

Grand Coulee-Creston Transmission Line Rebuild Project

Draft Environmental Assessment

December 2013



DOE/EA-1950



Grand Coulee-Creston
Transmission Line Rebuild Project
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Chapter 1

Purpose of and Need for Action

1.1 INTRODUCTION

Bonneville Power Administration (BPA) is proposing to rebuild its Grand Coulee-Creston transmission line which runs from the U.S. Bureau of Reclamation's (Reclamation) existing Grand Coulee Substation in Grant County, Washington southeast to BPA's existing Creston Substation in Lincoln County, Washington (see Figure 1-1). The aging, 28-mile-long 115-**kilovolt** (kV)¹ line requires replacement of its wood-pole structures and other line components and needs improvements to its access road system.

The Bonneville Power Administration (BPA) is a federal agency that owns and operates more than 15,000 circuit miles of high-voltage transmission 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 Act directs BPA to construct the improvements, additions, and replacements to its transmission system necessary to maintain electrical stability and reliability, and to provide service to BPA's customers (16 United States Code [U.S.C.] 838b (b-d)).

This environmental assessment (EA) was prepared for this proposal by BPA pursuant to regulations implementing the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*), which requires federal agencies to assess the impacts their actions may have on the environment. BPA prepared this EA to determine whether the Grand Coulee-Creston Transmission Line Rebuild Project (Proposed Action) would cause effects of a magnitude that would warrant preparing an Environmental Impact Statement (EIS), or whether it is appropriate to prepare a Finding of No Significant Impact (FONSI).

1.2 NEED FOR ACTION

BPA needs to take action to ensure the integrity and reliability of the existing Grand Coulee-Creston transmission line.

¹ Terms defined in the glossary (Chapter 6) are shown in bold, italicized typeface the first time they are used.

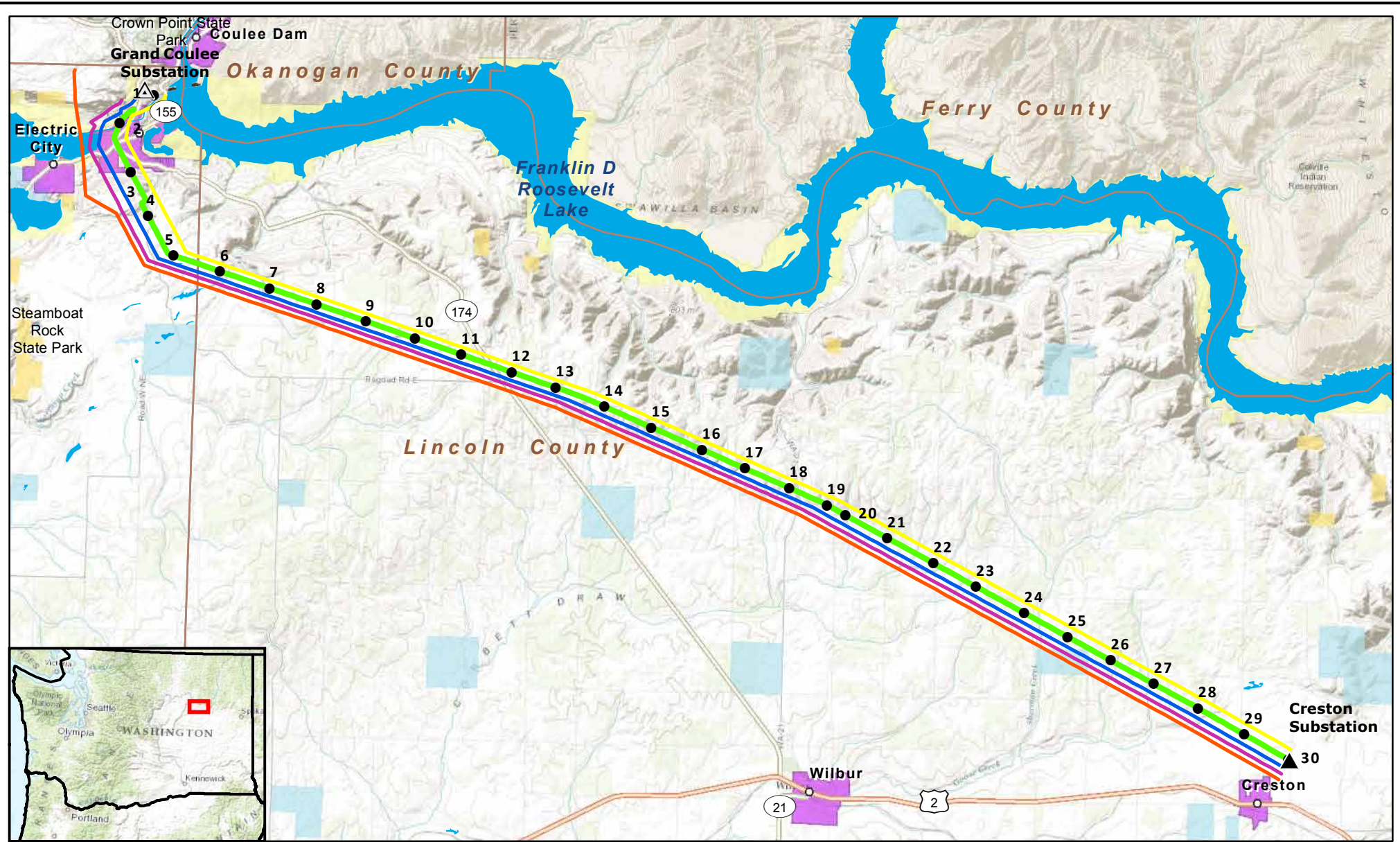
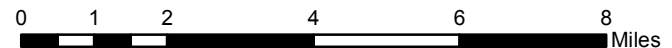


Figure 1-1
Project Location Map
Grand Coulee-Creston No. 1 Transmission Line Rebuild Project

4/26/2013

- ▲ BPA Substations
- △ Non-BPA Substations
- Grand Coulee-Creston No.1
- Grand Coulee-Bell No 3
- Grand Coulee-Bell No 5
- Grand Coulee-Bell No 6
- Grand Coulee-Westside AVA No 1



BPA built the transmission line in 1941 and the transmission line is old, physically worn, and structurally unsound in places. The original conductor has never been replaced and replacement parts are no longer available. In general, wood poles for transmission lines are expected to have a service life of 55 to 60 years, at which point they are usually replaced due to age, rot, and other forms of deterioration (Figure 1-2). Today, a majority of the existing wood-pole structures, hardware, and conductors exceed their service life and show normal deterioration due to age. The poor condition of the existing transmission line creates risks to public and worker safety and could lead to *outages* that would adversely affect power deliveries to BPA’s customers in eastern Washington.



Figure 1-2. Example of Structures in Poor Condition

1.3 PURPOSES OF ACTION

Purposes are defined here as goals to be achieved while meeting the need for action. BPA has identified the following purposes that it will use to evaluate the proposed alternatives:

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

1.4 PUBLIC INVOLVEMENT

BPA conducted public outreach for the proposed project through various means, including providing notice of the project, the environmental process, and opportunities to comment. On December 14, 2012, BPA sent a letter to people potentially interested in or affected by the Proposed Action, including adjacent landowners, public interest groups, local governments, Tribes, and state and federal agencies. After the December letter was distributed, BPA identified additional potentially interested landowners in the project area who were not included on the original mailing list. BPA sent out a second public letter to the newly-identified individuals on February 25, 2013. The letters explained the proposal, the environmental process, and how to participate.

BPA also created a website specifically for the project where people can access current information about the Proposed Action and environmental review process (<http://www.bpa.gov/goto/CouleeCrestonRebuild>).

The public comment period began on December 29, 2012, and BPA accepted comments on the project until March 27, 2013. BPA held two public scoping meetings in January 2013; one in Coulee Dam and one in Wilbur, Washington. Due to the identification of additional landowners, a third meeting was held in Wilbur in March 2013.

A total of 27 people attended the public meetings; eight attended the Coulee Dam meeting and 19 attended the meetings in Wilbur. Comments were provided during the meetings and written comments were also received from seven individuals and agencies. Comments received during the comment period were considered in the environmental analysis and can be found in their entirety on the project website. Comments were received on the following topics:

- Support of project for reliability and safety
- Requests to limit wildlife habitat and timber removal and to use herbaceous and shrub species to limit erosion and enhance habitat
- Reminder of laws and permits that may be applicable or required (Endangered Species Act, Clean Water Act), as well as working with appropriate state agencies
- Concerns and requests regarding land uses – potential impacts to Conservation Reserve Program lands, compensation for possible crop loss due to construction, need for crews to close gates along project, need for landowner notifications

BPA identified two Tribes that have a potential interest in the Proposed Action, based on their historic or current use of the land in the project area: the Spokane Tribe of Indians and the Confederated Tribes of the Colville Indian Reservation. BPA provided project information and described the *cultural resources* review process to tribal cultural resources specialists. BPA also requested information from the consulting Tribes on cultural resources in the project area and solicited comments from tribal representatives. The tribal comments were used to shape the project's cultural resource field investigation.

BPA has addressed the scoping comments in appropriate sections in this EA as applicable. BPA is releasing this Draft EA for review and comment. This Draft EA is also posted on the project website. During the review period, BPA will accept comments via e-mail, letter, public meeting, or telephone. After considering comments received during the Draft EA review period, the EA will be revised, if necessary, and finalized with a decision on how to proceed.

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Chapter 2

Proposed Action and Alternatives

This chapter describes the Proposed Action, the No Action Alternative, and alternatives considered but eliminated from detailed study. This chapter also compares the Proposed Action and the No Action Alternative to the project purposes, as well as to the potential environmental impacts.

2.1 PROPOSED ACTION

The Proposed Action is to rebuild 27.7 miles of the existing 28.2-mile-long Grand Coulee-Creston transmission line. This transmission line extends southeast from the existing Grand Coulee Substation, near the city of Grand Coulee, Washington, to the existing Creston Substation, located near the town of Creston, Washington (Figure 1-1). Approximately 5.5 miles of the western end of this transmission line is located in Grant County, with the remainder of the line located in Lincoln County. The Grand Coulee-Creston line has two *taps* where other local utility lines connect to the BPA line – one tap serves Grant County Public Utility District (PUD) (known as the Grant County PUD Tap) and one tap serves Avista and Inland Power and Light (known as the Wilbur Tap).

A 0.5-mile-long portion of the Grand Coulee-Creston line, starting at Grand Coulee Substation, has steel towers and would not be rebuilt. All towers, conductors, and other components of this portion of line would be left as-is and no access road work or vegetation clearing would be required. The rebuilt portion of the transmission line would be similar to the existing Grand Coulee-Creston transmission line in design and appearance. The Proposed Action would involve the following activities:

- removal of existing wood structures and conductors;
- installation of replacement structures and associated components;
- installation of conductors, *ground wires*, and *counterpoise*;
- reconstruction of the Grant County PUD and Wilbur taps;
- improvement and reconstruction of some existing access roads, including the installation of one gate and one *culvert*;
- establishment of temporary *staging areas* for storage of materials;
- establishment of *pulling and tensioning* sites;
- removal of some vegetation; and
- revegetation of areas disturbed by construction activities.

Table 2.1 provides a further overview of these activities. The main elements of the existing and proposed rebuilt transmission lines are compared in Table 2-2.

During construction, *best management practices* (BMPs) would be implemented to minimize construction-related *erosion* and the potential for introducing construction-related materials (e.g., oil and hazardous materials) into waterways and other sensitive habitats (e.g., *wetlands* and fish-bearing streams). All BMPs would be derived from and implemented in accordance with the *Stormwater Management Manual for Eastern Washington* (Washington State Department of Ecology [Ecology] 2004). Proposed *mitigation* measures are also presented within the relevant sections of this EA to minimize or reduce impacts to resources. The following discussion describes the Proposed Action in more detail.

2.1.1 Rights-of-Way and Easements

The right-of-way for the Grand Coulee-Creston transmission line is part of a combined right-of-way corridor with three other BPA transmission lines for its entire length between the Grand Coulee and Creston substations (Figure 3-1). This combined corridor ranges from 400 to 450 feet wide. Of this total width, the Grand Coulee-Creston right-of-way alone is 100 feet wide.

The other transmission lines that share this corridor, from nearest to furthest away, are the Grand Coulee-Bell No. 6 500-kV transmission line, the Grand Coulee-Bell No. 3/Grand Coulee-Westside No. 1 double-circuit 230-kV transmission line, and the Grand Coulee-Bell No. 5 230-kV transmission line. As shown in Figure 2-1, the other three BPA transmission lines that share the combined right-of-way corridor are all supported by lattice-steel structures that are much larger than the wood poles that comprise the existing Grand Coulee-Creston transmission line.

BPA has easements for the transmission line right-of-way and access roads from underlying property owners. The majority of the existing right-of-way for the Grand Coulee-Creston transmission line crosses land that is in private ownership. Less than 0.2 mile of the existing right-of-way crosses public land, which is managed by Reclamation, located adjacent to the Grand Coulee Substation. No new right-of-way would be required for the rebuild, but BPA proposes to acquire about 0.5 mile of new easement rights for use of existing access roads.

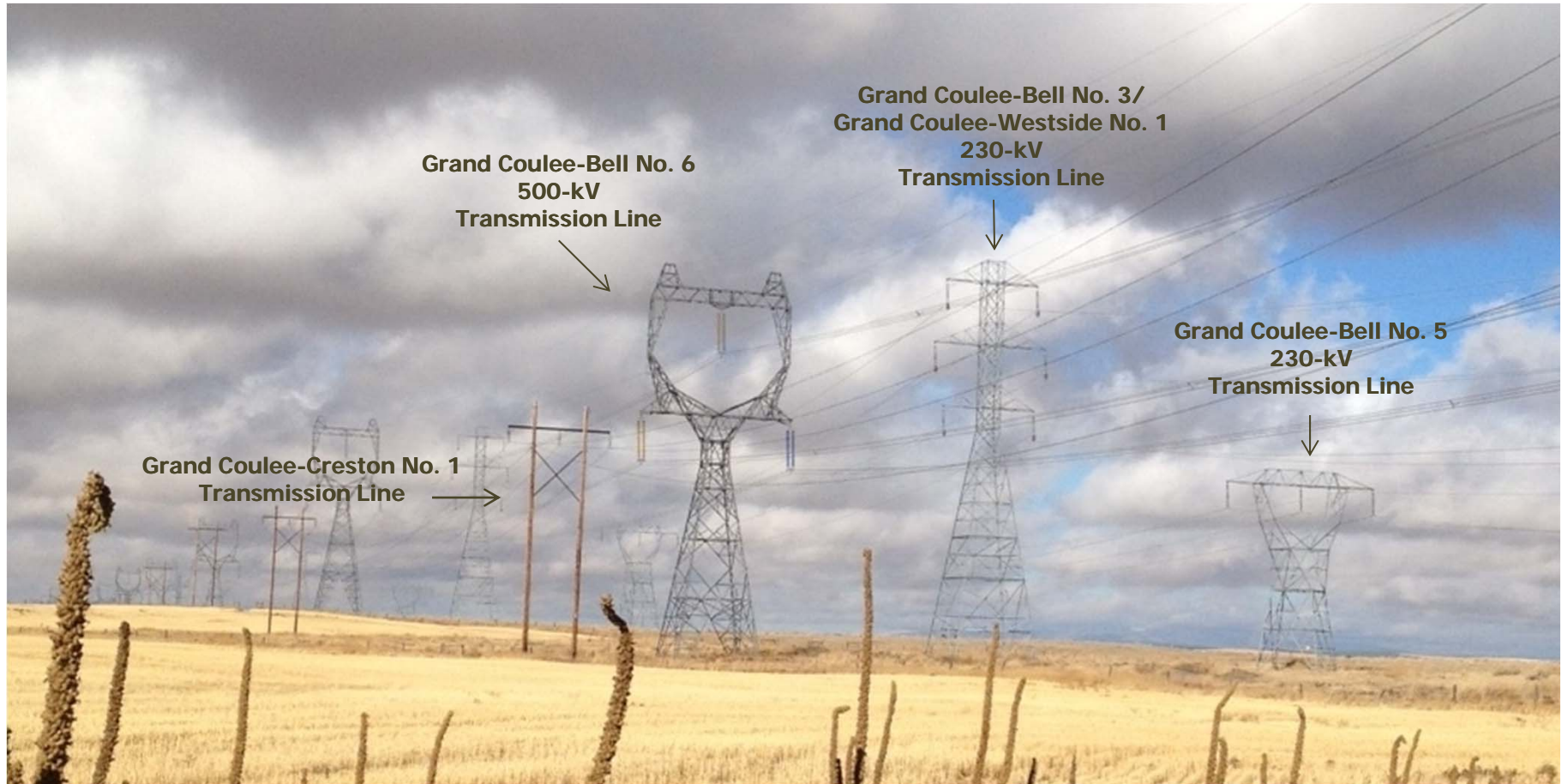


Figure 2-1. Existing Transmission Line Corridor

BPA Grand Coulee-Creston No. 1 Transmission Line Rebuild

Table 2-1. Overview of the Proposed Action

| Proposed Activity | Quantity |
|--|-----------------|
| Wood-Pole Structures | |
| Structures removed (number) | 253 |
| Structures installed (number) | |
| Two-pole structures | 230 |
| Three-pole structures | 23 |
| Structures installed in new location (number) | 1 |
| Structures with guy wires (number) | 35 |
| Access Roads¹ | |
| Total length of access roads used for project (miles) ² | 11.6 |
| Improvements and/or reconstruction (miles) | 1.4 |
| Easement acquisition for access roads/routes (miles) | 0.5 |
| Culverts installed(number) | 1 |
| Gates installed (number) | 1 |
| Vegetation Management | |
| Danger trees removed (number) | 0 |
| Other trees removed (number) ³ | 53 |
| Vegetation within the right-of-way removed | As needed |
| Vegetation along existing access roads removed | As needed |

Notes:

¹ No new access roads would be constructed.

