as a result of the potential for sediments reaching waters from pulling and tensioning would be low.

3.10.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would implement the following mitigation measures to avoid or minimize impacts from the Proposed Action on waterways and water quality. Other relevant mitigation measures that relate to vegetation and weed control are found in Section 3.8, Vegetation, of this EA.

- Implement a SPCC Plan in accordance with federal, state, and local requirements that addresses fuel and chemical storage, spill containment and cleanup, construction contractor training, and proper spilled material disposal activities. For activities within the DOE

Hanford Site, prepare and implement spill prevention and response procedures in coordination with DOE-RL staff.

- Schedule instream construction work for times when the flow within affected streams is minimal or absent.
- Design and construct access roads to minimize drainage from the road surface directly into surface waters, size new and replacement culverts large enough to accommodate predicted flows, and size and space cross drains and water bars properly to accommodate flows and direct sediment-laden waters into vegetated areas.
- Explain water resources-related mitigation measures, BMPs, and any permit requirements to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.
- Manage sediment as specified in the Stormwater Pollution Prevention Plan, with an approved method that meets the *Stormwater Management Manual for Eastern Washington* erosion and stormwater control BMPs, to eliminate sediment discharge into waterways and wetlands, minimize the size of construction disturbance areas, and minimize removal of vegetation, to the greatest extent possible (Washington State Department of Ecology 2004).
- Minimize ground disturbance and vegetation removal within 200 feet of wetlands, waterways, and floodplains, to the greatest extent practicable.
- Locate pulling and tensioning equipment at least 50 feet from surface waters, including wetlands, and outside of ***100-year floodplains***, if possible.
- Store, fuel, and maintain vehicles and equipment in designated vehicle staging areas located a minimum of 200 feet from any streams, water bodies, and wetlands, and during fueling or service, use pumps, funnels, absorbent pads, and drip pans.
- Control noxious weeds either manually, mechanically, and chemically as recommended for each species, prior to construction, with a focus on species with small, contained infestations to reduce the potential for widespread establishment and the need for long-term management.
- Use vehicle and equipment cleaning stations to minimize the introduction and spread of weeds during construction by cleaning vehicles and equipment prior to entering and as soon as possible after leaving each work area.
- Power wash all vehicles and equipment at an approved cleaning facility prior to mobilizing at construction work areas to remove any residual sediment, petroleum, or other contaminants; prior to entering wetlands, waterways, and floodplains, completely clean off any external petroleum products, hydraulic fluid, coolants, and other pollutants.
- Inspect equipment, including tanks, on a weekly basis for drips and leaks and promptly make necessary repairs.
- Prohibit sidecasting of road grading materials along roads within 50 feet of wetlands, waterways, and floodplains.
- Cut danger trees in the Sulphur Creek riparian corridor without disturbing tree roots.
- Install signage, fences, and flagging to restrict work areas and confine vehicles and equipment to designated routes outside of wetlands, waterways and floodplains where possible.
- Inspect and maintain access roads, fords, and other facilities after construction to ensure proper function and nominal erosion levels.

3.10.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

Implementation of the mitigation measures described above would reduce impacts on waterways and water quality but would not completely eliminate impacts. Direct impacts on surface water and surface-water quality from in-stream access road work could include increased turbidity during and after construction, increased erosion potential, and increased sedimentation in downstream waters. Indirect impacts on surface water and surface-water quality could include increased potential for sedimentation and increased potential of surface-water contamination from vehicle fluid spills and leaks.

3.10.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, the existing transmission lines would not be rebuilt or upgraded. Therefore, the impacts related to construction of the Proposed Action would not occur. Maintenance activities would likely increase as existing structures age and deteriorate, and more structure repair and replacement could be required compared to existing conditions. Maintenance of access roads would be needed and access road work proposed under the Proposed Action would likely need to take place as a maintenance activity. Maintenance activities would likely result in low impacts on waterways and water quality similar to the impacts described above. If it were necessary to perform repairs on an emergency basis, it would likely not be possible to plan or time these activities to minimize impacts on waterways and water quality. Because potential impacts resulting from emergency repairs would be temporary and localized, impacts would be low to moderate, depending on the type of surface water feature impacted.

3.11. WETLANDS AND FLOODPLAINS

3.11.1. Affected Environment

The study area for wetlands and floodplains includes the right-of-way for both transmission lines, which include the construction work areas for transmission line structures, pulling and tensioning sites, and new and existing roads that would be improved for access. This includes areas where wetlands, wetland buffers, and mapped 100-year floodplains could be directly affected by project work and areas indirectly affected by adjacent project activities.

Wetlands

Wetlands are areas that have certain characteristics related to water, soils, and vegetation. To be considered a wetland, the following criteria must be met: 1) the area must be inundated or saturated with water for a portion of the growing season in most years; 2) the soils in the area must have certain characteristics matching soil types that are subject to prolonged saturation (hydric soils); and 3) the area must contain plant species with special adaptations that enable them to grow in saturated soils.

To determine the presence of wetlands in the study area, a preliminary review of existing information was conducted. An assessment of available ***National Wetland Inventory*** digital maps showed no wetlands to be present in the survey area (U.S. Fish and Wildlife Service

2014g). A variety of other maps and aerial photographs were also used to identify ponds, streams, depressions, and other areas that might be wetland areas.

County soil survey maps were used to determine if there are any areas with hydric soils in the study area. No soil type with the potential to support hydric soils was identified within the survey area in Benton County (Natural Resources Conservation Service 2013a). One soil type with the potential to support hydric soils was identified within the survey area in Yakima County. Moxee silt loam on 2 to 15 percent slopes (Soil unit 83), has minor hydric soil potential; 5 percent of its inclusions may be frequently flooded for a long duration or very long duration during the growing season, or will at least in part meet one or more field indicators of a hydric soil. This soil unit is typically found on upland terraces at elevations of 800 to 2,000 feet (Natural Resources Conservation Service 2011, 2013b).

To verify the presence of wetlands in the study area, wetlands and waterways were delineated in accordance with the methods described in the 1987 *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (U.S. Army Corps of Engineers 2008), and the *Washington State Wetlands Identification and Delineation Manual* (Washington State Department of Ecology 1997). Delineation fieldwork was performed between May 12 and 16, 2014, with a follow-up site visit on July 23, 2014, to review parcels that were inaccessible during the initial survey (Tetra Tech 2014c).

A total of three wetlands were identified during the wetland delineation. Each is briefly described in the following sections. One wetland is located in the Midway-Moxee right-of-way and two wetlands are located in the Midway-Grandview right-of-way.

Midway-Moxee Wetland – Line Mile 31

A wetland dominated by shrubby vegetation (scrub-shrub wetland) is located in Yakima County between Midway-Moxee Structures 31/3 and 31/4, just northwest of the location where the transmission line crosses Postma Road. It is located on privately-owned land and is used to access the surrounding agricultural land. It occurs within a highly-disturbed section of Washout Gulch, a seasonal stream that receives flow from multiple seasonal drainages on Yakima Ridge (U.S. Geological Survey 1953a, 1953b). Dominant vegetation in this wetland includes native and non-native wetland and upland species including narrow-leaf willow, broad-leaved pepperweed, and flixweed (*Sisymbrium sophia*).

An unpaved access road used for agricultural access that would be used to access the transmission line crosses this wetland (Figure 3.11-1). The area through the wetland is built up on rocky fill material. Due to the high level of disturbance present both in the wetland and adjacent areas, this wetland is low-quality because it provides only limited water quality improvement, flood and erosion reduction, and wildlife habitat functions.

Figure 3.11-1. Photograph of Wetland Located Within Washout Gulch Between Midway-Moxee Structures 31/3 and 31/4 Showing Existing Agricultural Access Road that Crosses Wetland (Source: Tetra Tech 2014c)

Midway-Grandview Wetland – Line Mile 18

A scrub-shrub wetland that is dominated by willows is located in Benton County between Midway-Grandview Structures 18/7 and 19/1. It is located on privately-owned land surrounded by rangeland. It consists of a naturally occurring wetland located within and adjacent to the active streambed of Sulphur Creek. Dominant vegetation includes narrow-leaf willow, cursed buttercup, fringed willowherb, and common spikerush.

An unpaved, privately-owned access road used to access rangelands and the Midway-Grandview transmission line right-of-way crosses this wetland (Figure 3.11-2). This crossing includes an existing earthen ford. This wetland is frequented by cattle on a regular basis. As a result, both the vegetation and habitat quality are degraded. This wetland likely provides some minor water quality improvement, flood and erosion reduction, and wildlife habitat functions and is considered low to moderate quality.

Figure 3.11-2. Photograph of Wetland Within and Adjacent to Sulphur Creek Between Midway-Grandview Structures 18/7 and 19/1 Showing Existing Agricultural Access Road that Crosses Wetland (Source: Tetra Tech 2014c)

Midway-Grandview Wetland – Line Mile 25

A wetland that is dominated by herbaceous species (emergent wetland) is located in Yakima County between Midway-Grandview Structure 25/9 and the Grandview Substation. It is a narrow area that receives surface drainage (likely irrigation runoff) from the agricultural field to the east through a culvert under County Line Road. This wetland is dominated by narrow-leaf willow and reed canarygrass (*Phalaris arundinacea*) and its primary sources of hydrology are seasonal runoff and direct precipitation.

There are no roads that cross this wetland, although it is adjacent to County Line Road (Figure 3.11-3). It likely provides some water storage function and may contribute to sediment and toxic substance removal from flows entering the wetland through the culvert under County Line Road. It may also provide some limited wildlife habitat. Due to the dominance of non-native reed canarygrass, this wetland is considered low quality.

Figure 3.11-3. Photograph of Wetland Adjacent to County Line Road Between Midway-Grandview Structure 25/9 and the Grandview Substation (Source: Tetra Tech 2014c)

Floodplains

Mapped 100-year floodplains were identified using Federal Emergency Management Agency Flood Insurance Rate Maps for the study area (Federal Emergency Management Agency 1982, 2009). Under the National Flood Insurance Program, the Federal Emergency Management Agency identifies areas with a 1 percent chance of being flooded in a given year as the base flood zone or 100-year floodplain (Federal Emergency Management Agency 2011).

The study area crosses two mapped 100-year floodplains (Figure 3.11-4). One is associated with a series of unnamed drainages in Kittitas Canyon along the Midway-Moxee transmission line in Yakima County. The other 100-year floodplain occurs along Dry Creek along the Midway-Grandview transmission line in Benton County.

Kittitas Canyon Drainage Floodplain

The Midway-Moxee transmission line right-of-way crosses the northern tip of a mapped 100-year floodplain for an unnamed drainage associated with Kittitas Canyon near Structure 32/3 (Figure 3.11-4) (Federal Emergency Management Agency 2009). This area extends into the maintained transmission line right-of-way and the surrounding agricultural fields; however, no defined stream channels were identified in this location. Transmission line structures are not located in the mapped floodplain area.

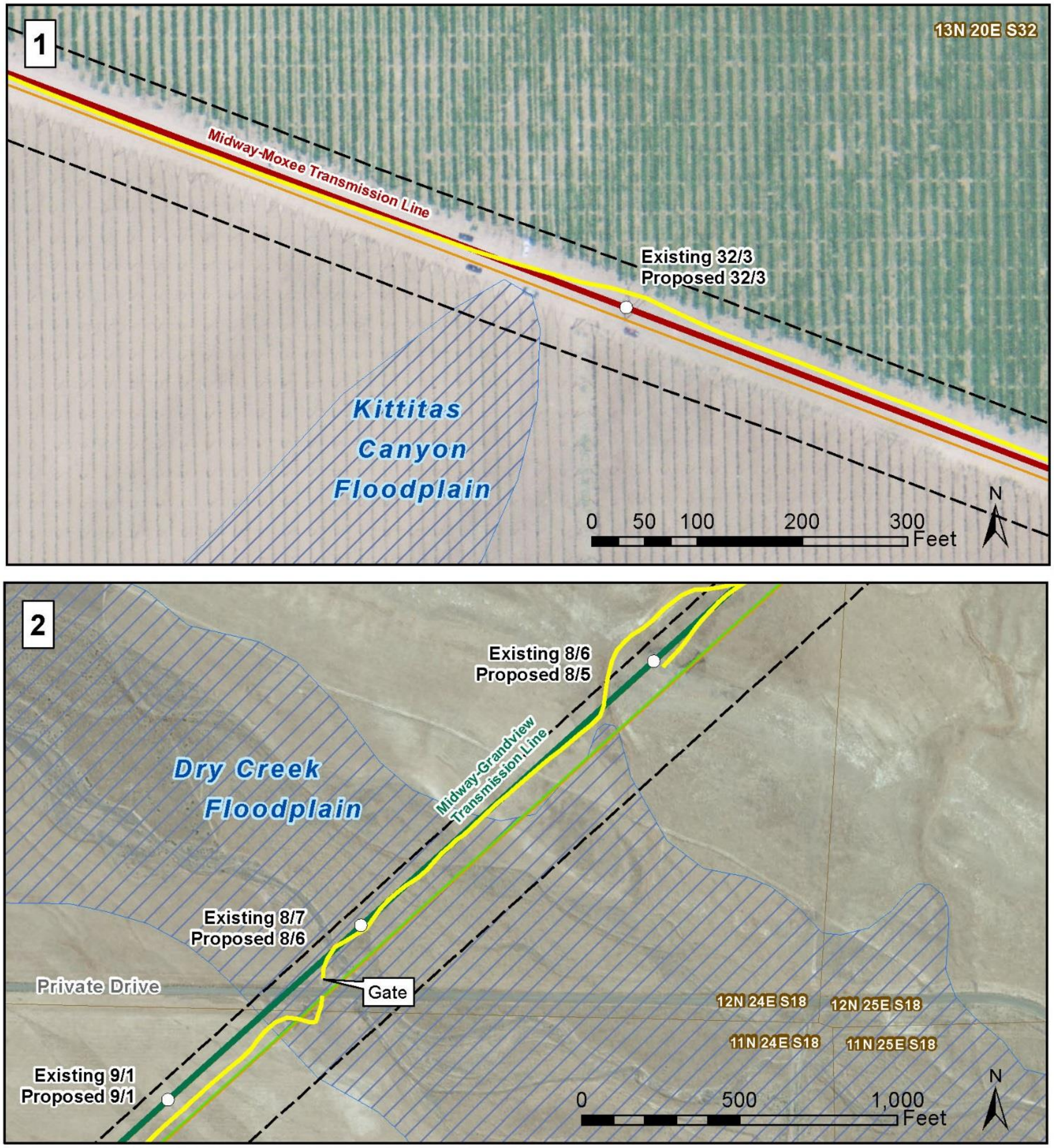


Figure 3.11-4. 100-Year Floodplains in the Study Area

Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project
Yakima and Benton Counties, Washington

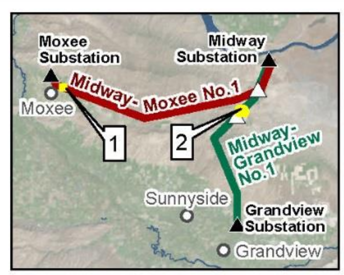
Transmission Line Features
- Midway-Moxee No.1 115-kV
- Midway-Grandview No.1 115-kV
- Transmission Line Structure (Proposed Structures Within 5 feet of Existing)
- Existing Line, BPA Owned
- Existing Line, Non-BPA Owned

Transmission Line Right-of-way

Existing Access Roads
- Improve

Other Features
- 100-year Floodplain
- Section, Township, Range

BONNEVILLE POWER ADMINISTRATION



Dry Creek Floodplain

The Midway-Grandview transmission line right-of-way crosses a mapped 100-year floodplain along Dry Creek between Structures 8/7 and 9/1 (Figure 3.11-4) (Federal Emergency Management Agency 1982). Dry Creek has a shallow channel and is considered an ephemeral waterway; no water was flowing during the May field visit. There is no riparian vegetation along this portion of Dry Creek and the associated floodplain consists of a broad, flat area vegetated with upland species, including cheatgrass and yellow rabbitbrush (Figure 3.11-5). Midway-Grandview Structure 8/7 is located within the boundaries of the mapped floodplain.

Figure 3.11-5. Photograph of Dry Creek and its Mapped 100-year Floodplain Between Midway-Grandview Structure 8/7 and 9/1 (Source: Tetra Tech 2014c)

3.11.2. Environmental Consequences – Proposed Action

Wetlands

Structure Removal and Installation

No existing or proposed structures are located within 100 feet of the boundaries of the identified wetlands in the study area. Consequently, construction activities required for the removal of existing structures and the installation of new structures would result in no direct impacts on wetlands, and indirect impacts would be avoided through the installation of erosion control structures. Impacts would be minimized by implementing the measures listed below in Section 3.11.3, Mitigation Measures – Proposed Action.

Access Road Work

The Proposed Action has the potential to directly and indirectly affect wetlands and impair wetland functions from construction disturbance associated with access road improvement and reconstruction, including improving an existing ford and from one pulling and tensioning site near the Grandview Substation. Table 3.11-1 lists construction work that would be done within 200 feet of the wetlands identified in the study area and the estimated wetland impacts that could occur as a result of these activities.

Table 3.11-1. Proposed Construction Activities within 200 Feet of Wetlands, Potential Wetland Impacts, and Estimated Fill

Wetland Location (MM-Midway-Moxee MG-Midway-Grandview)	Project Activities in and within 200 Feet of Wetlands	Description of Potential Impacts	Estimated Wetland Fill Area (acres)
Between MM Structures 31/3 and 31/4, adjacent to Washout Gulch	Improve access road between MM Structures 31/3 and 31/4	Access road to be improved is located adjacent to wetland; proposed road work footprint overlaps with wetland, so small amount of fill would be placed in wetland	<0.005
Between MG Structures 18/7 and 19/1, adjacent to Sulphur Creek	Remove and replace MG Structure 18/7	Structure work would not impact wetland	None
	Reconstruct road between MG Structures 18/7 and 19/1	Road to be reconstructed crosses wetland so small amount of fill would be placed in wetland	0.005
	Improve ford between MG Structures 18/7 and 19/1	Ford is located in channel of Sulphur Creek, so small amount of fill would be placed in an intermittent stream	0.005
Between MG Structures 25/9 and the Grandview Substation, adjacent to substation fence	Remove and replace MG Structure 25/9	Structure work would not impact wetland	None
	Pulling and tensioning work near Structure 25/9	Wetland could be temporarily impacted by placement of pulling and tensioning equipment if it is not possible to set up equipment outside of wetland	None
Total			<0.015

Existing access roads cross two wetlands, one along the Midway-Moxee transmission line and one along the Midway-Grandview transmission line. About 16 feet of the access road in the wetland near Midway-Moxee Structure 31/4 would be improved. About 42 feet of the access road and existing ford in the wetland near Midway-Grandview Structure 18/1 would be reconstructed, including improvements to the existing ford.

Direct impacts on wetlands associated with access road work could include temporary damage to wetland vegetation and compaction of wetland soils by construction machinery and the placement of permanent fill material (e.g., soil, rock). These impacts could potentially impair wetland hydrology, water quality, and habitat functions. Placement of permanent fill could also slightly reduce the acreage of wetlands in the study area. The amount of permanent wetland impact associated with access road and ford improvement/reconstruction in all wetlands would be less than 0.015 acre. BPA will work with the U.S. Army Corps of Engineers (USACE) to obtain any necessary permits for work in wetlands. Because of the small area impacted along existing roads, direct impacts from access road work on wetlands would be low.

Improvement and reconstruction of access roads in locally regulated wetland buffers could result in indirect impacts on wetlands. The Proposed Action would include the improvement of approximately 303 feet and the reconstruction of approximately 261 feet of existing access roads within 100 feet of the identified wetlands, which is the maximum local buffer applicable to these areas per the Benton and Yakima County Critical Area Ordinances. Construction activities in these areas could affect wetland buffers by removing or crushing vegetation and compacting soil, resulting in an increased potential for sedimentation into downslope wetlands. Soils disturbed by these activities could also be susceptible to colonization by noxious weeds, including perennial pepperweed, Scotch thistle, Canada thistle, field bindweed, and hoary cress, which are all known to grow on moist sites. Impacts on wetland buffers would be minimized by restricting the work area and by revegetating disturbed areas following completion of construction. Overall, the level of indirect wetland impacts associated with access road work would be low.

Pulling and Tensioning Sites

The use of a pulling and tensioning site within 200 feet of a wetland could result in vegetation removal, soil compaction, the potential for increased erosion, or the reduction in wetland function. One pulling and tensioning site is planned near the Grandview Substation and may be located within 200 feet of a wetland. If it is not possible to locate this site in excess of 200 feet from the nearby wetland, the site has the potential to affect the wetland buffer, a low impact. Impacts on wetland buffers would be minimized near the wetland by restricting the work area and by revegetating disturbed areas following completion of pulling and tensioning.

Floodplains

The Proposed Action has the potential to result in direct and indirect impacts on floodplains from construction disturbance associated with structure removal and installation and access road work. These impacts could impair floodplain functions and result in the spread of noxious weeds in disturbed areas. No pulling and tensioning sites associated with the Proposed Action would be located in or within 200 feet of floodplains, and no danger trees would be removed from any areas in or within 200 feet of the mapped 100-year floodplains in the study area.

Table 3.11-2 lists construction activities that would occur both in and within 200 feet of the mapped 100-year floodplains in the study area. Proposed work inside mapped floodplains would be limited to the Dry Creek floodplain and would include the replacement of one structure, installation of one gate, and the improvement of 978 feet (0.19 mile) of existing access road. Proposed work within 200 feet of mapped floodplains includes the removal and replacement of one structure and improvement of approximately 284 feet (0.05 mile) of existing access road near the Kittitas Canyon floodplain and the improvement of approximately 743 feet (0.14 mile) of access road. No pulling and tensioning sites are located in or within 200 feet of the mapped 100-year floodplains.

Table 3.11-2. Proposed Construction Activities within 200 Feet of Floodplains and Estimated Impacts

100-Year Floodplain Location (MM-Midway-Moxee MG-Midway-Grandview)	Project Activities in and within 200 Feet of 100-Year Floodplain	Description of Potential Impacts	Estimated Floodplain Impact Area (acres)
Between MG Structures 8/7 and 9/1, associated with Dry Creek	Remove and replace MG Structure 8/7 in 100-year floodplain	Structure work would not affect floodplain	None
	Install one gate in 100-year floodplain	One gate would be installed in existing fence within the 100-year floodplain; no fill placement would be required	None
	Improve 978 feet (0.19 mile) of access road in 100-year floodplain	Improvement work would involve regrading roadbed and adding surface rock to existing road within 100-year floodplain	0.31 acre
	Improve 743 feet (0.14 mile) of access road within 200 feet of 100-year floodplain	Improvement work would involve regrading roadbed and adding surface rock to areas outside of floodplain	None
Between MM Structures 32/3 and 32/4, associated with Kittitas Canyon Drainage	Remove and replace MM Structure 32/3 within 200 feet of 100-year floodplain	Structure located about 50 feet away from floodplain; work would not impact floodplain	None
	Improve 284 feet (0.05 mile) of access road within 200 feet of 100-year floodplain	Improvement work would involve regrading roadbed and adding surface rock to areas outside of floodplain	None
Total			0.31

Structure Removal and Installation

Only one structure, Midway-Grandview Structure 8/7, would be removed and replaced in a 100-year floodplain associated with Dry Creek. The structure would be replaced in the same location where it is currently located. Removing the existing wooden poles and augering holes for the new poles would result in the deposition of a small amount of excavated soils on the ground surface, soil compaction, and vegetation removal within the mapped 100-year floodplain of Dry Creek. Because these impacts would be temporary and localized, and would only minimally alter floodplain functions, they would be considered a low impact.

Removal and replacement of one structure within 200 feet of floodplains associated with Kittitas Canyon Drainage (Midway-Moxee Structure 32/3) could result in the deposition of a small amount of soil in floodplains. Implementation of mitigation measures described below in Section 3.11.3, Mitigation Measures – Proposed Action, would minimize sediment deposition into floodplains. The amount of sediment deposited from work within 200 feet of floodplains would be minimal and would not change existing flood-storage capacity or alter the course of floodwaters, a low impact.

Access Road Work

One access road would be improved in a mapped 100-year floodplain associated with Dry Creek, and one gate would be installed. Direct impacts on approximately 0.31 acre of floodplain from access road improvement work would result from activities such as grading or rocking of existing road surfaces and vegetation removal. These activities could result in minor soil compaction and erosion and sedimentation. They would not be expected to cause any major changes to floodplain capacity or any alteration of flood flows. One gate would also be installed in the floodplain where the access road intersects a private drive. This work would require the installation of two new posts and the gate itself. Soil disturbance resulting from these activities would be minimal. The new gate is not expected to result in any flow alteration within the floodplain because installation would only disturb a few square feet of ground. Consequently, direct impacts on mapped floodplains from access road improvement work and gate installation would be low.

As part of the Proposed Action, two access roads would be improved or reconstructed within 200 feet of floodplains, which could cause erosion and the deposition of soils in floodplains. Implementation of mitigation measures, including minimizing work areas, installing erosion and sediment control measures, and revegetating work sites would minimize sediment deposition into floodplains. The minimal amount of sediment that could be deposited from work within 200 feet of floodplains would not change existing flood-storage capacity or alter the course of floodwaters. Impacts are expected to be low and limited to incidental amounts of sediment deposition in the floodplain from soil erosion in disturbed areas.

3.11.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would implement the following mitigation measures to avoid, minimize, or compensate for impacts from the Proposed Action on wetlands and floodplains. Other relevant mitigation measures that relate to vegetation and weed control and are found in Section 3.8, Vegetation, of this EA.

- Implement a SPCC Plan in accordance with federal, state, and local requirements that addresses fuel and chemical storage, spill containment and cleanup, construction contractor training, and proper spilled material disposal activities. For activities within the DOE Hanford Site, prepare and implement spill prevention and response procedures in coordination with DOE-RL staff.
- Design and construct access roads to minimize drainage from the road surface directly into surface waters, size new and replacement culverts large enough to accommodate predicted flows, and size and space cross drains and water bars properly to accommodate flows and direct sediment-laden waters into vegetated areas.

- Explain wetland and floodplain-related mitigation measures, BMPs, and any permit requirements to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.
- Manage sediment as specified in the Stormwater Pollution Prevention Plan, with an approved method that meets the *Stormwater Management Manual for Eastern Washington* erosion and stormwater control BMPs, to eliminate sediment discharge into waterways and wetlands, minimize the size of construction disturbance areas, and minimize removal of vegetation, to the greatest extent possible (Washington State Department of Ecology 2004).
- Use vehicle and equipment cleaning stations to minimize the introduction and spread of weeds during construction by cleaning vehicles and equipment prior to entering and as soon as possible after leaving each work area.
- Minimize ground disturbance and vegetation removal within 200 feet of wetlands, waterways, and floodplains, to the greatest extent practicable.
- Locate pulling and tensioning equipment at least 50 feet from surface waters, including wetlands, and outside of 100-year floodplains, if possible.
- Prohibit sidecasting of road grading materials along roads within 50 feet of wetlands, waterways, and floodplains.
- Cut danger trees in the Sulphur Creek riparian corridor without disturbing tree roots.
- Store, fuel, and maintain vehicles and equipment in designated vehicle staging areas located a minimum of 200 feet from any streams, water bodies, and wetlands, and during fueling or service, use pumps, funnels, absorbent pads, and drip pans.
- Power wash all vehicles and equipment at an approved cleaning facility prior to mobilizing construction work areas to remove any residual sediment, petroleum, or other contaminants; prior to entering wetlands, waterways, and floodplains, completely clean off any external petroleum products, hydraulic fluid, coolants, and other pollutants.
- Inspect equipment, including tanks, on a weekly basis for drips and leaks and promptly make necessary repairs.
- Install signage, fences, and flagging to restrict work areas and confine vehicles and equipment to designated routes outside of wetlands, waterways, and floodplains where possible.
- Restrict construction activities to the minimum area needed to work effectively to limit disturbance of wetlands, waterways, and floodplains.
- Reseed disturbed areas after construction activities are complete, at the appropriate time period for germination, with a native seed mix, a seed mix recommended by WDFW, or a seed mix identified in the *Stormwater Management Manual for Eastern Washington*, or as agreed upon with landowners for use on their property (Washington State Department of Ecology 2004).
- Inspect and maintain access roads, fords, and other facilities after construction to ensure proper function and nominal erosion levels.

3.11.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

Implementation of the mitigation measures described above would reduce impacts on wetlands and floodplains but would not completely eliminate impacts. Work within wetlands and floodplains could result in minor soil compaction and erosion and deposition of a small amount of fill. Installation of structures and access road work near wetlands and floodplains could cause erosion and deposition of sediments into these resources.

3.11.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, BPA would not rebuild or upgrade the existing transmission lines. As a result, the wetland and floodplain impacts related to the construction of the Proposed Action would not occur. Operation and maintenance activities would continue for both lines and would be similar to existing conditions, as described in Section 2.2.11, Ongoing Maintenance and Vegetation Management, of this EA. Maintenance activities would likely increase as existing structures age and deteriorate, and more structure repair and replacement could be required. Maintenance of access roads would be needed and road work proposed under the Proposed Action would likely need to take place as a maintenance activity. Structure and access road work in wetlands and floodplains would occur but would be limited because most structures and access roads are located outside of these resources. Ongoing maintenance activities would result in low impacts on wetland and floodplains, similar to the impacts described above for construction of the Proposed Action. If it were necessary to perform repairs on an emergency basis, it would likely not be possible to plan or time these activities to minimize impacts on wetlands and floodplains. Because potential impacts resulting from emergency repairs would be temporary and localized, and because most work would occur outside of wetlands and floodplains, impacts would be low.

3.12. VISUAL QUALITY

3.12.1. Affected Environment

The study area for visual resources includes the existing and proposed rights-of-way for the Midway-Moxee and Midway-Grandview transmission lines, new or improved access roads, and surrounding residences, businesses, travel routes, recreational/community resources, and cultural sites with views of project work areas. The proposed transmission line structures and conductor within the rights-of-way are included as part of the study area.

The visual setting in the study area, primarily rural central Washington, is characterized by areas of open space with views of the ridgelines and foothills with areas of cultivated crops and more urban development concentrated toward Moxee and Grandview.

Within the study area, the Umtanum, Yakima, and Rattlesnake ridges are prominent visual features. The sweeping views of and from these mostly undeveloped ridgelines contribute to the open feel and rural character of the study area.

There are no designated scenic resources (such as byways, rivers or trails designated as “scenic” by a state or federal Agency) or viewpoints in the study area. The closest designated scenic resources are located within the city of Yakima, approximately 3 miles from the western end of the Midway-Moxee transmission line. The Yakima River Valley River Canyon runs north from Yakima and is designed as a Washington Tourism Route (Washington State Department of Transportation 2014a).

The ridgelines in the northwest part of the study area near the DOE Hanford Site provide views of a landscape dominated by low, shrubby vegetation. Undeveloped portions of the ridges and foothills provide opportunity for viewing wildflowers in the spring. Outside of the DOE Hanford Site, the vegetation changes to grasslands interspersed with cultivated croplands, increasing in concentration toward the populated centers at the ends of both lines. Near the Moxee and Grandview Substations, the visual landscape consists of a mix of residential and agricultural uses, but is notably more densely developed and populated.

The Midway-Moxee and Midway-Grandview transmission lines are prominent visual features within the visual landscape of the study area. In addition to these lines, other transmission lines are located within the study area. The locations of these lines in relation to the Midway-Moxee and Midway-Grandview transmission lines are presented in Table 2-3 of Chapter 2, Proposed Action and Alternatives, of this EA. Some of these lines have steel lattice structures, while others are wood-pole lines. Figure 2-5 shows the wood-pole Midway-Moxee and Midway-Grandview transmission lines on the DOE Hanford Site. Wood-pole structures tend to blend into the rural landscape more than steel lattice structures because they are lower in height and their shape and color are more natural.

Sensitive viewer groups within the study area include motorists, residents, and people participating in recreational activities. Typical views experienced by these sensitive viewer groups are discussed in greater detail below.

The first 2 miles of both transmission lines are located on the DOE Hanford Site with restricted public access (Figure 2-5). Because of the restricted access, sensitive viewers would include be limited to agency staff and tribes. Beginning in Line Mile 3, the transmission lines are visible from private access roads.

In Line Mile 5 the two transmission lines diverge. The Midway-Moxee transmission line continues to generally parallel SR 24 and the Midway-Grandview line crosses SR 24. The first 8 miles of the Midway-Moxee line are predominantly visible from SR 24 with some sporadic areas where views of the line from SR 24 are blocked by the rolling hills up to approximately Line Mile 8. Figure 3.12-1 shows views of the Midway-Moxee transmission line with SR 24 in the background at this location.

Figure 3.12-1. Photograph of SR 24 from Midway-Moxee Line Mile 8

After this point, the line is more visible as the elevation continues to drop and the lands flatten. Views of the line from Line Mile 8 to approximately Line Mile 20 include the Pacific Power and Light 230-kV transmission line along the same corridor. The Midway-Moxee line increases and decreases in visibility as SR 24 meanders toward Moxee. Visibility also increases and decreases depending on shielding by roadside vegetation and where the line blends into the background ridgeline with changing topography (Figure 3.12-2).

Figure 3.12-2. View of Midway-Moxee Line Mile 14 from SR 24

From approximately Line Mile 32 to the Moxee Substation, the residential density of the areas adjacent to the Midway-Moxee transmission line begins increasing appreciably. In this area, the transmission line is often located next to developed hop fields and orchards (Figure 3.12-3) and rural residences (Figure 2-6).

Figure 3.12-3. View of Midway-Moxee Line Mile 34 from Bittner Road

Figure 3.12-4 shows views of the Midway-Grandview transmission line where it and other BPA transmission lines cross SR 24 at Line Mile 5.

Figure 3.12-4. View of SR 24 from Midway-Grandview Line Mile 5

The Midway-Grandview transmission line shares a corridor with other BPA transmission lines, two of which are also visible from SR 241 (Figure 3.12-5) up to approximately Line Mile 14, where the Midway-Grandview line turns away from the highway, to the south where it crisscrosses private and local roadways. In this area, the topography is fairly level and includes open ranchland with views of Rattlesnake Ridge in the distance.

Figure 3.12-5. View of Midway-Grandview Line Mile 10 from SR 241

At Line Mile 22, the line enters more densely populated and developed agricultural and residential lands and continues to parallel North County Line Road from Line Mile 22 to the Grandview Substation (Figure 3.12-6).

Figure 3.12-6. View of Midway-Grandview Line Mile 24 from North County Line Road

Some private residences in the study area have views of the transmission line. Scattered single rural residences are located in the study area at Line Mile 5 and along the Midway-Moxee transmission line right-of-way near Midway-Moxee Line Miles 6, 14, 16, 23, and 25 with increasing density after Line Mile 29 into Moxee. There are also scattered single rural residences near the Midway-Grandview transmission line right-of-way near Midway-Grandview Line Mile 10 and with increasing density after Line Mile 24. In the areas of the highest residential concentrations, some residences are located between 50 and 300 feet from the Midway-Moxee and Midway-Grandview transmission line rights-of-way.

As discussed in Section 3.2, Land Use and Recreation, of this EA, there are no designated public recreational uses within the study area, although some hunting does occur on private lands. Views of the rights-of-way depend on the proximity to the lines and any vegetation or topographical features that may shield views.

3.12.2. Environmental Consequences – Proposed Action

Construction activities would result in temporary and permanent visual changes in the study area. Temporary visual changes would result from the presence of construction equipment and activities. Permanent visual changes would result from moving existing structures, the addition of nine new structures, increasing structure heights, increasing conductor diameter, removing some vegetation and danger trees, constructing new access roads, and surfacing roads that would be improved.

As described in Chapter 2, Proposed Action and Alternatives, of this EA, most wood-pole structures for both transmission lines would be placed in approximately the same locations (within 5 feet of the existing structures). With the exception of 31 structures, all other replacement structures would be within 10 feet of their existing locations.

With some exceptions, structures would be replaced with similar wood-pole structures (i.e., two-pole structures replaced with two-pole structures). Midway-Grandview Structure 1/1 would be replaced with steel poles instead of wood poles due to the location of the structure on a rocky cliff. Thirty two-pole wood structures would be replaced with three-pole wood structures at various locations along the Midway-Moxee and Midway-Grandview transmission lines for structural reasons.

The spacing of the poles of individual structures would increase in some locations along the Midway-Grandview transmission line to adequately support the conductor. Many of the proposed structures would be taller than the structures they are replacing. Along the Midway-Moxee transmission line, 37 structures would be taller to accommodate agricultural production. Given the open nature of the study area, wide views of the transmission lines, and the presence of several other transmission lines in many portions of the study area, it is expected that visual changes associated with increasing structure heights would generally be minimal.

Under the Proposed Action, the existing conductor would be replaced with a conductor with a larger diameter. The existing conductor for the Midway-Moxee transmission line has a diameter of approximately 0.66 inch compared to a diameter of approximately 0.84 inch for the proposed conductor. The existing conductor for the Midway-Grandview transmission line has a diameter of approximately 0.56 inch compared to a diameter of approximately 0.95 inch for the proposed conductor. Because of the increased conductor diameter, the proposed conductors would be more visible over a greater distance. However, the new conductor would look very similar to the existing conductor and would not be more reflective because BPA uses non-lustrous (pre-dulled) conductor.

Approximately 4.5 miles of new roads would be constructed along the Midway-Moxee transmission line corridor and 1.0 mile for the Midway-Grandview transmission line. New road construction would result in permanent visual changes in these locations primarily associated with the removal of vegetation and the placement of rock on the road surface.

Removal of approximately 172 danger trees within and near the rights-of-way would occur to provide for safe functioning of the transmission lines consistent with ongoing operation and maintenance activities. This would result in permanent visual changes in the locations of danger tree removal. Smaller vegetation may be crushed or removed during construction, resulting in a temporary visual change in the localized area of construction activities.

The type and level of visual impacts experienced by sensitive viewer groups from these activities are discussed below.

Motorists

Both transmission lines are visible from portions of SR 24 and SR 241 beginning near Line Mile 5 of both transmission lines, near the intersection of the two highways. Construction activities, such as structure removal and installation, access road work, and the resulting vegetation removal would potentially detract from the sweeping views of the study area; however, construction would be temporary, and motorists typically travel at relatively high speeds, which reduces their visual sensitivity. Temporary visual impacts related to construction would be low.

Permanent visual impacts on motorists traveling along SR 24 and SR 241 would occur from the addition of new wood-pole structures, increases in wood-pole structure heights, and increases in conductor sizes. However, given the relatively small increases in visibility from these changes and the high traffic speeds of motorists, the permanent visual impacts on motorists would be low.

Residents

Residential viewers are highly sensitive to changes in their visual environment. There are scattered residences in the northeast portion of the study area where the transmission lines constitute more prominent visual features. Near Moxee and Grandview, land uses become more densely developed and although residences are closer to the rights-of-way, views of other urban development and infrastructure detract from or block views of the lines.

Some residential viewers near the rights-of-way would have direct views of construction activities. Residences along Midway-Moxee Line Miles 5, 6, 14, 16, 23, and 25 and Midway-Grandview Line Miles 5, 10, 11, and 19 would be particularly affected, because construction equipment would either need to use private drives for access or because construction activities would occur within 1,000 feet of residences.

The greatest potential for visual impacts on residents would occur in the following locations, and the level of impact would vary depending on the location and proximity to construction areas.

- A single residence is located within 900 feet of Midway-Moxee Structure 5/2 and Midway-Grandview Structures 5/2 and 5/3. Another nearby single residence is located within 900 feet of Midway-Moxee Structures 5/4 and 5/5. There is little intervening topography or vegetation to block views of the transmission lines from these residences. Because construction impacts would be temporary and the visual changes would be small compared to the existing lines, the visual impacts would be low.
- On the Midway-Moxee transmission line, a single residence is located approximately 100 feet from Structure 6/7. Temporary visual changes during construction and permanent visual changes from increased structure height and conductor diameter would be moderate because of the proximity to the transmission line and the direct views from the residence.
- Single residences are located approximately 750 feet and 650 feet from Midway-Moxee Structures 14/2 and 16/1 respectively. Because construction impacts would be temporary and the visual changes would be small compared to the existing lines, the visual impacts would be low.
- A single residence is located approximately 820 feet from Midway-Moxee Structure 23/6 and over 1,000 feet from Midway-Moxee Structure 24/1. Because construction impacts would be

temporary and visual changes would be partially blocked by vegetation, the visual impacts would be low.

- Between Midway-Moxee Structure 25/4 and 25/5, a single residence is located about 400 feet from the edge of the right-of-way. Because construction impacts would be temporary and visual changes would be partially blocked by vegetation, the visual impacts would be low.
- From Midway-Moxee Structure 28/5 to the Moxee Substation, the number of residents within 500 feet or less of the edge of the right-of-way increases with some residences occurring within 50 feet of the right-of-way edge. In these areas, visual changes would be partially screened by vegetation and other buildings or residences. Depending on the visibility of the proposed changes, the visual impacts on residents in these areas would be low to moderate.
- A single residence is located approximately 750 feet from Midway-Grandview Structure 10/1. Because construction impacts would be temporary and visual changes would be partially blocked by vegetation, the visual impacts would be low.
- From Midway-Grandview Structure 24/1 to the Grandview Substation, the number of residents within close proximity (300 feet or less) to the edge of the right-of-way increases with some residences occurring within 50 feet of the right-of-way edge. In these areas, visual changes would be partially screened by vegetation; however, due to the close proximity of residents to the right-of-way, the visual impacts on residents in these areas would be moderate.

Recreation

People participating in hunting activities on private lands would also have views of construction activities, depending on their location. Noise and human presence generated by construction activities associated with the Proposed Action may also result in the disturbance of game animals, resulting in the avoidance of areas surrounding the transmission lines during construction. As mentioned previously, construction activities would be localized and relatively brief. Visual impacts on hunters would be variable, depending on the location and timing of the construction activity and the potential presence of hunters. The level of impacts would also vary depending on the level of visual sensitivity of the hunters. In some cases, the enjoyment of the visual setting may be an integral part of a hunter’s recreational experience and, in other cases, it may be secondary or unimportant. Visual impacts on recreation would therefore be low to moderate during construction. Because the proposed changes would not represent a substantial visual change compared with views of the existing transmission line, permanent visual changes affecting recreation would be low.

3.12.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would implement the following mitigation measures to avoid or minimize impacts on visual quality.

- Schedule all construction work during daylight hours to avoid noise and the use of nighttime illumination of work areas.
- Develop and distribute a schedule of construction activities to potentially affected landowners along the transmission line corridors to inform residents, including farm and grazing operations, when they may be affected by construction activities.

- Explain visual quality-related mitigation measures to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.
- Site all construction staging and storage areas away from locations that would be clearly visible from sensitive viewer groups as much as practicable.
- Control dust during construction, using water trucks or other appropriate methods, without the use of chemical additives, as needed.
- Limit vehicle speeds on unpaved roads and surfaces to 15 miles per hour.
- Maintain and clean construction sites as much as practicable and keep construction areas free of debris.

3.12.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

If the Proposed Action is implemented, there would some unavoidable impacts from construction-related disturbance in the form of construction equipment and activity that could be seen by sensitive viewer groups, including motorists, residents, and those participating in recreational activities. Permanent visual changes that would result from additional transmission line structures, taller structures, and larger diameter conductor could make the transmission lines slightly more visible in the landscape. Permanent visual changes that would result from new access roads and resurfaced access roads could make the access roads slightly more visible in the landscape.

3.12.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, BPA would not rebuild or upgrade the Midway-Moxee and Midway-Grandview transmission lines, and the visual impacts attributable to the Proposed Action described above would not occur. Ongoing transmission line maintenance activities would increase as facilities age and deteriorate, resulting in temporary and localized maintenance. Increased maintenance would result in temporary, localized, and low impacts from visual disturbance.

3.13. CULTURAL RESOURCES

3.13.1. Affected Environment

Regulatory Context

Cultural resources are resources associated with 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) (54 U.S.C. § 300101 *et seq*.), are a subset of cultural resources that are eligible for inclusion in the National Register of Historic Places (referred to as the National Register or NRHP). Historic properties may be districts, sites, buildings, structures, artifacts, ruins, objects, works of art, natural features important in human history at the national, state, or local level or properties of traditional religious and cultural importance to an Indian tribe. Historic properties include resources, which pre- and post-date contact between Euro-Americans and Native Americans.

The study area for cultural resources consists of the right-of-way for both transmission lines, which includes the construction work areas for transmission line structures, new and existing roads that would be used for access, and pulling and tensioning sites. Under the NHPA the study area is known as the “area of potential effects.” For purposes of consistency and clarity in this document, it will be referred to as the study area, which is intended to be synonymous with the area of potential effects.

The NHPA requires that cultural resources be identified and evaluated for eligibility in the NRHP using certain criteria. These criteria include an examination of the cultural resource’s age, ***integrity*** (of location, design, setting, materials, workmanship, feeling and association), significance in American culture, association with a significant person, possession of great artistic value, or properties that may yield important information about the past. A cultural resource must meet at least one criterion to be eligible for listing in the NRHP.

Pursuant to Section 106 of the NHPA, BPA consulted with the Washington State Historic Preservation Office (SHPO), DOE-RL, BLM, WDNR, and four Native American tribes with an interest in this area: the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes and Bands of the Yakama Nation, Nez Perce Tribe of Idaho, and the Wanapum Band. BPA requested input on the level and type of proposed cultural resource identification and evaluation efforts and information on cultural resources in the study area from the five tribes, the SHPO, the DOE-RL archeologist, the Bureau of Land Management archeologist, and the WDNR archeologist.

A review of the Washington Inventory System for Architectural and Archaeological Records Data website, maintained by the Washington Department of Archaeology and Historic Preservation, revealed that 11 cultural resources studies have previously been performed within portions of the study area or on lands immediately adjacent to it. Most of these studies only intersected small segments of the study area.

In keeping with its obligations to identify cultural resources within the study area, BPA commissioned a cultural resources inventory survey of the entire study area. Only a few scattered parcels were not surveyed due to problems with access to these areas, including areas with crops that would be damaged by surveys, presence of unfriendly animals, and lack of permission to access. The survey was conducted to find, revisit, and update previously identified sites and to look for any previously undocumented sites.

During the cultural resource survey, 48 previously undocumented archaeological sites and nine previously documented archaeological sites were found within the survey area. Of these, 42 sites are precontact in age. Precontact archeological sites, also known as prehistoric, contain the archeological remains of indigenous American societies as they existed before substantial contact with Euro-Americans and resulting written records. Twelve of the 42 sites are historic in age. Historic archeological sites, which can include sites and structures, contain artifacts that date from time periods before significant contact between Native Americans and Euro-Americans. Three of the 42 sites contained artifacts from both the precontact and historic era.

Twenty-eight of the previously undocumented archaeological sites are located in areas where no project-related activity is proposed. Because these resources are located in areas where no construction activity would occur, they would not be impacted by the Proposed Action and were not assessed for NRHP eligibility.

For the remaining 28 archaeological sites, BPA is in the process of commissioning an additional cultural resources survey that is intended to establish the NRHP eligibility status of these resources.

Historic properties also include ***traditional cultural properties*** (TCPs), which are associated 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). Properties of traditional religious and cultural importance to a Native American tribe are a type of TCP. Both the Wanapum Band and the Confederated Tribes and Bands of the Yakama Nation have completed TCP studies and have indicated that several TCPs overlap or are in close proximity to the project area. BPA will evaluate these TCPs for NRHP eligibility in consultation with the Washington SHPO and the consulting tribes.

Additional cultural work may be needed if design changes are made which change the project footprint. Once staging sites and any other work areas are identified, they would be surveyed for cultural resources and be the subject of consultation under the NHPA. These surveys could result in the discovery of additional cultural resources in the project area.

Historical Information

The study area is located within the Ceded Lands of the Yakama Nation that were ceded to the federal government as part of the Yakama Nation Treaty of 1855. The Wenatshapam were signatory to the Treaty of 1855. They were closely related with the Upper Yakama or Kittitas Band as they were commonly intermarried, shared fisheries, and co-occupied villages (Anastasio 1985; Ray 1936; Schuster 1998). After the signing of the Yakama Treaty of 1855, some Wenatshapam relocated to the Yakama Reservation, others remained, and later some relocated to the Colville Reservation set aside in 1872.

The study also represents the traditional territory of the Sahaptin-speaking Wanapum and Yakama, two "closely related but independent bands and villages of families, who once occupied contiguous territories in the south-central part of the state of Washington" (Schuster 1998).

In a wider context, the project area is located close to the confluence of two major plateau and Columbia basin rivers and consequently a number of Native American tribes are associated with the region. Large village sites, which served as bases for the seasonal gathering rounds can be found along the river banks and on the islands close by the northern portion of the project area near Midway (Chatters 1986).

The explorer David Thompson traveled through the Priest Rapids and White Bluffs area in the first and second decades of the 19th century. He noted the presence of a native people he called "Skummooin" which were almost certainly the ancestors to the present-day Wanapum (Nisbet 1994). However, the presence of the Yakama, Walla Walla, Chamnapum, Palouse, Umatilla, and Nez Perce people was also documented.

The first Europeans to pass through the region were explorers and fur traders in the early decades of the 19th century. After this initial period of exploration came a period of land-based fur trapping and trade that built upon an earlier maritime-based industry. With development of the land-based fur trapping industry, a greater number of Europeans began to travel throughout the region. The presence of immigrants to the area increased with the construction of inland fur-trade posts, including Fort Walla Walla in 1818 and Fort Vancouver in 1825.

By 1834, missionaries began moving into the region, with a Methodist mission established at The Dalles in 1838 (Hunn and French 1998). In the 1840s, the initial waves of pioneers heading west to the Willamette Valley along the Oregon Trail began to pass through the region, heralding the end of the fur trade era and the beginning of Euroamerican colonization. This migration of settlers was stimulated by the Oregon Donation Land Act of 1850, and by 1852 nearly 12,000 settlers were passing down the Columbia River, with most heading to the Willamette Valley (Hunn and French 1998).

With the increase in European American settlement, came increased conflict with the native people, many of whom resisted the appropriation of their lands. Hostilities broke out in 1855 following the crossing of Yakama lands by gold miners travelling to northeastern Washington. The conflicts that came to be known as the Yakima Wars began that same year after the Yakama were joined by other tribes in attempting to drive out the newcomers. The U.S. Army subdued the native forces and built Fort Simcoe to simultaneously keep settlers out of Yakama territory, and keep the Indians subdued. The Fort's mission failed, however, when miners crossed the region in 1858, prompting a renewal of the war. Defeated by the Army in that same year, the Yakama and their allies retreated to the reservation following the ratification of the Yakama treaty in early 1859 (Schuster 1998).

For a short period during the middle nineteenth century, cattle ranching was a primary economic activity in the region. This was supplemented by a small-scale logging industry along the Columbia River that supplied fuel to the steamboats operated by the Oregon Steam and Navigation Company on the river (Illustrated History 1904). Cattle ranching eventually gave way to farming in the 1870s, especially wheat and fruit orchards.

Towns in the study area vicinity began to be platted as early as the 1860s, with Yakima City established in 1861. By the 1880s numerous small towns began to be incorporated, including Sunnyside in 1893, Grandview in 1909, and Moxee in 1921. Railways began to be built throughout the region in the late nineteenth century and early twentieth century, linking otherwise remote areas of central Washington to urban centers, providing access to larger markets for locally grown produce.

The Hanford Reservation was established in 1943 to produce plutonium for weapons. The location was chosen primarily because it was a sparsely populated area with abundant cold water, needed for cooling, from the Columbia River. The part of the study area located on the Hanford Reservation is in the northwestern-most corner of the reservation and was never developed or used by DOE for any purpose, but was part of the buffer surrounding the Hanford Reservation facilities (U.S. Department of Energy 2003).

Historical Background of the Existing Transmission Facilities

To determine the eligibility of the BPA transmission facilities for listing in the NRHP, a Multiple Property Submission was prepared for BPA’s transmission system (Kramer 2012). This document identified the group of related significant properties that comprise BPA's transmission system, presented its historical context, and defined two types of properties that represent the context (Kramer 2012).

The Midway-Moxee transmission line was energized in 1941 and the Midway-Grandview transmission line was energized in 1947. The two transmission lines are considered important for their association with the development, design, and construction of the BPA Transmission Network. Furthermore, each appears to retain sufficient integrity to relate that association effectively.

Based on this assessment, the Midway-Moxee and Midway-Grandview transmission lines are likely to be eligible for listing in the NRHP as contributing elements of the BPA Transmission Network.

3.13.2. Environmental Consequences – Proposed Action

During project design, the location of known cultural resources was reviewed to determine how to avoid these resources as much as possible. Wherever possible, BPA implemented design changes to avoid impacts on known cultural resources.

It is not anticipated that the Proposed Action would adversely affect the characteristics that make either transmission line eligible for listing in the NRHP. While some design changes are required to ensure both lines remain compliant with existing safety standards for transmission lines, the changes in design would be relatively minor and are consistent with changes permitted under the multiple property documentation description of BPA's historic power system.

Currently, project construction is anticipated to impact several archaeological sites that may be eligible for listing on the NRHP. During construction, each site would be avoided to the greatest extent possible. If eligible archaeological sites cannot be avoided, then BPA would work with consulting parties to determine appropriate mitigation to address effects under the NHPA. BPA would conduct surveys of any currently unsurveyed areas within the cultural resource survey area prior to construction and address the results of the surveys with consulting parties.

If any known historic properties cannot be avoided during construction, impacts on these cultural resources during construction could potentially affect the integrity of these sites. Increased foot and vehicular traffic in the study area during construction activities could result in increased opportunity for vandalism and looting of cultural resources.

Impacts on cultural resources would depend on the amount and type of disturbance, the eligibility of the resource, and the type of mitigation. Implementation of the mitigation measures described below would minimize the potential for construction-related impacts and result in low to moderate impacts on documented cultural resources.

3.13.3. Mitigation Measures – Proposed Action

- Prior to construction, survey and identify cultural resources in any areas that were not previously surveyed due to lack of permission to enter or because of project changes and conduct consultation under the NHPA on any cultural resources that are identified.

- Avoid siting pulling and tensioning sites and new access roads within 100 feet of historic properties, where possible.
- Prepare and implement a mitigation plan for unavoidable impacts on cultural resources eligible for listing in the National Register in consultation with the SHPO, consulting tribes, and affected land managing agencies, that includes including the use of cultural resource monitors during construction, in agreed-upon locations.
- Explain cultural resource–related mitigation measures to construction contractors and inspectors, including the field marking of cultural sites for avoidance, during preconstruction meetings covering environmental requirements.
- Depict cultural sites in construction documents and on construction maps as sensitive sites to be avoided.
- Maintain construction limits greater than 100 feet away from cultural site boundaries where possible, through fencing or flagging as an area to be avoided.
- Minimize the size of construction disturbance areas and removal of vegetation near cultural resource sites, to the greatest extent possible.
- Implement an Inadvertent Discovery Plan that details construction crew member responsibilities for reporting in the event of a discovery during construction; require work to stop immediately and notification of local law enforcement officials (as required), appropriate BPA personnel, the Washington Department of Archaeology and Historic Preservation, affected land managing agencies, and affected tribes if cultural resources or human remains are discovered during construction activities.

3.13.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

Although implementation of mitigation measures would reduce the potential for impacts on cultural resources, the Proposed Action could potentially negatively impact cultural resource sites. If cultural sites eligible for listing in the NRHP cannot be avoided, BPA would work with consulting parties to determine appropriate mitigation to address effects under the NHPA. Disturbance of previously undocumented cultural resources could occur through inadvertent disturbance or destruction during project construction. Even with mitigation, the integrity of these sites could be affected and sensitive cultural information in an intact setting could be lost.

3.13.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, BPA would not rebuild the Midway-Moxee transmission line and rebuild and upgrade the Midway-Grandview transmission line. No project-related construction would occur; therefore, no project-related construction impacts on cultural resources would occur. Operation and maintenance activities would continue and would be similar to existing conditions. 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 road work proposed under the Proposed Action would likely need to take place as a maintenance activity. These maintenance activities could result in low to moderate impacts on cultural resources, depending on the level, amount, and type of disturbance, the eligibility of the resource, and the type of mitigation, similar to the impacts described above. If it were necessary to perform repairs on an emergency basis, it would not be possible to work with Section 106 consulting parties prior to the activities to determine appropriate mitigation to address effects under the NHPA.

3.14. AIR QUALITY AND GREENHOUSE GASES

3.14.1. Affected Environment

Air Quality

The study area for air quality is defined as the ***airshed*** that includes Benton and Yakima counties. While the primary factors that determine air quality are the locations of air pollutant sources and the amount of pollutants emitted from those sources, meteorological conditions and topography are also important contributing factors. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants.

Under the Clean Air Act (42 U.S.C. 7401 *et seq*.), EPA established national ambient air quality standards (NAAQS) for the following six ***criteria pollutants***: ozone, carbon monoxide (CO), lead, nitrogen dioxide, sulfur dioxide, and ***particulate matter*** which consists of ***particulate matter measuring 10 microns in diameter or less*** (***PM10***) and ***particulate matter measuring 2.5 microns in diameter or less*** (***PM2.5***). The NAAQS are divided into primary standards, which are set to protect human health within an adequate margin of safety, and secondary standards, which are set to protect environmental values such as plant and animal life.

Ecology establishes state ambient air quality standards that are at least as stringent as the national standards for the same six pollutants. The study area airshed is currently designated as an ***attainment*** area for all criteria air pollutants. While portions of Yakima County are designated as ***maintenance areas*** for the CO and PM10, these maintenance areas do not include the study area, which is located east of these maintenance areas (Washington State Department of Ecology undated).

The primary pollutants of concern in the study area are ozone (including precursor nitrogen oxides) and reactive organic gases, CO, and particulate matter. The principal characteristics surrounding these pollutants are discussed below.

CO is a product of incomplete combustion generated by mobile sources, residential wood combustion, and industrial fuel-burning sources. CO is released in the exhaust from automobiles and other vehicles. It is the air pollutant that would be emitted in the greatest quantity by the Proposed Action. CO is a pollutant whose impact is usually localized, and CO concentrations typically diminish within a short distance of roads. The highest ambient concentrations of CO usually occur near congested roadways and intersections during wintertime periods of air stagnation.

Ozone is a highly reactive form of oxygen created by an atmospheric chemical reaction of nitrogen oxides and reactive organic gases, both of which are emitted directly from industrial and mobile sources. Ozone problems tend to be regional in nature because the atmospheric chemical reactions that produce ozone occur over a period of time, and because, during the delay between emissions and ozone formation, ozone precursors can be transported far from their sources. Transportation sources like automobiles and trucks are some of the sources that produce ozone precursors.

Particulate matter is generated by industrial emissions, residential wood combustion, motor vehicle tailpipes, and fugitive dust from roadways and unpaved surfaces. At present, there are standards for PM10 and PM2.5, because these sizes of particulate contribute the most to human health effects, regional haze, and acid deposition.

Within the DOE Hanford Site, radioactive contaminants are the primary air pollutant of concern due to the site's historical and current nuclear and industrial activities. Standards for emissions of ***radionuclides*** to air from DOE-RL facilities have been established by EPA (40 CFR 61) and the State of Washington (WAC 173-480 and WAC 246-247). The 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).

Greenhouse Gases

GHGs are chemical compounds found in Earth's atmosphere that absorb and trap infrared radiation as heat. The study area for GHGs consists of areas where construction activities could result in GHG emissions. This includes the areas where construction activities would generate emissions through the operation of machinery and vegetation removal. The study area also includes all roads in the vicinity that could be subject to increases in traffic volumes from construction vehicles and worker trips.

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 instance, 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. Upon release, carbon is available to be taken up again by plants (Ecological Society of America 2008). In forests, the carbon can be stored for long periods of time. Because forests are so productive and long-lived, they have an important role in carbon capture and storage and can be thought of as temporary carbon reservoirs. There is also a large amount of GHGs stored deep underground in the form of fossil fuels. 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 carbon cycle by increasing the GHG emission rate over the storage rate. This 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 permanently displace vegetation, the GHG storage capacity of the disturbed area is diminished. Carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4) emissions increase when soils are disturbed (Kessavalou *et al.* 1998). Burning fossil fuels releases GHGs that have been stored underground for thousands of years. The resulting buildup of heat in the atmosphere due to increased GHG levels increases temperatures, which causes warming of the planet through a greenhouse-like effect (U.S. Energy Information Administration 2009).

The principal GHGs emitted into the atmosphere through human activities are CO_2, CH_4, N_2O, and fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) (U.S. Environmental Protection Agency 2013a).