² This total includes all roads used by BPA exclusively for access to the right-of-way. This total includes reconstructed/improved roads; it does not include project-specific travel routes or public roads.

³ These trees would be removed in transmission line right-of-way miles 1 through 3.

Table 2-2. Existing and Proposed Rebuilt Transmission Line Elements

| Specification | Existing Transmission Line | Rebuilt Transmission Line |
|---|----------------------------|---------------------------|
| Operating voltage (kV) | 115 | 115 |
| Conductor diameter (inch) | 0.68 | 0.84 |
| Right-of-Way | | |
| Corridor length with project rebuild activities (miles) | 27.7 | 27.7 |
| Right-of-way width (feet) | 100 | 100 |
| Wood-Pole Structures | | |
| Two-pole structures (number) | 239 | 230 ¹ |
| Three-pole structures (number) | 14 | 23 ¹ |
| Total structures | 253 | 253 |
| Structure height above ground (feet) | 40 to 80 feet | 50 to 125 feet |

Note:

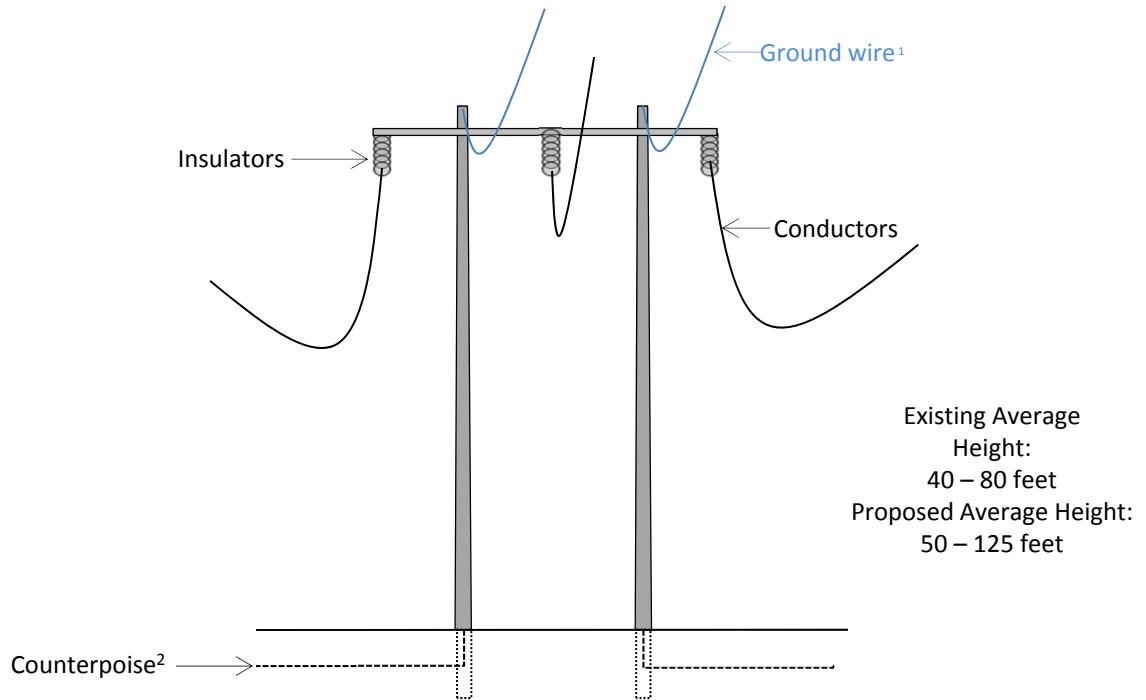
¹ The Proposed Action would require one wooden structure to be relocated within the right-of-way. All other structures would be replaced in nearly the same location.

2.1.2 Transmission Line Structures

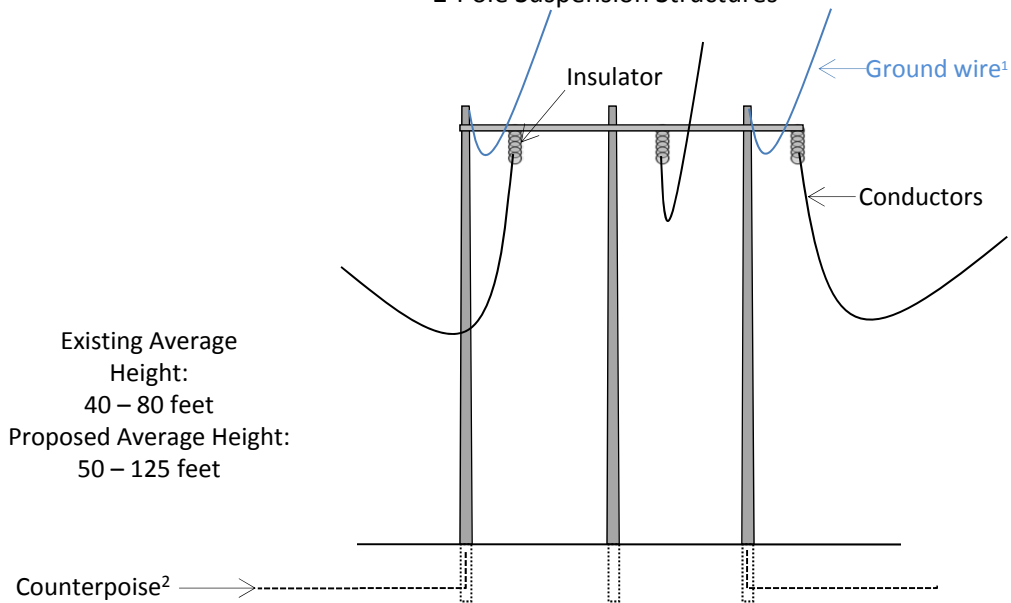
All of the existing wood-pole structures (structures 1/5 to 30/1) would be replaced under the Proposed Action. One wood-pole structure would be replaced in a different location within the right-of-way. Structure 2/5 is proposed to be moved from its existing location to approximately 160 feet closer to the existing access road to ease construction and extend the distance between a nearby gas station and the transmission structure. All other wood-pole structures would be replaced in a similar location. In general, the existing structures would be replaced with structures of essentially the same design – two-pole or three-pole – and with similar structural components (i.e., structure cross arms, *insulators*, and *dampers*). All wood structures would have the same general appearance but would vary in size depending upon their function.

The Grand Coulee-Creston transmission line structures are labeled by mile, as measured from Grand Coulee Substation. Each structure is then numbered sequentially within each mile. For example, structure 22/3 refers to the third structure in line mile 22.

Most (230) of the proposed structures would be two-pole suspension structures (Figure 2-2), which are used in straight alignments or where turning angles between structures are generally less than 15 degrees. They are constructed of two poles, because they do not have to withstand the stresses created by angles in the conductor.



Existing and Proposed
2-Pole Suspension Structures



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

Notes:

1. Ground wire would be installed approximately 0.5 mile from the Creston Substation.
2. Counterpoise would be installed at structures where ground wire is present.

Figure 2-2. Existing and Proposed Wood Pole Structures

BPA Grand Coulee-Creston No. 1 Transmission Line Rebuild Project

Twenty-three structures would be three-pole structures, either angle or dead-end (Figure 2-2). **Angle structures** would be located at points where the transmission line changes direction, generally at angles of 15 degrees or greater. **Dead-end structures** would be placed at intervals along the transmission line to independently carry the weight and tension of the conductors. Dead-end structures could be used on a straight alignment, at angles greater than 15 degrees, or on very long spans, such as river crossings.

The heights of the new wood-pole structures would be about 10 feet taller than existing structures, ranging from 50 to 125 feet above ground. Structure heights at particular locations would depend on the terrain, the length of the span, and other factors.

Removal of Existing Structures

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. All trucks and equipment would be restricted to operating within the workspaces, access roads, and travel routes established for the Proposed Action.

The conductors and overhead ground wires first would be removed by reeling the wires onto large spools using a large truck called a puller. The puller would be set up with empty reels to hold the old conductors as they are reeled in. Once removed, the old conductors would be delivered to a metal salvage location to be recycled.

Removal of existing structures then would involve excavating around the structure base and using a boom crane to pull the poles out of the ground. Removed poles would be hauled off site using a **line truck**. Some shrubs and small trees in the right-of-way would be cleared to allow equipment and machinery to access the structures, as detailed in Appendix B (see also Section 2.1.5, Vegetation Management).

Installation of Replacement Structures

Replacement structures would be brought to the structure sites from the staging areas by flatbed truck. All but one structure would be placed in the existing structure holes. The holes would be re-augured to about 10 feet deep in the ground; blasting could be required for holes in locations where bedrock is present. The replacement poles would be lifted by crane into position and placed into the holes. Holes then would be backfilled with excavated material and gravel, as required, and soil not used for backfilling would be spread evenly around the structure base for stability. At structure sites in sensitive areas, the augured soil would be removed from the site and disposed of in an appropriate fill or waste disposal site.

Replacement for two-pole suspension structures would disturb an area up to 50 feet by 100 feet per structure (approximately 0.1 acre) within the previously disturbed right-of-way. The disturbance area for replacement of three-pole wood structures would be larger (approximately 100 feet by 100 feet, or 0.2 acre).

Guy wire and anchors to support new structures would be installed as required. Guy wires would connect the wood-pole structures to the ground to provide extra support and stability. 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 underground guy wire anchor would be left or removed. Holes for new guy wire anchors would be dug with a backhoe. Depending on the height, design, and location of the new structure, a new guy wire anchor could be placed in the same location as the old anchor and set in crushed rock. The remainder of the guy wire anchor hole would be backfilled with onsite material.

2.1.3 Conductors, Overhead Ground Wires, and Counterpoise

Conductors

Alternating-**current** transmission lines, like the Grand Coulee-Creston transmission line, require three conductors (i.e., wires) to make a complete **circuit**. The existing conductors do not meet current standards. They are made of copper and replacement parts are no longer manufactured. The existing conductors would be removed and new ones attached to non-ceramic insulators. Insulators keep conductors a safe distance from other parts of the structure and prevent electricity in the conductors from moving to other conductors, the structure, or the ground.

The proposed conductors would be made of aluminum and steel and would have a higher electrical **capacity** than the existing conductors. The existing conductor has a diameter of 0.68 inch; the proposed conductor would be larger, with a diameter of 0.84 inch. The new conductor would be more reflective than the existing conductor for the first few years after installation, until the wire naturally weathers and dulls.

Overhead Ground Wires

Overhead ground wires are used for lightning protection. If lightning strikes, the overhead ground wire takes the charge instead of the conductors. An overhead ground wires are currently attached between the Grand Coulee Substation and structure 1/4, and between structure 29/6 and the Creston Substation. Ground wires located between structure 29/6 and the Creston Substation would be replaced under the Proposed Action.

Counterpoise

A system of underground wires, or counterpoise, is attached to some structures that carry the overhead ground wire for additional lightning protection. The counterpoise takes the lightning charge from the overhead ground wire and dissipates it into the earth. The counterpoise wires are buried in the ground and laid out horizontally from structures within the right-of-way.

New counterpoise would only be installed on five structures (structures 29/6, 29/7, 29/8, 29/9, and 30/1) where the overhead ground wires would be replaced. Typically, the counterpoise would be buried up to 30 inches below the ground surface using a small backhoe and the counterpoise would extend up to 100 feet from the structure base. The counterpoise would connect to a 5/8-inch **ground rod**. Ground rods typically measure 10 feet in length and would be placed entirely underground in a vertical orientation. The placement of counterpoise wires could

be adjusted to avoid sensitive areas, if possible. In areas where bedrock is at or near the surface, the wires would be laid on the surface and buried with loose aggregate.

Installation of Conductors, Ground Wires, and Counterpoise

The conductor would be installed (***stringing***) by setting up a pulling and tensioning site at the beginning and end of each identified pulling section. Typically, pulling sections are lengths along the right-of-way that are no more than 25 structures long. Conductor pulling and tensioning sites would be needed approximately every 2 to 4 miles depending on the length of each span and the terrain. Approximately 10 pulling and tensioning sites would be used during installation. ***Pulling and tensioning*** of the new conductors would generally occur near deadend or angle structures that would require an additional 30-foot by 150-foot of disturbed area. In or near sensitive habitats, disturbance areas would be reduced to 50 feet by 50 feet (approximately 0.06 acre) where possible. Staking or flagging would be installed in these areas to restrict vehicle and equipment access to designated routes and areas to protect these sensitive habitats.

After the equipment (puller and tensioner) is set up, a ***sock line*** (usually a rope) would be strung through all the structures. This stringing would be done using a helicopter or by workers on the ground. The sock line would be connected to a hard line (typically a small stranded steel wire), which would be connected to the new conductor and pulled through the structures. Once in place, the new conductor would be tensioned and sagged in place and securely clipped into all of the structures. The ***tensioner*** is a large piece of equipment that has many drums that the new conductor is fed through to get the proper tension.

At the same time that the conductors are replaced, overhead ground wires would be removed and replaced, and counterpoises would be replaced, if needed.

Grant County PUD and Wilbur Taps

BPA would rebuild portions of the existing taps (Grant County PUD and Wilbur taps) to reconnect the Grand Coulee-Creston line to the Grant County PUD and the Avista and Inland Power and Light transmission systems.

The Grant County PUD Tap connects its 13.2-kV power system to the Grand Coulee-Creston transmission line at structure 2/7 within the existing right-of-way. The Wilbur Tap connects Avista's 115-kV line to the Grand Coulee-Creston transmission line between structures 19/3 and 19/4.

These taps would remain at their current locations under the Proposed Action. The existing connection facilities (***disconnect switches*** and other connecting equipment) at the Grant County PUD Tap would be replaced in-kind at the new project structure and a 4-foot by 8-foot extension would be added to the switch platform.

At Wilbur Tap (Figure 2-3), a new ground switch would be installed and 4-foot by 8-foot extension would be added to the switch platform. To facilitate installation of the Wilbur Tap, a ***shoe-fly***, a temporary transmission line built to bypass a construction area, would be installed to limit the outage duration from tap construction. Temporary shoe-fly structures and conductors

would be installed at the site until the permanent structures are installed. Rebuild of the Grant County PUD Tap would not require the use of a shoe-fly.



Figure 2-3. Grant County PUD Tap on Left, Wilbur Tap on Right

2.1.4 Access Roads

Transmission line structures would be accessed from existing roads where possible. Roads leading to the vicinity of the transmission line are generally multi-use roads (e.g., residential access, country roads) used by a variety of individuals for various purposes. Existing access roads within the right-of-way were generally created for BPA use. In the past, when upgrading the other transmission lines in the corridor, BPA conducted extensive reconstruction of the access road system in the project area. Therefore, minimal road improvements are required under the Proposed Action.

However, access road work would be needed to improve access to some of the structure sites for construction and for ongoing operation and maintenance activities. This work would include improving and/or reconstructing approximately 1.4 miles of existing access road, acquiring about 0.5 mile of road easement, and creating temporary travel routes through farm fields to access structures for construction.

The temporary travel routes would be determined at the time of construction and would depend upon field planting schedules. Temporary travel routes would be used in their existing condition with the least impact necessary to allow travel during construction and facilitate restoration of

the area back to the pre-project condition after construction activity. If fields are not planted, the most direct route to the right-of-way would be used. If the fields are planted, a route would be established, in consultation with the landowner that would minimize crop damage. BPA would consult landowners prior to use to determine a route that would result in the least impacts to crops, and would compensate landowners for any crop damage.

To reconstruct or improve the access roads, an excavator first could be used to grub out some of the smaller shrubs growing at the immediate road surface edge. Soil disturbance and removal would be minimized as much as possible during vegetation removal. An excavator or large mowers or brush cutters (e.g., brush hogs) could be used to remove vegetation. Any larger limbs growing into the roadway would be cut manually with a chainsaw.

Road work would occur prior to and concurrent with structure replacement. As described above, roadway improvements and reconstruction would be needed along 1.4 miles of existing roads to provide suitable access for transmission line equipment. Improvements to access roads could involve: blading to shape existing road surfaces and turnouts; placement of surfacing aggregate to maintain or restore existing road surfacing; cleaning existing ditches and culverts; cleaning and installing culverts; and installing water bars and drain dips as needed to manage *stormwater runoff*. Most roads would be reconstructed or improved to a finished 14-foot-wide roadbed, although some areas would be wider to allow vehicles to negotiate curves or bends in the road and to accommodate cut and fill slopes associated with the improvements. The analysis in this EA assumes a potential disturbance width of 20 feet.

A new 8.5 foot by 6 foot diameter culvert, would replace an existing culvert along an access road between structures 6/8 and 7/1 to facilitate the crossing of an intermittent waterbody. Other existing culverts along project access roads would be inspected and cleared of debris.

Additional work associated with access roads would include the installation of a new gate between structures 12/5 and 13/1 to help discourage unauthorized access to the transmission line corridor. Gates proposed along temporary travel routes would remain in place as permanent features.

2.1.5 Vegetation Management

All areas disturbed by construction activities, except permanent road surfaces, would be reseeded with a predominantly native seed mix or a seed mix agreed upon with landowners. The original grade and drainage patterns in sensitive areas would be restored to the extent possible.

When vegetation comes too close to conductors, the electricity can jump (*arc*) from the transmission line to the vegetation. This can be very dangerous to any animal life in the surrounding area and can cause fires and *outages*. About 53 trees/shrubs are within the within the right-of-way that would require removal. These trees are located between structures 1/5 and 1/6, 1/8 and 2/1, 2/4 and 2/7, and at structure 6/2, as shown in Appendix B. The trees/shrubs include American elm, black locust, walnut, catalpa, willow, locust, aspen, apple, spruce, ponderosa pine, Jeffrey pine, unspecified hardwoods, and service berry and are between 6 to 47 diameters at breast height (dbh).

Trees located outside of the right-of-way that can a hazard to the line are called *danger trees*. No danger trees have been identified for this project.

2.1.6 Construction Activities

The construction schedule for the Proposed Action depends on the completion and outcome of the environmental review process. If the Proposed Action is implemented, access road improvements would likely begin in September of 2014. Transmission line construction would likely begin in June 2015 or shortly thereafter. All major construction activities would likely be completed by November 2015. Project construction activities are described below.

Construction Crews

Up to four work crews would be working along the entire transmission line on any given day. Crews would be working up to 10 hours per day, 6 days per week, for approximately 5 months. Each crew would consist of 4 to 6 contractor employees with a small number of support trucks delivering materials (e.g., wood poles, hardware, or conductor) and equipment (e.g., cranes, backhoes, excavators, *tensioners*, or *pullers*) to the work site. Typically, only one crew would be working at any given site; however, up to two crews could work at the stringing sites. Access road improvements would require an additional 6-person crew. As a result, up to 30 contractor employees could work along the entire corridor, with up to 12 employees at an individual work site.

Staging Areas

Staging areas would be used to store and stockpile new and removed materials, as well as other construction-related equipment. The size of the staging areas would be based on the types of sites available for lease and the size needed to accommodate materials and equipment. Each staging area could be up to 20 acres in size. Staging areas would be established within 10 miles of the transmission line, if possible, to minimize travel. Staging areas are generally existing large, level, paved sites in commercial or industrial areas. If these types of areas are not available or feasible, disturbed or common habitat types outside of sensitive habitat areas would be used for staging areas.

At this time, BPA anticipates that one temporary staging area would be established along or near the right-of-way. If the construction contractor identifies additional potential staging areas prior to construction, BPA would complete required site-specific environmental reviews when the locations were determined. Typically, additional staging areas would be located in previously disturbed areas.

2.1.7 Operation and Maintenance

Ongoing operation and maintenance of the rebuilt transmission line would be essentially the same as for the existing transmission line. The transmission line would continue to be operated at the current voltage (115 kV). BPA would conduct routine, periodic inspection and maintenance. A typical maintenance activity on wood-pole structures is insulator replacement. Although

emergency repairs could also be needed, the rebuilt transmission line is anticipated to require emergency maintenance less frequently and on a smaller scale than currently required.

Vegetation is cleared periodically during as part of ongoing operation and maintenance of the line to maintain access to structures, control *noxious weeds*, and keep vegetation at a safe distance from the conductor. Vegetation maintenance is guided by the program identified in BPA's Transmission System Vegetation Management Program Final Environmental Impact Statement (BPA 2000). The vegetation management program includes ongoing consultation with landowners and others concerning vegetation management activities. Vegetation management methods could include manual methods (e.g., hand pulling, clipping, and using chainsaws), mechanical methods (e.g., using roller-choppers and brush hogs), and/or chemical methods (herbicide use). Rebuilding the line would not change the lines vegetation maintenance actions or needs.

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, BPA would not rebuild the transmission line and would continue to operate and maintain the existing deteriorating transmission line. Construction activities associated with the Proposed Action would not occur. It is reasonable to expect that as the transmission line structures continue to fail intermittently, the ability of BPA to provide reliable electric service to its customers in the area would be adversely affected and the safety concerns that prompted this proposal for action would persist.

right-of-way vegetation management would continue under the No Action Alternative, including the removal of the 58 trees identified in the right-of-way. Further, BPA would continue to attempt to maintain the existing transmission line as its aged and rotting wood poles, hardware, conductor, and cross arms further deteriorate. Because of the condition of the transmission line, it is likely that the No Action Alternative would result in more frequent maintenance activities within the corridor than under the Proposed Action. 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 transmission line continue to deteriorate. Emergency repair activities could affect vegetation, wildlife, soils, water quality, and other natural resources in the immediate vicinity, and any downed transmission line resulting from structure failures would have a potential for causing fires in the vicinity of the downed transmission line.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

The Proposed Action would take place within the existing transmission line corridor. The basic design and function (e.g., structure design, location of poles and associated structures, and operating voltage) would not change. Constructing the transmission line in a new corridor would result in impacts outside of the existing right-of-way. Therefore, BPA is not considering an alternative route.

2.4 COMPARISON OF ALTERNATIVES

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

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

| Purpose | Proposed Action | No Action Alternative |
|--|---|---|
| Meet transmission system public safety and reliability standards set by NESC | The rebuilt transmission line would continue to operate at 115 kV. New structures and associated equipment would provide more reliability during routine operation and severe weather. Access road work would ensure that emergency repairs are done quickly. | While the existing transmission line would continue to operate at 115 kV, deteriorated and physically worn structures and associated equipment would pose a greater risk for outages and unreliable service. Emergency response times could be increased by access roads that are in poor condition. |
| Minimize environmental impacts | Construction-related environmental impacts would be minimized by designing the project to avoid sensitive resources, where possible. (See Table 2-4 for a comparison of the environmental impacts of the alternatives.) | There would be no construction related environmental impacts; however, maintenance impacts would increase as existing structures and roads deteriorate and require additional maintenance. Impacts could occur during emergency maintenance without the benefit of planned environmental review and mitigation and downed lines resulting from structure failures would have a potential for causing fires in the vicinity of the downed line. (See Table 2-4 for a comparison of the environmental impacts of the alternatives.) |
| Continue to meet BPA’s contractual and statutory obligations | The rebuilt transmission line would maintain system reliability and subsequent power delivery to BPA’s customers in eastern Washington. | The existing line would continue to deteriorate and threaten system reliability and subsequent power delivery. |
| Demonstrate cost-effectiveness | Environmental review, design and engineering, and construction costs are estimated at \$7.7 million. Would reduce maintenance costs. | Would avoid construction costs. Would incur maintenance costs, which, over time, could be higher than under the Proposed Action. |

Table 2-4. Summary of Impacts of the Proposed Action and No Action Alternative to Environmental Resources

| Environmental Resource | Proposed Action | No Action Alternative |
|---|---|---|
| Geology and Soils | Direct impacts from clearing, grading, vegetation removal, and soil compaction. Indirect impacts associated with soil erosion. Impacts would be low . | Direct impacts from continued operation and maintenance activities, danger tree removal, and incidental use of roads. Impacts would be low , but would increase as the deteriorating structures require more maintenance. |
| Land Use, Recreation and Transportation | Direct impacts from vehicles and equipment use of agricultural land. Small temporary impacts on CRP lands. Short-term direct impacts to local residents and businesses from construction activity. Short-term disruptions to local traffic and access. Overall impacts to land use and transportation would be low . There would be no impacts to recreation. | Continued levels of disruption to residents and businesses from operations and maintenance activities would result in low impacts similar to existing conditions; however impacts would increase as the deteriorating structures require more maintenance. There would be no impacts to recreation. |
| Water Resources | Potential direct impacts to one pothole wetland from ground disturbance could be avoided through mitigation. Direct impacts to one stream from a culvert replacement could be avoided through mitigation. Indirect impacts from ground disturbance resulting in erosion and sediment transport to surface waters. Impacts would be low . | Continued low level of impacts to water resources and wetlands from operation and maintenance. Impacts would be low , but would increase as the deteriorating structures require more maintenance. |
| Vegetation | Direct impacts from removal of or disturbance, including crushing vegetation, damage to plant roots from compaction of soils by heavy equipment, and soil disturbance. Indirect impacts from the introduction and spread of noxious weed species and disturbance to plant communities from erosion and sedimentation. Impacts would be low-to-moderate . | Continued levels of vegetation removal from operation and maintenance. Operation and maintenance activities would result in low-to-moderate impacts because the level of maintenance would likely increase as the structures deteriorate. |
| Fish | No direct impacts since no work would be carried out within streams. Indirect impacts from changes to water quality from sediment entering streams or accidental hazardous spills from construction equipment. Impacts would be low . | Continued levels of sedimentation from vegetation removal during operation and maintenance. Impacts would be low but would increase as the deteriorating structures require more maintenance. |
| Wildlife | Temporary displacement of wildlife during construction and disturbance of habitat. Indirect impacts from noxious weed infestation of habitat. Impacts would be low-to-moderate . | Continued level of disturbance from operations and maintenance activities. Impacts would be low-to-moderate but would increase as the deteriorating structures require more maintenance. |

| Environmental Resource | Proposed Action | No Action Alternative |
|---|---|---|
| Air Quality | Direct temporary and localized impacts from operation of construction equipment releasing emissions and dust. Impacts would be low . | Continued levels of air pollutants from operations and maintenance activities. Impacts would be low but would increase as the deteriorating structures require more maintenance. |
| Socioeconomics, Public Services and Environmental Justice | Direct short-term beneficial impacts from increased economic activity associated with local procurement of materials and equipment and spending by construction workers. This may also benefit minority and low-income populations. Minimal localized delays in traffic, no impacts on schools or school transportation services. Impacts would be low . | Continued levels of spending locally from operation and maintenance workers and equipment would result in low impacts; however more frequent disruption of service is likely as maintenance requirements increase over time. |
| Cultural Resources | Direct impacts from possible disruption of previously unrecorded cultural resources during construction or operation and maintenance activities. Impacts would be low-to-moderate . | Continued level of impacts from operations and maintenance activities. Impacts would be low-to-moderate but would increase as the deteriorating structures require more maintenance. |
| Visual Resources | Temporary impacts from observing construction activities. Post-construction, no increased impact on visual resources from existing conditions. Impacts would be low . | Continued level of impacts from operations and maintenance activities. Impacts would be low but would increase as the deteriorating structures require more maintenance. |
| Public Health & Safety | Potential temporary impacts to workers from use of heavy equipment, aircraft hazards, and exposure to hazardous materials during construction. Potential impacts to local residents from construction traffic entering and traveling across the project corridor and intentional destructive acts. Impacts would be low . | Continued level of impacts from operations and maintenance activities. Impacts would be low but would increase as the deteriorating structures require more maintenance. |
| EMF & Noise | No increases in electromagnetic field exposures during operation and maintenance. Temporary direct noise impacts from construction equipment, truck traffic, and occasional use of helicopters. Impacts would be low . | Continued level of impacts from operations and maintenance activities. Impacts would be low but would increase as the deteriorating structures require more maintenance. |
| Climate Change | Direct impacts from greenhouse gas (GHG) emissions from construction equipment, increased worker traffic, and continued operations and maintenance. Impacts would be low . | Continued level of impacts from operations and maintenance activities. Impacts would be low but would increase as the deteriorating structures require more maintenance. |

Chapter 3

Affected Environment, Environmental Consequences, and Mitigation Measures

3.1 INTRODUCTION

This chapter includes an analysis of the potential impacts of the Proposed Action and the No Action Alternative on the human and natural environment. Each section of this chapter includes a description of the potentially affected environment for a specific resource, an analysis of the impacts on that resource, the mitigation measures that would reduce those impacts, and the unavoidable impacts that would remain after mitigation measures have been taken into account. The potential cumulative impacts of the Proposed Action in conjunction with other projects identified in the general vicinity of the Proposed Action are addressed at the end of the chapter.

Each resource section includes the following primary subsections:

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

For each resource, the area potentially affected by the Proposed Action and existing information about the resource in this area is first described. This affected environment information serves as the baseline from which to evaluate the potential impacts of the alternatives. In general, this chapter uses the terms “project right-of-way” to identify resources actually within the proposed right-of-way and the term “project area” to identify resources within the general vicinity of the right-of-way.

3.2 GEOLOGY AND SOILS

3.2.1 *Affected Environment*

The project area is situated along the northern edge of the Columbia Basin Physiographic Region. The Columbia River Plateau is characterized by gently rolling hills and shallow valleys covered by fine, windborne deposits of silt that overlie Columbia River Basalt. The geology of the Columbia River plateau is dominated by the Columbia River Basalt group, a series of flood basalt flows that were formed between 17.5 and 6 million years ago when massive lava flows poured out onto what are now parts of Washington, Oregon, and Idaho (USGS 2003; WDNR 2013a).

The topography in the project area ranges from flat plateaus and graded agricultural land to gently undulating and moderately hilly with elevations ranging from about 1,600 to 2,800 feet. Most of the elevation change occurs in the western portion of the alignment from structures 1/6 to 3/9 in exposed basalt bluffs. Additional topographic relief is provided by intermittent and perennial streams and rolling hills.

Soils in the project area are composed primarily of unconsolidated sediments including: dune sand, loess, gravel deposits from flood deposits from glacial outburst floods, and alluvium (WDNR 2013b). Unconsolidated sediments are notably susceptible to wind and water erosion, particularly if soils are bare of vegetation. Most of the area surrounding the right-of-way consists of land used primarily for agricultural purposes and are regularly plowed.

Geologic Hazards

Geologic hazards noted in the project area include potential liquefaction of soil in the event of an earthquake and flash flooding. Wet or low-lying areas with unconsolidated sediment are generally susceptible to liquefaction. Bedrock areas are not susceptible to liquefaction. Liquefaction susceptibility in the project area is generally low (WDNR 2013b). There are no mapped current landslide risks in the project area (WDNR 2013c) and nearly all landslide risk in Lincoln County is associated with the steeper slopes along the Columbia River and the northern border (Northwest Management, Inc. 2011). Similar landslide susceptibility can be expected for Grant County. There are no active volcanoes in Lincoln or Grant County and the area is not likely to be directly affected by lava flows, pyroclastic flows, landslides, or lahars associated with eruptions from active volcanoes in the Cascade Range (Northwest Management, Inc. 2011), west of the project area.

Soil Erosion Hazards

Erosion hazards include areas overlain by soils with a high or severe erosion hazard, as rated by the Natural Resources Conservation Service (NRCS), and steep slopes. The NRCS considers slope and soil properties such as cohesion, drainage, and organic content in determining soil erosion hazard classes of soils. Generally, coarse-grained soils on level to low-slope ground that are well drained have low erosion hazard potential. Conversely, fine-grained soils on steep slopes that are poorly drained have the greatest erosion hazard potential. Erosion hazard potential is described in this analysis as slight, moderate, or severe.

The transmission line right-of-way would cross approximately 1,139 acres (85 percent) of land with slopes less than 15 percent, 157 acres (12 percent) of land with slopes of 15 to 30 percent, and 46 acres (3 percent) of lands with slopes greater than 30 percent. Slopes of less than 15 percent are prominent along the entire right-of-way. Slopes of 15 to 30 percent are primarily concentrated from structures 1/4 to 4/2 in Grant County and from structures 4/8 to 18/9 in Lincoln County. Slopes that are greater than 30 percent are primarily concentrated from structures 1/8 to 3/4 in Grant County and from structures 12/7 to 19/4 in Lincoln County. The greatest overall concentrations of slopes that are greater than 15 percent are from structures 2/7 to 4/1 in Grant County and from structures 14/3 to 19/3 in Lincoln County.

The existing roads that would be improved and/or reconstructed cross approximately 0.69 mile (50 percent) of land with slopes less than 15 percent, 0.52 mile (37 percent) of land with slopes of 15 to 30 percent, and 0.18 mile (13 percent) of lands with slopes greater than 30 percent. Within the project area, there are five existing roads in Grant County and three existing roads in Lincoln County. In Grant County, the existing road at structure 2/8 has slopes that are mostly 15 to 30 percent while the existing road at structure 2/5 is dominated by slopes that are less than 15 percent. The existing road at structure 3/3 contains slopes that are primarily greater than 30 percent and the existing roads at structures 3/5 and 5/4 primarily contain slopes less than 15 percent. In Lincoln County, the existing road at structure 7/1 primarily contains slopes that are 15 to 30 percent and the two existing roads near structure 16/5 primarily contain slopes that are less than 15 percent (Table 3-1).

Table 3-1. Slope Characteristics along the Transmission Line Right-of-Way and the Existing Road Improvements and/or Reconstruction

| Slope Category | Right-of-Way (acres) | Right-of-Way (%) | Existing Roads (miles) | Existing Roads (%) |
|-------------------------|----------------------|------------------|------------------------|--------------------|
| Less than 15 Percent | 1,139 | 85 | 0.69 | 50 |
| 15 to 30 Percent | 157 | 12 | 0.52 | 37 |
| Greater than 30 Percent | 46 | 3 | 0.18 | 13 |
| Totals | 1,342 | 100 | 1.38 | 100 |

3.2.2 Environmental Consequences—Proposed Action

The following sections describe the potential construction and operation and maintenance impacts on geology and soils from implementing the Proposed Action.