CO_2 is the major GHG emitted (U.S. Environmental Protection Agency 2013a; Houghton 2010). CO_2 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. CO_2 emissions resulting from the combustion of coal, oil, and gas constitute 84 percent of all U.S. GHG emissions (U.S. Environmental Protection Agency 2013a). Before the industrial revolution, CO_2 concentrations in the atmosphere were roughly stable at 280 parts per million. By 2010, CO_2 levels had increased to 390 parts per million, a 40 percent increase, as a result of human activities (U.S. Environmental Protection Agency 2013b).

CH_4 is emitted during the processing and transport of fossil fuels, through intensive animal farming, and by the degradation of organic waste. Concentrations of CH_4 in the atmosphere have increased more than 2.5 times of preindustrial levels (U.S. Environmental Protection Agency 2013b).

N_2O is emitted during agricultural and industrial activities and during the combustion of fossil fuels and solid waste. Atmospheric levels of N_2O have increased 18 percent since the beginning of industrial activities (U.S. Environmental Protection Agency 2013b).

Fluorinated gases, including HFCs, PFCs, and SF_6, are synthetic compounds emitted through industrial processes. They sometimes replace ozone-depleting compounds such as chlorofluorocarbons (CFCs) in insulating foams, refrigeration, and air conditioning. Fluorinated gases, particularly SF_6, are often used in substation equipment. SF_6 is used as an electrical insulator in high-voltage substation equipment such as circuit breakers, transformers, and ground switches. Although fluorinated gases are emitted in small quantities, fluorinated gases have the ability to trap more heat than CO_2 and are considered gases with a high ***global warming potential*** (U.S. Environmental Protection Agency 2013a).

Total human-caused GHG emissions were the highest in human history from 2000 to 2010 and reached 49 gigatons of ***carbon dioxide equivalent*** (CO_2e) per year in 2010 (Intergovernmental Panel on Climate Change 2014). Annual GHG emissions grew on average by 1.0 gigaton of CO_2e (2.2 percent) per year from 2000 to 2010 compared to 0.4 gigaton of CO_2e (1.3 percent) increase per year from 1970 to 2000.

Increasing levels of these GHGs could increase the Earth’s temperature by between 2.0° and 11.5° Fahrenheit by 2100 (U.S. Environmental Protection Agency 2013a). In the Pacific Northwest Region, an increase in annual temperature between 3.3° and 9.7° Fahrenheit may be realized between 2070 and 2099, depending on future total global emissions of GHGs (Mote *et al.* 2014). This increase in Earth’s temperature may result in accelerated melting of artic sea ice and glaciers, decreased periods of ice cover on lakes and rivers, changes in hydrology associated with early melting and decreased snow packs, changes in growing seasons and plant hardiness zones, changes in surface water characteristics, and increased extreme weather (Melillo *et al.* 2014). All of these changes could have a ripple effect on agricultural production, human health, public infrastructure, water supplies, hydropower generation, and terrestrial, aquatic, and marine ecosystems.

While models predict that atmospheric concentrations of all GHGs and temperatures will increase over the next century due to human activity, the extent and rate of change resulting from an individual project or action is difficult to predict, especially on a global scale. To lessen the BPA transmission system's contribution to GHG emissions, BPA developed a climate change roadmap, which included the adoption of a new Strategic Business Objective and a Key Agency Target related to climate change (Bonneville Power Administration 2008). The climate change roadmap identified measuring BPA's overall GHG emissions as a key starting point for BPA to manage its overall GHG footprint. As a result, BPA started collecting GHG data in 2009 to complete an inventory of existing GHG emissions. The GHG reporting serves as a benchmark for quantifying reductions in GHG emissions from various activities and functions and helps BPA in quantifying the value of potential remedies for reducing emissions, estimating the costs of changing current practices and prioritizing future GHG emission reduction actions.

In 2009, BPA became a founder and member of The Climate Registry, a nonprofit collaboration that sets standards to calculate, verify and report GHG emissions. BPA completed and published a GHG inventory for the years of 2009, 2010, 2011, and 2012. The Climate Registry has been third-party verified and is publicly available at the website http://www.theclimateregistry.org/.

In 2012, BPA's system-wide direct emissions from stationary and mobile combustion and fugitive sources totaled 88,524 metric tons of CO_2e (The Climate Registry 2013). These direct emissions were calculated from the use of vehicles, air transportation, building operation, and transmission line operation. The GHG emissions reported to The Climate Registry also includes a quantification of the SF_6 emissions from BPA facilities. In addition to reporting SF_6 emissions associated with total GHG emissions to The Climate Registry, BPA joined the EPA's SF_6 Emission Reduction Partnership in 1999, which includes voluntarily reporting of SF_6 emissions.

3.14.2. Environmental Consequences – Proposed Action

Air Quality

Construction activities associated with the Proposed Action would generate criteria pollutant emissions of nitrogen oxides, CO, PM10, and PM2.5, which would temporarily change ambient air quality in the study area. Construction equipment would consist of about 20 vehicles (pickups, vans) and another 40 pieces of heavy equipment, including bucket trucks, cranes, excavators (bulldozers, backhoes), road construction equipment (dump trucks, rollers, road bladers), line tensioners/pullers, and a helicopter. Emissions would originate from mobile and stationary construction equipment exhaust, delivery vehicles, helicopter activities, employee vehicle exhaust, and dust associated with land clearing and disturbance activities and vehicular travel on unpaved surfaces and roads. The operation of heavy equipment during construction could result in temporary increases in CO, CO_2, sulfur oxides, nitrogen oxides, and volatile organic hydrocarbons. 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. For these reasons, impacts on air quality from construction vehicle emissions would be low.

An increase in particulate matter would be the main air quality concern. Dust could be created during structure construction, access road work, travel on unpaved surfaces, and other soil-disturbing activities. Within the study area, dry, hot, and windy conditions, combined with the fine-grained unconsolidated nature of the soils, could result in soil erosion and the creation of dust when protective vegetation cover is removed. In addition, vegetation at the 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 dust generated during and after construction, but before vegetation cover has been restored, would be moderate. Dust control measures would include minimizing the extent of soil disturbance, watering disturbed areas as needed to control dust, and seeding disturbed areas to establish vegetation cover. BPA would require completion of a Fugitive Dust Control Plan for implementation during construction for activities within DOE Hanford Site.

Because construction would occur fall through spring over 2 years, impacts associated with construction activities would likely be low to moderate given the temporary nature of construction activities, as well as soil disturbance being limited to localized areas.

Greenhouse Gases

GHG emissions, primarily in the form of CO_2, N_2O, and CH_4, would be generated under the Proposed Action through the use of vehicles, heavy equipment, and helicopters during project construction. The Proposed Action would result in the clearing of approximately 0.3 acre of trees for the construction of new access roads and danger tree removal. Tree removal does not immediately emit GHGs and is not considered a direct emission, though tree removal could result in a permanent loss of a carbon storage reservoir. The following subsections estimate the direct emissions and loss of carbon storage from tree removal. Detailed assumptions used to derive these estimates are provided in Appendix D.

Soil disturbance could also result in an increase in GHG concentrations. Research has shown that emissions as a result of soil disturbance are short lived and return to background levels within several hours (Kessavalou *et al.* 1998; Intergovernmental Panel on Climate Change 2006). Carbon would be released when vegetation, other than trees, would be removed during construction. Once construction is complete, about the same amount of carbon would be stored by the regrowth of herbs and shrubs in disturbed areas and by accumulation of carbon in soils. Because temporary soil disturbance and removal of vegetation, other than trees, would only result in a temporary increase in GHG concentrations, they are not quantified below.

Direct Emissions

Direct GHG emissions resulting from the rebuilding the transmission lines as part of the Proposed Action were calculated using the assumptions described in Appendix D.

The Proposed Action could result in an estimated total of 17,381.1 metric tons of CO_2e emissions through the use of vehicles, equipment, and helicopters during construction activities. As described further in Appendix D, GHG emissions associated with equipment operation and vehicle use were overestimated to account for all potential construction activities.

To provide context for these levels of emissions, the EPA mandatory reporting threshold for large emission sources of GHGs is 25,000 metric tons of CO_2e emitted annually (74 Federal Register 56260). This threshold is approximately the amount of CO_2e generated by 4,400 passenger vehicles per year. Comparatively, the emissions during project construction would be equivalent to the emissions generated by about 3,060 passenger vehicles per year.

Given the low contributions, the impacts of the Proposed Action on GHG concentrations would be low.

Tree Sequestration Reduction

Based on the carbon cycle, trees act as temporary carbon reservoirs. Peak solid carbon storage occurs when a tree is fully mature. Alternatively, minimum solid carbon storage may occur when a forested area is permanently converted to a non-forested area, such as grasslands.

Rebuilding the transmission lines could require the removal of an estimated 0.3 acre of trees for danger tree removal. The nature of tree removal is to permanently convert land within the clearing area to a non-forested land use. Therefore, this action can be characterized as permanently maintaining the clearing area at the minimum level of carbon storage.

The estimated 0.3 acre of trees, if not removed, could sequester approximately 167.3 metric tons of CO_2e at full maturity. This is the quantity of CO_2e generated by 37.6 vehicles and 0.2 percent of BPA's annual CO_2e emissions. As described further in Appendix D, this estimate assumes that the removed trees are at full maturity and would remain in that state to provide full sequestration potential. This estimate is conservative as most of the removed trees are not at full maturity (i.e., at full sequestration potential) and many trees would not have reached maximum maturity through natural attrition or other human-related disturbances. Due to the small loss of GHG sequestration potential, tree removal under the Proposed Action would result in a low effect on GHG concentrations.

3.14.3. Mitigation Measures – Proposed Action

If the Proposed Action is implemented, BPA would implement the following mitigation measures to avoid or minimize impacts on air quality and climate change.

- Incorporate measures into a Fugitive Dust Control Plan for construction work on the DOE Hanford Site, identified in consultation with DOE-RL, which would minimize dust in the dry, windy conditions at the DOE Hanford Site.
- Encourage the use of the proper size of equipment for the job to maximize energy efficiency.
- Explain air quality-related mitigation measures to construction contractors and inspectors during a preconstruction meeting covering environmental requirements.
- Locate 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 local sources of rock for road construction, if possible, and obtain road fill materials from noxious weed-free quarries.
- Ensure all vehicles are in compliance with applicable federal and state air quality regulations for tailpipe emissions and properly maintained.
- Control dust during construction, using water trucks or other appropriate methods, without the use of chemical additives, as needed.
- Gravel access road surfaces in areas of sustained wind to reduce potential dust erosion.
- Limit vehicle speeds on unpaved roads and surfaces to 15 miles per hour.
- Minimize idling construction equipment, if feasible.

- Recycle or salvage non-hazardous construction and demolition debris, where practicable.
- Reseed disturbed areas after construction activities are complete, at the appropriate time period for germination, with a native seed mix, a seed mix recommended by WDFW, or a seed mix identified in the *Stormwater Management Manual for Eastern Washington*, or as agreed upon with landowners for use on their property (Washington State Department of Ecology 2004).

3.14.4. Unavoidable Impacts Remaining After Mitigation – Proposed Action

Construction and operation and maintenance activities associated with the Proposed Action would generate criteria pollutants, primarily dust and particulates. Because construction activities would be temporary and limited to localized areas, localized increases in dust and particulates would decrease after soils are stabilized by revegetation. The emissions of GHG emissions during construction from use of vehicles and equipment, increased worker traffic, and vegetation removal, would be below the EPA mandatory reporting threshold for large emission sources of GHGs.

3.14.5. Environmental Consequences – No Action Alternative

Under the No Action Alternative, the existing transmission line would not be rebuilt or upgraded, and, therefore, impacts related to construction of the Proposed Action would not occur. Because of the deteriorated condition of the transmission lines, it is likely that the No Action Alternative would result in more frequent maintenance than under the Proposed Action, and maintenance activities would result in localized air quality impacts due to the emission of criteria pollutants, including particulates. Maintenance activities, including the use of equipment and vehicles, would result in the temporary emission of GHGs. If access road work was eventually carried out as a maintenance project, then the impacts on air quality and GHG emissions from road work would likely be the same as described for the Proposed Action.

3.15. CUMULATIVE IMPACTS

Cumulative impacts are environmental impacts that result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal), entity, or person undertakes these actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

This section of the EA describes historical development and existing conditions that resulted from past activities in the vicinity of the Proposed Action, as well as reasonably foreseeable future development in the area. The following subsections describe the cumulative effects that the Proposed Action, in combination with past, present, and reasonably foreseeable future actions, would have on the various environmental resources discussed in this EA.

3.15.1. Past Actions

The nature and extent of past development and activities in the vicinity of the Proposed Action are described earlier in this chapter in the “Affected Environment” sections for each type of resource. These developments and activities resulted in present day conditions in the project area.

The Proposed Action is located within the traditional territory of the Sahaptin-speaking Wanapum and Yakama, two “closely related but independent bands and villages of families, who once occupied contiguous territories in the south-central part of the state of Washington” (Schuster 1998). Other tribes with a past and present interest in the area include the Nez Perce and the Confederated Tribes of the Umatilla Indian Reservation.

The original Indian inhabitants had camps and villages in the project vicinity, some of which were permanent and some of which were temporary; these tribes collected plants and other resources, hunted, and fished (Smith 1983; Galm and Masten 1985). The tribes in the area engaged in a seasonal round of subsistence activities.

The first European Americans to pass through the region were explorers and fur traders in the early decades of the 19th century. After this initial period of exploration came a period of land-based fur trapping and trade that built upon an earlier maritime-based industry. With development of the land-based fur trapping industry, a greater number of European Americans began to travel throughout the region. This intensified with the construction of inland fur-trade posts, including Fort Walla Walla in 1818 and Fort Vancouver in 1825.

In general, the type of development that caused impacts on resources in the vicinity of the Proposed Action began during the mid-nineteenth century. The initial waves of pioneers heading west to the Willamette Valley along the Oregon Trail began to pass through the region in the 1840s, heralding the end of the fur trade era and the beginning of Euroamerican colonization. This migration of settlers was stimulated by the Oregon Donation Land Act of 1850, and by 1852 nearly 12,000 settlers were passing down the Columbia River, with most heading to the Willamette Valley (Hunn and French 1998).

For a short period during the middle nineteenth century, raising cattle was a primary economic activity supplemented along the Columbia River by a small-scale logging industry that supplied fuel to the steamboats operated by the Oregon Steam and Navigation Company on the river (Illustrated History 1904). Cattle ranching eventually gave way to farming, notably wheat and fruit trees in the 1870s. Railways began to be built throughout the region in the late nineteenth century and early twentieth century, linking otherwise remote areas of central Washington to urban centers, providing access to larger markets for locally grown produce.

The need for flood control and the need to supply power to a growing economy led to the construction of numerous hydroelectric and water storage dams along the mid-Columbia River. The earliest of the mid-Columbia Dams was Rock Island Dam, completed in 1933 by the Puget Sound Power and Light Company. It was the first hydroelectric project on the main stem of the Columbia River and transmission lines and substations were installed to distribute electricity. The BPA was formed in 1937 to distribute and market electricity generated from hydroelectric dams on the Columbia River. Construction of BPA’s original Master Grid began in 1939 in order to link two of the first Columbia River dams, Bonneville and Grand Coulee. The Master Grid was intended to be expanded by construction of feeder lines radiating outward to spur development in more rural or underserved areas. When the nation entered World War II in 1941, federal priorities shifted from rural electrification to defense, with a priority placed on developing industry, primarily aluminum and shipbuilding, in the Northwest. After World War II and the completion of the Master Grid in 1945, BPA focused on expansion of peacetime industry to market its surplus power and continued expanding its system through feeder lines.

The Yakima Training Center (YTC) (formerly known as the Yakima Firing Center) is a 327,000-acre sub-installation of Joint Base Lewis-McChord located to the north/northwest of the Proposed Acton in Yakima and Kittitas Counties, Washington. The YTC is bordered on the north by I-90 and on the south by the top of Yakima Ridge, and is situated directly between I-82 on the west and the Columbia River to the east. Much of YTC has been used as a military training center since before World War II. Military units in the Pacific Northwest began using 160,000 acres near Yakima, Washington, leased from local landowners as an anti-aircraft artillery range for range firing and small-unit testing in 1941. In 1951, the Army purchased over 261,000 additional acres and enlarged the Yakima Firing Center to accommodate increased training needs. Several military units continued to train on the facility into the 1990s leading to the addition of 63,000 acres in 1992.

The DOE 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 (U.S. Environmental Protection Agency 2012).

At that time, the federal government directed the Native Americans who used and inhabited the newly created Hanford Site to leave their camps and resource gathering, hunting, and fishing areas. Tribal access to areas that were traditionally used by tribes was either denied or restricted due to Hanford Site public safety and security concerns.

After World War II, the Hanford facilities continued to be used and upgraded until the late 1980s. Beginning in 1989, the DOE-RL primary mission at the DOE Hanford Site switched from production to waste cleanup. In May of that year, the DOE, EPA, and Ecology signed the Tri-Party Agreement and no plutonium has been produced for defense purposes at the site since that time.

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 (U.S. Department of Energy 2011b). Fire history maps maintained by DOE-RL include a series of fires that burned areas near the Midway Substation but outside of the transmission line right-of-way in 1977, 1993, and 1996 (U.S. Department of Energy 2012b).

There are a number of other transmission lines that were constructed along or near the Midway-Moxee and Midway-Grandview transmission lines (Table 3.15-1). A non-BPA transmission line, the 230-kV Union Gap-Midway line owned by Pacific Power and Light, is adjacent to approximately 12 miles of the Midway-Moxee transmission line. Pacific Power and Light also owns a 69-kV line and a 66-kV line in the area. In addition, there are several low-voltage lines (below 35-kV) in the area, not included in Table 3.15-1. BPA’s periodic vegetation management activities have been conducted along BPA’s transmission lines and have included the control of weeds and removal of vegetation that was growing too closely to BPA transmission line facilities. Similar historical vegetation management activities have likely occurred for the non–BPA owned transmission facilities in the area.

Table 3.15-1. Transmission Lines Adjacent to the Midway-Moxee and Midway-Grandview Transmission Lines

Location Relative to Substations and Transmission Line Structures	Adjacent Transmission Lines (BPA owned lines unless otherwise noted)
Midway-Moxee Transmission Line	
Midway Substation to Midway-Moxee Structure 1/8	230-kV Wine Country–Midway 115-kV Midway-Grandview 230-kV North Bonneville–Midway
Midway-Moxee Structures 1/8 to 5/4	230-kV Wine Country–Midway 115-kV Midway-Grandview 230-kV North Bonneville-Midway 550-kV Schultz-Wautoma
Midway-Moxee Structures 5/4 to 8/2	No adjacent transmission lines
Midway-Moxee Structures 8/2 to 20/1	230-kV Pacific Power and Light line
Midway-Moxee Structures 20/1 to 34/8 at the Moxee Substation	No adjacent transmission lines
Midway-Grandview Transmission Line	
Midway Substation to Midway-Grandview Structure 1/7	230-kV Wine Country–Midway 115-kV Midway-Moxee 230-kV North Bonneville–Midway
Midway-Grandview Structures 1/8 to 5/4	230-kV Wine Country–Midway 115-kV Midway-Moxee 230-kV North Bonneville-Midway 550-kV Schultz-Wautoma
Midway-Grandview Structures 5/4 to 6/8	230-kV Wine Country–Midway 230-kV North Bonneville–Midway 550-kV Schultz-Wautoma
Midway-Grandview Structures 6/8 to 9/3	230-kV North Bonneville-Midway
Midway-Grandview Structures 9/3 to 14/2	500-kV Wautoma-Ostrander 230-kV North Bonneville–Midway
Midway-Grandview Structures 14/2 to 25/9 at the Grandview Substation	No adjacent transmission lines

The Williams Northwest Pipeline, which transports natural gas, passes to the east side of Yakima, Washington; generally running north-south in this area. The pipeline is located approximately 2.5 miles southwest of the Midway-Moxee transmission line at its closest point. The pipeline is a 4,000-mile bi-directional natural gas transportation system crossing the states of Washington, Oregon, Idaho, Wyoming, Utah and Colorado and serves as a primary artery for the transmission of natural gas to the Pacific Northwest and Intermountain Region. The Northwest's bi-directional system provides access to British Columbia, Alberta, Rocky Mountain and San Juan Basin gas supplies.

A network of local roads and state and county highways have been developed in the vicinity of the Proposed Action, which has facilitated further development. The Midway-Moxee transmission line generally parallels SR 24 and does not cross any major roads although it does cross some county roads near Moxee. Depending on the location, the right-of-way is about 1 to 2 miles north of SR 24. The Midway-Grandview transmission line crosses SR 24 (between Structures 5/6 and 5/7) and SR 241 (between Structures 13/5 and 14/5). In this area, both SR 24 and SR 241 are primarily used by local residents and farming trucks.

Typical residential development that has occurred in the area includes scattered rural residences, with more dense residential development near and within Moxee and Grandview. Scattered rural residences are located along the Midway-Moxee transmission line near Line Miles 5, 6, 14, 16, 23, and 25, with increasing density from Line Mile 29 into Moxee. Scattered rural residences also are located near Line Mile 5 of the Midway-Grandview transmission line right-of-way and with increasing density from Line Mile 24 into Grandview. In larger parcels in the study area, rural residences are often associated with agricultural operations.

3.15.2. Current and Reasonably Foreseeable Future Actions

Current actions are those projects, developments, and other actions that are currently underway, either because they are currently in permitting, under construction, or are occurring on an ongoing basis. Reasonably foreseeable future actions generally include those actions formally proposed or planned, or highly likely to occur based on available information. Various sources, including local, state, and federal agency websites and county staff, were consulted to obtain information about any current and reasonably foreseeable future development in the project vicinity. The following describes these current and reasonably foreseeable future actions.

Transmission Line Projects

Vantage to Pomona Heights Transmission Line Project

In 2008, Pacific Power applied for a right-of way from the BLM for construction of a new 230-kV transmission line connecting the Vantage and Pomona Heights Substations. Pacific Power requires the new line to enhance the overall operating flexibility and security of the regional transmission grid and to improve system reliability in the Yakima Valley. The BLM, acting as the lead federal agency for the proposed project, determined an EIS was required.

On January 4, 2013, the BLM released the Draft Environmental Impact Statement (DEIS) for public review and comment, identifying an Agency Preferred Alternative paralleling an existing transmission line in Yakima County, and generally following Road N and crossing the Saddle

Mountains in Grant County (Alternative D). Alternative Route 2c analyzed in the DEIS would parallel the existing Midway-Moxee transmission line on its south side for about 8.6 miles from the intersection of these two lines southeast of Moxee.

However, as a result of the comments received at the meetings and submitted in writing, the BLM, Pacific Power, and the YTC met and identified a new route that is located largely on YTC land and away from the Midway-Moxee transmission line. The route was analyzed in a Supplemental DEIS released for public review and comment by BLM on January 2, 2015. Pacific Power anticipates the construction will begin in mid- to –late 2015, with service beginning in mid-2017 (Pacific Power 2014).

Benton to Othello Transmission Line Project

Avista Utilities is proposing to rebuild its 12.6-mile, 115-kV wood-pole Benton-Othello Switching Station (Othello) transmission line within the existing 200-foot-wide right-of-way from its starting point on Hanford Reach National Monument to its ending point at the Othello substation. This rebuild project would remove approximately 108 wooden structures and install approximately 80 self-weathering steel structures. This includes two structures on either side of the Columbia River crossing. The structure on the island will be removed but not replaced. Approximately five of the existing steel poles would also be replaced. All poles that are being replaced are located within Avista's right-of-way or easement. Access to the existing structures and laydown areas may be located outside of the right-of-way but is identified within the easements (Anderson pers. comm.).

The project is in a conceptual stage but is anticipated to impact White Bluff's Bladderpod, wetlands, and sage-steppe habitat, and it may affect cultural resources. The project is in the early stages of development and no technical reports (wetland delineation, cultural resource survey report, or biological assessments) have been prepared and no tribal consultation has been conducted (Anderson pers. comm.). The anticipated project completion date is 2016 (Columbia Grid 2015). Approximately 11 miles of the remaining Benton-Othello transmission line leading to the Benton substation were rebuilt as part of BPA's Midway-Benton No. 1 Rebuild Project in 2013.

Transmission Line Maintenance

BPA will conduct future maintenance activities within the Midway-Moxee and Midway-Grandview transmission line rights-of-way and other transmission line rights-of-way in the area. Transmission line maintenance can include replacement of hardware, such as insulators; replacement of structures and conductor; and work on access roads. 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. These activities are presently conducted and are anticipated to continue into the future. Supplement Analyses to BPA's Transmission System Vegetation Management Program Final Environmental Impact Statement / Record of Decision have been completed to satisfy compliance with NEPA (Bonneville Power Administration 2000). In addition, other utilities in the area conduct ongoing maintenance of their facilities.

Midway-Pot Holes No. 1 Insulator and Access Road Project – BPA's Midway-Potholes No. 1 line is a 230-kV, lattice-steel tower transmission line. BPA proposes to perform routine access road maintenance and line insulator replacements along a ten-mile portion of the BPA Midway-Potholes No. 1 transmission line in Grant County, Washington. At its closest point, this project would be over 10 miles north of the Midway Substation.

To perform this line maintenance, necessary access road maintenance would be done, including shaping, rocking, and compacting the existing road surface on about 12-miles of existing gravel access roads. The majority of the roads are within the transmission line corridor, but some portions are off the right-of-way. The project is proposed for 2016.

Riverland-Midway No. 1 Line Retirement Project – BPA would retire and fully remove about 2.3 miles of the 13.8-kV Riverland-Midway No. 1 line extending from the Midway Substation, likely within the next 2 to 3 years.

Midway-Benton No. 2 Fiber Replacement Project – The Midway-Benton No. 2 Fiber Replacement Project is located between the Midway and Benton Substations on the DOE Hanford Site and is proposed in 2015 or 2016. 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 using existing access roads to remove and replace the fiber optic cable.

Ellensburg-Moxee No. 1 Right-of-Way Geotechnical Exploration between Structures 17/1-22/2 – BPA released a Categorical Exclusion for the proposal to conduct subsurface geotechnical exploration to characterize the right-of-way, for the direct burial of the existing overhead fiber optic cable between Structures 17/1 and 22/2 on the Ellensburg-Moxee No. 1 transmission line (Bonneville Power Administration 2014). This section of fiber optic cable has been susceptible to acts of vandalism and is needed to protect and maintain BPA's operational communication abilities. Geotechnical exploration would include using a backhoe to excavate 37 test pits each being approximately 10 feet long by 3 feet wide and 5 feet deep. The project, which would take place approximately 10 miles northwest of the Moxee Substation, is planned for 2016.

DOE Hanford Site Operation

Site cleanup, waste disposal, and tank waste stabilization are currently underway on the DOE 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 DOE 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 DOE Hanford Site, Hanford Reach National Monument, and National Wildlife Refuge
- DOE also maintains several electric transmission and distribution lines

The *Hanford Comprehensive Land Use Plan* limits most development to previously disturbed areas, primarily within lands designated Industrial (U.S. Department of Energy 2008). The

Hanford Comprehensive Land Use Plan anticipates multiple uses of the DOE Hanford Site, including waste management operations in the Central Plateau and industrial development in the eastern and southern portions of the site. Lands in the vicinity of the Proposed Action and within the DOE Hanford Site are designated Preservation, as is most of the DOE Hanford Site. Lands under this designation are managed to protect archaeological, cultural, ecological, and natural resources, with public access restricted to nonintrusive research or game-management activities. No new consumptive uses (e.g., mining) are allowed.

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.

Pipeline Projects

The Williams Northwest Pipeline, which transports natural gas, passes to the east of Yakima Washington; generally running north-south in this area (discussed in *Past Actions*). Williams conducts routine maintenance on the existing Northwest Pipeline.

The *2014 Gas Outlook* published by the Northwest Gas Association does not indicate that construction of any new natural gas pipelines and storage facilities are reasonably foreseeable in the area (Northwest Gas Association 2014).

Yakima Training Center

The YTC is a large area, located about 1.0 mile to the north of the Midway-Moxee transmission line at its closest point (Line Mile 11 to Line Mile 12), that is managed by the U.S. Department of Defense. In recent years, the YTC has served as a desert-style training complex for soldiers stationed at Joint Base Lewis-McChord, the Army National Guard, Special Operations Command, Marine Corps, Air Force, Navy, and Coast Guard units, as well as local and federal law enforcement agencies, and allied forces from Canada and Japan (Joint Base Lewis-McChord 2012). Military maneuvering and live fire activities occur both along the 250 miles of roads on the YTC and off-road in remote areas. Of the YTC's 327,000 acres, roughly, 1,700 acres are devoted to the Cantonment Area, the developed, city-like portion of the installation located in the southwestern portion of the YTC. The remaining 325,000 acres are devoted to training areas for military activities including infantry, tracked and wheeled vehicles, gunnery (i.e., artillery), engineering, various types of live fire training (e.g., small arms, artillery), air assault and air drop operations, and river crossing activities. Established training facilities include the Multi-Purpose Range Complex, Multi-Purpose Training Range, Selah Airstrip, Vagabond Army Airfield, and the Urban Operations Village, among others.

Private Agricultural Development and Facilities

In 2014, a private landowner with property situated along the Midway-Moxee transmission line applied to Yakima Country for a permit to construct three controlled atmospheric buildings and two mechanical rooms to support the operation of an existing agricultural facility. The total size of buildings proposed would be approximately 89,000 square feet. The facility would also include two concrete parking spaces. The proposed facilities would be located about 100 feet from the Midway-Moxee transmission line right-of-way near Midway-Moxee Structure 17/6. The project would be completed in phases, as controlled atmosphere buildings are needed. The first building was scheduled for construction in 2014 and the other buildings are anticipated to be constructed in the next 2 to 4 years.

Transportation Projects

The Washington State Department of Transportation *2014–2017 Statewide Transportation Improvement Program* (STIP) was approved in January 2014 (Washington State Department of Transportation 2014b). The STIP includes projects such as pavement overlays, roadway widening, bridge replacement or repair, signal systems, safety enhancements, bicycle and pedestrian facilities, and transit improvements. BPA reviewed the STIP and did not identify any reasonably foreseeable future actions in the vicinity of the Proposed Action.

Land Use Development Projects

The predominant land uses in the land use study area consist of undeveloped rangeland, dryland agriculture, and irrigated crops. Cultivated crops within the study area include vineyards, hops, wheat, and orchard lands.