Construction Impacts

Removal of Existing Structures and Installation of New Structures

Direct impacts on soils would result from clearing of vegetation, grading, and compaction of soils by heavy equipment during removal and installation of proposed structures. Clearing and grading, commonly with a bulldozer, removes both vegetation and the uppermost biologically active portion of the soil. Compaction from heavy equipment degrades soil structure, reducing the pore space needed to retain moisture and promote gas exchange. The extent of impacts at any one site would depend on the quality of soils, amount of moisture in the soils, amount of *surface water* flowing across the site, steepness of slopes in the area, amount of time bare soils are left unvegetated, and the type of structure erected, including whether guy wires would be needed to anchor the structure in place. Most existing structures would be removed by excavating around the pole base and removing the pole with a boom crane. Soils around the base of structures would be temporarily compacted and but would stabilize as they become settled and as vegetation becomes reestablished on bare soils.

Indirect effects from construction of the transmission line may include increased soil erosion by removing vegetation, exposing soils, and increasing runoff in compacted areas. Soils most

subject to erosion tend to be on the flatter, gentler terrain which would be subject to these mitigation measures. Slopes tend to occur on basalt, which is less susceptible to erosion. The steep slopes crossed by the right-of-way would be mostly spanned. Potential indirect impacts on soils would be associated with soil erosion, either during construction (minor sheet erosion²) or after construction, before vegetation is able to reestablish. The risk of erosion would be highest where the unconsolidated sediments are susceptible to wind and water erosion: on steep slopes with loess deposits and after rain events. There are 25 locations where structures would either be removed and/or replaced on slopes ranging between 15 and 30 percent and six locations on slopes greater than 30 percent (structures 1/8, 2/1, 3/2, 3/3, 3/4, and 18/2). BPA would minimize construction-related erosion by limiting disturbance during the critical erosion period (November through March); avoiding operation of heavy equipment in wet areas to reduce soil compaction and erosion; and revegetating disturbed areas after construction is completed. These prescriptions, which are included in the mitigation measures in Section 3.2.3, would reduce the potential for construction-related erosion on highly erodible lands.

Temporary soil compaction, damage to soil structure, and the risk of erosion would occur as a result of the Proposed Action. However, since most structures would be replaced in the same location as they currently exist, and mitigation measures described in Section 3.2.3, such as using stabilization and revegetation measures, would be used to reduce construction-related soil impacts.

Potential impacts associated with tensioning sites would include compaction from heavy equipment degrading soil structure and reducing pore space. Implementation of the mitigation measures identified in Section 3.2.3, such as limiting heavy equipment use, would reduce construction-related soil impacts from tensioning sites. Overall, potential impacts to soils and geology from the removal of existing structures and installation of new structures are considered to be **low**.

Access Roads

Road reconstruction/improvement, and the use of temporary travel routes would result in soil compaction and temporary increases in construction-related erosion and stormwater runoff. Erosion associated with reconstruction/improvement and the subsequent use of access roads during construction activities would have the greatest impact in areas associated with creeks and streams or in areas with steep slopes greater than 30 percent. This would also be the case with temporary travel routes. Approximately 0.2 mile of the access road reconstruction/improvement would occur on steep slopes.

With proper road design, use of water bars to direct surface water runoff, and other BMPs, the potential for construction-related erosion and resulting impacts on soils and geology would be reduced, and as a result impacts to soils would **low**.

² The removal of surface material from a wide area of gently sloping or graded land by broad continuous sheets of running water rather than by streams.

Tree Removal

Removal of the 53 trees within the right-of-way would include cutting the vegetation above ground with the roots would be left in place, resulting in **no** direct effects to soils. Indirect effects of vegetation removal on soils could include increasing soil exposure to erosive rain if adequate ground cover is not present, resulting in **low** impacts to soils.

Staging Areas

Since BPA would locate all staging areas outside of sensitive areas (e.g., streams and wetlands), in level, open, and likely developed or disturbed sites, potential impacts on soils at staging areas are expected to be **low**.

Operation and Maintenance Impacts

Operation and maintenance activities would include incidental repairs to access roads, which could cause localized soil disturbance by redistributing soils and gravel surfacing. Most vegetation management activities are non-ground disturbing and would not disturb underlying soils. In general, operation and maintenance activities would have a **low** direct impact on soils because they would be confined to small, localized areas dispersed along the length of the transmission line right-of-way.

Geologic Hazards

Seismic hazards are expected to be low due to the low incidence of earthquakes in the area. Earthquakes can be expected occasionally in the general vicinity of the project area and could be felt along the right-of-way.

Structures installed in unconsolidated sediments near stream channels could be located in areas with a moderate potential for liquefaction and structures installed near streams subject to flash floods could be damaged by high flows. To assess the potential for these hazards to affect the transmission line, BPA maintenance crews would continue to conduct annual visits to survey for landslide activity or other effects associated with geologic hazards. Any impacts on the transmission line from noted events would be addressed during those surveys. Since the locations of the structures would not change from current conditions (with the exception of one), the impacts would be similar to existing conditions and **low**.

3.2.3 Mitigation—Proposed Action

If the Proposed Action is implemented, the following mitigation measures would reduce impacts on geology and soils:

- Minimize the ground disturbance footprint, particularly in areas prone to erosion, such as along steep slopes (structures on slopes greater than 30 percent are: 1/8, 2/1, 3/2, 3/3, 3/4, and 18/2).
- Design roads to limit water accumulation and install appropriate access road drainage (e.g., culverts, ditches, water bars, cross drainage, or roadside berms) to control and disperse runoff, prevent erosion, and reduce the risk of mass wasting.

- Conduct work during the dry season, as possible, when streamflow, rainfall, and runoff are low to minimize erosion, sedimentation, and soil compaction.
- Use stabilization and revegetation measures to limit soil exposure times by using stabilization and revegetation measures (also see Section 3.5, Vegetation).
- Prepare and implement a stormwater pollution prevention plan that addresses measures to reduce erosion and runoff and stabilize disturbed areas.
- Inspect and maintain access roads, culverts, and other facilities after construction to ensure proper function and nominal erosion levels.
- Inspect revegetation work and sites to verify adequate growth, and contingency measures as needed.

3.2.4 *Unavoidable Impacts Remaining After Mitigation—Proposed Action*

Although construction BMPs would reduce the potential for temporary increases in erosion, some increased levels would be expected. Long-term impacts after mitigation would be limited to soil compaction and minor erosion of formerly vegetated ground in areas where reseeding could is not be successful. As a result, unavoidable impacts to soils and geology are expected to be **low**.

3.2.5 *Environmental Consequences—No Action Alternative*

Under the No Action Alternative, the Proposed Action would not be constructed and there would be no construction-related impacts to geology and soil resources. Continued operation and maintenance of the existing transmission line would have **low** impacts on geology and soils resulting from line maintenance, danger tree removal, and incidental use of access roads to maintain the transmission line infrastructure. Maintenance activities would likely increase over time as existing structures deteriorate, which could lead to more erosion and compaction than under existing conditions.

3.3 LAND USE, RECREATION, AND TRANSPORTATION

This section describes the existing land use, recreation, and transportation/traffic in the project area, and the potential construction and operation and maintenance impacts from the Proposed Action and No Action alternatives. The land use, recreation, and transportation area of analysis includes the existing right-of-way, the access road and travel route system that extends off of the right-of-way, and the adjacent properties that could be affected by the Proposed Action.

3.3.1 *Affected Environment*

Landowners within the project area consist of private individuals, the city of Grand Coulee, Grant County, Grant County PUD, Reclamation, and the WDNR. The majority of the existing transmission line right-of-way (97 percent) crosses private land. The proposed access roads

would cross approximately 225 feet of land managed by Reclamation, while the remaining road reconstruction and/or improvements would cross private land.

Comprehensive Planning and Zoning

In the city of Grand Coulee, the transmission line traverses areas designated as “Residential, Low Density” from structures 1/5 to 3/4, which is similar to the Grant County designation.

Residential, Low Density zoning allows single-family residential housing and duplexes in varying densities, ranging from one to four dwelling units per acre.

Zoning within Grant County includes “Urban Residential 2” from structures 1/5 to 1/8; “Open Space Conservation” from structures 3/4 to 4/2; and “Agriculture” from structure 4/2 to the county boundary near structure 5/5. The Urban Residential 2 zoning district is established within urban growth areas to provide for low-density residential development in areas having higher residential densities with access to urban centers and governmental services. The Open Space Conservation zoning district is comprised of privately-owned lands within the Open Space land use designation and allows for limited residential development, or for the enjoyment of recreation, scenic amenities, or for the protection of environmentally sensitive areas. The purpose of the Agricultural zoning district is to provide land for continued farming activities, to conserve agricultural land, and to reaffirm agricultural use, activities, and operations as the primary use of the zoning district (Grant County 2013a).

The Grant County Comprehensive Plan similarly designates “Residential, Low Density” from structures 1/5 to 1/8; “Open Space (Rural)” from structures 3/4 to 4/2; and “Dryland” from structure 4/2 to the county boundary near structure 5/5. Residential, Low Density allows single-family residential housing and duplexes in varying densities, ranging from one to four dwelling units per acre. The Open Space (Rural) designation provides for open, undeveloped areas that are not suitable for intensive development and that could be available for public uses, such as parks or recreation. Dryland Agriculture is used primarily for grain or feed crop production including ground in the Conservation Reserve Program, which is described below (Grant County 2006).

The Lincoln County Comprehensive Plan and the zoning designate areas crossed by the transmission line from structures 5/5 to the terminus at 30/1 as Agriculture. The zoning designation provides minimum standards, including requirements for residential dwellings and restrictions on other uses to minimize their impact on the surrounding agricultural use. This comprehensive plan designation is intended to protect the agricultural base of Lincoln County, and to maintain agriculture’s important position in the county. Non-agricultural developments are only allowed if they are compatible with the current agricultural practices in these areas. (Lincoln County 1983, 2013).

Land Uses

Land use and cover in the project area is classified as developed land and shrub/scrub/grasslands from the city of Grand Coulee to approximately 1 mile east of the Grant County/Lincoln County line (USGS 2006). From that point eastward the land use and cover is primarily agricultural land interspersed with shrub/scrub/grasslands, to approximately 2.5 miles west of the Creston

Substation where the land use and cover transitions to continuous shrub/scrub/grasslands (Figure 3-1).

The majority of the existing transmission line right-of-way (approximately 16.3 miles) crosses agricultural land, of which approximately 780.9 acres is located within the existing transmission line right-of-way (Table 3-2). Approximately 9.9 miles of the transmission line right-of-way crosses shrub/scrub/grasslands (487.2 acres), 1.3 miles crosses developed open space (63.7 acres), and 0.2 mile crosses developed land (9.8 acres).

Table 3-2. Land Use/Cover Type within Existing Transmission Line Right-of-Way

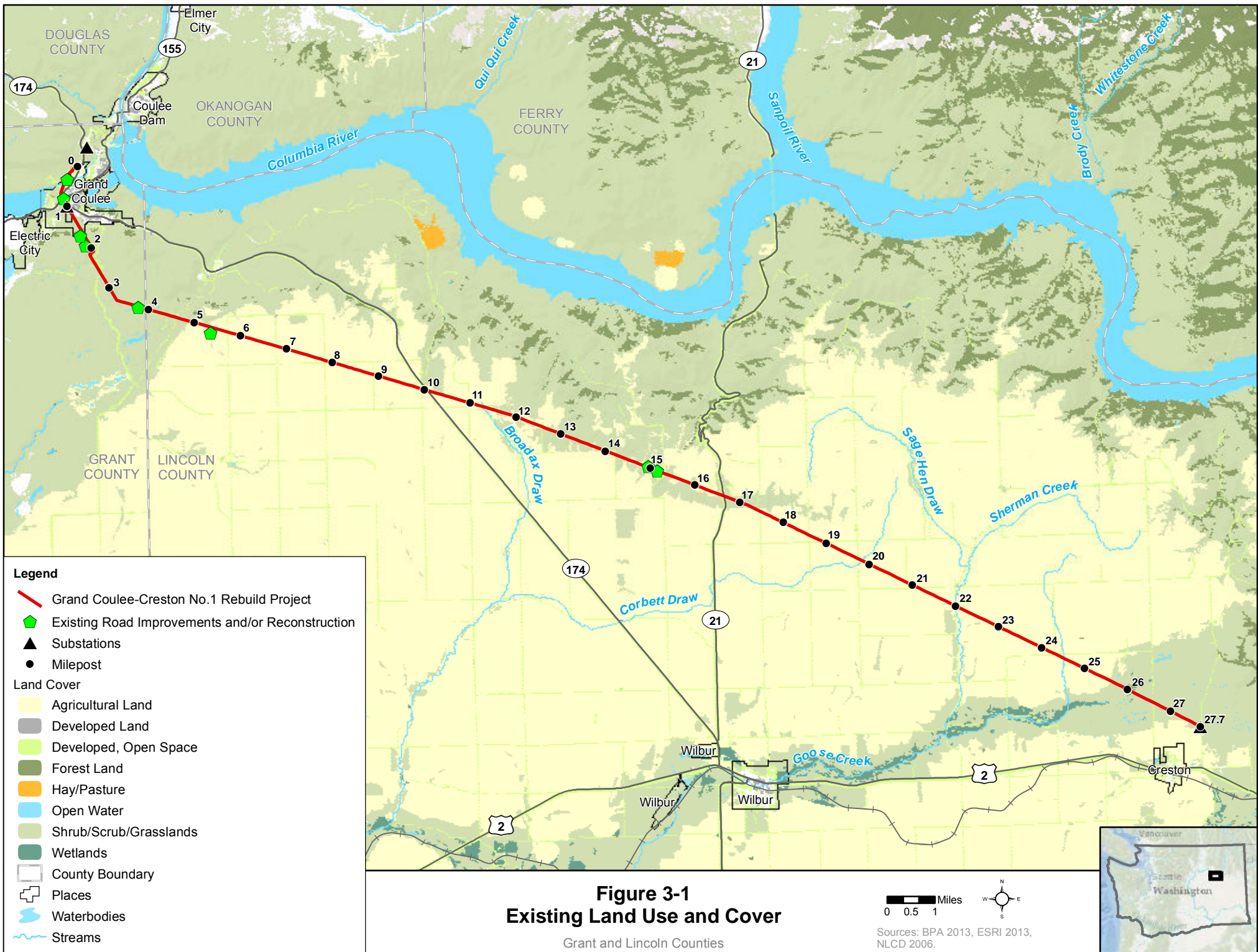
| Land Use/Cover Type | Miles | Acres |
|----------------------------|--------------|----------------|
| Agricultural Land | 16.3 | 780.9 |
| Developed Land | 0.2 | 9.8 |
| Developed Open Space | 1.3 | 63.7 |
| Shrub/Scrub/Grasslands | 9.9 | 487.2 |
| Totals | 27.7 | 1,341.6 |

Sources: ESRI 2013; USGS 2006.

Developed Land, Developed Open Space

Developed land and developed open space is primarily concentrated along the first 1.5 miles of the transmission line right-of-way in the city of Grand Coulee, from approximately structures 1/5 to 2/7 (Figure 3-1). The following land uses were identified on developed lands within 1,000 feet of the transmission line right-of-way between structures 1/5 and 3/1, in and near the city of Grand Coulee:

- 154 residences;
- 31 businesses;
- 1 hospital (Coulee Medical Center);
- North Dam Park;
- 3 places of worship; and
- 1 school (Grand Coulee Dam Middle School).



Another concentration of developed land is located in the town of Creston, approximately 0.5 mile southwest of the eastern terminus of the transmission line at the Creston Substation. Approximately 10 rural residences were identified within 1,000 feet of the transmission line right-of-way in unincorporated Lincoln County, at structures 9/6, 18/3, 21/4, 22/3, and 24/4.

Developed open space lands include portions of existing city streets, county roads, and state highways crossed by the transmission line, including SR 174 and SR 155 in the city of Grand Coulee and SR 21 in Lincoln County.

Rangeland

Rangelands are vast natural landscapes (e.g., grasslands, shrublands, woodlands, and wetlands). The project area crosses open range shrublands and grasslands interspersed with areas of woodlands and lands cleared in past years for grazing and other agricultural uses. Most of the crossed rangeland consists of land classified by the USGS (2006) NLCD as shrubland, grassland, and woodland (Figure 3-1). The transmission line and access roads cross rangelands between structures 2/8 and 6/4, southeast of the city of Grand Coulee, and between structure 28/1 and the Creston Substation, respectively. Rangeland in the project area is used for cattle and horse grazing and provides wildlife habitat and open space for recreation.

Agricultural Land

Agricultural land is the primary land use and cover within the right-of-way, between structures 6/4 and 28/1 in the Lincoln County (Figure 3-1). According to the U.S. Department of Agriculture, in 2007 approximately 74 percent of the land area in Lincoln County (approximately 743,236 acres) was cultivated cropland (USDA 2007). Most of the cultivated cropland in Lincoln County is un-irrigated and used to grow winter wheat for grain. Farmers are permitted to cultivate crops within and adjacent to the transmission line right-of-way.

The transmission line right-of-way would cross approximately 228 acres of *prime farmland* (17 percent) and 86 acres of prime farmland if irrigated (6.4 percent) in Lincoln County (Figure 3-2). Prime farmland becomes prevalent but dispersed along the right-of-way from structures 6/4 to 14/3 and then continues from structures 20/2 to 27/7. Prime farmland, if irrigated, is present along the right-of-way beginning at structure 16/8 and extends to the terminus at structure 30/1. There is no prime farmland or prime farmland if irrigated on the existing road improvements and/or reconstruction.

Conservation Reserve Program Lands

Three parcels crossed by the transmission line right-of-way are currently enrolled in the USDA's Farm Service Agency (FSA) Conservation Reserve Program (CRP). The CRP is a voluntary program that compensates landowners who enter into 10- to 15-year contracts to establish and maintain a long-term conserving cover of grasses and/or trees to reduce soil *erosion*, improve water quality, and enhance wildlife habitat (USDA 2007). Participating landowners receive annual rental payments for the term of their contracts. Landowners also could receive funding to fence streams that exclude livestock and to build grass waterways. The first CRP parcel is

located in an area of cultivated cropland between structures 12/8 and 13/5. The parcel includes a perennial stream (Broadax Draw). The second CRP parcel is located in an area of grassland or shrub-steppe between structures 16/8 and 17/5 and includes several streams. The third CPR parcel is located in an area of cultivated cropland between structure 29/7 and the Creston Substation. No streams are located on this parcel.

Recreation

Within the city of Grand Coulee, the Grand Coulee City Park is located on SR 174 and offers visitors a playground and picnic area. Several parks are located north of the transmission line along SR 155 in and around the city of Coulee Dam and the Lake Roosevelt National Recreation Area, including Cole Park, Crown Point State Park, Douglas Park, Mason City Memorial Park, Mead Park, and the Downriver Trail that extends 6.7 miles below the Grand Coulee Dam.

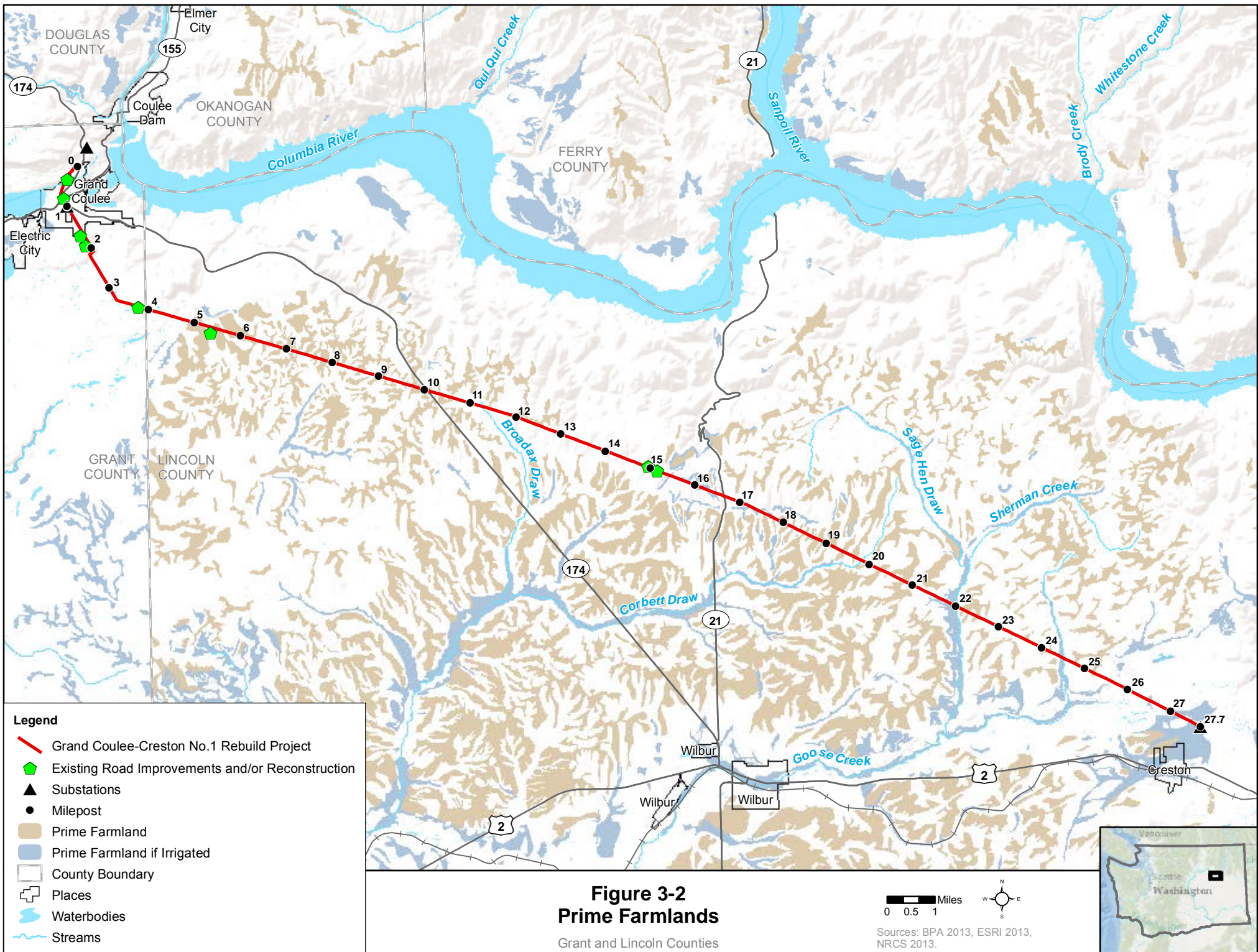
On the north shoreline of Banks Lake, along SR 155, the North Dam Park is within 1,000 feet of the transmission line right-of-way near structure 2/4. The park offers a picnic area, tennis courts, softball fields, an amphitheater, a playground, and the Gehrke Windmills, which is a local tourist attraction. Farther southwest along SR 155 on Banks Lake is the Coulee Playland Resort and Steamboat Rock State Park. The resort and state park offer camping facilities, boating access, and other recreation opportunities.

Transportation

Annual Average Daily Traffic (ADT) volumes for 2012 were identified from the WSDOT for primary transportation roadways in the project area (as depicted on Figure 3-1), to measure how heavily traveled they are along the right-of-way. ADT volumes in 2012 nearest to where they are crossed by the right-of-way were as follows:

- State Route 174 – south of structure 2/4 at State Route 155 – 1,700 vehicles;
- State Route 155 – north of structures 2/4 and 2/5 at State Route 174 – 5,200 vehicles;
- State Route 174 – south of structure 2/5 at State Route 155 – 3,000 vehicles;
- State Route 174 – north of structure 6/1 at Spring Canyon Campground Road – 1,800 vehicles; and
- State Route 21 – south of structure 18/3 at Jurgensen Road – 300 vehicles.

State Routes 174 and 155 had the highest 2012 ADT volumes in the city of Grand Coulee, receiving ingress and egress to surrounding communities and recreation areas; but these volumes are relatively minor compared to larger urban centers and major roadways in the state.



3.3.2 Environmental Consequences—Proposed Action

The following sections describe the potential construction and operation and maintenance impacts on land use, recreation, and transportation from implementing the Proposed Action.

Construction Impacts

Comprehensive Plans and Zoning

The Proposed Action would use the existing transmission line right-of-way and thus would continue to be consistent with the city of Grand Coulee, Grant County, and Lincoln County zoning designations and comprehensive plans.

Land Uses

The proposed improvements and/or reconstruction of 1.4 miles of existing access roads would not result in new disturbance areas. However, the replacement of structures would result in small amounts of disturbance within all four land use and cover type categories within the existing transmission line right-of-way (Table 3-3). These impacts would occur only during the construction phase and would last a few hours to a few days at each structure location, resulting in **low** impacts to land uses.

Table 3-3. Land Use/Cover Type within Areas of Disturbance for Structures

| Land Use/Cover Type | Acres |
|------------------------|------------|
| Agricultural Land | 1.7 |
| Developed Land | 0.01 |
| Developed Open Space | 0.2 |
| Shrub/Scrub/Grasslands | 1.0 |
| Total | 2.9 |

Notes: For these calculations, areas of disturbance are assumed to be 500 square feet buffers for all structures from 1/5 to 30/1.

Source: USGS 2006.

Developed Land, Developed Open Space

The Proposed Action would have small temporary impacts on developed land and developed open space areas, primarily where construction activities would disturb the ground within established work areas. These impacts would be noticeable for a period of hours or a few days as various types of construction activities occur at each structure site.

Construction activities associated with removal and installation of conductors and structures would likely be visible to nearby businesses, residences, and other existing land uses as well as from existing city streets, county roads, and state highways crossed by the transmission line. In some cases, construction vehicles and equipment would pass close to residences as they travel on access roads or overland to reach the transmission line right-of-way.

Construction could also temporarily disrupt local access to private residences, and construction activities could increase localized noise and fugitive dust levels for brief periods, as described in Section 3.14, EMF and Noise, and Section 3.8, Air Quality, respectively. Impacts to developed land would be **low**.

Rangeland

Structure replacement activities within rangeland (e.g., shrub/scrub/grasslands) would be temporary and localized, and would affect only a small portion of the existing shrub/scrub/grasslands in Grant and Lincoln Counties. BPA's acquisition of easements for existing access roads on rangelands would result in **no** impacts on current landowners, because they primarily involve formalizing and legally recording existing agreements. Impacts to vegetation and wildlife are discussed in Section 3.5, Vegetation, and Section 3.7, Wildlife, respectively.

Agricultural Land

The Proposed Action would have a small temporary impact on agricultural land where construction activities would disturb the ground within established work areas. Use of temporary travel routes through cultivated cropland could damage existing crops, if present at the time of construction. Travel routes would be determined at the time of construction and would take into consideration field planting and harvesting schedules. If fields are not planted, the most direct route to the structure would be used. If fields are planted, a route would be established in consultation with the landowner with the objective of minimizing crop damage. As described in the mitigation section below, disturbed areas would be restored to pre-project conditions and landowners would be compensated for any resulting crop damage.

BPA's acquisition of easements for existing access roads on agricultural lands would result in **no** impacts on current landowners.

Conservation Reserve Program Lands

The Proposed Action would have small temporary impacts on CRP lands. The FSA handbook *Agricultural Resource Conservation Program for State and County Offices* (USDA 2010) allows CRP lands to be crossed by public utilities, provided the county committee approves the use and the use is certified to have a minimum effect (i.e., vegetative cover is restored and impacts on erosion, wildlife and wildlife habitat, water, and air quality are kept to a minimum). In the unlikely event that the use was not approved by the Douglas County Office of Farmland Preservation, BPA would compensate the landowner for the affected acreage. BPA would work with landowners to provide information and mitigation measures to maintain CRP status or provide compensation if the usage was not allowed within the right-of-way. Impacts to CRP lands would be **low**.

Recreation

The transmission line right-of-way does not cross any parks, although several parks are located north of the transmission line in Electric City and the Lake Roosevelt Recreation Area, and west of the transmission line along Banks Lake. There would therefore be **no** impacts to recreation.

Transportation

The Proposed Action has the potential to result in short-term transportation impacts from construction-generated traffic. This could occur as a result of increased traffic on local roadways and from disrupting local traffic during construction. The increase in construction-related traffic would represent a relatively low increase in daily traffic volume, when compared to the ADT volumes for the roads in the project area. Up to 30 contractor employees could be employed along the transmission line right-of-way during peak construction (June through November), generating up to 30 additional passenger vehicle roundtrips per day. In addition, a small number of support trucks would deliver materials (e.g., wood piles, string, or conductors) and equipment (e.g., cranes, backhoes, excavators, tensioners, or pullers) to the work sites. Lane closures would result in temporary traffic delays but are not expected to substantially degrade traffic operation at these locations, because of their short duration. Implementation of the mitigation measures discussed below would further minimize transportation impacts, which are expected to be **low**.

Operation and Maintenance Impacts

Long-term impacts to all land use types from ongoing operations and maintenance activities would be similar to those already occurring along the transmission line and would not result in any new or different impacts. There would therefore be **low** impacts to all land use types from operations and maintenance activities.

Since the existing transmission line right-of-way does not cross any parks, there would be **no** impacts to recreation resources in the project area.

No additional operation and maintenance-related traffic impacts are expected on highways and local roads in the project area. There would therefore be **no** impacts to transportation from operations and maintenance.

3.3.3 Mitigation—Proposed Action

If the Proposed Action is implemented, the following mitigation measures would minimize impacts on land use, recreation, and transportation:

- Distribute, post, and publicized the construction schedule so landowners and recreational users know when potential construction-related disruptions might occur.
- Schedule construction during periods when active farms along the right-of-way are likely to be fallow, where possible, to minimize the potential for crop damage.
- Consult with landowners to identify travel routes across cultivated farmland that would minimize crop damage.

- Restore disturbed farmland back to the pre-project conditions and compensate landowners for the value of commercial crops damaged or destroyed by construction activities.
- Work with applicable landowners to maintain their CRP status or provide compensation if the usage was not allowed by the Douglas County Office of Farmland Preservation.
- Revegetate disturbed areas after the conclusion of construction, with the exception of those areas required to remain clear of vegetation to ensure the safety of the transmission line and access to the structures.
- Maintain access to residences, farms, and businesses during construction.
- Keep construction activities and equipment clear of residential driveways, to the extent possible.
- Use water trucks or other measures to minimize fugitive dust during project construction.
- Coordinate the routing and scheduling of construction traffic with WSDOT and county road staff.
- Publicize road closures and traffic delays to minimize impacts to traffic.
- Employ traffic-control flaggers and post signs warning of construction activities and merging traffic, when necessary, for short interruptions of traffic.

3.3.4 *Unavoidable Impacts Remaining After Mitigation—Proposed Action*

During construction, potential unavoidable impacts could consist of small temporary impacts on agricultural lands, rangelands, and developed lands where construction activities would disturb the ground within established work areas and along temporary travel routes. Construction activities would likely be visible to the businesses, residences, and sensitive land uses present, as well as existing city streets, county roads, and state highways crossed by the transmission line. Construction activities would also cause minor delays and interruptions to local traffic in the project area, generate noise and dust in residential areas, and temporarily interfere with agricultural and recreational activities. Most of these short-term construction impacts would cease once construction was completed. As a result, unavoidable impacts to land use, recreation and transportation are expected to be **low**.

3.3.5 *Environmental Consequences—No Action Alternative*

Under the No Action Alternative, construction activities would not occur. Initially, operation and maintenance activities would be similar to those currently performed on the transmission line right-of-way and conducted at similar intervals. However, maintenance activities would likely increase in frequency as existing structures continued to deteriorate, which could result in more frequent disruptions or interference with adjacent land uses, recreation areas, and transportation

routes. As a result, impacts to land use, recreation and transportation under the No Action alternative are expected to be **low**.

3.4 WATER RESOURCES

This section describes the existing water resources, water quality, and wetlands in the project area, and the potential construction and operation and maintenance impacts from the Proposed Action and No Action alternatives.

3.4.1 Affected Environment

The water resources project area includes all surface waters crossed by the existing transmission line right-of-way and the access road and travel route system inside and outside of the right-of-way, as well as surface waters located within 100 feet of any existing or proposed infrastructure. This distance (100 feet) was selected because it is a reasonable maximum distance within which project actions relating to land disturbance could potentially cause some increase in sediment runoff to streams (Knutson and Naef 1997).

Surface Water

More than half of the streams within the project area are part of the Upper Wilson Creek *watershed*. Other watersheds partially included in the project area are the Welsh Creek-Franklin D. Roosevelt Lake watershed and the Upper Grand Coulee watershed (Figure 3-3). Table 3-4 identifies the number of mapped streams in the project area by watershed and subwatershed.