The Benton County Planning Department was contacted and asked for information on any planned projects in the vicinity of the Proposed Action. With the exception of a planned cellular telephone communication tower located approximately 1 mile from the Midway-Grandview transmission line, no other foreseeable projects were identified (Posey pers. comm.).

The Yakima County Planning Department was contacted regarding planned projects in the vicinity of the Proposed Action. With the exception of the controlled atmospheric buildings described above, no other foreseeable projects were identified (Deitrick pers. comm.).

3.15.3. Cumulative Impact Analysis

The following subsections describe the cumulative effects that the Proposed Action, in combination with the past, present, and reasonably foreseeable future actions identified above, would have on the various environmental resources discussed in this EA.

Land Use and Recreation

Land use in the vicinity of the Proposed Action has incrementally changed due to past and present disturbance from transportation and utility infrastructure construction and maintenance, development of a gas pipeline, residential development, ranching, and agricultural activities. This trend will likely continue, although current land use is not expected to change in the near future. The effects of the past changes have been to introduce dispersed human development and agricultural uses into the area.

The Proposed Action would result in temporary impacts on agricultural lands from disturbance of soils, disturbance of CRP lands, crop lands, and grazing lands, inconvenience to farmers, and some minor permanent impacts associated with conversion of farmlands to new road construction and removal of trees that serve as a wind break. The addition of the low impacts of the Proposed Action on land use and recreation when added to the impacts from other activities in the area as the impacts from past projects would result in a low cumulative impact on land use and recreation.

Transportation

The construction of some of the reasonably foreseeable future actions described above could occur during the same timeframe as the construction of the Proposed Action. Implementation of these projects would involve work crews traveling to and from work sites, and material and equipment deliveries. This would result in temporary increases in local traffic and could result in periodic delays and temporary road/lane closures in the same general vicinity as the Proposed Action. The Proposed Action would result in low, temporary impacts on transportation from increased traffic generated by construction workers and temporary land closures. The addition of the low impacts of the Proposed Action added to the impacts from other activities in the area as well as the impacts from past projects would result in a low cumulative impact on transportation.

Socioeconomics and Environmental Justice and Public Services

Past and present population growth, residential development, utility, energy, and transportation infrastructure development, operation, and maintenance, ranching, agricultural activities, and public service operations have occurred in the vicinity of the Proposed Action. Growth and development trends are expected to continue, but would not change much in the near future. The areas that the transmission line traverses are mostly rural in nature and are likely to remain the same.

Indian inhabitants in this area were displaced and have not had access to traditional resource gathering, fishing, and hunting areas. Although some efforts are being made to enable tribal use of public lands, lack of access to traditional use areas is likely to affect Indian populations into the future, limiting their ability to carry out traditional activities in their traditional use areas.

Some reasonably foreseeable future actions would contribute to the temporary socioeconomic well-being of Benton and Yakima counties, but are not expected to induce substantial regional growth or place unusual demands on suppliers of goods and services. Proposed projects are anticipated to include construction-related impacts that may temporarily affect population and housing, employment, income, and property, but are unlikely to cause disproportionate adverse effects on the region’s environmental justice populations. However, because of the temporary and localized nature of these activities and low impact on existing socioeconomics and public services within the study area, the incremental contribution of the Proposed Action along with the reasonably foreseeable future actions would result in a low cumulative impact on socioeconomics, environmental justice, and public services. Further, the Proposed Action would provide more reliable, electrical power, which would have a cumulative socioeconomic benefit to Yakima and Benton counties through providing more reliable power and meeting increased load.

Noise

Noise levels in the project vicinity are cumulatively affected by the existing transmission lines, existing traffic, existing residential uses, agricultural activities, and any infrastructure maintenance projects carried out by local, state, and federal governments and private companies. After being rebuilt, the level of audible noise from operation of both transmission lines is expected to decrease and as such would not contribute to an increase in the long-term cumulative noise impacts. The Proposed Action in combination with any nearby and concurrent activities could result in cumulatively increased noise levels in the short term during project construction. However, because construction noise impacts would be temporary and localized, they would not contribute to long-term cumulative noise impacts in the project vicinity and temporary cumulative noise impacts would be low.

Public Health and Safety

EMF levels in the project vicinity are cumulatively affected by the operation of transmission lines. The rebuilt transmission lines would have similar electric field levels to those of the existing line. In areas where the wood-pole height is increased, ground-level EMF would decrease slightly within the rights-of-way and no changes are expected beyond the edge of the rights-of-way. Along the Midway-Grandview transmission line, rebuilding the transmission line would result in an increase in magnetic field levels. Because EMF levels would be within national and international guidelines and BPA design standards, the impacts of the Proposed Action when combined with other actions would result in low cumulative impacts on public health and safety.

Geology and Soils

The primary past and present activities that have affected soils in the vicinity of the Proposed Action include construction and maintenance of utility, pipeline, and transportation infrastructure; residential development; ranching; agricultural activities; and wildfires. These actions have led to soil erosion, compaction, loss of productivity, and loss of soil by overlying roads and structures. Reasonably foreseeable future activities including infrastructure maintenance with periodic replacement, and ongoing ranching and agricultural activities are expected to continue at similar intensities as in recent years, with similar levels of soil impacts. This trend will likely continue, although current land use is not expected to change much in the near future and no reasonably foreseeable road projects have been identified.

The Proposed Action would result in no impacts on geological resources and low to moderate impacts on soils on a limited acreage compared to the overall area. Low to moderate temporary impacts and low permanent impacts on soils would result from construction disturbance resulting in topsoil removal, increased erosion, compaction of soils, and decreased soil productivity. Limited permanent disturbance of soils for access road work would result in low to moderate temporary impacts and a low long-term impact on soils. The addition of potential impacts of the Proposed Action, when added to the impacts from other past, present and reasonably foreseeable future activities, would result in low to moderate cumulative impacts on soils.

Vegetation

The primary past and present disturbance of vegetation in the study area occurred through activities such as agricultural development, irrigation system construction, grazing, residential development, road construction, utility infrastructure construction, and wildfires. These actions have contributed to the conversion of historic shrub-steppe and perennial grassland plant communities to irrigated agricultural croplands, non-native annual grasslands dominated by cheatgrass, and disturbed areas dominated by non-native species. Past and present activities have resulted in the introduction and spread of noxious weeds in the area. The spread of noxious weeds will likely continue as a result of ongoing and reasonably foreseeable actions.

Some of the reasonably foreseeable future actions identified above could cause permanent or temporary impacts on native plant communities and special-status species. While most of these actions would not result in the same level of impact as past actions, incremental disturbance of remaining moderate and high-quality native habitats and special-status species could continue to occur. Because some of these activities would be coupled with mitigation and restoration efforts, these impacts would likely be temporary. Nonetheless, it would take some time to re-establish the functions and values (e.g., wildlife habitat, soil stabilization) provided by those communities if they are affected.

The amount of vegetation that would be affected by the Proposed Action is small compared to the area affected by agricultural activities, livestock grazing, wildfire, and vegetation control along roads and other utility corridors. There would be some unavoidable impacts on two special-status plant species. In combination with the mitigation measures, the Proposed Action would have a low to moderate impact in regard to loss to vegetation communities.

Construction activities associated with the Proposed Action could contribute to cumulative noxious weed impacts because linear corridors can act as a path for the movement of weed species and because of the difficulty of controlling many weed species. The potential contribution of the Proposed Action would, however, be minimized by project-related mitigation measures designed to minimize the spread of new noxious weed infestations and colonization in the area. The incremental impacts of the Proposed Action along with other past, present and reasonably foreseeable future actions would result in low to moderate cumulative impacts on vegetation.

Wildlife

Past and present development and other activities have had an adverse impact on wildlife species and their habitat in the project vicinity. The clearing and conversion of land for home sites, communities, transportation, energy, and utility infrastructure, and other uses have resulted in the loss of wildlife habitat. Grazing modified the native habitats and agricultural operations resulted in disturbed grasslands and cropland dominating the area. Existing roads in the project vicinity have led to increased disturbance from human activity, increased landscape fragmentation and the presence of wildlife travel barriers, lost habitat, and the introduction and spread of noxious weeds. This habitat loss and modification has resulted in the displacement of wildlife species. Wildlife species also have been directly affected by hunting and trapping activities, as well as incidental harm and killing from other human activities in the area.

Reasonably foreseeable future actions involving development would be expected to incrementally add to these impacts. Existing electric transmission infrastructure is a notable presence in the vicinity of the Proposed Action. Ongoing vegetation management along existing utility rights-of-way in the vicinity of the Proposed Action and continued agricultural, livestock grazing, and residential development activities would result in continued disturbance of vegetation communities through vegetation clearing, soil disturbance and compaction, and introduction of non-native invasive plant species. Some of the reasonably foreseeable future actions identified above would have similar effects.

The Proposed Action would contribute to impacts on wildlife and wildlife habitat through temporary disturbance during construction and permanent removal of small areas of wildlife habitat through construction of new transmission line structures and access roads. The implementation of the mitigation measures described in Section 3.9, Wildlife, of this EA would reduce impacts on wildlife and wildlife habitat. The incremental contribution of the Proposed Action along with other past, present and reasonably foreseeable future actions would result in low to moderate cumulative impacts on wildlife.

Waterways and Water Quality

Past, present, and future actions in the project vicinity that have and would continue to cumulatively affect water resources and water quality include utility, pipeline, and transportation infrastructure construction and maintenance, agriculture, irrigation system construction and maintenance, ranching, and residential development. These activities have resulted in the alteration of natural surface drainage patterns, channelization of streams and drainages, erosion of streambeds, banks, and adjacent land, withdrawal of groundwater from both shallow and deep aquifers, and the contamination of both surface and groundwater with nitrates and other agricultural pollutants.

Although the Proposed Action could increase the potential for erosion and overland transport of suspended sediments to surface waters, such impacts would be temporary and localized. Some fill could be deposited in waterways that are mainly ephemeral during culvert and ford installation. No impacts are expected on groundwater resources.

Therefore, the incremental contribution of the Proposed Action, when combined with the impacts of other past, present and reasonably foreseeable future actions, would result in low cumulative impacts on water resources and water quality.

Wetlands and Floodplains

Wetlands in the vicinity of the Proposed Action have been and would continue to be impacted by past, present, and future activities. In the past, wetlands were degraded or filled to facilitate agricultural development, by grazing of livestock in wetlands, and road and by utility infrastructure construction. Sources of wetland hydrology were and continue to be altered by the modification of natural drainage patterns and diversion of surface waters for irrigation and stock watering, and by the large-scale withdrawal of groundwater for irrigation. Wetland vegetation has and would continue to be degraded by the introduction and spread of non-native and invasive plants.

The Proposed Action could result in the placement of small amounts of fill material into two wetlands for the construction and repair of access roads and fords. Activities adjacent to wetlands could result in the increased potential for sediment to be deposited into wetlands and for the introduction of noxious weeds. Because of the temporary and localized nature of the project activities, the relatively low amount of impact on existing wetlands, and implementation of the mitigation measures, the contribution of the Proposed Action when combined with the impacts of other past, present and reasonably foreseeable future actions would result in low cumulative impacts on wetlands.

The same kind of past, present, and future activities in the vicinity of the Proposed Action have cumulatively affected 100-year floodplains. These activities have resulted in the placement of fill material, development activities, and the removal of floodplain vegetation in floodplains, reducing the floodwater storage capacity and altering flow patterns in the flood zone. These conditions have resulted in increased erosion and sedimentation in downstream waters.

The Proposed Action is expected to result in minor changes in quality and function of the mapped 100-year floodplains. Proposed project activities would require minor surface disturbance and vegetation removal in two 100-year floodplains. Although such activities could make these areas more susceptible to the spread and establishment of noxious weeds, the implementation of mitigation measures outlined in Section 3.11, Wetlands and Floodplains, of this EA would reduce these impacts. Because of the temporary and localized nature of the project activities in two floodplains, the relatively low amount of impact on existing floodplains, and implementation of the mitigation measures, the contribution of the Proposed Action, when combined with the impacts from other past, present and reasonably foreseeable future actions, would result in low cumulative impacts on floodplains.

Visual Quality

Visual resources in the project vicinity have incrementally changed due to past and present development. This trend is expected to continue although current views within the study area are not expected to change much in the near future. This development has increased the presence of human-made elements (e.g., buildings, roads, utilities, and agriculture, including orchards, vineyards, and hop fields) in the visual landscape, although much of the area maintains elements of its original visual quality. The decline of shrub-steppe, which has a distinctive visual quality, has changed the visual character of the landscape. Reasonably foreseeable future actions could contribute to changes in the visual environment, primarily through temporary construction disturbance.

Most visual impacts from the Proposed Action would be temporary and localized, except for some permanent but minor changes to views that would result from increased structure height, the addition of nine new structures, and the increased diameter of the proposed conductor. However, some residential viewers near the rights-of-way would have direct views of construction activities, and there are scattered residences where the transmission lines constitute more prominent visual features. Because of the limited nature of these visual changes, the incremental contribution of the Proposed Action, when combined with the impacts of other past, present and reasonably foreseeable future actions, would result in low to moderate cumulative impacts on visual resources.

Cultural Resources

Past and present development and other activities have had negative impacts on cultural resources in the project vicinity. Some impacts on cultural resources are likely to have occurred as a result of inadvertent disturbance or destruction during ground-disturbing activities including construction and maintenance of utility, pipeline, and transportation infrastructure; residential development; ranching; and agricultural activities. The extent of looting and vandalism to cultural resources in the project vicinity is not known. These impacts include disturbance of cultural sites, reduction of the cultural integrity of certain sites, and removal of cultural artifacts.

Indian inhabitants in this area were displaced and have not had access to traditional cultural resources, which includes resource gathering, fishing, and hunting areas. Although some efforts are being made to allow tribal use of public lands, lack of access to traditional use areas is likely to affect Indian populations into the future, limiting their ability to carry out traditional activities in their traditional use areas.

Implementation of the mitigation measures included in Section 3.13, Cultural Resources, of this EA would minimize impacts and would reduce the potential for the Proposed Action to impact cultural resources. In the event that previously undiscovered cultural resources were encountered during construction or operation, potential impacts would depend on the level and amount of disturbance and whether the affected resource is eligible for listing in the NRHP. Because of the mitigation measures identified in Section 3.13, Cultural Resources, of this EA, the incremental contribution of the Proposed Action, when combined with the impacts of other past, present, and reasonably foreseeable future actions, would result in low cumulative impacts on cultural resources.

Air Quality and Greenhouse Gases

Sources of air pollutants that have and would continue to emit pollutants in the area include construction, use and maintenance of transportation infrastructure; utility infrastructure construction, maintenance, and operation; and ranching and agricultural activities.

The Proposed Action is located in an attainment area for the NAAQS. When considering criteria pollutant emissions from all other past, present, and reasonably foreseeable future actions, the minor incremental increase in emissions associated with the Proposed Action are not anticipated to cause a violation of the NAAQS. Project dust generation would be in addition to other sources of dust throughout the study area, including soil disturbance from other transmission line projects. With appropriate mitigation measures to control dust during project implementation, the increase in dust levels would result in overall low cumulative contributions to relative dust levels in the study area. Because of the low impact on air quality, the incremental contribution of the Proposed Action, when combined with the impacts of other past, present, and reasonably foreseeable future actions, would result in low cumulative impacts on air quality.

There has likely been an effect on GHG contributions from past and current activities in the vicinity of the Proposed Action including construction, use and maintenance of transportation infrastructure; utility infrastructure construction, maintenance, and operation; and ranching and agricultural activities. As described in Section 3.14, Air Quality and Greenhouse Gases, of this EA, the impacts of the Proposed Action on GHG concentrations would be low. Impacts would be further reduced through implementation of the mitigation measures identified in Sections 3.14, Air Quality and Greenhouse Gases, of this EA.

All levels of GHG emissions are significant in that they contribute to global GHG concentrations and climate change. Because of the low amount of emissions of GHGs, the incremental contribution of the Proposed Action to cumulative impacts on global GHG concentrations would be low.

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Chapter 4
Environmental Consultation, Review, and Permit Requirements

This chapter addresses statutes, implementing regulations, and executive orders applicable to the Proposed Action. BPA will send this draft EA to federal and state agencies, tribes, and state and local governments as part of the consultation process for the Proposed Action. Persons, tribes, agencies, and governmental entities consulted, contacted, or notified are listed in Chapter 5, Persons, Tribes, and Agencies Receiving the Environmental Assessment, of this EA.

4.1. NATIONAL ENVIRONMENTAL POLICY ACT

This EA was prepared pursuant to regulations implementing NEPA (42 U.S.C. 4321 *et seq*.), which requires 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 prepared this draft EA to determine if the Proposed Action would create any significant environmental impacts that would warrant preparing an EIS, or if a FONSI is justified.

4.2. FISH, WILDLIFE, AND VEGETATION

4.2.1. Endangered Species Act

The ESA of 1973 (16 U.S.C. 1531 *et seq.*), as amended in 1988, 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 USFWS for wildlife and freshwater species, and by the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries), also known as the National Marine Fisheries Service (NMFS), for anadromous fish and marine species.

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 any endangered or threatened species or result in the destruction or adverse modification of critical habitat. Section 7(c) of the ESA and other federal regulations require that federal agencies prepare a biological assessment (BA) addressing the potential effects of their actions on listed or proposed endangered species and designated critical habitat. Because there are no fish-bearing streams in the project area and no habitat for listed fish species, BPA is not consulting with NOAA Fisheries on this project. Therefore, BPA is only consulting with USFWS on listed and proposed species and designated critical habitat that could be affected by the Proposed Action.

BPA used the following resources to determine which ESA-listed species, species proposed for listing, and designated critical habitat occur in the study area as defined in Section 3.9, Wildlife, of this EA:

- USFWS lists of fish, wildlife, and plant species in the project area that are protected under the ESA and designated critical habitat (U.S. Fish and Wildlife Service 2014a, 2014b, 2015)
- WDFW database records of PHS in the study area (Washington Department of Fish and Wildlife 2014)
- Washington Natural Heritage Program GIS dataset of rare plant and wildlife species and ecosystems of special concern (Washington Natural Heritage Program 2014)

U.S. Fish and Wildlife Service Consultation

ESA-listed animal species on the USFWS list for the project include the bull trout, Canada lynx, gray wolf, grizzly bear, Columbia Basin DPS pygmy rabbit, marbled murrelet, northern spotted owl, and yellow-billed cuckoo (U.S. Fish and Wildlife Service 2015). All the listed species are threatened except for the pygmy rabbit and gray wolf, which are endangered. Species proposed for listing on the USFWS project list include the fisher and the Western DPS of the gray wolf. The USFWS list included designated critical habitat for bull trout, northern spotted owl, and marbled murrelet. One candidate wildlife species, the Columbia Basin DPS greater sage-grouse, has the potential to occur in the project area.

ESA-listed plant species on the USFWS list for the project include two threatened species: Ute ladies'-tresses and Umtanum desert buckwheat. There is designated critical habitat for Umtanum desert buckwheat in Benton County. Candidate plant species include northern wormwood (*Artemisia campestris* var. *wormskioldii*) and whitebark pine (*Pinus albicaulis*).

BPA entered into pre-consultation with USFWS concerning potential impacts on ESA-listed species from the Proposed Action. On April 25, 2013, a site visit was conducted on the DOE Hanford Site with staff from BPA, USFWS, DOE-RL, and WDNR. USFWS staff members were provided the draft vegetation survey plan and ground and aerial wildlife survey plans for review and comment in March 2013. They were provided the opportunity to comment on the two drafts of the wildlife and vegetation survey reports.

BPA is coordinating with federal and state land managers whose lands are affected by the Proposed Action as part of its ESA Section 7 consultation with USFWS. BPA has existing right-of-way agreements on the DOE Hanford Site and BLM-administered lands and would acquire access road easements across BLM-administered lands, Bureau of Reclamation lands, and WDNR lands.

BPA prepared a BA for USFWS that addresses effects of the Proposed Action on ESA-listed and proposed species that may occur in the project area. BPA included ESA-listed species in the BA that are known to occur in the project area or if there is a possibility they could occur, due to the presence of potential habitat for a species. Umtanum desert buckwheat is the only ESA-listed species that is known to occur in the project area.

BPA made a No Effect determination for all ESA-listed and proposed species. The No Effect determination, based on a lack of potential habitat in the project area, was made for the following species: bull trout, Canada lynx, gray wolf, grizzly bear, pygmy rabbit, marbled murrelet, northern spotted owl, yellow-billed cuckoo, fisher, and Ute ladies'-tresses. There would be No Effect on Umtanum desert buckwheat individuals because they are far enough from construction work areas that direct and indirect effects would be avoided with the implementation of mitigation measures, as agreed upon with USFWS.

Potential habitat for greater sage-grouse, a candidate species, occurs in the project area, and this species is included in the BA. In the event greater sage-grouse is listed under the ESA before or during implementation of the project, consultation would occur prior to the potential for any effects on this species from the Proposed Action. The potential effects on greater sage-grouse are discussed in Section 3.9, Wildlife, of this EA.

In the BA, BPA addressed potential effects on designated critical habitat in the project area. Designated critical habitat for Umtanum desert buckwheat is the only designated critical habitat in the project area.

BPA submitted the draft BA to BLM, USFWS, DOE-RL, WDFW, and WDNR for review and comment in March 2015 as part of the pre-consultation process. Only USFWS had comments, which were addressed in the final BA. BPA submitted the draft BA to the four consulting tribes for review and comment in May 2015 as part of the pre-consultation process. No tribal comments were received.

In June 2015, BPA submitted the final BA to USFWS and entered into informal consultation. BPA requested concurrence with the determination that the Proposed Action would not destroy or adversely modify the designated critical habitat of Umtanum desert buckwheat. The potential effects on Umtanum desert buckwheat designated critical habitat are discussed in Section 3.8, Vegetation, of this EA.

4.2.2. 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. 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. The analysis in Section 3.9, Wildlife, of this EA indicates that the Proposed Action would have impacts on wildlife, which would be minimized with the implementation of appropriate mitigation. Because there are no fish-bearing streams in the project area, there are no expected impacts on fish species.

Both WDFW and USFWS provided scoping comments on the Proposed Action. BPA considered the comments while planning surveys to identify wildlife, while assessing impacts, and proposing appropriate mitigation.

BPA coordinated with a WDFW biologist concerning project activities with the potential to affect wildlife. BPA conferred with WDFW and USFWS via email and telephone regarding wildlife species and habitat in the study area and discussed the types of field surveys that would be needed in the study area. BPA provided both WDFW and USFWS the opportunity to review aerial and ground wildlife survey plans. Both WDFW and USFWS provided comments on the wildlife study plan. BPA sent the draft Midway-Moxee wildlife survey report to BLM, USFWS, WDNR, and WDFW in December 2013 for review and comment. BPA sent the draft Midway-Grandview wildlife survey report to BLM, USFWS, WDNR, and WDFW in January 2014 for review and comment. After addressing comments and conducting some additional surveys in 2014, the final report was distributed to BLM, USFWS, WDNR, and WDFW in December 2014.

Mitigation measures designed to conserve wildlife and their habitats are listed in Section 3.8, Vegetation; Section 3.9, Wildlife; Section 3.10, Waterways and Water Quality; and Section 3.11, Wetlands and Floodplains, of this EA. BPA consulted with USFWS regarding the potential effects on ESA-listed species, designated critical habitat, and candidate species with the potential to occur in the project area (see Section 4.2.1, Endangered Species Act, above). BPA coordinated with USFWS and WDFW on potential effects on migratory birds (see Section 4.2.5, Responsibilities of Federal Agencies to Protect Migratory Birds, and Section 4.2.6, Bald and Golden Eagle Protection Act, below).

4.2.3. Magnuson-Stevens Fishery Conservation and Management Act

NOAA Fisheries is responsible for ensuring compliance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (Magnuson-Stevens Act [16 U.S.C. § 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). NOAA Fisheries is required to respond and provide EFH conservation and enhancement recommendations.

The Upper Columbia River and Lower Yakima River are designated as EFH for Chinook salmon and Coho salmon; however, the Proposed Action is located outside the riparian zone of both rivers. The Midway Substation, which is approximately 3,500 feet (0.7 mile) from the Upper Columbia River, would be the project’s closest point to the Upper Columbia River. The Moxee Substation, which is approximately 3.5 miles from the Lower Yakima River, would be the project’s closest point to the Lower Yakima River. Project work areas are far enough from designated EFH that the implementation of BMPs and mitigation measures would avoid erosion, sedimentation, and an increase in turbidity in fish-bearing waters. As such, BPA determined that the Proposed Action does not have the potential to adversely affect EFH.

4.2.4. Migratory Bird Treaty Act and Federal Memorandum of Understanding

The Migratory Bird Treaty Act implements various treaties and conventions between the U.S. 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 non-native birds such as pheasant, chukar, gray partridge (*Perdix perdix*), house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), 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 of Federal Agencies to Protect Migratory Birds), discussed below (U.S. Department of Energy and U.S. Fish and Wildlife Service 2013). BPA follows this MOU to minimize potential impacts on migratory birds. The Proposed Action may affect migratory birds through a minimal loss of habitat and the potential for collisions with the transmission line. Potential impacts and mitigation to minimize impacts on migratory birds are discussed in Section 3.9, Wildlife, of this EA.

4.2.5. Responsibilities of Federal Agencies to Protect Migratory Birds

Executive Order 13186 directs federal agencies whose actions may negatively affect migratory bird populations to work with USFWS to develop an agreement to conserve migratory birds. As described above, DOE and USFWS have an MOU to address migratory bird conservation in accordance with this executive order (U.S. Department of Energy and U.S. Fish and Wildlife Service 2013). The MOU addresses how both agencies can work cooperatively to address migratory bird conservation and includes specific measures to consider applying during project planning and implementation.

Field studies were conducted to determine the avian species and bird habitats present in the study area. Aerial surveys for raptor species and greater sage-grouse were conducted within 1 mile of the Midway-Moxee transmission line in spring 2013 and aerial surveys for raptor species were conducted within 1 mile of the Midway-Grandview transmission line in spring 2014. At the request of WDFW, the aerial survey area was expanded to 2 miles of the Midway-Grandview transmission line along two creeks that cross this line and that are known raptor nesting habitat. This information was used to assess the potential impacts on migratory birds from the Proposed Action (see Section 3.9, Wildlife, of this EA).

Because resident birds may already be accustomed to avoiding the existing transmission lines, the change in conductor position may not increase the risk of avian collision. The new conductor would be larger diameter than the existing conductor and would be more visible to birds, which may help them avoid collisions.

Because Midway-Moxee and Midway-Grandview are both 115-kV transmission lines, the conductors would be spaced far enough apart to prevent electrocution of raptors. BPA plans to construct as much as the project as possible during the fall, winter, and early spring, outside of the typical nesting period for migratory birds.

The Proposed Action would result in a similar level of impacts on migratory birds as it would on other birds and wildlife, as described in Section 3.9, Wildlife, of this EA. Potential impacts on migratory birds would be reduced by implementation of mitigation measures, which are also identified in Section 3.9 of this EA.

4.2.6. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668–668d) prohibits the taking or possessing of and commerce in bald and golden eagles, with limited exceptions. The Act only covers intentional acts or acts in “wanton disregard” of the safety of bald or golden eagles. Washington Natural Heritage Program data do not identify any known bald and golden eagle nests within 1 mile of the Midway-Moxee or Midway-Grandview transmission lines. No occupied bald or golden eagle nests were observed during aerial avian surveys in spring 2013 and spring 2014, within 1 mile of the project area. Because the Proposed Action would not involve knowing take or other acts of wanton disregard of bald or golden eagles, implementation of the Proposed Action would not violate the Bald and Golden Eagle Protection Act.

4.3. FLOODPLAINS, WETLANDS, WATERWAYS, AND WATER QUALITY

As part of the NEPA review, DOE NEPA regulations require that impacts on floodplains and wetlands be assessed and that 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). An evaluation of impacts of the Proposed Action on floodplains and wetlands is discussed below and in more detail in Section 3.11, Wetlands and Floodplains, of this EA.

During the design phase, efforts were made to avoid and minimize impacts on floodplains, wetlands, and waterways. The Midway-Grandview transmission line crosses two mapped 100-year floodplains: one along Dry Creek in Benton County and the Kittitas Canyon Floodplain in Yakima County. As described in Section 3.11, Wetlands and Floodplains, of this EA, the Proposed Action has the potential to result in direct and indirect impacts on floodplains from construction disturbance associated with structure removal and installation and access road work. These impacts could alter floodplain functions and result in the spread of noxious weeds in disturbed areas. However, the Proposed Action would not alter floodplain capacity because only a small amount of rock and gravel would be added to the floodplains during work on existing access roads. Because impacts would be temporary, localized, and would only minimally alter floodplain functions, they would be considered a low impact.

Wetlands delineations conducted in May and June of 2013 identified three wetlands in potential work areas. One wetland is located in the Midway-Moxee right-of-way, and two wetlands are located in the Midway-Grandview right-of-way. Efforts were made to avoid or minimize impacts on each wetland area. Access road work and pulling and tensioning activity would result in temporary damage to wetland vegetation, compaction of wetland soils by construction machinery, and the placement of permanent fill material (e.g., soil, rock). Placement of permanent fill could also reduce the acreage of wetlands in the study area. The amount of permanent wetland impacts associated with the Proposed Action in all wetlands would be less than 0.02 acre. Because of the small area impacted, direct impacts on wetlands would be low. See Section 3.11, Wetlands and Floodplains, for a description of wetlands, potential impacts of the Proposed Action on wetlands, and mitigation to avoid or minimize impacts.

Wetland and waterway management, regulation, and protection are addressed in several sections of the Clean Water Act (CWA) (33 U.S.C. 1251 *et seq.*), including Sections 401, 402, and 404. The sections applicable to the Proposed Action are discussed below.

> **Section 401** – A federal permit to conduct an activity that causes discharges into navigable waters is issued only after the affected state certifies that existing water quality standards would not be violated if the permit were issued. Washington’s current turbidity standard (WAC 173-201A-200 (1)(e)) requires that turbidity not increase more than a certain percentage from background levels as measured at an upstream control point. If a

Section 402 or 404 permit is needed, Ecology would review the Proposed Action's permit application for compliance (Section 3.10, Waterways and Water Quality, of this EA).

Section 402 **–** This section authorizes discharges of pollutants, including stormwater, under the National Pollutant Discharge Elimination System (NPDES) permitting program. Region 10 of the EPA has a general permit for discharges from construction activities. BPA would prepare a Stormwater Pollution Prevention Plan to address stabilization practices, structural practices, stormwater management, and other controls (Section 3.10, Waterways and Water Quality, of this EA).