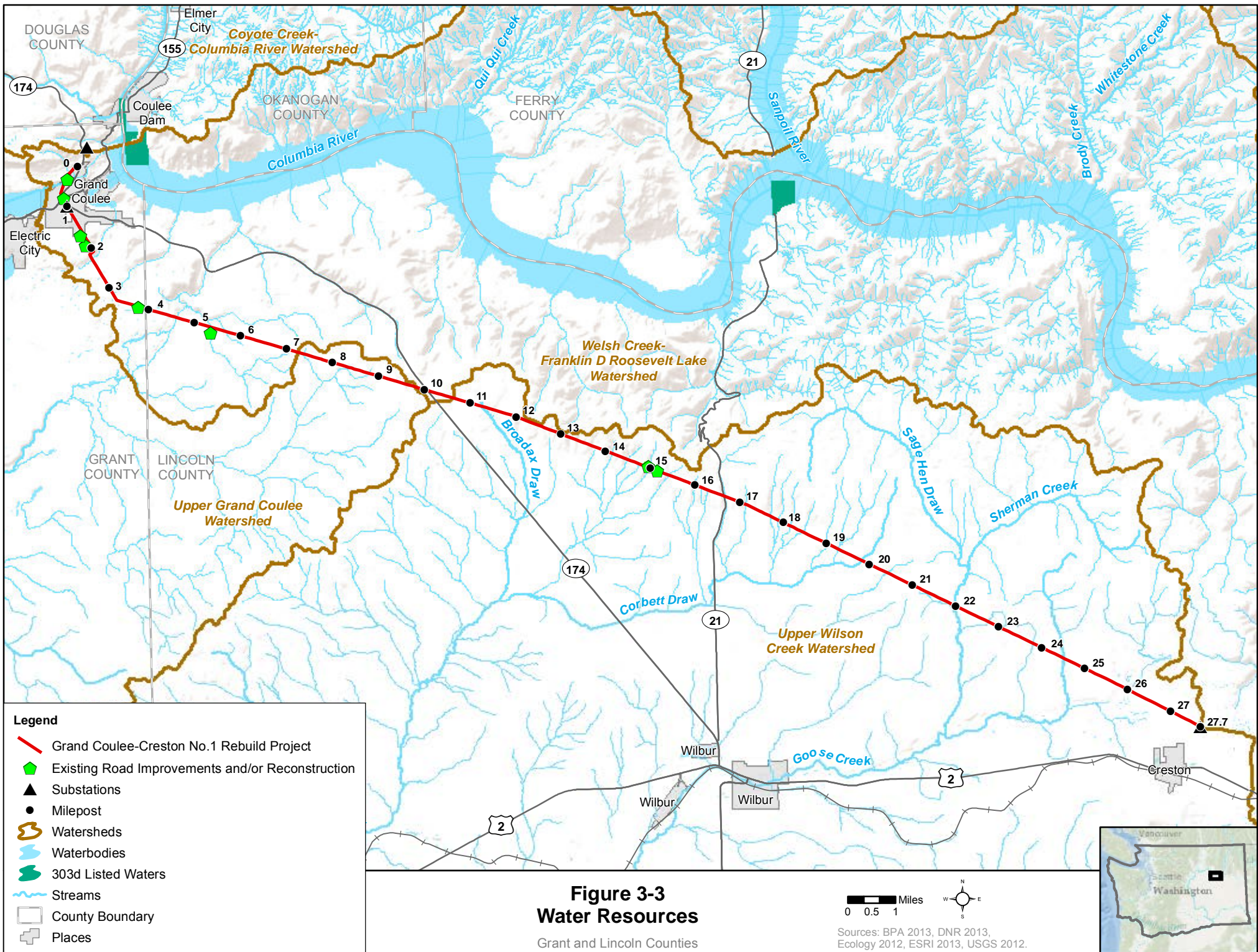
Table 3-4. Project Area Watersheds

| Watershed (5th field) ¹ | Subwatershed (6th Field) ¹ | Number of Streams ² |
|---------------------------------------|--|--------------------------------|
| Welsh Creek-Franklin D Roosevelt Lake | Coulee Dam- Franklin D Roosevelt Lake | 3 |
| | Spring Canyon | 3 |
| | Kaufman Creek- Franklin D Roosevelt Lake | 0 |
| | Subtotal | 6 |
| Upper Grand Coulee | Northrup Canyon | 3 |
| Upper Wilson Creek | Upper Corbett Creek | 19 |
| | Upper Good Creek | 8 |
| | Subtotal | 30 |
| Project Area Total | | 36 |

Notes:

¹ The United States Geological Survey (USGS) organizes watersheds by dividing hydrologic units into successively smaller hydrologic units. Each hydrologic unit is given a unique identifier known as a hydrologic unit code (HUC). 5th field and 6th field refer to the fifth and sixth levels of this classification, respectively.

² Number of streams was counted from the USGS HUC data layer.



These watersheds are part of two major subbasin areas: the Lake Roosevelt subbasin and the Crab Creek subbasin. Ultimately, all streams in the project area either drain north to Lake Roosevelt, west to Banks Lake, or west-southwest to the Columbia River. The vast majority of the project area occurs in Lincoln County and within the Crab Creek subbasin; the most western portion of the project area occurs within the Lake Roosevelt subbasin, as part of both Grant and Lincoln Counties.

According to the WDNR stream typing system, the right-of-way and associated access roads/travel routes either cross or are within 100 feet of streams in 36 different locations. A complete list of these streams is presented in Appendix B, which identifies the waterbody name, the next named downstream waterbody, water type, and flow type, as well the nearest transmission line structures. Water types are identified based on the WDNR stream typing system (Washington Administrative Code [WAC] 222-16-030), as follows:

- Type S: shorelines of the state,
- Type F: fish-bearing waters,
- Type N: non-fish-bearing waters,
 - Type Np: perennial, non-fish-bearing waters,
 - Type Ns: seasonal, non-fish-bearing waters,
- Type U: unidentified water.

Of the 36 locations in which streams are within the immediate right-of-way project area, 26 are identified as intermittent, two as perennial, and the remaining eight streams as "unknown unidentified water." Collectively, eight of these streams are part of the Lake Roosevelt subbasin with the remaining 21 streams part of the Crab Creek subbasin.

Flash floods, which are characterized by a rapid rise of the water level in a small stream, river, or dry wash, are common in areas of steep terrain and are often associated with brief, intense rainfall. Eastern Washington is prone to flash flooding. Thunderstorms, steep ravines, alluvial fans, dry or frozen ground, and light vegetation, which tends not to absorb moisture, all contribute to flash flooding. The risk of flash flooding in the project area is greatest in the drainages and deep canyons, which are generally spanned by the existing transmission line.

None of the waterbodies along the project are considered "impaired waterbodies" as defined by Section 303(d) of the federal Clean Water Act (33 U.S.C. 1251 *et seq.*) (Ecology 2012a).

Shorelines of the State

The Columbia River in Grant County is designated as a Shoreline of the State under the Washington Shoreline Management Act, which was enacted in 1971 as Revised Code of Washington (RCW) Chapter 90.58. Local shoreline regulations apply to activities within designated shorelines of the Columbia River.

Perennial and Intermittent Streams

The project area is drained by two perennial streams that cross or are within 100 feet of the transmission line right-of-way and access road system. Named mapped perennial streams (moving west to east) include Upper Grand Coulee Canal and Sherman Creek. Named intermittent streams (moving west to east) include Broadax Draw and Goose Creek (Figure 3-3). In addition, numerous unnamed intermittent streams drain the project area. The following sections briefly describe the named streams in the project area. Additional detail is provided for each stream in Section 3.6, Fish.

Upper Grand Coulee Canal

Upper Grand Coulee Canal crosses the right-of-way between structures 2/1 and 2/2. This stream is within Grand Coulee city limits in Grant County, about 250 feet south of Canal Service Road. This is a perennial unidentified water (Type U) that flows between the Columbia River and Banks Lake. It is a tributary to the Columbia River.

Broadax Draw

Broadax Draw crosses the right-of-way between structures 12/8 and 12/9. This stream is in Lincoln County, about 100 feet north of Hesseltine Road. This is an intermittent unidentified water (Type U) that flows into Corbett Draw.

Sherman Creek

Sherman Creek crosses the right-of-way between structures 24/3 and 24/4. This stream is in Lincoln County and parallels Sherman Draw Road. This is a perennial fish-bearing stream (Type F) that flows into Goose Creek.

Goose Creek

Goose Creek crosses the right-of-way between structures 26/8 and 26/9. This stream is in Lincoln County, about 600 feet south of Kurtz Road. This is an intermittent fish-bearing water (Type F) that flows into Goose Creek.

Unnamed Streams

In addition, review of the WDNR stream database indicates that there are two unnamed intermittent streams that cross the proposed reconstructed access road. One of these intermittent streams would require the installation of a culvert at the crossing between structures 6/8 and 7/1.

Groundwater

The project area for the **groundwater** analysis includes regional aquifer systems that underlie the transmission line right-of-way and access road and travel route system; namely, Miocene Wanapum Basalt and Quaternary alluvium.

Groundwater is a major water source for public water supplies, irrigation, and industrial uses. The project area is situated upon aquifers in Quaternary alluvium and Miocene Wanapum basalt. Alluvium rocks consist of highly permeable coarse sand, gravel, and cobble originating in

volcanic bedrock. Miocene basalt consists primarily of flood-type basaltic lava flows that were extruded from major fissures. Similar to Pliocene and younger basaltic rock, most of the interconnected open space in which groundwater passes occurs in interflow zones (between individual lava flows). However, these structural features are less common in Miocene basalt flows. The largest yields are obtained from wells that penetrate numerous open spaces (Whitehead 1994).

The EPA defines a sole source aquifer as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas might have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend on the aquifer for drinking water (EPA 1995). There are no EPA designated sole source aquifers within in the right-of-way.

The State of Washington defines a Wellhead Protection Area (WHPA) as the surface and subsurface area surrounding a water well or well field supplying a public water supply system through which contaminants are reasonably likely to move toward and reach such well or well field within one, five, and 10 years (WSDOH 2010). Review of GIS data provided by the Washington State Department of Health (2011) indicated that there are no WHPAs in the project area. The closest identified WHPA is located approximately one mile south of the eastern portion of the project area.

Wetlands

The wetlands area of analysis includes the right-of-way and the proposed access roads and travel routes that extend off the right-of-way. A search of the National Wetlands Inventory (NWI) was conducted to determine the presence of wetland features within the project area. Field reconnaissance surveys were conducted May 2013 to verify the existence of these features as well as identify any features not included in the NWI.

A total of seven wetlands were identified using the NWI and an additional 14 wetlands were identified during the field reconnaissance survey. Four types of wetlands were identified: freshwater pond, freshwater emergent wetland, and pothole.

The project area contains several depression pothole wetlands located in shrub/scrub/grasslands habitats. These wetlands gradually fill with water throughout the winter and spring and many dry up completely as the summer progresses. Depression wetlands are important for wildlife in an arid landscape, providing breeding habitat for amphibians and waterfowl, and an important water source for many terrestrial species.

Summary information is presented for the identified wetlands in Table 3-5. This table identifies the wetland type, acreage within the right-of-way, and location to nearest structures.

Table 3-5. Summary of Wetlands in the Project Area

| Wetland ID | Wetland Type | Acres within Right-of-Way | Structure/Distance |
|------------------|-----------------------------|---------------------------|------------------------------------|
| A | Freshwater Pond | 0.16 | 5/7 (340 feet) to 5/8 (230 feet) |
| B | Freshwater Emergent Wetland | 0.10 | 5/8 (590 feet) to 6/1 (230 feet) |
| C | Freshwater Emergent Wetland | 0.11 | 4/7 (430 feet) to 4/8 (475 feet) |
| D | Freshwater Pond | 0.21 | 5/7 (175 feet) to 5/8 (515 feet) |
| E | Freshwater Emergent Wetland | 0.07 | 6/2 (110 feet) to 6/3 (1,075 feet) |
| F | Freshwater Emergent Wetland | 0.01 | 5/1 (540 feet) to 5/2 (350 feet) |
| G | Freshwater Pond | 0.42 | 5/2 (510 feet) to 5/3 (215 feet) |
| X-A | Pothole | 0.11 | 4/6 (130 feet) to 4/7 (190 feet) |
| X-B ² | Pothole | - | 4/7 (290 feet) to 4/8 (450 feet) |
| X-C ² | Pothole | - | 4/8 (130 feet) to 4/9 (370 feet) |
| X-D | Pothole | 0.01 | 5/1 (30 feet) to 5/2 (460 feet) |
| X-E | Pothole | 1.07 | 5/2 (725 feet) to 5/3 (55 feet) |
| X-F | Pothole | 0.14 | 5/5 (400 feet) to 5/6 (30 feet) |
| X-G ² | Pothole | - | 5/6 (430 feet) to 5/7 (70 feet) |
| X-H ² | Pothole | - | 5/7 (110 feet) to 5/8 (540 feet) |
| X-I ² | Pothole | - | 5/7 (270 feet) to 5/8 (400 feet) |
| X-J ² | Pothole | - | 5/8 (170 feet) to 6/1 (540 feet) |
| X-K ² | Pothole | - | 5/8 (345 feet) to 6/1 (340 feet) |
| X-L ² | Pothole | - | 6/1 (515 feet) to 6/2 (65 feet) |
| X-M ² | Pothole | - | 6/2 (40 feet) to 6/3 (1,200 feet) |
| X-N | Pothole | 0.25 | 29/1 (490 feet) to 29/2 (11 feet) |

Notes:

¹ Wetland IDs were assigned with two sets of alphabetical designations, wetlands identified during field reconnaissance surveys but not during review of NWI were given an “X” label.

² Pothole wetlands that only had GPS point taken during surveys, no size data is available for these wetlands.

Sources: U.S. Fish and Wildlife Service NWI; Cardno ENTRIX staff.

3.4.2 Environmental Consequences—Proposed Action

The following sections describe the potential construction and operation and maintenance impacts on water resources, water quality, and wetlands from implementing the Proposed Action.

Construction Impacts

Removal of Existing and Installation of New Structures

Clearing of vegetation and grading associated with the removal and installation of structures, including counterpoise replacement, if required, would expose soils and make them more susceptible to erosion. This could degrade waterbodies if eroded sediment were to reach a waterbody. However, all existing or proposed new structures are located at least 50 feet from any waterbody. Compaction from heavy equipment degrades soil structure, reducing pore space, which could lead to increased erosion if erosion control measures are not implemented. The risk of erosion would be greatest where unconsolidated sediments are susceptible to wind and water erosion: on steep slopes with erodible soils and after rain events.

Each structure site would have a small area of exposed bare soil for a few weeks that could, if not maintained, erode and be a source of sediment to nearby streams. However, this would generally fall within the range of current conditions, as many of the existing and proposed structures are located in cultivated fields that are frequently laid bare for plowing and planting. In addition, implementation of the mitigation measures in Section 3.4.3, such as conducting as much work as possible during the dry season when stream flow, rainfall, and runoff are low, would reduce these potential construction-related water quality impacts.

Replacement of the existing structures is not expected to affect infiltration of surface water to groundwater, because the new structures would be set in the existing holes and would result in no or a small net gain in impervious surfaces. Spill prevention and response plans would be developed to reduce the potential for spills and provide for swift responses, which would minimize any potential for groundwater contamination (see Section 3.13, Public Health and Safety).

No NWI mapped wetland is located within 100 feet of any proposed structure under the Proposed Action. However, the field reconnaissance survey found that structure removal and replacement is proposed within 100 feet of Wetlands X-D, X-E, X-F, X-G, X-L, X-M, and X-N, all of which are pothole wetlands (Table 3-5). Wetland X-N is approximately 11 feet from structure 29/2. Potential disturbance to this wetland would be reduced by accessing the structure from the north and conducting work during the dry season. For the remaining wetlands, it is likely that structure-related disturbance could be avoided completely. Staking and flagging would be installed in these areas to restrict vehicle and equipment access to designated routes and areas to protect these sensitive habitats.

Mitigation measures listed in Section 3.4.3, including marking of wetlands in the field, would minimize impacts to wetlands and their associated buffers. With implementation of these mitigation measures, direct impacts to wetlands would be limited to vegetation damage with the potential for indirect impacts to water quality from erosion and soil disturbance. Vegetation in these wetlands includes herbaceous plants and shrubs, which would likely regenerate quickly, resulting in temporary impacts.

There are no wetlands located where counterpoise would be installed and there would, therefore, be **no** direct or indirect impacts to wetlands as a result of counterpoise replacement, if required.

Disturbances associated with tensioning sites would be temporary and localized, mainly occurring nearby or in conjunction with the removal of existing structures, the installation of new structures, and implementation of the mitigation measures described in Section 3.4.3 would reduce these impacts, resulting in **low** impacts.

Waters could become contaminated from chemicals or other pollutants associated with construction activities. Construction activities require the use fuel and other chemicals, such as coolants, hydraulic fluids, and brake fluids, to operate heavy equipment and vehicles. The potential risk of water quality impacts associated with accidental spills during construction would be **low**, due to the implementation of BMPs including a Spill Prevention and Treatment Plan.

Access Roads

Access road reconstruction/improvements would require clearing and grading that would temporarily expose soils to potential erosion and the subsequent transport of sediment to surface waters. Implementation of the mitigation measures in Section 3.4.3 would reduce the potential for erosion and adverse water quality impacts associated with access road reconstruction. In addition, improved and reconstructed access roads would be composed of a compacted gravel surface to minimize erosion. Roads would also be reconstructed with drainage ditches and/or water bars, as necessary, to prevent potential surface erosion or other road failure. The Proposed Action would involve one culvert replacement in an intermittent waterbody, under the existing farm access road between structures 6/8 and 7/1. This culvert replacement would occur in the dry season to avoid potential turbidity impacts on water quality during installation. This work would occur when there is no flow or, if that is not possible, stream flow would be diverted from the culvert location during installation/replacement, as necessary.

Review of the WDNR stream database (Appendix C) indicates that 26 waterbodies (19 intermittent, two perennial, and five unknown) would be crossed by travel routes over existing non-public roads (access roads). Three waterbodies (two intermittent and one unknown) would be crossed by existing access roads and temporary travel routes through agricultural fields. Travel routes across agricultural fields would be used in their existing condition with the least impact necessary, to allow travel during construction and facilitate restoration of the area back to existing conditions after construction activities are completed. Because there would be no fording of these 26 waterbodies, **no** impacts would occur.

Although composed of a compacted gravel surface, reconstructed/improvements access roads would decrease groundwater infiltration rates within their footprint, but would not likely have a noticeable effect on overall infiltration rates in the project area.