Section 404 **–** Authorization from the USACE is required, in accordance with the provisions of Section 404 of the CWA, when dredged or fill material is discharged into waters of the United States, including wetlands and non-wetland waters (e.g., streams, rivers, lakes). The Proposed Action would result in no temporary fill and less than 0.009 acre of permanent fill in wetlands from structure installation, culvert installation, and road reconstruction. BPA would work with USACE to obtain any necessary permits for work in wetlands, including permits under Section 404 for unavoidable wetland and waterway impacts. Potential wetland impacts are described in Section 3.11, Wetlands and Floodplains, of this EA and potential impacts on waterways are described in Section 3.10, Waterways and Water Quality, of this EA.

If any wetland and floodplain impacts would be unavoidable, BPA would send notice of proposed wetland and floodplain impacts to appropriate government agencies, including the USACE, Federal Emergency Management Agency (FEMA) regional office, Ecology, tribes, and local governments.

4.4. FEDERAL, STATE, AREAWIDE, AND LOCAL PLAN AND PROGRAM CONSISTENCY

4.4.1. DOE Hanford Site

The Midway Substation and approximately the first 2 miles of both transmission lines are located within the DOE Hanford Site and the Rattlesnake Unit of the Hanford Reach National Monument. A total of 30 transmission line structures and associated access roads are on the DOE Hanford Site.

The *Hanford Comprehensive Land-Use Plan* provides guidance for future use of the site's lands and resources (U.S. Department of Energy 1999, 2008). Lands within the study area are designated Preservation, as is most of the DOE Hanford Site. Lands under this designation are managed to protect archaeological, cultural, ecological, and natural resources, with public access restricted to nonintrusive research or game-management activities. No new consumptive uses (e.g., mining) are allowed.

The *Hanford Site Biological Resources Management Plan* (U.S. Department of Energy 2013a) is DOE's primary implementation plan for managing natural resources under the *Hanford Comprehensive Land-Use Plan*. It is one of several implementation plans under the framework of the *Hanford Comprehensive Land-Use Plan.* The *Hanford Site Biological Resources*

Management Plan establishes DOE's management objectives, strategies, actions, and general directives for managing biological resources on the DOE Hanford Site. The purpose of the plan is to provide the DOE-RL, Office of River Protection, and Hanford contractors with a consistent approach to protect and manage biological resources on the site. Essential aspects of Hanford biological resource management include resource monitoring, impact assessment, mitigation, and restoration. The 2013 revision of the *Hanford Site Biological Resources Management Plan* includes two implementation documents, the *Ecological Compliance Assessment Management Plan* and the *Hanford Site Biological Resources Mitigation Strategy* (U.S. Department of Energy 2013a). The Proposed Action would be consistent with the *Hanford Site Biological Resources Management Plan* and project environmental review and documents, including the EA and BA, which include identification of resources, impact assessment, mitigation, and restoration of areas impacted by project implementation.

The *Hanford Site Revegetation Manual* (U.S. Department of Energy 2013b) provides consistent direction for revegetation and restoration actions designed and implemented by DOE Hanford Site contractors. The manual describes the overall revegetation strategy for the DOE Hanford Site and provides general specifications for plant and seed selection as well as designing, scheduling, and implementing various revegetation actions. It also provides the background information needed by restoration ecologists to modify these specifications as needed to account for site-specific conditions. The *Hanford Site Revegetation Manual* applies to all actions that occur on the DOE Hanford Site, unless specifically directed otherwise by DOE-RL. It is DOE-RL policy that the project or contractor that creates the disturbance is responsible for planning and performing the revegetation action consistent with the manual. A Revegetation Plan is being created by BPA, in coordination with DOE-RL and USFWS staff, to ensure that post-construction revegetation adequately addresses construction-related disturbance to plant communities and wildlife habitats on preservation lands.

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 (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 (U.S. Fish and Wildlife Service 2008). Rebuilding the transmission lines is consistent with the activities allowed under the *Hanford Reach National Monument Comprehensive Conservation Plan*, and consultation on natural and cultural resources is being conducted, in coordination with DOE-RL staff, to ensure consistency with the Plan.

4.4.2. Bureau of Land Management

Both the Midway-Moxee and the Midway-Grandview transmission lines cross BLM-administered lands. Along the Midway-Moxee transmission line, about 0.8 mile of the right-of-way along Line Miles 6 and 8, including four transmission line structures and associated access roads, are on three parcels of BLM-administered lands. Along the Midway-Grandview transmission line, about 0.8 mile of the right-of-way along Line Miles 12, 13, and 18, including five structures and associated access roads, are on three parcels of BLM-administered lands. About 1 mile of existing access roads outside of the transmission line right-of-way crosses two

BLM parcels: one near Midway-Moxee Line Mile 7 and one near Midway-Grandview Line Mile 14. These existing access roads would need to be improved or reconstructed to allow construction access.

BLM's land use plans are called resource management plans (RMPs). In accordance with the provisions of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1711-1712), RMPs ensure that public lands are managed under the principles of multiple use and sustained yield. The planning decisions contained in an RMP are the basis for every on-the-ground action BLM undertakes.

In 1987 the BLM Spokane District developed and approved the Spokane RMP, a land use plan for eastern Washington (Bureau of Land Management 1987). In 1992, the District prepared a major amendment to that plan (Bureau of Land Management 1992). The Spokane RMP is the approved land use plan applicable to BLM-administered lands in the project area.

In general, the Spokane RMP allows for a variety of uses on BLM-administered lands, including right-of-way grants, provided that those uses can occur within the sustained yield capacity of resources. Use within the sustained yield of the various renewable resources of public lands allows the achievement and maintenance in perpetuity of a high-level of annual or regular periodic output, consistent with multiple use. Consideration is given to resource concerns, such as the protection of cultural and natural resources, including rare plant habitat and wildlife resources. Furthermore, the RMP does not repeal valid, existing rights that are held by other federal agencies, which includes utility rights-of-way.

BLM is in the process of updating these documents and is preparing the *Eastern Washington and San Juan RMP*. BLM published the document *Analysis of the Management Situation for the Eastern Washington and San Juan Resource Management Plan* in March 2011 that summarizes existing conditions, trends, and management guidance for BLM-administered lands. The Midway-Moxee and the Midway-Grandview transmission lines were identified as existing utility corridors in this report (Bureau of Land Management 2011a).

Because the Midway-Moxee and Midway-Grandview transmission lines operate within valid, existing rights-of-way through BLM-administered lands, the Proposed Action would be consistent with BLM's land use plans.

4.4.3. State and Local Consistency

BPA, as a federal agency, is not required to comply with the same requirements as non-federal entities unless Congress has waived its federal sovereign immunity. As a federal agency, BPA only obtains those state and local permits for which Congress has clearly and unambiguously waived sovereign immunity. However, BPA would, to the maximum extent practicable, strive to meet or exceed the substantive standards and policies of the following environmental and land-use regulations to ensure that the Proposed Action would be consistent with the applicable land use plans and policies.

4.4.4. Land Use Planning Framework

The following local land use plans and land classifications guide development in the area affected by the Proposed Action.

Benton County Comprehensive Plan

The Benton County Comprehensive Plan was adopted in 1985 and updated in 2007. Goal 54 of the plan includes, "Facilitate maintenance and rehabilitation of existing utility systems" (Benton County 2006). Both the Midway-Moxee and Midway-Grandview transmission lines are identified in the *Benton County Comprehensive Plan* as existing utility corridors. Land crossed by these transmission lines in Benton County falls under one of the following zoning designations (Benton County 2012):

- **Growth Management Act Agriculture District.** These are lands identified in the official Zoning Map of Benton County and in the *Benton County Comprehensive Plan* as having critical agricultural resources (soils, climate, and water) where commercial agricultural activities are most appropriately conducted on large parcels of land with significant separation between uses that conflict with agricultural practices. Utility distribution facilities are identified as an allowable use in this zoning designation.
- **Unclassified.** Allows for a number of uses consistent with heavy industrial, energy-related, environmental clean-up, and research and development. This classification is found predominantly in the DOE Hanford Site within Benton County.

The Proposed Action would use the existing transmission line corridor already identified in the *Benton County Comprehensive Plan* and allowed within the current zoning designations. As such, the Proposed Action is consistent with the land use plans of Benton County.

Yakima County Comprehensive Plan

The *Yakima County Comprehensive Plan* was adopted in 1997 and was last updated in 2007 (Yakima County 2007). The plan notes that existing electrical facilities within the county do not place restrictions on normal residential, commercial, or industrial growth, and the major institutions and industries of the county can readily be accommodated. The plan also includes goals and policies indicating that necessary and adequate utilities are provided to the county (Goal UT-1), reasonable environmental protections are implemented while providing utilities (Goal UT-2), and upgraded transmission lines should evaluate the use of existing corridors (Policy UT-17.2) (Yakima County 2007).

Land crossed by the transmission line routing alternatives in Yakima County falls under one of the following zoning designations (Yakima County 2010, Yakima County GIS 2014):

- **Agriculture.** The purpose of this district is to preserve and maintain areas for the continued practice of agriculture and to permit only those new uses that are compatible with agricultural activities.
- **Remote/Extremely Limited.** The purpose of this district is to implement comprehensive plan goals and policies directed toward protecting the environment and retention of open spaces at a level consistent with the carrying capacity of the land and cost-effective service availability.
- **Valley Rural.** The purpose of this district is to protect and maintain the openness and rural character of outlying areas of the County in the lower Wenas and the valley floors of the lower Ahtanum, Naches, and Yakima Valleys.

- **Planned Development.** These are areas of planned residential, commercial, industrial or mixed-use development.

The Yakima County Zoning Ordinance notes that all land uses legally established prior to the effective date of the ordinance in 1974 shall be considered existing uses of the zoning district in which they are located (Yakima County 2010). The Proposed Action would use the existing transmission line corridor and is an existing use of the zoning districts in which it is located. The Proposed Action would also support goals and policies identified in the *Yakima County Comprehensive Plan* noted above. As such the Proposed Action would be consistent with the land use plans of Yakima County.

Potential impacts on land use from the Proposed Action and mitigation to minimize these impacts are discussed in Section 3.2, Land Use and Recreation, of this EA.

4.5. CULTURAL AND HISTORICAL RESOURCES

Preserving cultural resources allows Americans to have an understanding and appreciation of their origins and history. 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. Cultural resources include National Landmarks, archeological sites, properties of traditional religious and cultural importance to a Native American Tribe (also known as traditional cultural properties or TCPs), and other properties listed (or eligible for listing) in the NRHP. American Indian Tribes have rights under specific laws, as well as the opportunity to voice concerns about issues under these laws when resources with religious and cultural significance to tribes could be impacted by a proposed project.

Cultural resource laws, regulations, and other directives include:

- Antiquities Act of 1906 (16 U.S.C. 431–433)
- Historic Sites Act of 1935 (16 U.S.C. 461–467)
- Section 106 of NHPA (54 U.S.C. 300101 *et seq*.), as amended
- Archaeological Data Preservation Act of 1974 (16 U.S.C. 469 a–c)
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470 aa-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 requires agencies to consult with states, interested and affected tribes, and other parties on various aspects of the process; identify and evaluate historic properties; and assess impacts on historic properties along with participation from interested and affected parties, including tribes, and then avoid, minimize, and 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 religious and cultural significance to tribes.

Pursuant to Section 106 of the NHPA, BPA is consulting with the Washington SHPO, DOE-RL staff, BLM, WDNR, and four Native American tribes with an interest in this area including the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes and Bands of the Yakama Nation, Nez Perce Tribe of Idaho, and the Wanapum Band.

In keeping with its obligations to identify cultural resources within the study area, BPA commissioned a cultural resources inventory survey of the cultural resources study area. BPA is in the process of commissioning an additional cultural resources survey that is intended to establish the NRHP eligibility status of cultural resources that could be affected by the Proposed Action. BPA will evaluate these cultural resources for NRHP eligibility in consultation with the Washington SHPO, tribes, and other consulting parties.

Both the Wanapum Band and the Yakama Nation have completed TCP studies and have identified several TCPs that overlap or are in close proximity to the project area. BPA will evaluate these TCPs for NRHP eligibility in consultation with the Washington SHPO and the tribes.

If it is determined through consultation that the Midway-Moxee and Midway-Grandview transmission lines are eligible for listing in the NRHP as contributing elements of the BPA Transmission Network, it is not anticipated that the Proposed Action would adversely affect the characteristics that would make either line NRHP-eligible. Proposed changes in the design of both lines would be relatively minor and consistent with changes permitted under the multiple property documentation description of BPA's historic power system.

If any known historic properties cannot be avoided during construction, impacts on these cultural resources during construction could potentially affect the integrity of these sites. Currently, project construction is anticipated to impact several archaeological sites that may be eligible for listing on the NRHP. During construction, each site would be avoided to the greatest extent possible. If eligible archaeological sites cannot be avoided, then BPA would work with consulting parties to determine appropriate mitigation to address effects under the NHPA.

Impacts on cultural resources would depend on the amount and type of disturbance, the eligibility of the resource, and the type of mitigation. The potential impacts of the Proposed Action on cultural resources and mitigation to minimize these impacts are discussed in Section 3.13, Cultural Resources, of this EA.

4.6. AIR QUALITY

The Clean Air Act, as revised in 1990 (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 Washington, EPA has delegated authority to Ecology. Because the Proposed Action would occur in an area that is currently in attainment for meeting the NAAQS and because no stationary sources of air emissions would occur, construction activities associated with the Proposed Action are exempted from state regulation. The potential effects of the Proposed Action on air quality and mitigation to minimize these impacts are discussed in Section 3.14, Air Quality and Greenhouse Gases, of this EA.

4.7. GREENHOUSE GAS EMISSIONS

GHGs absorb radiation and prevent heat loss to space. Models predict that atmospheric concentrations of all GHGs will increase over the next century, but 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 the following:

- The Clean Air Act 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 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 of GHGs are required to submit annual reports to EPA (U.S. Environmental Protection Agency 2010).
- Executive Orders 13423 and 13514 require federal agencies to measure, manage, and reduce GHG emissions by agency-defined target amounts and dates.
- In Washington, 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.

GHG emissions were calculated for proposed project activities that would produce GHG emissions: transportation-related direct emissions resulting from construction activities, ongoing operations and maintenance activities for the estimated 50-year operational life of the transmission line, and permanent vegetation removal for new roads and installation of nine additional structures. GHG emissions would be below EPA's mandatory reporting threshold. The impact of the Proposed Action on GHG concentrations would be low, as discussed in Section 3.14, Air Quality and Greenhouse Gases, of this EA.

4.8. HAZARDOUS MATERIALS

The application of several regulations that pertain to the management and use of hazardous materials related to the Proposed Action are summarized below.

4.8.1. The Spill Prevention Control and Countermeasures Rule

The Spill Prevention Control and Countermeasures Rule is intended to prevent discharges of oil and oil-related materials from reaching navigable waters and adjoining shorelines. It applies to facilities with total aboveground oil storage capacity (not actual gallons on site) of greater than 1,320 gallons and facilities with underground storage capacity of 42,000 gallons. No onsite storage of oil or oil-related materials is proposed as part of the Proposed Action.

4.8.2. Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act provides funding for hazardous materials training in emergency planning, preparedness, mitigation implementation, response, and recovery. Eligible individuals include public officials, emergency service providers, medical personnel, and other tribal response and planning personnel.

4.8.3. Uniform Fire Code

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

4.8.4. Toxic Substances Control Act

The Toxic Substances Control Act (TSCA; 15 U.S.C 2601 *et seq.*) is intended to protect human health and the environment from toxic chemicals. Section 6 of TSCA regulates the use, storage, and disposal of polychlorinated biphenyls (PCBs). BPA adopted guidelines to ensure that PCBs are not introduced into the environment. Equipment used for the project would not contain PCBs. Any equipment removed that may have PCBs would be handled according to the disposal provisions of TSCA.

4.8.5. Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 [a-y]) registers and regulates pesticides. BPA uses herbicides (a kind of pesticide) during vegetation management. Herbicides are used on transmission line rights-of-way, along access roads, and in substation yards to control vegetation, including noxious weeds. When BPA uses herbicides, the date, dose, and chemical used are recorded and reported to state government officials. Herbicide containers are disposed of according to Resource Conservation and Recovery Act (RCRA) standards described below.

4.8.6. Resource Conservation and Recovery Act

RCRA (42 U.S.C. 6901 *et seq.*) is designed to provide a program for managing and controlling hazardous waste by imposing requirements on generators and transporters of hazardous waste and on owners and operators of treatment, storage, and disposal facilities. Each facility owner or operator is required to have a permit issued by EPA or the state. Typical transmission line and substation bay construction and maintenance activities, in BPA's experience, have generated small amounts of hazardous wastes such as solvents, pesticides, paint products, motor and lubricating oils, and cleaners. Small amounts of hazardous wastes may be generated by the project. These materials would be disposed of according to state law and RCRA.

If a hazardous material, toxic substance, or petroleum product is discovered and may pose an immediate threat to human health or the environment, BPA requires that the construction contractor notify the Contracting Officer's Technical Representative (COTR) immediately. Other conditions such as large dump sites, drums of unknown substances, suspicious odors, stained soil, etc., must also be reported immediately to the COTR. The COTR would coordinate with the appropriate BPA personnel as well as applicable state and federal agencies. In addition, the construction contractor would not be allowed to disturb such conditions until the COTR has given the notice to proceed.

4.9. EXECUTIVE ORDER ON ENVIRONMENTAL JUSTICE

In February 1994, Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, was released to federal agencies. The order states that federal agencies shall 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. The Proposed Action would cause no known impacts on minority and low-income populations. An analysis of potential environmental justice impacts from the Proposed Action is included in Section 3.4, Socioeconomics, Environmental Justice, and Public Services, of this EA.

4.10. NOISE

The Federal Noise Control Act of 1972 (42 U.S.C. 4901 *et seq.*) requires that federal entities, such as BPA, comply with state and local noise requirements. Environmental noise is regulated by the state of Washington, which establishes limits on level and duration of noise (WAC 173-60). Table 4-1 below identifies maximum permissible noise levels codified by Washington State. Temporary construction is exempt from state and local regulation. The Proposed Action would result in noise impacts from construction equipment, truck traffic, and occasional use of a helicopter, and audible noise from operations is expected to decrease. Potential noise impacts from the Proposed Action and mitigation to minimize impacts are discussed in Section 3.5, Noise, of this EA.

Table 4-1. Washington State Maximum Permissible Noise Levels

Noise Source	Noise Limitations[1] at Receiving Property (in dBA)		
	Class A	Class B	Class C
Class A (Residential)	55 (7:00 am – 10:00 pm) 45 (10:00 pm – 7:00 am)	57	60
Class B (Commercial)	57 (7:00 am – 10:00 pm) 47 (10:00 pm – 7:00 am)	60	65
Class C (Industrial)	60 (7:00 am – 10:00 pm) 50 (10:00 pm – 7:00 am)	65	70

Source: WAC 173-60-040

Notes:

1 At any hour of the day or night the applicable noise limitations above may be exceeded for any receiving property by no more than (i) 5 dBA for a total of 15 minutes in any 1-hour period, or (ii) 10 dBA for a total of 5 minutes in any 1-hour period, or (iii) 15 dBA for a total of 1.5 minutes in any 1-hour period.

2 Abbreviation: dBA = A-weighted decibel(s)

4.11. TRANSPORTATION

4.11.1. Washington State Department of Transportation

Oversize load and overweight load permits for transportation of large construction materials would be required on state highways pursuant to Revised Code of Washington 46.44.

Any loads larger than 8 feet in width, 14 feet in height, or 53 feet in length would require an oversize load permit. Any load more than 16 feet in height or width would require a superload permit. The construction contractors for the Proposed Action would consult with the Washington State Department of Transportation, Yakima County Public Services Department, and Benton County Public Works Department to secure necessary transportation permits for oversize or overweight vehicles used for project construction. Furthermore, the routing and scheduling of construction traffic would be coordinated with the Washington State Department of Transportation and Benton and Yakima county road staff to minimize interruptions to local traffic.

Washington State Department of Transportation requires a utility permit for utilities that cross state highways and for utility projects that are located within 300 feet of highway rights-of-way.

Section 3.3, Transportation, of this EA contains an analysis of potential impacts on transportation from the Proposed Action.

4.12. 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. FCC regulations require that impacts on reception be mitigated. It is expected that the Proposed Action would cause no interference with radio, television, or other reception (see Section 3.6, Public Health and Safety, of this EA). BPA would comply with FCC requirements and investigate any complaints about electromagnetic interference, if any interference occurs.

4.13. FARMLAND PROTECTION ACT

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

As discussed in Section 3.2, Land Use and Recreation, of this EA, the Proposed Action would convert agricultural land to access roads and transmission structure footprints and would result in the loss of approximately 11.5 acres of land suitable for unirrigated grazing land and 0.39 acre of land designated as cultivated crops. Other potential impacts on agricultural lands and mitigation to minimize impacts are discussed in Section 3.2, Land Use and Recreation, and Section 3.4, Socioeconomics, Environmental Justice, and Public Services, of this EA.

4.14. PERMITS FOR RIGHT-OF-WAY ON PUBLIC LANDS

Both the Midway-Moxee and Midway-Grandview transmission lines would cross land administered by BLM, DOE-RL, BoR, and WDNR. BPA is coordinating with BLM, DOE-RL, BoR, and WDNR to meet each agency's requirements for crossing their lands and has submitted information detailing all proposed activities to the appropriate staff.

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Chapter 5
Persons, Tribes, and Agencies Receiving the Environmental Assessment

5.1. INTRODUCTION

The mailing list for the Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project includes potentially interested or affected landowners or trustees; local, state, and federal agencies; public officials; tribes in the project vicinity; utilities; nonprofit organizations; libraries; media; and others who expressed an interest in the Proposed Action. Landowners within 0.25 mile of the transmission line rights-of-way for both lines and whose lands are crossed by access roads were contacted. Specific individuals and agencies were contacted to gather information and data about the project vicinity and applicable requirements, as part of consultation, or for permit applications.

Entities and persons on the project mailing list have directly received or have been given instructions on how to receive available project information, including the opportunity to review the draft EA. Specific entities (other than private persons and landowners) receiving notification of the availability of this EA are listed below by category.

5.2. FEDERAL

The following federal agencies and representatives were contacted:

- Advisory Council on Historic Preservation, Office of Federal Agency Programs
- National Oceanic and Atmospheric Administration, National Marine Fisheries Service
- U.S. Army Corps of Engineers – Seattle District
- U.S. Army Corps of Engineers – Walla Walla District
- U.S. Department of Agriculture, Natural Resources Conservation Service
- U.S. Department of Agriculture, Natural Resources Conservation Service – Central Area
- U.S. Department of Energy – Richland Operations Office
- U.S. Department of the Interior, Bureau of Indian Affairs – Colville Agency
- U.S. Department of the Interior, Bureau of Indian Affairs – Yakama Agency
- U.S. Department of the Interior, Bureau of Land Management – Spokane District
- U.S. Department of the Interior, Bureau of Land Management – Wenatchee Field Office
- U.S. Department of the Interior, Bureau of Reclamation – Columbia-Cascades Area Office
- U.S. Department of the Interior, Fish and Wildlife Service – Central Washington Field Office
- U.S. Department of the Interior, Fish and Wildlife Service, Mid-Columbia River National Wildlife Refuge Complex
- U.S. Department of the Interior, Fish and Wildlife Service, Migratory Bird Coordinator Office – Pacific Region
- U.S. Department of the Interior, Fish and Wildlife Service – Wenatchee Field Office

- U.S. Department of Transportation, Federal Aviation Administration – Northwest Mountain Region
- U.S. Environmental Protection Agency – Region 10
- U.S. Federal Emergency Management Agency – Region X
- U.S. House of Representatives – Office of Congressman Doc Hastings
- U.S. Senate – Offices of Senators Maria Cantwell and Patty Murray

5.3. STATE

The following state agencies and representatives were contacted:

- Washington Department of Archaeology and Historic Preservation
- Washington Department of Commerce
- Washington Department of Ecology, Environmental Review Section
- Washington Department of Ecology – Central Regional Office
- Washington Department of Fish and Wildlife
- Washington Department of Fish and Wildlife, Habitat Program
- Washington Department of Fish and Wildlife – South Central Region 3
- Washington Department of Natural Resources
- Washington Department of Natural Resources – Southeast Region
- Washington Department of Natural Resources, Right of Way Program
- Washington Department of Natural Resources, Washington Natural Heritage Program
- Washington Department of Transportation
- Washington Department of Transportation, Aviation Division
- Washington Department of Transportation, Utilities, Railroads, and Agreements
- Washington Energy Facility Site Evaluation Council
- Washington Parks and Recreation Commission
- Washington Secretary of State
- Washington State House of Representatives – Districts 9, 15, and 16
- Washington State Senate – Districts 9, 15, and 16

5.4. TRIBES

The following Native American tribes were contacted:

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

5.5. LOCAL GOVERNMENT

The following local governments and representatives were contacted:

- City of Grandview – City Council, City Engineer, Mayor, Planning Commission
- City of Moxee – City Council, Mayor, Public Works
- County of Benton – Board of Commissioners, Court House, Department of Planning and Building, Department of Public Works, Planning Commission, Weed Board
- County of Yakima – Board of Commissioners, Building and Fire Safety Division, Department of Planning, Department of Transportation and Roads, Farm Service Agency, Noxious Weed Board, Surface Management

5.6. UTILITIES

The following utilities were contacted:

- Benton County Public Utilities District
- Benton Rural Electric Association
- Inland Power and Light Company
- PacifiCorp

5.7. LIBRARIES

The following libraries were contacted:

- Washington State Library – Olympia, WA
- Grandview Library
- Moxee Library
- Terrace Heights Library
- West Richland Library
- Yakima Central Library

5.8. MEDIA

The following media were contacted:

- Sunnyside Daily Sun
- Yakima Herald Republic
- Grandview Herald

5.9. NONPROFIT GROUPS AND OTHER ORGANIZATIONS

The following nonprofit groups and other organizations were contacted:

- Seattle Audubon Society
- Lower Columbia Basin Audubon Society
- Yakima Valley Audubon Society
- The Nature Conservancy – Washington Field Office
- Natural Resources Defense Council
- Washington Environmental Council
- Washington Native Plant Society – State Chapter
- Washington Native Plant Society – Central Washington Chapter
- Washington Native Plant Society – Columbia Basin Chapter

Chapter 6
Glossary and Abbreviations

6.1. GLOSSARY

100-year floodplain – An area that has a 1 percent chance of being flooded in a given year; designated by the Federal Emergency Management Agency.

A-weighted decibel (dBA) – A logarithmic unit of sound measurement based on an A-weighted scale commonly used for measuring environmental and industrial noise levels.

Access road – A road or road spur that provides access to the transmission line corridor and transmission line structure sites during construction and operation and maintenance.

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.

Alluvial fan – A low cone-shaped deposit of material laid down by a swift-flowing stream as it enters a plain or an open valley.

Alternating current – In alternating current, the flow of electric charge periodically reverses direction as compared to direct current, where the flow of electric charge is only in one direction. Alternting current is the form in which electric power is delivered to businesses and residences.

Annual average daily traffic – Average daily traffic on a roadway link for all days of the week during a period of one year, expressed in vehicles per day.

Attainment – A geographic region where the concentration of one or more criteria air pollutants do not exceed national ambient air quality standards.

Best management practices (BMPs) – Various practices that are effective and practical means of avoiding or reducing impacts during construction; they are used to prevent or reduce the amount of erosion and sedimentation from areas disturbed during construction; these practices also benefit other resources by reducing construction disturbance areas.

Capacity – A measure of the ability of a transmission line, groups of transmission lines (path), or a transmission system to carry electricity; the maximum load that a generator, piece of equipment, substation, transmission line or system can carry under existing service conditions.

Carbon dioxide equivalent (CO_2e) – A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential. Carbon dioxide equivalents are commonly expressed as “million metric tons of carbon dioxide equivalents ($MMTCO_2e$).” The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated global warming potential.

Circuit – A system of conductors through which an electric current is intended to flow; a single circuit transmission line consists of one alternating current transmission line, made up of three conductors; a double circuit transmission line consists of two alternating current transmission lines, which would have two sets of three conductors.

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

Counterpoise – A system of underground wires that are attached to and buried at the base of transmission structures that take a lightning charge from the ground wire on the structure and dissipate it into the earth.

Criteria pollutants – Air pollutants having National Ambient Air Quality Standards.

Cross-drain culvert – A culvert installed under and across a road to carry ditch water to the downslope side of a road.

Cultural resources – A general term used to refer to a wide range of resources, including historic structures, archaeological sites, places of traditional, religious and cultural significance, sacred sites, Native American human remains, and associated objects, which are entitled to special consideration under federal statute, regulations, and executive orders.

Culvert – A metal or concrete pipe used to carry or divert runoff water from a drainage, such as a ditch or stream; usually installed under roads to prevent washouts and erosion.

Cumulative impact – An impact that results when the impacts on resources from the Proposed Action are added to impacts that have or could occur to that resource from other actions, including past, ongoing, or reasonably foreseeable future actions.

Damper – A device mounted in structures to reduce the amplitude of mechanical vibrations

Designated critical habitat – The specific areas within the geographic area, occupied by the species at the time it was listed, that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection.

Diameter at breast height (dbh) – A standard method of expressing the diameter of the trunk or bole of a standing tree, calcuated by measuring the outside bark diameter at a point 4.5 feet above the ground on the uphill side of the tree.

Direct impact – An impact that is caused by the action and occurs at the same time and place.

Distribution line – A local utility transmission line that is a lower voltage system and is used to deliver electric power to end users (utility customers).

Drain dip – A cross drainage structure where a low spot is excavated along the profile of the road and where surface water of stream flow is directed across the road.

Easement – A grant of the right to use land in a manner granted under a formal agreement between two parties; utilities generally acquire easements for transmission lines and access roads to obtain the right to use the land for access, construction and improvements, and operation and maintenance of its transmission lines.

Electric and magnetic fields (EMF) – 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.

Electric field – An electric property associated with each point in space when charge is present.

Electromagnetic interference (EMI) – Interference with the operation of an electrical device caused by the presence of an electromagnetic field.

Endangered species – A species designated under the federal Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.

Ephemeral draw – A topographic feature that, during rain events or snow melt, acts as a small drainage area and channels overland flows into a stream. These features do not have a defined bed or bank or a defined continuous channel. They are located at the low point where two ridges or mounds of earth come together and provide a natural drainage path for surface water runoff to be directed into first order streams.

Erosion – The wearing away of land surface by wind or water that occurs naturally from weather or runoff but can be intensified by land-clearing practices related to such activities as farming, residential or industrial development, road building, or timber-cutting.

ESA-listed – Describes a species designated under the federal Endangered Species Act as either threatened or endangered.

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

Ford – A shallow place in a body of water, such as a river or stream, where water is shallow and does not prevent the crossing of a vehicle; ford improvement or construction can include grading and stabilizing stream banks at the approach to the ford and adding coarse fill material within the channel to stabilize the crossing

Global warming potential – Global warming potential compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide.

Ground wire – Wire on a transmission line that would take the charge during a lightning strike, which is then directed down to the base of the structure and into the ground; used to protect electrical equipment from electrical surges.

Guard structures – Structures installed temporarily at transportation, flood control, utility crossings, parks, and other sensitive locations to protect these underlying areas during conductor stringing operations. The guard structures intercept conductor should it drop below a conventional stringing height, preventing damage to underlying structures. These guard structures are temporary and are removed after conductor installation is complete.

Guy wire – A tensioned cable attached to structures, such as transmission structures, used to support or strengthen the structure to add stability.

Guy wire anchor – An underground structure, normally a metal plate buried in the ground, that is attached to an anchor rod and serves as a foundation of support for the system of guy wires that supports a structure.

Habitat – The combination of biotic (living) and abiotic (non-living) components that provides the ecological support system for plant or animal populations.

Hanford Reach – Columbia River reach extending from 15 miles upstream of the mouth of the Yakima River to Priest Rapids Dam.

Hard line – A strong wire that is used to pull the conductor through a transmission structure when the conductors are being installed.

Indirect impact – Impacts that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Insulator – A component of the transmission line structure made of non-conducting material, such as ceramic or fiberglass, generally bell-shaped; connects the conductor to the suspension structure and prevents the transmission of electrical current from the conductor to the ground.

Integrity (cultural resources) – The quality of a resource such that the location, setting, design, materials, workmanship, feeling, and association are retained.

Kilovolt (kV) – One thousand volts.

Lithosol – Rocky soil that is very thin and formed from the weathering of the underlying rocks.

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

Loess – An unstratified silt, usually buff to yellowish brown loamy deposit; found in North America, Europe, and Asia; believed to be chiefly deposited by the wind.

Magnetic field – The invisible lines of magnetic force produced by electric current flowing in a conductor, such as a transmission line, service wires in a house, or household appliances; measured in terms of lines of force per unit area with the measurement unit being tesla (T) or gauss (G) (one tesla equals 10,000 gauss); also see electric and magnetic fields.

Maintenance area – Any area that was formerly nonattainment for a criteria pollutant but has since met U.S. Environmental Protection Agency promulgated standards and has had a maintenance plan to stay within the standards approved by the U.S. Environmental Protection Agency pursuant to 40 Code of Federal Regulations 51.110.

National Wetland Inventory – A U.S. Fish and Wildlife Service program started in the 1970s to inventory and map all wetlands, primarily for scientific purposes. The data and maps it produces are used to track gains and losses of wetlands.

Outage – An event caused by a disturbance on the electrical system that requires the electrical provider to remove a piece of equipment or a portion or all of a line from service; caused by human actions or natural events.

Overhead ground wire – A wire attached to the top of certain structures to route electricity from lightning to the ground through the structure, preventing damage to the electrical equipment in the substations.

Particulate matter – Airborne particles including dust, smoke, fumes, mist, spray, and aerosols.

Particulate matter measuring 2.5 microns in diameter or less (PM2.5) – A measure of particles in the atmosphere with a diameter of less than or equal to a nominal 2.5 micrometers.

Particulate matter measuring 10 microns in diameter or less (PM10) – A measure of particles in the atmosphere with a diameter of less than or equal to a nominal 10 micrometers.

Pulling site – A staging area located at the beginning of a segment along the transmission line where equipment (i.e., a puller) is set up and used to pull the conductor through the transmission line.

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

Scree – Loose rock debris covering a slope.

Sheet erosion – Detachment of soil particles from rain drops and from water flowing overland and the removal of soil moving downslope as a sheet instead of in definite channels.

Sock line – A line used to install the conductor through a structure; the sock line is used to pull the hard line through the transmission line, which is then used to pull the conductor through.

Staging areas – The area cleared and used by the construction contractor to store and assemble materials or structures immediately before and during construction.

State candidate species – Defined in Washington Department of Fish and Wildlife Policy M-6001 to include fish and wildlife species that the department will 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.

State endangered species – Defined in Washington Administrative Code 232-12-297, Section 2.4, to include "any wildlife species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state."

State sensitive species – Defined in Washington Administrative Code 232-12-297, Section 2.6, to include "any wildlife species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened throughout a significant portion of its range within the state without cooperative management or removal of threats."

State threatened species – Defined in Washington Administrative Code 232-12-297, Section 2.5, to 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."

State-listed – A species designated under state law as either endangered, threatened, or sensitive.

Structure cross arm – Supporting feature on a structure.

Talus – Sloping accumulation of rock debris.

Tensioning site – A staging area located at the end of a segment along the transmission line, where equipment (i.e., a tensioner) is set up and used to tighten the conductor along the transmission line.

Threatened species – A species designated under the federal Endangered Species Act that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Traditional cultural property (TCP) – Site that is eligible for inclusion in the National Register of Historic Places because of its association with 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.

Waterbar – A constructed ditch and berm designed to direct water across a road.

6.2. ABBREVIATIONS

BA	Biological Assessment
BLM	U.S. Bureau of Land Management
BMP	best management practice
BoR	U.S. Bureau of Reclamation
BPA	Bonneville Power Administration
CEQ	Council on Environmental Quality
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COTR	Contracting Officer's Technical Representative
CRP	Conservation Reserve Program
CWA	Clean Water Act
dBA	A-weighted decibels
dbh	diameter at breast height
DEIS	Draft Environmental Impact Statement
DOE	U.S. Department of Energy
DOE-RL	DOE 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	electric and magnetic fields
EMI	electromagnetic interference
EPA	U.S. Environmental Protection Agency
ESA	federal Endangered Species Act
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FM	frequency modulated
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
GIS	Geographic Information System
GPS	Global Positioning System

HFC	hydrofluorocarbon
I-	Interstate
kV	kilovolt
kV/m	kilovolts per meter
L_{DN}	day-night noise level
MOU	memorandum of understanding
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NESC	National Energy Safety Code
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PAC	Priority Area of Conservation
PCBs	polychlorinated biphenyls
PFC	perfluorocarbon
PHS	Priority Habitats and Species
PM10	particulate matter measuring 10 microns in diameter or less
PM2.5	particulate matter measuring 2.5 microns in diameter or less
Proposed Action	Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project
PUD	Public Utility District
RCRA	Resource Conservation and Recovery Act
REA	Rural Electric Association
Rebuild and Upgrade Project	Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project
RMP	resource management plan
ROD	Record of Decision
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SPCC	Spill Prevention, Control, and Countermeasures
SR	State Route
STIP	Statewide Transportation Improvement Program
TCP	traditional cultural property
TSCA	Toxic Substances Control Act

U.S.C.	U.S. Government Code
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WRIA	Water Resource Inventory Area
YTC	Yakima Training Center

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Chapter 7
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APPENDIX A

Vegetation Resources Supplemental Information

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List of Tables

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Table A-1. Special-Status Plant Species Known to Occur or with Potential to Occur in the Midway-Moxee and Midway-Grandview Survey Area

***Scientific Name* (Common Name)**	**Status: Federal[1] / State[2] / BLM[3]**	**Habitat Characteristics / Identifying Features[4]**	**Potential to Occur in Survey Area**
Agoseris elata (Tall agoseris)	-- / S / --	Meadows, open woods, and exposed rocky ridge tops on various slope aspects, from low elevations (500 feet) to timberline (2,900–7,800 feet). Associated species vary depending on elevation and whether the site is on the east side of the Cascades. The vegetation is generally dominated by herbaceous species.	Low; suitable habitat limited in the survey area
Aliciella leptomeria (Great Basin gilia)	-- / T / --	Open dry habitats on gravelly bluffs; sandy swales; on caliche. Elevation 470–1,140 feet. Associated species: *Artemisia tridentata*, *Grayia spinosa*, *Purshia tridentata*, *Cryptantha circumcissa*, *Eremothera* (*Camissonia*) *minor*, *Poa secunda*, *Oryzopsis hymenoides*, *Machaeranthera canescens*, *Gilia sinuata*, and *Bromus tectorum*.	Moderate to high; known to occur outside of survey area
Artemisia campestris var. *wormskioldii* (Wormskiold's northern wormwood)	C / E / S	Known from two occurrences in the Columbia River floodplain on basalt, compacted cobble, and sand in shrub-steppe vegetation. Associated species: *Phacelia hastata*, *Rumex venosus*, *Artemisia campestris* var. *scouleriana*, *Lupinus polyphyllus*, *Eriogonum compositum*, *Sisymbrium altissimum*, *Penstemon acuminatus*, and *Centaurea diffusa*.	None to low; suitable habitat limited within survey area
Astragalus arrectus (Palouse milk-vetch)	-- / T / S	Grassy hillsides, sagebrush flats, river bluffs, and open ponderosa pine/Douglas fir forests in grassy or shrub dominated openings. Elevation 1,000–4,000 feet. Associated species: *Holodiscus discolor*, *Symphoricarpos albus*, *Purshia tridentata*, *Brodiaea douglasii*, *Balsamhoriza sagittata*, and *Lupinus* spp.	Low to moderate; suitable habitat may occur within survey area
Astragalus columbianus (Columbia milk-vetch)	SoC / S / S	Dry, often sandy places with sparse vegetation usually on slopes but sometimes on flats; associated with shrub-steppe vegetation. Elevation 500–2,100 feet. Associated species: *Erigeron filifolius*, *Erigeron poliospermus*, *Phlox longifolia*, and *Bromus tectorum*. May be confused with *A. speirocarpus*.	Known to occur within survey area
Astragalus geyeri (Geyer's milk-vetch)	-- / T / S	Depressions in mobile or stabilized dunes, sandy flats, and valley floors. Elevation 630–670 feet. Associated species: *Ericameria nauseosa*, *Oryzopsis hymenoides*. Often, a high cover of annual weedy plants, like cheatgrass *Bromus tectorum*, *Salsola tragus*, and *Sisymbrium altissimum*, is present.	Low to moderate; suitable habitat may occur within survey area
Astragalus misellus var. *pauper* (Pauper milk-vetch)	-- / S / S	Open ridgetops and upper slopes (rarely middle and lower slopes), along western margin of the Columbia Basin province. In *Artemisia tridentata*/*Pseudoroegneria spicata* community. Elevation 500–3,000 feet. Associated species: *Artemisia rigida*, *Eriogonum sphaerocephalum*, *Poa secunda*, *Erigeron linearis*, *Phlox longifolia*, *Lomatium macrocarpum*, and *Crepis occidentalis*.	Low to moderate; suitable habitat may occur within survey area

Scientific Name (Common Name)	Status: Federal[1] / State[2] / BLM[3]	Habitat Characteristics / Identifying Features[4]	Potential to Occur in Survey Area
Cistanthe rosea [*Calyptridium roseum*] (Rosy pussypaws)	-- / T / S	Sandy to gravelly soils in coniferous forests and sagebrush shrub. In Washington, within low swales in sandy soil among big sagebrush. Elevation 520–530 feet. Associated species: *Bromus tectorum*, *Poa secunda*, *Cryptantha circumscissa*, *Holosteum umbellatum*, *Draba verna*, *Mimulus suksdorfii*, *Microsteris gracilis*, *Loeflingia squarrosa*, *Aliciella leptomeria*, and *Artemisia tridentata*.	Low to moderate; suitable habitat may occur within survey area
Collomia macrocalyx (Bristle-flowered collomia)	-- / S / S	Dry, open places at lower elevations; sparsely vegetated and associated with sagebrush steppe, talus, rock outcrops, and lithosols. Elevation 850–2,100 feet. Associated species: *Artemisia tridentata*, *Pseudoroegneria spicata, Artemisia rigida*, *Poa secunda, Salvia dorrii*, *Eriogonum niveum*, *E. sphaerocephalum*, *E. thymoides*, *Phacelia linearis*, *Collomia grandiflora*, *Balsamorhiza careyana*, and *Chaenactis douglasii*.	Low to moderate; suitable habitat may occur within survey area
Cryptantha gracilis (Narrow-stem cryptantha)	-- / S / S	Talus and pockets of silt; associated with sagebrush steppe. Elevation 1,250–2,680 feet. Associated species: *Artemisia tridentata*, *Bromus tectorum*, *Philadelphus lewisii*, *Balsamorhiza careyana*, *Ericameria nauseosa*, and *Amelanchier alnifolia*.	Low to moderate; suitable habitat may occur within survey area
Cryptantha leucophaea (Gray cryptantha)	SoC / S / S	Regional endemic known from sandy substrate along the Columbia and lower Yakima rivers. Restricted to sand dunes that have not been completely stabilized. Elevation 300–2,500 feet. Associated species: *Oenothera pallida*, *Hesperostipa comata*, *Purshia tridentata*, *Artemisia tridentata*, *Poa secunda*, *Eriogonum niveum*, *Penstemon attenuata*, *Astragalus succumbens*, *Chaenactis douglasii*, and *Bromus tectorum*.	Low to moderate; little suitable habitat within survey area
Cryptantha rostellata (Beaked cryptantha)	-- / T / S	Very dry microsites on coarse substrate generally in shrub-steppe communities; usually found in scattered patches of a few individuals along dry drainages. Elevation 600–2,900 feet. Associated species: *Artemisia tridentata, Agropyron spicatum*, *Artemisia rigida*, *Poa secunda, Purshia tridentata*, *Ribes cereum*, *Salvia dorrii*, *Blepharipappus scaber*, *Scutellaria angustifolia*, *Collomia grandiflora*, *Cryptantha pterocarya*, *Pectocarya setosa*, *Phacelia linearis*, *Lomatium grayi*, *Balsamorhiza careyana*, *Lithophragma* sp., *Bromus tectorum*, and *Poa bulbosa.*	Low to moderate; suitable habitat is present in survey area
Cryptantha scoparia (Miner's candle)	-- / S / S	Dry, open slopes and flats, commonly among sagebrush; gravel bars and alluvial slopes and thin gravelly soil over basalt. Elevation 1,200–1,280 feet. Associated species: *Eriophyllum lanatum*, *Bromus tectorum*, *Eriogonum niveum*, *Artemisia tridentata*, *Pseudoroegneria spicata*, *Bromus mollis*, *Epilobium minutum*, and *Krascheninnikovia lanata*.	Low to moderate; suitable habitat is present in survey area

Scientific Name (Common Name)	Status: Federal[1] / State[2] / BLM[3]	Habitat Characteristics / Identifying Features[4]	Potential to Occur in Survey Area
Cryptantha spiculifera (Snake River cryptantha)	-- / S / S	Sandy knolls and badlands and talus at low elevations; dry, open, flat or sloping areas in stable or stony soils. Associated species: *Artemisia rigida*, *Artemisia tridentata*, *Ericameria nauseosa*, *Eriogonum sphaerocephalum*, *Salvia dorrii*, *Lupinus sericeus*, *Pseudoroegneria spicata*, and *Poa secunda*.	Moderate; suitable habitat may occur within survey area
Cuscuta denticulata (Desert dodder)	-- / T / --	Occurs on various shrubs (*Artemisia*, *Chrysothamnus*, *Ericameria*) within desert areas. Elevation 880 feet. Associated species: *Artemisia tridentata*, *Poa secunda*, *Oryzopsis hymenoides*, *Astragalus caricinus*, *Erigeron poliospermus*, *Cymopterus terebinthinus*, *Helianthus cusickii*, and *Bromus tectorum*.	Low to moderate; potential habitat may occur within survey area
Eatonella nivea (White eatonella)	-- / T / --	Dry, sandy desert or volcanic areas; populations are on bare soil in sparsely vegetated sagebrush steppe, associated with other annuals. Associated species: *Artemisia tridentata*, *Purshia tridentata*, *Salvia dorrii*, *Cryptantha circumscissa*, *Phacelia linearis*, *Mentzelia laevicaulis*, *Eriogonum niveum*, and *Bromus tectorum*.	Low to moderate; suitable habitat may occur within survey area
Eremothera [*Camissonia*] *minor* (Small-flower evening primrose)	-- / S / --	Gravelly basalt, sandy soils, and cryptogamic crust. Elevation 460–1,140 feet. Associated species: *Artemisia tridentata*, *Ericameria nauseosa*, *Purshia tridentata*, *Bromus tectorum*, and *Poa secunda*. May be confused with *C. contorta* and *C. pygmaea*.	Moderate to high; known to occur outside survey area
Eremothera [*Camissonia*] *pygmae* (Dwarf evening primrose)	-- / S / S	Unstable soil or gravel in steep talus, dry washes, banks, and roadcuts. Associated species: *Ipomopsis minutiflora*, *Phacelia linearis*, *Artemisia tridentata*, *Purshia tridentata*, *Mentzelia dispersa*, *Cryptantha pterocarya*, *Mimulus suksdorfii*, and *Camissonia andina*. May be confused with *C. boothii* and *C. minor*.	Moderate; suitable habitat occurs within survey area
Erigeron piperianius (Piper's daisy)	-- / S / S	Dry, open places, often with sagebrush. Elevation 400–2,250 feet. Typically on well-drained somewhat alkaline soil. Occurs most commonly in the big sagebrush/bluebunch wheatgrass plant community type and to a lesser extent in the winterfat/Sandberg's bluegrass community type.	Known to occur
Eriogonum codium (Umtanum desert buckwheat)	T / E / S	Endemic to a very narrow range in Benton County. The only known population of this species occurs at elevations ranging between 1,100 and 1,320 feet on flat to gently sloping microsites near the top of the steep, north-facing basalt cliffs overlooking the Columbia River. It is apparently restricted to the exposed top of one particular basalt flow (the Lolo Flow). Associated species: *Grayia spinosa*, *Salvia dorrii*, *Phacelia linearis*, *Cryptantha pterocarya*, *Eremothera* (*Camissonia*) *minor*, and *Bromus tectorum*.	Known to occur

***Scientific Name* (Common Name)**	**Status: Federal[1] / State[2] / BLM[3]**	**Habitat Characteristics / Identifying Features[4]**	**Potential to Occur in Survey Area**
Erythranthe [*Mimulus*] *suksdorfii* (Suksdorf's Monkey-flower)	-- / S / S	Open, moist, or rather dry places, from the valleys and foothills to moderate or occasionally rather high elevations in the mountains. In moist pockets and drainages in sagebrush steppe vegetation. Associated species: *Collomia linearis*, *Draba verna*, *Plectritis macrocera*, *Cryptantha ambigua*, *Microsteris gracilis*, *Ranunculus testiculatus*, and *Juniperus communis*.	Moderate; suitable habitat is present in survey area
Hypericum majus (Canadian St. John's-wort)	-- / S / --	Along ponds, lakesides or other low, wet places; riparian habitat. Elevation 100–2,300 feet. Associated species: *Equisetum* sp., *Juncus bufonius*, *J. tenuis*, *J. articulatus*, *Cyperus bipartitus*, *Luzula parviflora*, *Carex vulpinoidea*, *Deschampsia cespitosa*, *Phalaris arundinacea*, *Helenium autumnale*, *Myosotis laxa*, and *Plantago major*.	None to low; suitable habitat not likely to occur within survey area
Loeflingia squarrosa var. *squarrosa* (Loeflingia)	-- / T / --	Low swales within sandy areas and associated with *Artemisia tridentata*. Elevation 400–500 feet. Associated species: *Artemisia tridentata, Bromus tectorum, Poa secunda, Cryptantha circumscissa, Mimulus suksdorfii, Holosteum umbellatum, Microsteris gracilis, Gnaphalium palustre, Epilobium minutum, Gilia sinuate*, and *Juncus bufonius.*	Low; suitable habitat may occur within survey area
Lomatium serpentinum (Snake Canyon desert-parsley)	-- / S / S	Low elevations in moderately deep sandy or rocky soil; rock crevices or clefts on open moderate to steep slopes. Associated species: *Pseudoroegneria spicata* and *Poa secunda.*	Low; suitable habitat is present in survey area; however, most known occurrences of species are historic
Lomatium tuberosum (Hoover's desert parsley)	SoC / S / S	Loose rocky slopes and basalt drainage channels; rocky hillsides. Elevation 600–2,300 feet. Associated species: *Allium acuminatum*, *Delphinium nuttallianum*, *Eriogonum niveum*, *Galium aparine*, *Poa secunda*, and *Bromus tectorum*.	Moderate to high
Minuartia nuttalli var. *fragilis* (Nuttall's sandwort / brittle sandwort)	-- / T / --	Plains, open pine forest, chaparral slopes, dry rock cliffs; dry basalt scree slopes, open gravelly benches, or limestone talus. Elevation 25–7,900 feet.	Low to moderate; suitable habitat may occur in the survey area

Scientific Name (Common Name)	Status: Federal[1] / State[2] / BLM[3]	Habitat Characteristics / Identifying Features[4]	Potential to Occur in Survey Area
Nicotiana attenuata (Coyote tobacco)	-- / S / S	Dry, sandy bottom lands, dry rocky washes, and in other dry open places. Elevation 400–10,000 feet. Associated species: *Elymus cinereus*, *Centaurea diffusa*, *Salsola tragus*, *Veronica americana*), *Verbascum thapsus*, *Solanum triflorum*, *Bromus tectorum*, *Marrubium vulgare*, *Polygonum aviculare*, *Pseudoroegneria spicata*, *Gilia minutiflora*, *Eriastrum sparsiflorum*, *Euphorbia glyptosperma*, *Nama densum*, *Verbena bracteata*, *Achillea millefolium*, *Mentzelia laevicaulis*, *Gnaphalium* sp., *Melilotus* sp., and *Sonchus* sp.	Moderate; suitable habitat is present in survey area
Oenthera cespitosa ssp. *cespitosa* (Cespitose evening-primrose)	-- / S / S	Talus slopes, road cuts, and dry hills as well as along the flat river terrace of the Columbia River. Elevation 400–1,200 feet. It occurs within general areas dominated by *Artemisia tridentata* or *Artemisia rigida*. *Ericameria nauseosa*, *Eriogonum douglasii*, and *E. niveum* are common shrubs. Other associated species: *Poa secunda*, *Achnatherum thurberianum*, *Hesperostipa comata*, *Oryzopsis hymenoides*, *Koeleria macrantha*, *Astragalus purshii*, *A. succumbens*, *Balsamorhiza careyana*, *Chaenactis douglasii*, *Comandra umbellata*, *Cryptantha pterocarya*, *Cymopterus terebinthinus*, *Erigeron filifolius*, *Leptodactylon pungens*, *Mentzelia laevicaulis*, and *Phacelia hastata*.	Moderate; suitable habitat is present in survey area
Pediocactus nigrispinus [*P. simpsonii* var. *robustior*] (Snowball cactus)	-- / S / S	Thin, rocky soil on ridge tops, desert valleys, and low mountains. Elevation 1,000–4,000 feet. Associated species: *Artemisia rigida*, *Eriogonum thymoides*, *Poa secunda*, *Balsamorhiza hookeri*, *Allium* spp., *Lomatium* spp., *Erigeron linearis*, *Haplopappus stenophyllus*, *Phlox hoodia*, and *Brodiaea douglasii*.	Low; suitable habitat not likely in survey area
Penstemon eriantherus var. *whitedii* (Whitehed's penstemon)	-- / S / S	Dry, open places in between shrubs; in the plains, valleys, and foothills, sometimes ascending to moderate elevations in the mountains. Elevation 525–3,835 feet. Associated species: *Artemisia tridentata*, *Purshia tridentata*, *Salvia dorrii*, *Eriogonum* sp., and *Ericameria nauseosa*.	Low to moderate; suitable habitat may be present in survey area
Rotala ramosior (Lowland toothcup)	-- / T / --	Wet, swampy places, lakes and pond margins, and along free-flowing river reaches in association with *Juncus* and *Eleocharis* species. Elevation 200–2,259 feet.	Low; suitable habitat unlikely in survey area

Scientific Name (Common Name)	Status: Federal[1] / State[2] / BLM[3]	Habitat Characteristics / Identifying Features[4]	Potential to Occur in Survey Area
Silene scouleri ssp. *scouleri* (Scouler's catchfly)	-- / S / --	Coastal bluffs, rocky and grassy slopes, dry prairie, woodlands. Elevation 0–12,400 feet.	Low
Spiranthes diluvialis (Ute ladies'-tresses)	T / E / --	Found in low-elevation, seasonally flooded, moist habitats. In Washington known from a moist meadow adjacent to Ponderosa Pine/Douglas-fir woodlands and adjacent to the Columbia River on stabilized gravel bars that are moist throughout the growing season. Elevation 720–1,500 feet. Associated species: *Artemisia tridentata, Purshia tridentata, Chrysothamnus* sp., *Eleocharis rostellata, Carex viridula* var. *viridula, Panicum occidentale*, *P. capillare*, and *Juncus torreyi*.	Low; little potential habitat in the survey area
Tauschia hooveri (Hoover's tauschia)	SoC / T / S	Sagebrush scablands, often barren rocky clay or basalt lithosols. Elevation 1,400–3,000 feet. Associated species: *Poa secunda, Artemisia rigida, Talinum spinescens*, *Allium scilloides, Viola trinervata, Lewisia rediviva, Lomatium canbyi*, and *Erigeron poliospermus*. .	Low to moderate; suitable habitat may be present in survey area
Texosporium sancti-jacobi (Lichen)	SoC / T / STR	Arid to semi-arid shrub-steppe, grassland or savannah communities up to 3,300 feet in elevation. Associated species: *Purshia tridentata, Poa secunda*, *Festuca idahoensis, Pseudoroegneria spicata*, the lichens *Megaspora verrucosa, Trapeliopsis* spp., *Cladonia* spp., and the moss *Encalypta rhaptocarpa.*	Low

Source: Tetra Tech 2014.

[1] U.S. Fish and Wildlife Service Classification:

T= A species designated under the federal Endangered Species Act that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range

SoC = An informal term for Species of Concern, not defined in the federal Endangered Species Act. The term commonly refers to species that are declining or appear to be in need of conservation

C = Candidate species are plants and animals for which U.S. Fish and Wildlife Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the federal Endangered Species Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities

[2] State Status: Washington Natural Heritage Program (2013, 2014) provides the following explanation of state status:

E = Endangered taxa are at critically low levels or their habitats have been degraded or depleted to a significant degree presenting the danger of becoming extinct or extirpated from Washington within the foreseeable future if factors contributing to their decline continue

T = Threatened are likely to become Endangered in Washington within the foreseeable future if factors contributing to population decline or habitat degradation or loss continue

S = Sensitive taxa are vulnerable or declining and could become Endangered or Threatened in the state without active management or removal of threats

[3] BLM status: S = Sensitive; STR = Strategic

[4] Habitat requirements and identifying characteristics are primarily from the Washington Natural Heritage Program Field Guide to Selected Rare Plants (Washington Natural Heritage Program and Bureau of Land Management 2014), as well as Hitchcock and Cronquist (1973) and Camp and Gamon (2011)

BLM = Bureau of Land Management; DOE = U.S. Department of Energy

Table A-2. Potential Impacts on Vegetation Communities from Midway-Moxee Structure Replacement

Vegetation Community	Land Ownership										Total (Acres)	
	Private (Acres)		DOE Hanford Site (Acres)		BLM (Acres)		WDNR (Acres)		BPA[1] (Acres)			
	Temp[2]	Perm[3]	Temp[2]	Perm[3]	Temp[2]	Perm[3]	Temp[2]	Perm[3]	Temp[2]	Perm[3]	Temp[2]	Perm[3]
Agriculture	**23.7**	**1.0**	**–**	**–**	**–**	**–**	**–[4]**	**–**	**–**	**–**	**23.7**	**1.0**
Annual grassland	**11.9**	**0.7**	**–**	**–**	**0.4**	**–[4]**	**2.1**	**0.1**	**0.4**	**–[4]**	**14.8**	**0.9**
Perennial grassland	**–**	**–**	**0.7**	**–[4]**	**–**	**–**	**–**	**–**	**–**	**–**	**0.7**	**–[4]**
Medium quality	–	–	0.7	–[4]	–	–	–	–	–	–	0.7	–[4]
Conservation Reserve Program	**5.6**	**0.3**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**5.6**	**0.3**
Lithosol	**0.6**	**–[4]**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**0.6**	**–[4]**
Medium quality	0.6	–[4]	–	–	–	–	–	–	–	–	0.6	–[4]
Shrub-steppe	**11.1**	**0.6**	**0.5**	**–[4]**	**0.3**	**–[4]**	**0.6**	**–[4]**	**–**	**–**	**12.5**	**0.6**
Low quality	9.4	0.5	–	–	0.3	–[4]	0.6	–[4]	–	–	10.3	0.5
Medium quality	1.7	0.1	0.5	–[4]	–	–	–	–	–	–	2.2	0.1
High quality	–	–	–[4]	–	–	–	–	–	–	–	–[4]	–
Shrub-steppe–lithosol mosaic	**0.2**	**–[4]**	**0.2**	**–[4]**	**–**	**–**	**–**	**–**	**–**	**–**	**0.4**	**–[4]**
Low quality	0.2	–[4]	–[4]	–	–	–	–	–	–	–	0.2	–[4]
Medium quality	–[4]	–	0.2	–[4]	–	–	–	–	–	–	0.2	–[4]
Shrub-steppe–perennial grassland mosaic	**–**	**–**	**1.9**	**0.1**	**–**	**–**	**–**	**–**	**–**	**–**	**1.9**	**0.1**
Low quality	–	–	0.2	–[4]	–	–	–	–	–	–	0.2	–[4]
Medium quality	–	–	1.7	0.1	–	–	–	–	–	–	1.7	0.1
Disturbed and developed	**4.0**	**0.4**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**4.0**	**0.4**
Total	**57.1**	**3.1**	**3.3**	**0.2**	**0.7**	**–[4]**	**2.7**	**0.1**	**0.4**	**–[4]**	**64.2[5]**	**3.3**

Source: Tetra Tech 2014

Dash indicates zero

1 Land owned by BPA includes the Moxee Substation and Midway Substation; impacts noted here are from replacement of Midway-Moxee Structure 34/8 near the Moxee Substation

2 Acres of temporary impact based on an assumed 100-foot by 100-foot (0.2 acre) potential disturbance area (excluding the area of permanent impacts) around each structure, which would include areas of equipment movement for removing existing structures and installing new structures; actual disturbance area would depend on site-specific conditions at each structure and whether the work area can be reduced, thus temporary impacts would likely be less than indicated. Acreage of transitory impact from pulling and tensioning activity is not included.