No road reconstruction/improvements would occur near any wetlands identified in the project area. Wetlands X-A through X-M are located along existing access roads, but impacts are expected to be **low**, due to the use of the existing roadbed and the limited amount of new

construction activities. Indirect impacts to wetlands from access road use during construction would be **low** due to the existing disturbance in these areas and the low frequency of use. An overall decline in the hydrologic regime of the wetland is not expected. Implementation of the mitigation measures identified in Section 3.4.3 would include minimizing ground disturbance when working in or near waterbodies and installing stakes or flagging to restrict vehicles and equipment to designated travel routes.

Tree Removal

Riparian vegetation is an important factor in maintaining cool temperatures in waterbodies in the Pacific Northwest. Natural riparian vegetation, especially large trees, is limited in the project area due to the arid environment. For smaller streams, shorter riparian vegetation is generally adequate to maintain stream temperatures and the smaller tributaries in the project area are either well shaded with low-growing vegetation, or are not shaded at all.

As stated in Section 2.1.5, a total of 53 trees/shrubs would be removed near two waterbodies within the western portion of the project area. One of these waterbodies is a concrete-lined canal owned by Reclamation, which lacks riparian vegetation. The other waterbody is an intermittent unidentified (Type U) stream. Approximately 20 serviceberry trees (*Amelanchier* spp.) trees that contribute little-to-no stream shading would be removed near the second waterbody located near structure 6/2. Because BPA already conducts vegetation management along its right-of-way, and since no riparian vegetation would be removed under the Proposed Action, **low-to-no** impacts would occur to stream shading and water temperatures compared to current conditions.

Staging Areas

BPA would require the construction contractor to locate all staging areas outside of stream channels and at least 200 feet from wetlands in level, open, and already developed or disturbed sites. **No** impacts on water resources and water quality are anticipated as a result of staging areas for the Proposed Action.

Operation and Maintenance Impacts

Operation and maintenance activities would not change from existing conditions. Generally, these activities would have no or little impact on surface waters. Maintenance activities could require access by vehicles during line inspections. Occasionally, equipment such as insulators could need replacement. Current vegetation management activities would continue, including removal or pruning of danger trees and control of noxious weeds within the right-of-way.

Waters could become contaminated from chemicals or other pollutants associated with periodic operation and maintenance activities. Construction activities require the use fuel and other chemicals, such as coolants, hydraulic fluids, and brake fluids, to operate heavy equipment and vehicles. The potential risk of water quality impacts associated with accidental spills during construction would be **low**, due to the implementation of BMPs including a Spill Prevention and Treatment Plan.

Only approved herbicides would be used by a licensed applicator and only in quantities that would degrade in the surface soil or plant surfaces in accordance with BPA's *Transmission System Vegetation Management Program Final EIS* (BPA 2000). Based on these application procedures, there would likely be no measureable transmission of these substances to ground or surface waters and **no** related impact to ground or surface waters during operation and maintenance.

3.4.3 Mitigation—Proposed Action

If the Proposed Action is implemented, the following mitigation measures would reduce impacts on water resources:

- Utilize standard BMPs, in accordance with the *Stormwater Management Manual for Eastern Washington* (Ecology 2004), where applicable.
- Design and construct roads to minimize drainage from the road surface directly into water features.
- Minimize erosion, sedimentation, and soil compaction by conducting as much work as possible during the dry season when streamflow, rainfall, and runoff are low.
- Conduct the culvert installation/replacement work during the dry season, either when stream flows, rainfall, and runoff are low; when there is no flow; or by divert flow from the stream culvert location during installation, as necessary.
- Complete culvert installation/replacement work between July 1 and September 15, the WDFW in-water work window.
- Stabilize approaches to streams and stream crossings with clean rock or steel plates during construction.
- Drainage control features, such as drain dips on access road should be used, as needed to control runoff and erosion.
- Minimize the ground disturbances when working in or near waterbodies during construction, particularly in areas prone to erosion, and install stakes or flagging to restrict vehicles and equipment to designated routes and work areas.
- Conduct as much work as possible during the dry season when stream flow, rainfall, and runoff are low.
- Install sediment barriers and other suitable erosion- and runoff-control devices, where needed, prior to ground-disturbing activities at construction sites to minimize offsite sediment movement.
- Prepare and implement a Stormwater Pollution Prevention Plan that addresses measures to reduce erosion and runoff and stabilize disturbed areas.
- Implement pollution and erosion control measures prior to construction and maintain them throughout the duration of the Proposed Action.

- Store construction vehicles or equipment at least 50 feet from any stream or wetland or use secondary containment systems as necessary.
- Locate refueling and servicing operations where spilled material cannot enter natural or manmade drainage conveyances (e.g., ditches, catch basins, ponds, wetlands, streams, and pipes). Use pumps, funnels, absorbent pads, and drip pans when fueling or servicing vehicles.
- Keep spill response materials on site and with equipment.
- Maintain vehicles and equipment in good working order to prevent oil and fuel leaks.
- Ensure that temporary travel routes would avoid waterbodies and wetlands, whenever possible.
- Flag or stake wetland boundaries in the vicinity of construction areas and ensure these areas are avoided during construction.
- Locate tensioning sites at least 50 feet from streams or wetlands when possible.
- Locate structure guy anchors outside of wetlands and buffers when possible.
- Place erosion control materials around the work area when working within 25 feet of wetlands. Remove and stabilize material in an *upland* area.
- Require a BPA environmental specialist to meet with contractors and inspectors in the field and visit wetlands near or within construction areas to review mitigation measures and any permit requirements.
- Conduct as much work as possible during the dry season when streamflow, rainfall, and runoff are low.
- Inspect and maintain access roads, culverts, and other facilities after construction to ensure the proper function and nominal erosion levels.

3.4.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

Implementation of the Proposed Action may result in temporary exposure of soils to potential erosion and the subsequent transport of sediment to surface waters. However, these impacts would be temporary and would end after vegetation is established on bare soils. **No** permanent unavoidable impacts to water quality or wetlands are expected from the Proposed Action.

3.4.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, no construction or construction-related impacts on water resources, wetlands, and water quality would occur. Operation and maintenance impacts, , would be similar to those described for the Proposed Action. However, as the existing line ages, the frequency of maintenance activity would likely increase, as would the potential for unplanned

emergency maintenance activities. As a result, impacts to water quality and wetlands under the No Action alternative are expected to be **low**.

3.5 VEGETATION

This section describes the existing vegetation, noxious weeds, and special status plants in the project area, and the potential impacts from the Proposed Action and No Action alternatives.

3.5.1 Affected Environment

The project area is within the Columbia Basin physiographic province, which extends south from the Columbia River between the Cascade Range and Blue Mountains of Oregon (Franklin and Dyrness 1973). The climate is arid to semiarid with low precipitation, hot, dry summers, and relatively cold winters (Franklin and Dyrness 1988). Precipitation averages approximately 10 to 15 inches a year in the project area portion of Eastern Washington (USGS 2005).

Topography in the area of the Proposed Action ranges from flat plateaus and graded agricultural land to gently undulating hills and valleys. A few areas of steep cliffs and canyons are in the project area, some of which are associated with wetlands and riparian areas. Starting at structure 1/5, the existing transmission line runs south from the Columbia River in the city of Grand Coulee (approximate elevation 1,500 feet), then climbs almost 1,000 feet onto a undulating plateau vegetated with native shrub-steppe (elevations ranging from 2,200 to 2,500 feet). At structure 7/1, the plateau flattens considerably (ranging from 2,600 to 2,700 feet) and the right-of-way traverses a well-defined agricultural area until structure 14/2. From structures 14/2 to 19/4, the right-of-way traverses a hilly grassland-steppe (elevations ranging from 2,500 to 2,700 feet). From structures 19/4 to 28/1, the project area is comprised of active agriculture (average elevation 2,400 feet). Approximately one mile of the project right-of-way (structures 28/1 to 28/9) is gently undulating forest shrub-steppe with some agricultural grazing. The last mile of the project right-of-way, from structures 28/9 to 30/1, is intensively grazed grassland.

Vegetation Communities and Land Cover Types within the Project Area

Major vegetation communities and land cover types are described below. These communities follow descriptions provided in the *Field Guide to Washington's Ecological Systems* (Rocchio and Crawford 2008), and supplemented as needed by the *Natural Vegetation of Oregon and Washington* (Franklin and Dyrness 1973). Descriptions are based on the field reconnaissance surveys conducted in the project area in May 2013, and supplemented with information gathered during the noxious weed surveys conducted in late July and early August 2013. Appendix D provides a list of common species observed within the project area during the surveys. The nomenclature follows the USDA Plants Database (USDA NRCS 2013).

Developed Lands

Developed land and developed open spaces include those areas dominated by rural, suburban, and commercial development. Along the project right-of-way, developed lands are associated

with the city of Grand Coulee from structures 1/5 to 2/7. Areas of relatively intact shrubland-steppe within these developed lands were found between structures 1/5 and 2/1, and 2/5 and 2/6.

Agriculture

Agricultural practices, including crop production, rural development, and livestock grazing are the dominant land use in the project area, and occupying nearly 16.3 of the 27.7 miles of the project right-of-way. The primary agricultural practice is dryland wheat farming, but other irrigated and dryland crops are also present. Active agriculture (interspersed with rural development) was observed from structures 6/4 to 6/8, 7/1 to 12/8, 13/6 to 14/2, and 19/4 to 28/1. Livestock grazing occupies a small portion of the right-of-way, from structures 28/1 to 30/1. Agricultural areas with crop production provide low quality habitat for native vegetation, based on an abundance of non-native species, rural development, and frequent cultivation. These areas can be susceptible to erosion, the spread of noxious weeds, vandalism, and other issues.



Figure 3-4. Agricultural Land near Structure 9/5

Grassland-Steppe

Rocchio and Crawford (2008) describe the Columbia Plateau Steppe and Grassland community as extensive grasslands, dominated by perennial bunch grasses and forbs (greater than 25 percent cover) sometimes with a sparse (less than 10 percent cover) shrub layer. This community often forms a landscape mosaic with the Columbia Plateau Scabland Shrubland ecological system.

Herein referred to as grassland-steppe, this community is commonly integrated with shrubland-steppe and scabland shrublands throughout the project area (Figure 3-5). Grassland-steppe was interspersed between agricultural operations, from structures 12/8 to 13/6, 14/2 to 19/4, and 28/1 to 30/1 where it occupied land too steep and/or rocky for cultivation. These areas were gently

sloping, with frequent ephemeral drainages. Native bunch grasses were common, such as basin wildrye (*Leymus cinereus*), Idaho fescue (*Festuca idahoensis*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). Herbaceous species including silky lupine (*Lupinus sericeus*) were also prevalent. Weedy non-native species were abundant in this community; dominants were cheat grass (*Bromus tectorum*), flix weed (*Descurainia sophia*), and tall tumble mustard (*Sisymbrium altissimum*).

Scabland shrubland (described below) was found, especially from structures 14/5 to 15/1, and in these localized areas, native species were found to predominate, including the Washington listed “sensitive” species Grand Coulee onion (*Allium constrictum*). Between structures 28/1 and 28/9, vernal pools, scabland shrubland, and ponderosa pine occurred within this shrubland-steppe community, as shown in Figure 3-6.



Figure 3-5. Grassland-Steppe near Structure 14/3



Figure 3-6. Ponderosa Pine Occurring within the Grassland-Steppe Community near Structure 28/3

Shrubland-Steppe

The dominant natural community within the project area was represented by Inter-Mountain Basins Big Sagebrush Shrubland and/or Inter-Mountain Basins Big Sagebrush Steppe (Rocchio and Crawford 2008), herein referred to as shrubland-steppe. These two communities are described in the literature as sagebrush shrublands dominated by big sagebrush (*Artemisia tridentata*) with approximately 25 percent cover of herbaceous species, occurring throughout the Columbia Basin, between mountain ranges and in the foothills (Rocchio and Crawford 2008).

Big sagebrush dominated shrubland-steppe was observed from structures 1/5 to 2/2, 2/7 to 6/4, and 6/8 to 7/1. Habitat quality in these areas was high to moderate, with non-native species like flix weed proliferating along roadsides, and in the transmission line construction right-of-way. As shown in Figure 3-7, this community transitions with scabland shrubland (described below) and grassland-steppe (described above), and vernal pools also exist here.

Common species in the shrub layer included: service berry (*Amelanchier alnifolia*), wax current (*Ribes cereum*), and several species of buckwheat (*Eriogonum* spp.). Native bunch grasses (bluebunch wheatgrass, basin wildrye, Idaho fescue) were common in openings. Flowering annuals and perennials included arrowleaf balsam root (*Balsamorhiza sagittata*), Columbia ragwort (*Senecio integerrimus*), stiff yellow indian paintbrush (*Castilleja lutescens*), fiddleneck (*Amsinkia* sp.), desert-parsley species (*Lomatium* spp.), and delphinium (*Delphinium* sp.).



Figure 3-7. Shrubland-Steppe Community, Interspersed with Vernal Pools, near Structure 5/5

Scabland Shrubland

Columbia Plateau Scabland Shrubland (Rocchio and Crawford 2008) is a unique community associated with shallow lithic soils over fractured basalt (Figure 3-8). Due to poor drainage through the basalt, winter precipitation often saturates soils from fall to spring, creating locally variable habitat that supports a unique vegetation assemblage. Total vegetative cover is typically low (less than 50 percent) and is colonized by an open dwarf-shrub community dominated by scabland sagebrush (*Artemisia rigida*), and several other dwarf shrubs including thymeleaf buckwheat (*Eriogonum thymoides*), narrowleaf mock goldenweed (*Nestotus stenophyllus*), Gairdner's penstemon (*Penstemon gairdneri*), and spreading phlox (*Phlox diffusa*). Interstitial areas and rocks are densely colonized by lichens mosses such as spike moss (*Selaginella* sp.).

Native bunch grasses are common, including blue grass species (*Poa* spp.), while exotic grasses and forbs are largely absent from this community due to extended soil saturation during early winter when most of these opportunistic annual species are colonizing. These conditions are alternately favorable to some native perennial wildflowers such as wild onion (*Allium* sp.), bitter root (*Lewisia rediviva*), lace leaf stone crop (*Sedum lanceolatum*), and Grand Coulee onion (constricted Douglas' onion).

This community intergrades with shrubland-steppe and grassland-steppe, described above, and was observed intermittently from structures 2/7 to 6/4, 14/5 to 15/1, and 28/1 to 28/9. Habitat quality in these areas was high to moderate, with non-native species proliferating along roadsides and in the transmission line construction right-of-way.



Figure 3-8. Columbia Plateau Scabland Shrubland near Structure 3/5

Vernal Pools

Vernal pools are ephemeral freshwater wetlands associated with the exposed volcanic scabland of the Columbia Plateau (Rocchio and Crawford 2008). Vernal pools occur within the big sagebrush shrubland-steppe habitat areas and are found in depressions with impermeable bottoms that are not subject to runoff or drainage (Rocchio and Crawford 2008). They are typically located on basalt flows and have silty clay bottoms. These depressions usually fill with water during the winter and spring and are commonly dry in summer. In the project area, vernal pools are typically small and their quality varies from low to high (Figure 3-9). This vegetation community was found within the shrubland-steppe from structures 4/3 to 6/2 and 28/1 to 28/9. Common species included basin wildrye, rush (*Juncus* sp.), spike rush (*Eleocharis* sp.), iris (*Iris* sp.), common yarrow (*Achillea millefolium*), and whitestem fraseria (*Frasera albicaulis*).

In some areas Canada thistle, a noxious weed, has become well established in these pools. Habitat quality for some pools that have not been invaded by noxious weeds or heavily grazed by cattle is excellent, such as the pool in Figure 3-9 near structure 5/7. For other pools, such as the one shown in Figure 3-10 near structure 28/6, heavy grazing has compromised the habitat quality.



Figure 3-9. Vernal Pool near Structure 5/7



Figure 3-10. Vernal Pool with Heavy Grazing near Structure 28/6

Riparian Woodland Shrubland

Riparian areas occur infrequently in the project area, but notably do occur between structures 6/2 and 6/3, and 6/8 and 7/1 (Figure 3-11). This community is described by Rocchio and Crawford (2008) as Columbia Basin Foothill Riparian Woodland Shrubland. The Riparian Woodland Shrubland has steep valleys and canyons associated with relatively large drainages. The riparian

area between structures 6/2 and 6/3 contains a stand of quaking aspen (*Populus tremuloides*) and a diversity of shrubs including wild rose (*Rosa* sp.), red-stem dogwood (*Cornus sericea*), choke cherry (*Prunus virginiana*), and snowberry (*Symphoricarpos* sp.), and herbaceous species such as figwort (*Scrophularia* sp.), horsemint (*Agastache* sp.), stinging nettle (*Urtica* sp.), and starry false lily of the valley (*Maianthemum stellatum*).

Noxious Weeds

Noxious weeds have a tendency to spread quickly, have the potential to displace native species, and cause a variety of ecological impacts. As defined by Washington State Noxious Weed Control Board, a “noxious weed” is the traditional, legal term for any invasive, non-native plant that threatens agricultural crops, local ecosystems, or fish and wildlife habitat. The term “noxious weeds” includes non-native grasses, flowering plants, shrubs, and trees. It also includes aquatic plants that invade wetlands, rivers, lakes, and shorelines (NWCB 2013). Noxious weed infestations have contributed to the loss of agricultural productivity and ecological functionality on public and private lands. The eradication and control of noxious weeds is a high management priority for state and federal land management agencies, as well as private individuals and companies.