[3] Acres of permanent impact based on an assumed area of 0.012 acre around each two-pole structure and 0.016 acre for each three-pole structure

[4] Less than 0.05 acre of impact

[5] There are 28 structures on both the Midway-Moxee and the Midway-Grandview transmission lines where the 100-foot by 100-foot temporary structure impact areas of overlap (i.e., structures between the Midway Substation and Midway-Moxee Structure 5/3, just south of Midway-Grandview Structure 5/3). The total overlap between the temporary impacts for these 28 structures is 1.8 acres.

BLM = Bureau of Land Management; BPA = Bonneville Power Administration; DOE = U.S. Department of Energy; Perm = permanent; Temp = temporary; WDNR = Washington Department of Natural Resources.

Table A-3. Impacts on Vegetation Communities from Midway-Moxee Access Road Work

Vegetation Community	Land Ownership				Total (Acres)[1]
	Private (Acres)[1]	DOE Hanford Site (Acres)[1]	BLM (Acres)[1]	WDNR (Acres)[1]	
Agriculture	**4.6**	–	–	**0.4**	**5.0**
Annual grassland	**10.1**	–	**1.3**	**2.8**	**14.2**
Perennial grassland	–	**0.6**	–	–	**0.6**
Medium quality	–	–[3]	–	–	–[3]
High quality	–	0.6	–	–	0.6
Conservation Reserve Program	**5.7**	–	–	–[3]	**5.7**
Lithosol	**0.1**	–	–	–	**0.1**
Low quality	0.1	–	–	–	0.1
Medium quality	–[3]	–	–	–	–[3]
Shrub-steppe	**8.5**	**1.1**	**0.5**	**0.5**	**10.6**
Low quality	7.3	–	0.5	0.5	8.3
Medium quality	1.2	0.2	–	–	1.4
High quality	–	0.9	–	–	0.9
Shrub-steppe–lithosol mosaic	**1.2**	**0.3**	–	–	**1.5**
Low quality	1.2	–	–	–	1.2
Medium quality	–	0.3	–	–	0.3
Shrub-steppe–perennial grassland mosaic	–	**2.4**	–	–	**2.4**
Medium quality	–	0.9	–	–	0.9
High quality	–	1.5	–	–	1.5
Disturbed and developed[2]	**28.2**	**4.1**	**0.8**	**2.1**	**35.2**
Total	**58.4**	**8.5**	**2.6**	**5.8**	**75.3[4]**

Source: Tetra Tech 2014

Dash indicates zero acres

[1] Acreage calculation based on:

- New roads: 20-foot-wide disturbance area (14-foot-wide road bed plus 3 feet on either side)
- Improvements to and reconstruction of existing access roads: 10-foot-wide disturbance area, based on the assumption that existing roads are at least 10 feet wide, and an additional 5-foot-wide strip on either side could be disturbed to create a 14-foot-wide road bed. Because some existing roads may be wider than 10 feet, this may tend to overestimate rather than underestimate vegetation impacts.

[2] Disturbed and developed land consists primarily of paved, gravel, and unpaved road surface that is relatively devoid of vegetation

[3] Less than 0.05 acre of impact

[4] Approximately 13.0 of the total acres of potential impacts from access road work would occur along roads that would provide access to both the Midway-Moxee and Midway-Grandview transmission lines

BLM = Bureau of Land Management; WDNR = Washington Department of Natural Resources; DOE = U.S. Department of Energy

Table A-4. Impacts on Vegetation Communities from Midway-Moxee Pulling and Tensioning

Vegetation Community	Land Ownership				Total[1]
	Private (Acres)[1]	DOE Hanford (Acres)[1]	BPA (Acres) [1]	WDNR (Acres) [1]	
Agriculture	5.2	–	–	–	5.2
Annual Grassland	3.5	–	0.4	1.5	5.4
CRP	0.4	–	–	–	0.4
Disturbed and Developed	0.4	–	–	0.1	0.5
Lithosol	**0.3**	**–**	**–**	**–**	**0.3**
medium quality	0.3	–	–	–	0.3
Shrub-steppe	**2.2**	**0.3**	**–**	**0.8**	**3.3**
low quality	2.1	–	–	0.8	2.9
medium quality	0.1	0.3	–	–	0.4
Shrub-steppe – Lithosol mosaic	**–**	**0.5**	**–**	**–**	**0.5**
medium quality	–	0.5	–	–	0.5
Shrub-Steppe – Perennial Grassland Mosaic	**–**	**0.4**	**–**	**–**	**0.4**
low quality	–	0.3	–	–	0.3
medium quality	–	0.1	–	–	0.1
Total	**12.0**	**1.2**	**0.4**	**2.4**	**16.0**

Dash indicates zero

[1] All impacts from pulling and tensioning activities assumed to be temporary

Table A-5. Potential Impacts on Vegetation Communities from Midway-Grandview Structure Replacement

Vegetation Community	Land Ownership								Total (Acres)	
	Private (Acres)		DOE Hanford Site (Acres)		BLM (Acres)		WDNR (Acres)			
	Temp[1]	Perm[2]	Temp[1]	Perm[2]	Temp[1]	Perm[2]	Temp[1]	Perm[2]	Temp[1]	Perm[2]
Agriculture	**6.5**	**0.4**	**–**	**–**	**–**	**–**	**–**	**–**	**6.5**	**0.4**
Annual grassland	**6.7**	**0.3**	**–**	**–**	**–**	**–**	**0.7**	**–[3]**	**7.4**	**0.3**
Perennial grassland	**3.5**	**0.2**	**0.7**	**–[3]**	**–**	**–**	**–**	**–**	**4.2**	**0.2**
Low quality	3.5	0.2	–	–	–	–	–	–	3.5	0.2
Medium quality	–	–	0.7	–[3]	–	–	–	–	0.7	–[3]
Conservation Reserve Program	**7.3**	**0.4**	**–**	**–**	**0.1**	**–[3]**	**–**	**–**	**7.4**	**0.4**
Shrub-steppe	**10.1**	**0.5**	**0.5**	**–[3]**	**1.2**	**0.1**	**0.2**	**–[3]**	**12.0**	**0.6**
Low quality	7.9	0.4	–	–	0.1	–[3]	0.2	–	8.2	0.4
Medium quality	2.2	0.1	0.5	–[3]	1.1	0.1	–	–	3.8	0.2
Shrub-steppe–lithosol mosaic	**–**	**–**	**0.2**	**–[3]**	**–**	**–**	**–**	**–**	**0.2**	**–[3]**
Medium quality	–	–	0.2	–[3]	–	–	–	–	0.2	–[3]
Shrub-steppe–perennial grassland mosaic	**–**	**–**	**1.7**	**0.1**	**–**	**–**	**–**	**–**	**1.7**	**0.1**
Medium quality	–	–	1.7	0.1	–	–	–	–	1.7	0.1
Disturbed and developed	**1.6**	**0.1**	**–**	**–**	**–**	**–**	**–**	**–**	**1.6**	**0.1**
Total	**35.7**	**1.9**	**3.1**	**0.2**	**1.3**	**0.1**	**0.9**	**–[3]**	**41.0[4]**	**2.2**

Source: Tetra Tech 2014
Dash indicates zero

1 Acres of temporary impact based on an assumed 100-foot by 100-foot potential disturbance area (excluding the area of permanent impacts) around each structure, which would include areas of equipment movement for removing existing structures and installing new structures; actual disturbance area would depend on site-specific conditions at each structure and whether the work area can be reduced, thus temporary impacts would likely be less than indicated. Acreage of transitory impact from pulling and tensioning activity is not included.

2 Acres of permanent impact based on an assumed area of 0.012 acre around each two-pole structure and 0.016 acre for each three-pole structure

3 Less than 0.05 acre of impact

4 There are 28 structures on both the Midway-Moxee and the Midway-Grandview transmission lines where the 100-foot by 100-foot temporary structure impact areas of overlap (i.e., structures between the Midway Substation and Midway-Moxee Structure 5/4, just north of Midway-Grandview Structure 5/4). The total overlap between the temporary impacts for these 28 structures is 1.8 acres.

BLM = Bureau of Land Management; BPA = Bonneville Power Administration; DOE = U.S. Department of Energy; Perm = permanent; Temp = temporary; WDNR = Washington Department of Natural Resources

Table A-6. Impacts on Vegetation Communities from Midway-Grandview Access Road Work

Vegetation Community	Land Ownership			Total (Acres)
	Private (Acres)[1]	BLM (Acres)[1]	WDNR (Acres)[1]	
Agriculture	**0.6**	**–**	**–**	**0.6**
Annual grassland	**5.0**	**–**	**0.9**	**5.9**
Perennial grassland	**2.9**	**–**	**–**	**2.9**
Low quality	2.9	–	–	2.9
Conservation Reserve Program	**8.2**	**–**[3]	**–**	**8.2**
Riparian	**0.1**	**–**	**–**	**0.1**
Shrub-steppe	**10.9**	**1.4**	**1.5**	**13.8**
Low quality	7.7	0.4	1.5	9.6
Medium quality	3.2	1.0	–	4.2
Disturbed and developed[2]	**28.5**	**1.5**	**1.1**	**31.1**
Total	**56.2**	**2.9**	**3.5**	**62.6**[4]

Source: Tetra Tech 2014

Dash indicates zero

1 Acreage calculation based on:

- New roads: 20-foot-wide disturbance area (14-foot-wide road bed plus 3 feet on either side)
- Improvements to and reconstruction of existing access roads: 10-foot-wide disturbance area, based on the assumption that existing roads are at least 10 feet wide, and an additional 5-foot-wide strip on either side could be disturbed to create a 14-foot-wide road bed. Because some existing roads may be wider than 10 feet, this may tend to overestimate rather than underestimate vegetation impacts.

2 Disturbed and developed land consists primarily of existing paved, gravel, and unpaved road surface that is devoid of vegetation

3 Less than 0.05 acre of impact

4 Additionally, approximately 13.0 acres of potential impacts from access road work would occur along roads that would provide access to both the Midway-Moxee and Midway-Grandview transmission lines (between the Midway Substation and Midway-Moxee Structure 5/3); these impacts are included in Table A-3, but not included here

BLM = Bureau of Land Management; WDNR = Washington Department of Natural Resources

Table A-7. Impacts on Vegetation Communities from Midway-Grandview Pulling and Tensioning

Vegetation Community	Land Ownership[1]
	Private (Acres)[2]
Agriculture	2.5
Annual Grassland	0.4
CRP	2.6
Disturbed and Developed	0.5
Perennial Grassland	**1.5**
low quality	1.5
Shrub-steppe	**2.7**
low quality	2.7
Total	**10.2**

[1] Pulling and tensioning sites on DOE Hanford Site and BPA-owned land occur in the area where the Midway-Moxee and Midway-Grandview transmission lines share a common corridor. To avoid double-counting, impacts on vegetation communities from these pulling and tensioning sites are only presented in Table A-4. All impacts from pulling and tensioning sites along just the Midway-Grandview transmission line would occur on private land.

[2] All impacts from pulling and tensioning activities assumed to be temporary

Table A-8. Impacts on Special-Status Plant Species from Structure Replacement, Access Road Work, and Pulling and Tensioning

Project Component by Land Ownership		Estimated Number of Individuals Impacted		Impacts on Occupied Habitat (Acres)[1]			
		Columbia Milk-Vetch	Piper's Daisy	Columbia Milk-Vetch		Piper's Daisy	
				Temp[2]	Perm[3]	Temp[2]	Perm[3]
Structure Replacement	**Midway-Moxee**						
	DOE Hanford Site total	69	502	1.53	0.08	0.88	0.04
	Private land total	1,192	0[4]	4.11	0.21	0[4]	0[4]
	BLM total	31	0	0.44	0.02	0	0
	Total	**1,292**	**502**	**6.08**	**0.31**	**0.88**	**0.04**
	Midway Grandview						
	DOE Hanford Site land total	95	606	1.09	0.06	0.88	0.04
	Private land total	294	0	2.41	0.12	0	0
	Total	**389**	**606**	**3.50**	**0.18**	**0.88**	**0.04**
Access Road Work[5]	**Midway-Moxee**						
	DOE Hanford Site total	606[6]	Unknown[6]	6.04	0	4.52	0
	Private land total	10,007[6]	Unknown[6]	12.13	0	3.00	0
	BLM total	363	0[6]	2.01	0	0.22	0
	Total	**10,976[6]**	**Unknown**	**20.18**	**0**	**7.74**	**0**
	Midway-Grandview[7]						
	Private land total	70[7]	Unknown[8]	2.20[7]	0	0.47[7]	0
	Total	**70[7]**	**Unknown[8]**	**2.20[7]**	**0**	**0.47[7]**	**0**
Pulling and Tensioning[9, 10]	**Midway-Moxee[9]**						
	DOE Hanford Site total	16	510	0.32	0	0.96	0
	Private land total	281	0	1.29	0	0	0
	Total[11]	**297**	**510**	**1.61**	**0**	**0.96**	**0**

Source: Tetra Tech 2014

1 Occupied habitat includes structure sites where special-status plant species were observed. If a structure site also contained unsuitable habitat (e.g., agricultural or developed land) that did not contain individuals of special-status status species, this area was not considered occupied habitat and was excluded from the analysis.

2 Acres of temporary impact based on an assumed 100-foot by 100-foot (0.2 acre) potential disturbance area (excluding the area of permanent impacts) around each structure, which would include areas of equipment movement for removing existing structures and installing new structures; actual disturbance area would depend on site-specific conditions at each structure and whether the work area can be reduced, thus temporary impacts would likely be less than indicated

3 Acres of permanent impact based on an assumed area of 0.012 acre around each two-pole structure and 0.016 acre for each three-pole structure

4 One small population of Piper's daisy was observed on private land in the right-of-way; however, no individuals were observed around structures where removal and installation would occur

5 Acreage for access road impacts based on a 20-foot-wide disturbance area. The entire 20-foot wide disturbance area was used, including existing road beds of access roads to be improved and reconstructed, because special-status species were commonly seen growing within existing road beds. All impacts from access road work are considered temporary as these species are likely to recolonize the new road beds once construction is complete.

6 Estimates of individuals of special-status species observed in access roads within the right-of-way were not collected, except on BLM-administered land; therefore, this estimate likely underestimates the number of individuals impacted

[7] To avoid double-counting, impacts on Columbia milk-vetch and Piper's daisy from access road work that would occur along roads that would provide access to both the Midway-Moxee and Midway-Grandview transmission lines are included for Midway-Moxee, but not included here for Midway-Grandview

[8] Estimates of individuals of special-status species observed in access roads within the right-of-way were not collected, except for within BLM-administered land

[9] All impacts on special-status plant species from pulling and tensioning activities along the Midway-Grandview transmission line would occur within pulling and tensioning sites located where the Midway-Moxee and Midway-Grandview transmission lines share a common corridor. To avoid double counting, impacts on special-status plant species from these pulling and tensioning sites are only presented under Midway-Moxee.

[10] All impacts from activities within pulling and tensioning sites assumed to be temporary. Impacts on individuals and occupied habitat from other project activities (i.e., structure replacement and access road work), where applicable, are not included in this number to avoid double-counting.

[11] Total may not equal the sum of rows or columns due to rounding

BLM = Bureau of Land Management; DOE = U.S. Department of Energy; Perm = permanent; Temp = temporary

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APPENDIX B

Wildlife Resources Supplemental Information

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List of Tables

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Table B-1. List of Special-Status Species Potentially Occurring in or near the Study Area

***Scientific name (**Common Name)**	**Status: Federal[1] / State[2] / BLM[3]**	**Habitat Characteristics**	**Potential to Occur in Survey Area**
Endangered Species Act–Listed as Endangered			
Brachylagus idahoensis (Pygmy rabbit), Columbia Basin DPS	Endangered	Pygmy rabbits are typically located in the deep loamy soils of sagebrush dominated landscapes.	**Unlikely** No pygmy rabbits or their sign were observed during the surveys for the Proposed Action (Tetra Tech 2014). Yakima County is not within the expected historical distribution of the species, and the most recent observation in Benton County was unverified and occurred in 1979.
Canis lupus (Gray wolf)	Endangered / Endangered	Packs typically occupy large distinct territories, 200–500 square miles, and defend these areas from other wolves or packs. Suitable wolf habitat is generally characterized as public land with mountainous, forested habitat that contains abundant prey, low road density, low numbers of domestic livestock and sheep, low agricultural use, and few people (U.S. Fish and Wildlife Service 2013a).	**Unlikely** The gray wolf is becoming re-established in Washington, but the closest wolf pack is in the Blue Mountains approximately 70 miles east of the study area, and no wolf sightings have been reported at the DOE Hanford Site or any other part of the survey area. Based on this current distribution, use of the site by wolves would be limited to possible wide-ranging transients (Washington Department of Fish and Wildlife 2014).
Endangered Species Act–Listed as Threatened			
Coccyzus americanus (Yellow-billed cuckoo)	Threatened	Yellow-billed cuckoos prefer open, lowland, deciduous woodlands with open clearings and shrubby vegetation, typically located along river and stream corridors (Hughes 1999).	**Unlikely** No yellow-billed cuckoos or their habitat were observed during the surveys for the Proposed Action (Tetra Tech 2014). It is believed that Washington State no longer supports breeding populations (Washington Department of Fish and Wildlife 2012). In addition to the rarity of this species in Washington, habitat within the study area is not suitable for yellow-billed cuckoo due to the absence of large riparian woodlands**.**
Brachyramphus marmoratus (Marbled murrelet)	Threatened	Marbled murrelets range along the Pacific coast from Alaska to California, and typically nest within but sometimes beyond 50 miles of shore. They utilize forests for nesting and prefer typical old-growth type stands or mature forests with an old-growth component (U.S. Fish and Wildlife Service 1997).	**Unlikely** No marbled murrelet or their sign were observed during the surveys for the Proposed Action (Tetra Tech 2014). Breeding or nesting habitat does not occur in the study area.

Scientific name (Common Name)	Status: Federal[1] / State[2] / BLM[3]	Habitat Characteristics	Potential to Occur in Survey Area
Lynx canadensis (Canada lynx)	Threatened	Canada lynx in Washington utilize subalpine and high elevation mixed conifer zones in the mountains; typically at elevations greater than 3,500 feet (Stinson 2001). Canada lynx are found in north-central and northeast Washington, with almost all records coming from Okanogan, Chelan, Ferry, Stevens, and Pend Oreille counties (Stinson 2001).	**Unlikely** No Canada lynx or their habitat were observed during the surveys for the Proposed Action (Tetra Tech 2014). The study area occurs in low elevation shrub-steppe habitats modified by human development and does not contain the habitat requirements utilized by the Canada lynx.
Salvelinus confluentus (Bull trout)	Threatened	Bull trout are typically associated with the colder streams in a river system and often spawn near cold-water springs and areas of groundwater infiltration (64 FR 58911). All life stages of bull trout are associated with complex forms of cover (large woody debris, undercut banks, boulders, and pools) and stability in both stream channel and stream flow (64 FR 58911).	**Unlikely** The Project does not cross streams within the current distribution of the species or any tributaries that maintain natural connectivity to streams or rivers where bull trout are known to occur (StreamNet 2012). The project does not cross any streams that meet bull trout habitat requirements.
Strix occidentalis caurina (Northern spotted owl)	Threatened	All parts of its range are characterized by the presence of coniferous forests; typically structurally complex forests are preferred, such as those found among old growth, but occasionally northern spotted owls will utilize mature and rarely younger-aged forests (Washington Department of Fish and Wildlife 2012).	**Unlikely** No northern spotted owls or their habitat were observed during the surveys for the Proposed Action (Tetra Tech. 2014). The study area occurs in low elevation shrub-steppe habitats modified by human development, and does not include habitat for spotted owls.
Ursus arctos horribilis (Grizzly bear)	Threatened	Grizzly bears are typically solitary animals that maintain home and seasonal ranges for food gathering, mating, and caring for young; one study showed home ranges from approximately 7 square miles to 165 square miles (Craighead 1976). Grizzly bears in Washington are found in mountainous forested terrain with low road density, abundant prey and few people (U.S. Fish and Wildlife Service 2013b).	**Unlikely** No grizzly bears or their sign were observed during the surveys for the Proposed Action (Tetra Tech 2014). The Proposed Action is located in Yakima and Benton counties and is approximately 100 miles from the nearest grizzly bear ecosystem, the North Cascades. While grizzly bears may move great distances in search of food and other bears, the study area does not provide habitat for this species.

Scientific name (Common Name)	Status: Federal[1] / State[2] / BLM[3]	Habitat Characteristics	Potential to Occur in Survey Area
Endangered Species Act Proposed			
Pekania pennanti (Fisher), West Coast Population	Proposed Threatened	Typical habitat used by fishers includes low- to mid-elevation environments of coniferous and mixed conifer and hardwood forests with late-successional characteristics (large-diameter trees, coarse woody debris, and large snags, cavity trees, or deformed trees). The western portion of Yakima County contains potential habitat for the fisher and is included within the Eastern Washington Cascades analysis area sub-region, as described in the Draft Species Report (U.S. Fish and Wildlife Service 2014).	**Unlikely** USFWS considers the fisher population to be "likely extirpated" from the Eastern Washington Cascades sub-region (U.S. Fish and Wildlife Service 2014). No fishers or their habitat were observed during the surveys for the Proposed Action (Tetra Tech. 2014). There are no conifer forests or other habitat suitable for fishers within the study area.
Endangered Species Act Candidate			
Centrocercus urophasianus (Greater sage-grouse), Columbia Basin DPS	Candidate/ Threatened, PHS Listed	This species is found in desert, grassland/herbaceous, savanna, and shrubland/chaparral. Habitat includes foothills, plains, and mountain slopes where sagebrush is present, often with a mixture of sagebrush, meadows, and aspen, in close proximity. The species uses a wide variety of sagebrush mosaic habitats, including (1) tall sagebrush types such as *Artemisia tridentata*, *A. tripartite*, and *A. cana*; (2) low sagebrush types, such as *A. arbuscula* and *A. nova*; (3) mixes of low and tall sagebrush with abundant forbs; (4) riparian and wet meadows; (5) steppe dominated by native forbs and bunchgrasses; (6) scrub-willow; and (7) sagebrush/ woodland mixes with juniper, *Pinus ponderosa*, or *Populus tremuloides* (Stinson *et al*. 2004; Washington Department of Fish and Wildlife 2014).	**Potentially** No sign of active leks or of individuals was observed during the surveys for the Proposed Action.
Federal Species of Concern			
Contia tenuis (Sharp-tailed snake)	Species of Concern/ Candidate, PHS Listed	Habitat includes moist situations in pastures, meadows, oak woodlands, broken chaparral, and the edges of coniferous or hardwood forests, and shrubby rabbitbrush-sagebrush (Hallock 2009). This snake is found generally under logs, rocks, fallen branches, or other cover. It retreats underground during dry periods.	**Potentially** No occurrences of this species in the study area have been published (Washington Department of Fish and Wildlife 2014); however, the species has been identified at Yakima Sportsman State Park approximately 5 miles from the Proposed Action. Potential habitat exists within the study area near water sources and drainages, most likely on irrigated private property.

*Scientific name (*Common Name)	Status: Federal[1] / State[2] / BLM[3]	Habitat Characteristics	Potential to Occur in Survey Area
Athene cunicularia (Burrowing owl)	Species of Concern/ Candidate, PHS Listed	Preferred habitat includes open grasslands, especially prairie, plains, savanna, and sometimes other open areas such as vacant lots near human habitation or airports (Wahl *et al*. 2005). This owl spends much time on the ground or on low perches such as fence posts or dirt mounds.	**Confirmed** Burrowing owls would potentially utilize badger holes in the study area and have the highest likelihood of occurrence in the DOE Hanford Site. This species was confirmed present along the Midway-Grandview transmission line.
Lanius ludovicianus (Loggerhead shrike)	Species of Concern/ Candidate, PHS Listed	Loggerhead shrikes nest in shrubs or small trees in open country with scattered trees and shrubs, savanna, and occasionally, open woodland (Vander Haegen 2003). In Washington, this species is known to breed in the shrub-steppe of the central Columbia Basin (Yosef 1996). They often perch on poles, wires, or fence posts; suitable hunting perches are an important part of their habitat.	**Confirmed** Nesting pairs were observed in the eastern half of the Midway-Moxee study area and in the central portion of the Midway-Grandview study area.
Falco peregrinus (Peregrine falcon)	Species of Concern/ Sensitive, PHS Listed	Potential nesting and roosting habitat for this species usually includes cliffs or high escarpments that dominate the nearby landscape, although office buildings, bridges, and river cutbanks have also been used for nesting (U.S. Fish and Wildlife Service 1982; Craig 1986). Preferred nesting cliffs are at least 150 feet high (U.S. Fish and Wildlife Service 1982). Foraging habitat includes open areas such as marshes, lakes, river bottoms, and meadows with a high abundance of songbirds, waterfowl, and shorebirds.	**Potentially** This species has not been formally documented in the study area, and no individuals were observed during the wildlife survey. There remains some potential for this species to utilize the study area, particularly the DOE Hanford Site (Washington Department of Fish and Wildlife 2014).
Buteo regalis (Ferruginous hawk)	Species of Concern/ Threatened, PHS Listed	They are found in open country, primarily prairies, plains, and badlands, as well as associated with sagebrush, saltbush-greasewood shrubland, arid woodland, and desert (Leary 1996). They nest in trees, on steep slopes and cliff ledges, hillsides, power line towers, and sometimes on sloped ground on the plains or on mounds in open desert. They generally avoid areas of intensive agriculture or human activity and prefer open grasslands and shrub-steppe.	**Confirmed** During the wildlife survey, an active nest was documented in the eastern half of the Midway-Moxee study area, and two active nests were documented in the central portion of the Midway-Grandview study area.

Scientific name (Common Name)	Status: Federal[1] / State[2] / BLM[3]	Habitat Characteristics	Potential to Occur in Survey Area
Urocitellus townsendii nancyae (Townsend's ground squirrel)	Species of Concern/NL, PHS Listed	Little is known about this species. It is thought that its preferred habitat is primarily open sagebrush and grassland but also includes large patches of sagebrush at the lower edges of forest, as well as pastures and abandoned fields, generally in well-drained soils, especially embankments (Yensen and Sherman 2003).	**Confirmed** Several active colonies of this species were documented throughout the western half of the study area. Distributions ranged from diffuse and sporadic to high-density concentrations. Areas of the highest densities appeared to correspond to edges of human-disturbed soil, primarily agriculture of various scales. This species was observed along both transmission lines.
Washington Department of Fish and Wildlife-Listed Only			
Masticophis taeniatus (Striped whipsnake)	NL/Candidate, PHS Listed	Supporting habitats include shrublands, arid grasslands, sagebrush flats, canyons, and rocky stream courses; microhabitats are terrestrial and arboreal. This snake retreats underground or into deep crevices in cold weather.	**Potentially** It is extremely rare in Washington and is believed to occur at the DOE Hanford Site in very small numbers. This species was historically found near and to the east of the Midway Substation (Hallock 2006). The species likely hibernates in rocky habitats but, at the DOE Hanford Site, active individuals have been located away from rocky habitats. Based on this information, scattered individuals of this species could be present within the study area, and hibernating habitat may be present in rocky and talus areas.
Coluber constrictor (Racer)	NL/Monitored	Racers are most often found in dry sunny areas with cover, including open woodland, open fields, hedgerows, thickets, and wood edges; they are commonly seen crossing roads. They can be found in wetter areas like marshes, bogs, and lake edges (Burke Museum of Natural History and Culture 2013).	**Potentially** There is potential for racers to be present in the study area.
Hypsiglena torquata (Night snake)	NL/Monitored	Night snakes are usually found in warm, dry habitat such as deserts, grasslands, and open woodlands (Burke Museum of Natural History and Culture 2013).	**Potentially** They are uncommon in Washington but have been documented in the DOE Hanford Site in the vicinity of the Midway Substation (Hallock 1998). In the study area, they occur primarily in talus but also within big sagebrush and rabbitbrush habitat (Weaver 2008). Based on these habitat associations, this species may be present in small numbers throughout shrubby portions of the site, but is most likely to be found in the eastern half of the study area, where talus is present.

*Scientific name (*Common Name)	Status: Federal[1] / State[2] / BLM[3]	Habitat Characteristics	Potential to Occur in Survey Area
Ardea herodias (Great blue heron)	NL/Monitored	Great blue herons are common to saltwater and freshwater habitats from open coasts, marshes, sloughs, riverbanks, and lakes to backyard goldfish ponds. They also forage in grasslands and agricultural fields. Breeding birds gather in colonies or "heronries" to build stick nests high off the ground.	**Confirmed** Great blue herons were documented in the western half of the Midway-Moxee transmission line study area and southern half of the Midway-Grandview transmission line study area and were associated with irrigated agricultural areas.
Numenius americanus (Long-billed curlew)	NL/Monitored	This is a bird of open habitats: upland shortgrass prairies, wet meadows, grasslands, and in winter, agricultural fields, saltwater marshes with tidal channels, intertidal mudflats, and coastal estuaries (McGaugh 2000). During all seasons, flat or gently rolling terrain is characteristic of curlew habitat.	**Confirmed** Individuals were documented sporadically in the western half of the Midway-Moxee transmission line study area, but had relatively high densities in the central portion of the Midway-Grandview transmission line study area, north and south of Sulphur Creek.
Falco mexicanus (Prairie falcon)	NL/Monitored, PHS Listed	Prairie falcons inhabit grasslands, shrub-steppe, and agricultural habitats in mostly arid landscapes (DeLong and Steenhof 2004). They nest primarily on cliffs including buttes, canyon walls, rock outcrops, ridges, cave walls, and mine highwalls.	**Confirmed** An active nest was documented on the basalt cliffs in the DOE Hanford Site during the wildlife survey. An adult, likely associated with that nest, was also observed flying around the southern end of the DOE Hanford Site. This species was observed throughout the Midway-Grandview study area, particularly around Grandview, and two nests were documented.
Buteo swainsoni (Swainson's hawk)	NL/Monitored	Swainson's hawks forage in open farmland, sagebrush desert, or prairies. They nest in wooded groves along streams, windbreaks, or other treed or brushy areas near open habitats, often building nests in introduced locust or cottonwood trees.	**Confirmed** One active nest was documented in the DOE Hanford Site during the wildlife survey. This species had relatively high densities along the southern half of the Midway-Grandview transmission line study area, and several nests were documented.
Amphispiza belli (Sage sparrow)	NL/Candidate, PHS Listed	Sage sparrows are common breeding birds in landscapes dominated by *Artemisia* spp. that form large, undisturbed tracts of tall and dense shrub-steppe (Hansley and Beauvais 2004).	**Confirmed** Breeding pairs were documented in areas of large, mostly uninterrupted expanses of sagebrush such as those found in the DOE Hanford Site and in some areas in the central portion of the Midway-Grandview transmission line study area.

Scientific name (Common Name)	Status: Federal[1] / State[2] / BLM[3]	Habitat Characteristics	Potential to Occur in Survey Area
Lepus townsendii (White-tailed jackrabbit)	NL/Candidate	White-tailed jackrabbits prefer grass-dominated habitats typically found at higher elevations in eastern Washington, and in the past have been observed on the Arid Lands Ecology Reserve (U.S. Department of Energy Assistant Secretary for Environmental Management 2012). They are also known to be associated with open grasslands and sagebrush plains.	**Potentially** This species is not anticipated to be found in the study area other than on an occasional basis. However, there is some potential for it to be present.
Lepus californicus (Black-tailed jackrabbit)	NL/Candidate, PHS Listed	This species inhabits open plains, fields, and deserts, especially open country with scattered thickets or patches of shrubs. It rests by day in shallow depressions or forms (U.S. Department of Energy Assistant Secretary for Environmental Management 2012).	**Confirmed** This species was documented in the eastern portion of the Midway-Moxee transmission line study area during the wildlife survey. It was observed in edge areas between agriculture and shrub-steppe habitat.

DOE = U.S. Department of Energy; DPS = Distinct Population Segment; FR = Federal Register; NL = Not listed; PHS = Priority Habitats and Species; USFWS = U.S. Fish and Wildlife Service

Table B-2. Existing Habitat Types by Land Ownership within the Midway-Moxee and Midway-Grandview Survey Area

Wildlife Habitat Type	Land Ownership (Acres)					Total[3,4]
	Private	DOE Hanford[1]	BLM	WDNR	BPA[2]	
Midway-Moxee Survey Area						
Agriculture	212.1	–	–	8.9	0.1	221.2
Annual grassland	118.5	22.4	9.8	20.6	3.5	174.9
Perennial grassland	58.8	36.8	-	0.2	-	95.7
Shrub-steppe	155.8	124.7	3.1	4.7	2.9	291.2
Developed	72.2	30.9	0.8	2.4	7.2	113.4
Wetland	0.1	–	–	–	–	**0.1**
Total[4]	**617.6**	**214.8**	**13.7**	**36.6**	**13.7**	**896.4**
Midway-Grandview Survey Area						
Agriculture	177.8	–	–	–	–	177.8
Annual grassland	117.7	22.4	–	8.6	–	148.7
Perennial grassland	205.8	36.8	0.3	–	–	242.9
Shrub-steppe	225.0	124.7	31.5	7.0	–	388.2
Riparian	0.5	–	–	–	–	**0.5**
Developed	49.7	30.9	1.4	2.4	–	84.4
Total[4]	**776.6**	**214.8**	**33.2**	**18.0**	–	**1,042.5**

Dash indicates zero.

1 On the DOE Hanford Site the Midway-Moxee and Midway-Grandview survey areas are the same; therefore, acres of existing wildlife habitat types on the DOE Hanford Site for these two survey areas are the same

2 Land owned by BPA includes the Moxee Substation

3 Total acreage within the Midway-Moxee survey area includes some overlap with Midway-Grandview survey area

4 Total may not equal the sum of rows or columns due to rounding

BLM = Bureau of Land Management; BPA = Bonneville Power Administration; DOE = U.S. Department of Energy; WDNR = Washington Department of Natural Resources

Table B-3. Access Road Impacts on Wildlife Habitat Types and Habitat Quality

Wildlife Habitat Type	Area of Disturbance by Habitat Quality			Total Disturbance[1]
	Permanent (Acres)			Permanent (Acres)
	Low Quality	Medium Quality	High Quality	
Midway-Moxee Access Roads				
Agriculture	5.0	–	–	5.0
Annual grassland	14.1	–	–	14.1
Perennial grassland	5.2	0.5	0.6	6.3
Shrub-steppe	5.2	5.7	3.5	14.4
Developed[2]	35.1	–	–	35.1
Total	**64.7**	**6.2**	**4.1**	**75.1**[3]
Midway-Grandview Access Roads				
Agriculture	0.6	–	–	0.6
Annual grassland	5.8	–	–	5.8
Perennial grassland	10.2	1.0	–	11.2
Shrub-steppe	9.7	4.1	–	13.9
Riparian	–	–	0.1	0.1
Developed[2]	31.1	–	–	31.1
Total	**57.4**	**5.2**	**0.1**	**62.6**

Dash indicates zero

[1] Total may not equal the sum of rows or columns due to rounding

[2] Existing transmission line access roads proposed for improvement or reconstruction are considered to be developed habitat

[3] Mapped Priority Habitats and Species cliff habitat accounts for 3.0 acres of the total permanent impacts from roads, of which 1.4 acres are developed habitat associated with existing road network

Table B-4. Structure Replacement Impacts on Wildlife Habitat Types and Habitat Quality

Wildlife Habitat Type	Area of Disturbance by Habitat Quality						Total Disturbance (Acres)[1]	
	Temporary (Acres)[2]			Permanent (Acres)[3]			Temporary	Permanent
	Low Quality	Medium Quality	High Quality	Low Quality	Medium Quality	High Quality		
Midway-Moxee Structure Replacement								
Agriculture	23.6	0.1	–	1.0	–	–	23.77	1.0
Annual grassland	14.9	–	–	0.8	–	–	14.9	0.8
Perennial grassland	5.1	0.5	0.7	0.3	–[4]	–[4]	6.2	0.3
Shrub-steppe	3.2	9.9	2.4	0.2	0.5	0.1	15.4	0.8
Developed	4.0	–	–	0.4	–	–	4.0	0.4
Total[1]	**50.7**	**10.4**	**3.0**	**2.6**	**0.5**	**–**	**64.2**	**3.3**
Midway-Grandview Structure Replacement								
Agriculture	6.5	–	–	0.4	–	–	6.5	0.4
Annual grassland	7.4	–	–	0.4	–	–	7.4	0.4
Perennial grassland	10.9	0.7	–	0.6	–[4]	–	11.6	0.6
Shrub-steppe	8.0	3.6	2.4	0.4	0.2	0.1	13.9	0.7
Developed	1.6	–	–	0.1	–	–	1.6	0.1
Total	**34.3**	**4.3**	**2.4**	**1.8**	**0.3**	**0.1**	**40.9**	**2.2**

Dash indicates zero

1 Total may not equal the sum of rows or columns due to rounding. Total includes 0.6 acre of temporary impacts and 0.04 acre of permanent impacts on shrub-steppe habitat within mapped Priority Habitats and Species cliff habitat.

2 Acres of temporary impact based on an assumed 100-foot by 100-foot potential disturbance area (excluding the area of permanent impacts) around each structure, which would include areas of equipment movement for removing existing structures and installing new structures; actual disturbance area would depend on site-specific conditions at each structure and whether the work area can be reduced, thus temporary impacts would likely be less than indicated

3 Acres of permanent impact based on an assumed area of 0.012 acre around each two-pole structure and 0.016 acre for each three-pole structure

4 Impacts less than 0.05 acre

Table B-5. Pulling and Tensioning Impacts on Wildlife Habitat Types and Quality

Wildlife Habitat Type	Area of Disturbance by Habitat Quality[1]			Total
	Low	Medium	High	
Midway-Moxee Pulling and Tensioning				
Agriculture[2]	5.1	–	–	**5.1**
Shrub-steppe	2.3	1.7	0.6	**4.6**
Perennial Grassland[2]	0.4	–	–	**0.4**
Annual Grassland[2]	5.4	–	–	**5.4**
Developed[2]	0.5	–	–	**0.5**
Total	**13.7**	**1.7**	**0.6**	**16.0**
Midway-Grandview Pulling and Tensioning[3]				
Agriculture[2]	2.5	–	–	**2.5**
Shrub-steppe	2.3	0.3	–	**2.6**
Perennial Grassland[2]	4.2	–	–	**4.2**
Annual Grassland[2]	0.4	–	–	**0.4**
Developed[2]	0.5	–	–	**0.5**
Total	**9.9**	**0.3**	**–**	**10.2**

Dash indicates zero

1 All impacts from pulling and tensioning activities assumed to be temporary

2 All impacts occur in low-quality wildlife habitat

3 Pulling and tensioning sites unique to Midway-Grandview all occur on private lands. Impacts from pulling and tensioning sites that will service both Midway-Moxee and Midway-Grandview are included in the table only for Midway-Moxee.

Table B-6. Impacts on Wildlife Habitat Type and Quality by Project Feature, Publicly Owned Lands

Wildlife Habitat Type	Access Road Disturbance[1]			Structure Disturbance						Pulling and Tensioning			Total Disturbance (Acres)[2]	
	Permanent (Acres)			Temporary (Acres)[3]			Permanent (Acres)[4]			Temporary (Acres)				
	Low Quality	Medium Quality	High Quality	Low Quality	Medium Quality	High Quality	Low Quality	Medium Quality	High Quality	Low Quality	Medium Quality	High Quality	Temporary	Permanent
Department of Energy Hanford Site														
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Annual grassland	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Perennial grassland	–	–	0.6	–	–	1.3	–	–	0.1	–	–	–	1.3	0.7
Shrub-steppe	–	0.2	3.5	0.2	–	4.8	–	–	0.3	0.3	0.3	0.6	6.3	4.0
Developed[5]	4.1	–	–	–	–	–	–	–	–	–	–	–	–	4.1
Total[2]	**4.1**	**0.2**	**4.1**	**0.2**	**–**	**6.1**	**–**	**–**	**0.1**	**0.3**	**0.3**	**0.6**	**7.6**	**8.7**
	Bureau of Land Management													
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Annual grassland	1.3	–	–	0.4	–	–	–[6]	–	–	–	–	–	0.4	1.3
Perennial grassland	–[6]	–	–	0.1	–	–	–[6]	–	–	–	–	–	0.1	–[6]
Shrub-steppe	0.7	1.2	–	0.1	1.4	–	–[6]	0.1	–	–	–	–	1.5	2.0
Developed[5]	2.2	–	–	–	–	–	–	–	–	–	–	–	–	2.2
Total[2]	**4.2**	**1.2**	**–**	**0.6**	**1.4**	**–**	**–[6]**	**0.1**	**–**	–	–	–	**2.0**	**5.5**
	Washington Department of Natural Resources													
Agriculture	0.4	–	–	–[6]	–	–	–	–	–	–	–	–	–[6]	0.4
Annual grassland	3.7	–	–	2.8	–	–	0.2	–	–	1.5	–	–	4.3	3.8
Perennial grassland	–[6]	–	–	–[6]	–	–	–	–	–	–	–	–	–[6]	–[6]
Shrub-steppe	2.0	–	–	0.8	–	–	0.1	–	–	0.8	–	–	1.6	2.0
Developed[5]	3.1	–	–	–	–	–	–	–	–	0.1	–	–	0.1	3.1
Total[2]	**9.2**	**–**	**–**	**3.6**	**–**	**–**	**0.2**	**–**	**–**	**2.4**	–	–	**6.0**	**9.4**

Dash indicates zero

1 Midway-Moxee and Midway-Grandview are co-located within adjacent right-of-way on the Department of Energy Hanford Site and share access roads

2 Total may not equal the sum of rows or columns due to rounding. Total includes the following impacts in mapped Priority Habitat and Species cliff habitat: 1.4 acres of permanent impacts associated with roads classified as developed habitat, 1.7 acres of permanent impacts on shrub-steppe habitat from roads and structures, and 1.3 acres of temporary impacts in shrub-steppe habitat from structure rebuild.

3 Acres of temporary impact based on an assumed 100-foot by 100-foot potential disturbance area (excluding the area of permanent impacts) around each structure, which would include areas of equipment movement for removing existing structures and installing new structures; actual disturbance area would depend on site-specific conditions at each structure and whether the work area can be reduced, thus temporary impacts would likely be less than indicated

4 Acres of permanent impact based on an assumed area of 0.012 acre around each two-pole structure and 0.016 acre for each three-pole structure

5 Existing transmission line access roads proposed for improvement or reconstruction are considered to be developed habitat

6 Impacts less than 0.05 acre

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APPENDIX C

Water Resources Supplemental Information

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List of Tables

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Table C-1. Existing and Proposed Transmission Line Structures within 200 feet of Waterways along the Midway-Moxee and Midway Grandview Transmission Lines

Existing Structure	Distance to Waterway (Feet)	Proposed Structure	Estimated Distance to Waterway (Feet)	Waterway Type
N/A	N/A	MM Structure 4/5	188	Ephemeral
MM Structure 10/3	84	MM Structure 10/3	79	Ephemeral
MM Structure 11/3	109	MM Structure 11/3	114	Ephemeral
MM Structure 12/4	23	MM Structure 12/4	18	Ephemeral
MM Structure 20/1	366	MM Structure 20/1	126	Ephemeral
N/A	N/A	MM Structure 20/3	108	Ephemeral
N/A	N/A	MM Structure 20/4	180	Ephemeral
MM Structure 26/2	187	MM Structure 26/1	182	Ephemeral
MM Structure 28/4	79	MM Structure 28/4	84	Ephemeral
MM Structure 33/7	178	MM Structure 33/7	173	Ephemeral
MM Structure 34/5	33	MM Structure 34/5	33	Perennial
MM Structure 34/6	70	N/A	N/A	Ephemeral
MG Structure 8/4	62	MG Structure 8/4	117	Ephemeral
MG Structure 8/6	111	MG Structure 8/6	109	Ephemeral
MG Structure 8/7	90	MG Structure 8/7	97	Ephemeral
MG Structure 11/6	102	MG Structure 11/6	192	Ephemeral
MG Structure 13/1	126	MG Structure 13/1	124	Ephemeral
MG Structure 14/2	73	MG Structure 14/2	103	Ephemeral
MG Structure 17/1	151	MG Structure 17/1	150	Ephemeral
MG Structure 17/3	172	MG Structure 17/3	170	Ephemeral
MG Structure 17/6	176	MG Structure 17/6	178	Ephemeral
MG Structure 18/5	41	MG Structure 18/5	41	Ephemeral
MG Structure 18/7	160	MG Structure 18/7	160	Intermittent
MG Structure 19/2	95	MG Structure 19/2	91	Ephemeral
MG Structure 19/4	185	MG Structure 19/4	185	Ephemeral
MG Structure 22/6	136	MG Structure 22/6	132	Ephemeral
MG Structure 24/4	129	MG Structure 24/4	131	Ephemeral
MG Structure 25/4	49	MG Structure 25/4	53	Perennial
MG Structure 25/6	130	MG Structure 25/6	137	Perennial

MG = Midway-Grandview; MM = Midway-Moxee; N/A = not applicable

Table C-2. Proposed Access Road Work in Waterways along the Midway-Moxee Transmission Line

Location (Nearest Existing Transmission Line Span)	Type of Waterway	Waterway Width (Feet)	Proposed Activity
Between MM Structures 2/4 and 2/5	Ephemeral	1.5	Improve existing access road
Between MM Structures 4/2 and 4/3	Ephemeral	12.0	Improve existing access road
			Repair existing ford
Between MM Structures 4/5 and 4/6	Ephemeral	2.0	Improve existing access road
Between MM Structures 8/1 and 8/2	Ephemeral	3.0	Reconstruct existing access road
Between MM Structures 8/4 and 8/5	Ephemeral	5.0	Improve existing access road
	Ephemeral	2.0	Improve existing access road
	N/A	–	Improve existing access road
			Repair existing ford
Between MM Structures 8/5 and 8/6	Ephemeral	3.0	Improve existing access road
			Repair existing ford
Between MM Structures 8/6 and 9/1	Ephemeral	4.0	Improve existing access road
Between MM Structures 9/3 and 9/4	Ephemeral	10.0	Improve existing access road
			Repair existing ford
	Ephemeral	3.0	Improve existing access road
Between MM Structures 9/5 and 9/6	Ephemeral	3.0	Improve existing access road
	Ephemeral	3.0	Improve existing access road
	N/A	–	Repair existing ford
Between MM Structures 10/1 and 10/2	Ephemeral	3.0	Construct new access road
			Repair existing ford
Between MM Structures 10/2 and 10/3	Ephemeral	3.0	Construct new access road
			Install new ford
Between MM Structures 10/4 and 10/5	Ephemeral	4.0	Reconstruct existing access road
			Repair existing ford
Between MM Structures 11/2 and 11/3	Ephemeral	4.0	Construct new access road
			Repair existing ford
Between MM Structures 12/2 and 12/3	Ephemeral	n.d.	Improve existing access road
			Repair existing ford
Between MM Structures 13/5 and 13/6	Ephemeral	4.0	Improve existing access road

Location (Nearest Existing Transmission Line Span)	Type of Waterway	Waterway Width (Feet)	Proposed Activity
			Repair existing ford
Between MM Structures 16/6 and 16/7	Ephemeral	2.0	Improve existing access road
Between MM Structures 19/1 and 19/2	Ephemeral	7.0	Construct new access road
			Install new ford
Between MM Structures 19/3 and 19/4	Ephemeral	3.0	Construct new access road
			Install new ford
Between MM Structures 19/6 and 20/1	Ephemeral	7.0	Construct new access road
			Install new ford
Between MM Structures 20/2 and 20/3	Ephemeral	4.0	Reconstruct existing access road
Between MM Structures 20/5 and 20/6	Ephemeral	3.0	Improve existing access road
			Repair existing ford
Between MM Structures 20/8 and 21/1	Ephemeral	4.0	Improve existing access road
			Repair existing ford
South of Structure 21/4	Ephemeral	15.0	Improve existing access road
Between MM Structure 22/1 and 22/2	Ephemeral	n.d.	Repair existing ford
Between MM Structures 23/1 and 23/2	Ephemeral	6.0	Improve existing access road
Between MM Structures 23/2 and 23/3	Ephemeral	6.0	Construct new access road
			Install new culvert
South of Structure 24/2	Ephemeral	6.0	Reconstruct existing access road
Between MM Structures 24/1 and 24/2	Ephemeral	5.0	Improve existing access road
Between MM Structures 26/2 and 26/3	Ephemeral	7.0	Improve existing access road
Between MM Structures 26/5 and 26/6	Ephemeral	7.0	Improve existing access road
Between MM Structures 28/4 and 28/5	Ephemeral	3.0	Construct new access road
North of Structure 30/4	Perennial	8.0	Improve existing access road
Between MM Structures 31/4 and 31/5	N/A	–	Improve existing access road
			Replace existing culvert
Between MM Structures 33/5 and 33/6	N/A	–	Install new culvert
Between MM Structures 34/2 and 34/3	N/A	–	Install new culvert
Between MM Structures 34/4 and 34/5	Perennial	7.0	Improve existing access road
Between MM Structures 34/5 and 34/6	Ephemeral	6.0	Improve existing access road

MM = Midway-Moxee; n.d. = no data

Table C-3. Proposed Access Road Work in Waterways along the Midway-Grandview Transmission Line

Location (Nearest Existing Transmission Line Span)	Type of Waterway	Waterway Width (Feet)	Proposed Activity
Between MG Structures 7/6 and 8/1	Ephemeral	6.0	Improve existing access road
Between MG Structures 8/3 and 8/4	Ephemeral	6.0	Improve existing access road
Between MG Structures 8/5 and 8/6	Ephemeral	4.0	Improve existing access road
	Ephemeral	4.0	Improve existing access road
			Repair existing ford
Between MG Structures 8/6 and 8/7	Ephemeral	4.0	Improve existing access road
Between MG Structures 8/7 and 9/1	Ephemeral	15.0	Improve existing access road
Between MG Structures 10/1 and 10/2	Ephemeral	8.0	Reconstruct existing access road
			Repair existing ford
Between MG Structures 11/5 and 11/6	Ephemeral	6.0	Improve existing access road
	Ephemeral	6.0	Improve existing access road
			Repair existing ford
Between MG Structures 12/3 and 12/4	Ephemeral	3.0	Improve existing access road
			Replace existing culvert
Between MG Structures 12/7 and 13/1	Ephemeral	6.0	Reconstruct existing access road
Between MG Structures 12/7 and 13/1	Ephemeral	2.0	Reconstruct existing access road
			Repair existing culvert
Between MG Structures 13/4 and 13/5	Ephemeral	3.0	Reconstruct existing access road
			Replace existing culvert
Between MG Structures 14/2 and 14/3	Ephemeral	3.0	Reconstruct existing access road
			Repair existing ford
	Ephemeral	3.0	Reconstruct existing access road
			Install new ford
Between MG Structures 14/7 and 14/8	Ephemeral	3.0	Reconstruct existing access road
Between MG Structures 14/8 and 15/1	Ephemeral	4.0	Reconstruct existing access road
			Repair existing ford
Between MG Structures 15/2 and 15/3	Ephemeral	12.0	Reconstruct existing access road
			Repair existing ford
Between MG Structures 15/6 and 16/1	Ephemeral	6.0	Reconstruct existing access road
			Repair existing ford

Location (Nearest Existing Transmission Line Span)	Type of Waterway	Waterway Width (Feet)	Proposed Activity
West of Structure 16/1	Ephemeral	4.0	Improve existing access road
Between MG Structures 16/5 and 16/6	Ephemeral	3.0	Reconstruct existing access road
Between MG Structures 16/7 and 17/1	Ephemeral	6.0	Improve existing access road
Between MG Structures 17/1 and 17/2	Ephemeral	3.0	Improve existing access road
Between MG Structures 17/2 and 17/3	Ephemeral	2.0	Improve existing access road
Between MG Structures 17/6 and 18/1	Ephemeral	3.0	Reconstruct existing access road
	Ephemeral	3.0	Reconstruct existing access road
Between MG Structures 18/3 and 18/4	Ephemeral	6.0	Construct new access road
Between MG Structures 18/5 and 18/6	Ephemeral	6.0	Improve existing access road
			Reconstruct existing access road
Between MG Structures 18/7 and 19/1	Intermittent	25.0	Reconstruct existing access road
			Repair existing ford
Between MG Structures 19/2 and 19/3	Ephemeral	10.0	Improve existing access road
Between MG Structures 19/4 and 19/5	Ephemeral	3.0	Improve existing access road
			Install new ford
Between MG Structures 19/5 and 19/6	Ephemeral	2.0	Improve existing access road
East of Structure 19/6	Ephemeral	6.0	Improve existing access road
			Repair existing ford
East of Structure 20/3	Ephemeral	10.0	Reconstruct existing access road
			Repair existing culvert
East of Structure 20/5	Ephemeral	6.0	Improve existing access road
Between MG Structures 21/6 and 21/7	Ephemeral	10.0	Improve existing access road
			Repair existing ford
Between MG Structures 22/6 and 22/7	Ephemeral	2.0	Improve existing access road
Between MG Structures 23/5 and 23/6	Perennial	5.0	Construct new access road
			Install new culvert
Between MG Structures 23/7 and 24/1	Ephemeral	n.d	Construct new access road
			Install new ford
	Perennial	5.0	Improve existing access road
			Replace existing culvert

MG = Midway-Grandview; n.d. = no data

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APPENDIX D

Greenhouse Gas Emissions Supplemental Information

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List Tables

Abbreviations

BMPs	best management practices
CH_4	methane
CO_2e	carbon dioxide equivalent
GHG	greenhouse gas
GWP	global warming potential
N_2O	nitrous oxide

APPENDIX D

Greenhouse Gas Emissions Supplemental Information

Implementation of the Proposed Action could contribute to an increase in greenhouse gas (GHG) concentrations through the activities listed below. The assumptions and methods used to determine the project's contribution to GHG levels are described below.

D.1. ASSUMPTIONS

D.1.1. Construction

Project construction would take place over 2 years with peak construction activity, including road and structure installation, occurring between October and April each year. Construction would take place during a total of about 14-months. Non-peak construction activities would include installing and removing items associated with best management practices (BMPs), establishing staging areas, moving equipment and materials into and out of the project area, and conducting site restoration work.

The transportation components of GHG emissions were estimated 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 14-month-long peak construction period and the 6-month-long non-peak construction 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 likely overestimated because the following assumptions were used:

- All workers would travel in separate vehicles to and within the project area each day.
- A maximum number of workers would be required to implement the project.
- The round-trip distance to the project area is the distance from Richland, Washington, to a point approximately midway in the project vicinity and back (about 40 miles round trip).[1]
- All workers would travel the full length of the project area each day. Although this could be true for some workers, such as inspectors, other workers would like travel less when construction is taking place in the eastern portion of the project.

[1] The distance to the project midpoint was chosen as part of developing a conservative estimate as the substation is the furthest point of the project from Richland. Workers would likely travel fewer miles to reach most project work areas.

- Fuel consumption is based on the average fuel economy for standard pickup trucks of 17 miles per gallon, although more efficient vehicles could be occasionally used (U.S. Environmental Protection Agency 2013).
- Average helicopter fuel consumption is estimated by BPA pilots at 1 mile per gallon.

Up to 30 construction workers would be at work on the transmission line during the peak construction period (14 months), and an estimated 30 workers could be present during the non-peak construction period (6 months).

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 every week from the BPA headquarters in Portland, Oregon, during the 14-month-long peak construction period would result in a total of 112 round trips at an estimated 400 miles per trip.

Helicopters may be used to install 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 (see Chapter 2, Proposed Action and Alternatives, of the EA). It was assumed that the helicopter would be used for approximately 2 months (40 work days) to conduct this work. An estimated one round trip from Portland International Airport each day would result in a total of 40 round trips at an estimated 300 miles per trip.

Fuel consumption and GHG emissions would also result from operation of onsite heavy construction equipment. Heavy construction equipment may include augers, bulldozers, excavators, graders, heavy-duty trucks, and front-end-loaders. Similar to the transportation activities listed above, increased use of heavy construction equipment would occur during peak construction.

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. 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 pieces of equipment would be in operation during peak construction and 10 pieces of equipment 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 a significant overestimation because equipment commonly operates in idle or at reduced power.
- Equipment would operate at approximately 35 percent efficiency, representing the percentage of productive energy extracted from the diesel fuel relative to the maximum potential energy within the fuel (i.e., 128,450 British thermal units per gallon of diesel) (Alternative Fuels Data Center 2013).

D.1.2. Tree Sequestration Reduction

Tree growth and future carbon sequestration rates are highly variable and depend on several factors including the species of tree, age of tree, climate, forest density, and soil conditions. Within the Pacific Northwest, a report published by the U.S. Forest Service in 2006 estimates the maximum carbon density associated with a fully mature forest ranges from 41 to 233 metric tons of carbon per acre (Smith *et al*. 2006). Although tree removal does not immediately emit any GHGs, this analysis is intended to account for the permanent loss of a carbon storage reservoir resulting from land use changes.

The permanent removal of trees would occur due to the building of new access roads, which would result in the creation of a road surface and shoulders that would be kept clear of trees (0.3 acre) and due to the removal of danger trees

The analysis assumes that approximately 0.3 acre of land would be permanently cleared of trees and converted to an area where trees would not be allowed to regrow. This is an overestimation because some of these areas either currently lack mature trees or are already within the existing BPA right-of-way. Further, trees in some of these areas would never reach full maturity due to natural attrition or other human-related disturbances. Because a majority of the trees cleared would be hardwoods, a maximum carbon storage estimate of 182.5 metric tons of carbon per acre was used (Smith *et al*. 2006). It is assumed that 100 percent of the stored carbon would be converted to CO_2 upon conversion. The use of tree removal equipment to clear new access road areas and the right-of-way was included within the construction section analysis, described above.

D.2. DETAILED RESULTS

The GHG emissions or storage loss are quantified below for construction and tree sequestration reduction associated with the Proposed Action described above.

D.2.1. Construction Emissions

Table D-1 displays the results of calculations for the construction activities that would contribute to GHG emissions. Construction of the Proposed Action would result in an estimated 17,381.1 metric tons of carbon dioxide equivalent (CO_2e)[2] emissions.

[2] CO_2e 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.

Table D-1. Estimated Greenhouse Gas Emissions from Project Construction

Estimated Greenhouse Gas Emissions of Construction Activities	CO_2 (Metric Tons)	CH_4 (CO_2e)[1] (Metric Tons)	N_2O (CO_2e)[1] (Metric Tons)	Total CO_2e (Metric Tons)[3]
Peak construction transportation	253.6	205.1	954.6	1,413.2
Off-peak construction transportation	27.2	22.0	102.3	151.4
BPA employee transportation	25.4	20.5	95.5	141.3
Helicopter operation	27.1	0.6	0.1	27.8
Peak construction: equipment operation	14,025.6	17.5	90.1	14,133.2
Off-peak construction: equipment operation	1,502.7	1.9	9.6	1,514.3
TOTAL[3]	**15,861.5**	**267.5**	**1,252.1**	**17,381.1**

1 CO_2 emission factors calculated from The Climate Registry (2014)

2 CH_4 and N_2O emissions have been converted into units of CO_2e using the Intergovernmental Panel on Climate Change GWP factors of 25 GWP for CH_4 and 298 GWP for N_2O (The Climate Registry 2014)

3 The sum of the individual entries may not sum to the total depicted due to rounding

CH_4 = methane; CO_2e = equivalent carbon dioxide; GWP = global warming potential; N_2O = nitrous oxide

D.2.2. Tree Sequestration Reduction

BPA estimates that approximately 0.3 acre of trees needs to be removed for the Proposed Action. As indicated in Table D-2 below, if those trees were to be allowed to reach full maturity, the area would provide approximately 167.3 metric tons of CO_2e.

Table D-2. Estimated Greenhouse Gas Storage Potential of Removed Trees

Tree Clearing Activity	Acres	Total CO_2e Storage Loss (metric tons)[1]
Access roads	0.3	167.3
Right-of-way clearing	–	–
TOTAL[2]	**0.3**	**167.3**

1 Based on a maximum carbon storage rate of 182.5 tons of carbon per acre. Assumes that 100 percent of the carbon stored would be converted to CO_2.

2 The sum of the individual entries may not sum to the total depicted due to rounding

CO_2e = equivalent carbon dioxide

D.3. REFERENCES

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