Figure 3-11. Riparian Woodland/Shrubland near Structure 6/2

A survey for noxious weeds was completed for a 400-foot-wide right-of-way for the entire length of the project between July 30 and August 6, 2013. Table 3-6 provides a summary of the survey results, including scientific and common name, Lincoln and Grant counties classifications, and spatial extent and abundance.

In general, noxious weeds are classified into one of three categories:

- Class A noxious weeds are *nonnative* species whose distribution in Washington is still limited. Preventing new infestations and eradicating existing infestations are the highest priority. Eradication of all Class A plants is required by law. No Class A species were found during the noxious weeds survey.
- Class B noxious weeds are nonnative species presently limited to portions of the state. Class B species are designated for control in portions of the state where they are not yet widespread. Prevention of new infestations in these areas is a high priority. In regions where Class B species are already abundant, control is decided at the local level, with containment as the primary goal. Nine Class B species were found during the noxious weed survey (see Table 3-6).
- Class C noxious weeds are nonnative plants that are already widespread in Washington or are of special interest to the State's agricultural industry. Class C status allows counties to enforce control if locally desired. Other counties could choose to provide education or technical support for the removal or control of these weeds. Six Class C species were found during the noxious weed survey (see Table 3-6).

The most common weed found on the county weed lists and within the project area was Canada thistle. St. Johnswort, diffuse knapweed, dalmatian toadflax, kochia, and bull thistle were also common throughout much of the survey area.

Table 3-6. Noxious Weed Species Identified during the Undesirable Plants Survey

| Common Name | Scientific Name | County Classification ¹ | Spatial Extent and Abundance ² |
|--------------------|--|------------------------------------|--|
| Baby's breath | <i>Gypsophila paniculata</i> | C | 8 locations, totaling <0.01 acre |
| Bull thistle | <i>Cirsium vulgare</i> | C | 150 locations, totaling 2.3 acres |
| Canada thistle | <i>Cirsium arvense</i> | C | 449 locations, totaling 32.8 acres and 1,042.4 linear feet |
| Dalmatian toadflax | <i>Linaria dalmatica</i> ssp. <i>dalmatica</i> | B | 110 locations, totaling 2.0 acres |
| Diffuse knapweed | <i>Centaurea diffusa</i> | B | 206 locations, totaling 4.8 acres and 1,057.0 linear feet |
| Field bindweed | <i>Convolvulus arvensis</i> | C | 18 locations, totaling 0.19 acre and 790.3 linear feet |
| Kochia | <i>Kochia scoparia</i> | B | 51 locations, totaling 1.8 acres and 1,468.0 linear feet |
| Longspine sandbur | <i>Cenchrus longispinus</i> | B | 2 locations, totaling 0.01 acre and 26.6 linear feet |
| Poison hemlock | <i>Conium maculatum</i> | B | 9 locations, totaling 0.7 acre |
| Puncturevine | <i>Tribulus terrestris</i> | B | 1 location, totaling 33.4 linear feet |
| Rush skeletonweed | <i>Chondrilla juncea</i> | B | 3 locations, totaling 0.02 acre |
| Scentless mayweed | <i>Matricaria perforata</i> | C | 2 locations, totaling 0.06 acre |
| St. Johnswort | <i>Hypericum perforatum</i> | C | 432 locations, totaling 21.1 acres |
| Sulfur cinquefoil | <i>Potentilla recta</i> | B | 6 locations, totaling 0.01 acre |
| Tansy ragwort | <i>Senecio jacobaea</i> | B | 1 location, totaling 0.1 acre |

Notes:

¹ Class B weeds are non-native species whose distribution is limited to portions of Washington State. Prevention of new infestations is the primary goal for Class B species.

Class C weeds are noxious weeds that are either already widespread in Washington or are of special interest to the agricultural industry. The Class C status allows the county to enforce control if it is beneficial to that county.

² Noxious weed survey conducted from July 30 through August 6, 2013 by Cardno ENTRIX. Weed data were collected as points, lines, and/or polygons depending on the data type that would most appropriately describe the infestation.

Habitat Quality

Habitat quality can be defined as a community's departure from its natural state caused by alterations to the physical state and species composition. The overall quality of plant communities varies depending on the land use history and other physical factors such as elevation, aspect, soil depth, and so forth. Vegetation in the project area has been extensively modified by a variety of land uses, including suburban/commercial development, agriculture,

livestock grazing, and road and utility right-of-way construction. These practices have the potential to introduce and promote the spread of noxious weeds, discussed in the section above.

Impacts from rural, suburban, and commercial development were observed from structures 2/2 to 2/7 in the vicinity of the city of Grand Coulee, resulting in relatively low habitat quality. Active agriculture was dominant from approximately structures 6/4 to 28/1, interspersed with grassland-steppe from structures 12/8 to 13/6 and 14/2 to 19/4. These areas had low habitat quality based on an abundance of non-native species, rural development, and frequent cultivation.

Relatively intact communities dominated by grassland, shrubland and forest steppe were observed from structures 1/5 to 2/2, 2/7 to 6/4, 6/8 to 7/1, and 28/1 to 28/9. Habitat quality in these areas was high to moderate, with non-native species proliferating along roadsides and in the transmission line construction right-of-way. Habitat quality was low from structures 28/9 to 30/1 due to intensive livestock grazing and dominance by exotic species.

Special Status Plant Species

Special status plant species are those species that have been identified for protection and/or management under the Federal Endangered Species Act of 1973 (16 U.S.C 1531 *et seq.*), or the Washington State Natural Heritage Program (WDNR 2011). No federally-list plant species and one state-listed sensitive species occur along the project. Washington State Sensitive species are species that are vulnerable or declining and could become threatened or ***endangered*** without active management.

A rare plant survey was conducted in May 2013 for the entire length of the existing project right-of-way excluding cultivated areas, and along access roads located outside of the project right-of-way. The survey included a general reconnaissance of vegetation communities and rare plant habitats (see Figures 3-12 for a map of the locations of special status plants found in the project area). Prior to the survey, a target list of special status species known to occur in Grant and Lincoln Counties was compiled, based upon Washington State Department of Natural Resources Natural Heritage Program maintained lists for Grant and Lincoln Counties (WDNR 2013c; Appendix E). The project area is within the potential habitat range of only one federally-listed plant species, Spalding's silene (*Silene spaldingi*), which is listed as a ***threatened species*** and does not have any known occurrences near the project right-of-way (WDNR 2013d).

Nineteen occurrences of Douglas' constricted onion (or "Grand Coulee onion"), a Washington state sensitive species, were found along the right-of-way (Figure 3-13), clustered between structures 4/3 and 5/2, and 14/4 and 15/1. Previously identified occurrences of Grand Coulee onion were outside of the right-of-way within shrub-steppe vegetation near the west end of the project area. Previously identified occurrences were as close as 300 feet to the right-of-way, in the vicinity of structures 3/4 to 5/8. Grand Coulee onion occurs on flat basalt lithosol areas within grassland-steppe and shrubland-steppe vegetation in the project area.

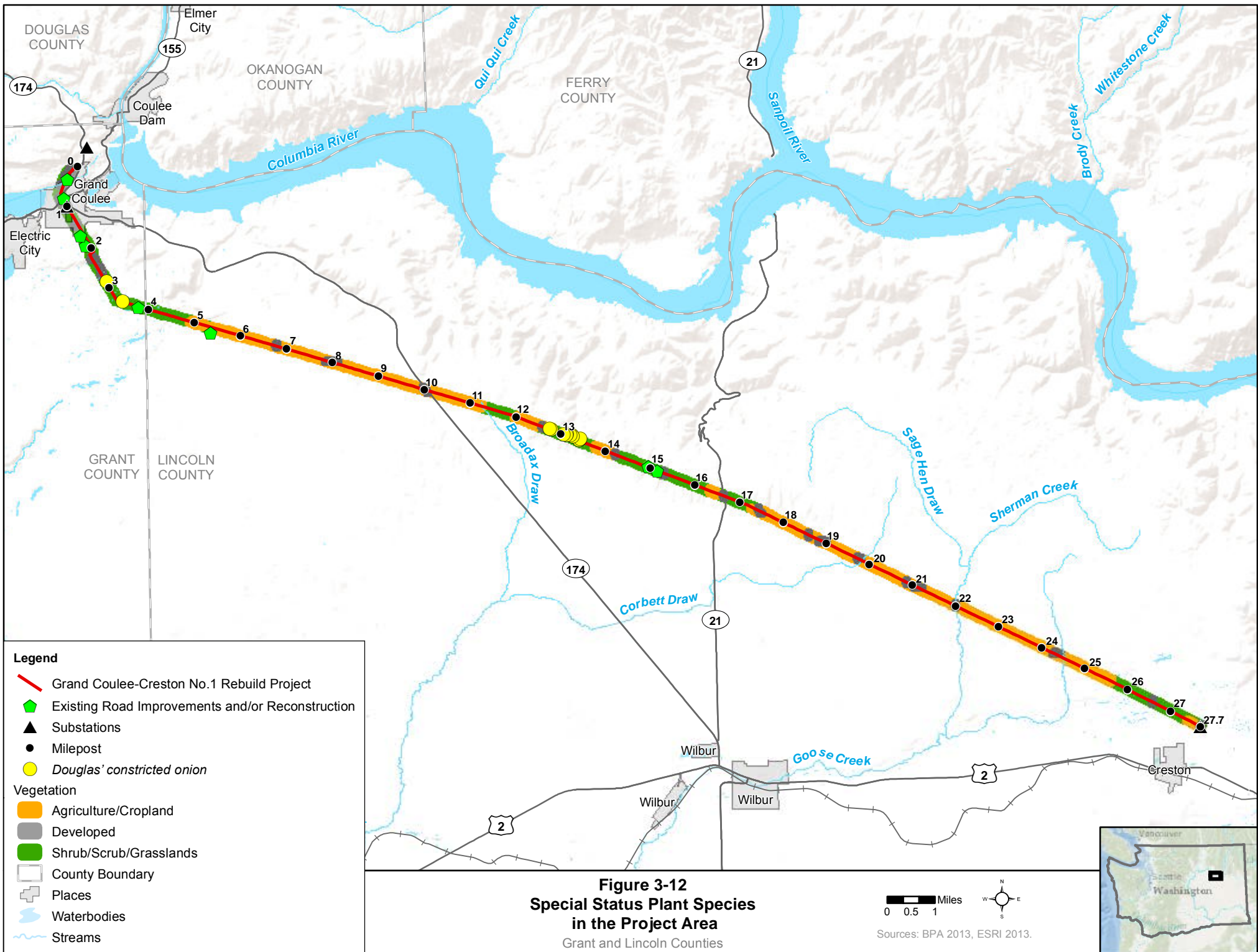




Figure 3-13. Douglas' Constricted Onion near Structure 4/4

3.5.2 Environmental Consequences—Proposed Action

The following sections describe the potential construction and operation and maintenance impacts on vegetation, noxious weeds, and special status plant from implementing the Proposed Action. Direct impacts to vegetation would include the removal of or disturbance to vegetation, including crushing vegetation, damage to plant roots from compaction of soils by heavy equipment, and soil disturbance. Indirect impacts could include the introduction and spread of noxious weed species and disturbances to plant communities from erosion and sedimentation.

Construction Impacts

Removal of Existing Structures and Installation of New Structures

Structure removal and replacement would result in clearing and crushing of vegetation, the loss of native plants, damage to plant roots from compaction of soils by heavy equipment, soil disturbance, and minor reduced soil productivity in localized areas within the existing right-of-way. The extent of direct impacts at any particular site would depend on the quality of existing vegetation and soils, as well as site topography. Structures and associated components would be replaced within their existing locations, which would minimize impacts to vegetation. However, in some grassland-steppe and shrub-steppe areas, these activities would result in localized loss of mature native plants, habitat complexity, and species diversity. At most sites, two-pole structure replacement would disturb an area up to 50 feet by 100 feet per structure (about 0.1 acre) within the existing right-of-way. The disturbance area for the three-pole structures could be up to 100 feet by 100 feet (about 0.2 acre).

The clearing associated with removal of structures and installation of new structures would have **low** impacts on vegetation because of the relatively small area to be cleared in relation to the larger landscape.

Washington State Sensitive Douglas constricted onion occurs near structures that would be replaced at the following locations:

- One population occurs about 40 feet from structure 4/4.
- Four populations occur near structure 4/5. One of these populations is within 30 feet of the existing structure; three are located 80 to 100 feet from the structure.
- One population occurs over 90 feet from structure 5/1.
- One population occurs over 90 feet from structure 14/4.

Construction would likely avoid most Douglas constricted onion plant populations entirely. However, some populations could be affected, especially those located in the vicinity of structures 4/4 and 4/5. These areas would be surveyed for this species prior to construction and flagged and construction disturbance in these areas would be reduced (see Section 3.5.3). Impacts to special status plant species from removal of existing structures and installation of new structures are expected to be **low**.

Access Roads

Road improvements and reconstruction would require removal of existing vegetation in some locations and would affect existing vegetation that has grown up in or around the edges of the existing roadbed. These impacts are expected to be minor, however, due to the relatively small size of the disturbance areas.

Use of temporary travel routes across fields would crush existing vegetation, damage roots, and compact soils, but most vegetation would likely recover over time. In most cases, these routes would cross farm fields, which would experience seasonal ground disturbance anyway, and be restored to their existing condition following construction.

Impacts associated with access road reconstruction/improvement on populations of special status plants would be avoided, if possible, since road work would not occur in areas with known occurrences of special status plant populations. Impacts to vegetation from access road improvements would be **low**.

Tree Removal

The 53 small trees (e.g., American elm, black locust, walnut, catalpa, willow, locust, aspen, apple, spruce, ponderosa pine, Jeffrey pine, unspecified hardwoods, and service berry) that would be removed between structures 1/5 and 2/7 are in developed lands with suburban, residential, and industrial uses along the project right-of-way where the vegetation habitat is of poor quality. This activity would have a **low** impact on vegetation, since the trees are located in previously-developed areas with poor habitat quality, and most are relatively small (less than 8 inches in diameter at breast height [dbh]).

Noxious Weeds

During and following construction, noxious weeds could spread and colonize disturbed areas as a result of the movement of soils and materials contaminated with weed seeds and from natural weed seed dispersal. Areas where the soil is bare are particularly vulnerable to infestation by weeds. Although weeds already occur and are widespread in some areas of the right-of-way, the presence and abundance of weeds has the potential to increase in the right-of-way as a result of construction. However, implementation of mitigation measures, such as washing equipment at strategic locations along the right-of-way, would reduce the spread of noxious weeds. Standard mulching and prompt revegetation through seeding and planting would help to reduce noxious weed infestations in the project area. Impacts to vegetation from noxious weed infestation are expected to be **low-to-moderate**.

Staging Areas and Tensioning Sites

Potential impacts to vegetation at staging areas are expected to be **low** because staging areas would be located outside of sensitive areas (streams, wetlands, areas with special status plants), in level, open, and already developed or disturbed sites. In addition, all areas temporarily disturbed during construction would be returned to preconstruction conditions and revegetated as appropriate.

Potential impacts associated with tensioning sites could include clearing and crushing of vegetation, damage to plant roots from compaction of soils by heavy equipment, and soil disturbances. However, implementation of the mitigation measures identified below would reduce construction related soil impacts. Impacts to vegetation from construction related soil impacts are expected to be **low**.

Operation and Maintenance Impacts

Ongoing vegetation management activities would occur under the Proposed Action, including periodic trimming, cutting, or clearing of trees and shrubs to allow access to transmission facilities and to prevent vegetation from growing too close to the conductors. Vegetation maintenance would be conducted under BPA's *Transmission System Vegetation Management Program Final EIS*, which uses a variety of methods to keep plants from interfering with transmission lines, including manual, mechanical, chemical, and biological methods to foster low-growing plant communities (BPA 2000). These activities would occur under the Proposed Action and No Action alternatives and would result in **low-to-moderate** impacts on vegetation.

3.5.3 Mitigation—Proposed Action

If the Proposed Action is implemented, the following mitigation measures would minimize impacts on vegetation:

- Cut or crush vegetation, rather than blade, in areas that would remain vegetated, to maximize the ability of native plants to resprout and maintain soil integrity. Soils would be prepared if needed prior to seeding.

- Implement restoration or stabilization actions as soon as possible after ground disturbing activities.
- Prior to seeding, prepare soils through decompaction, if needed.
- Reseed all disturbed areas as soon as possible after construction, with an appropriate seed mix that is discussed with and agreed upon with landowners. Native seed mixes would be used where appropriate and effective.
- Periodically inspect reseeded sites to verify adequate growth. If necessary, implement contingency measures to ensure adequate growth and vegetation cover.
- Equip all vehicles with basic fire-fighting equipment, including extinguishers and shovels, to potentially put out small fires.
- Reduce disturbance areas associated with structure replacement to a 50-foot by 50-foot (0.06 acre) area where special status plants occur (structures 4/4, 4/5, 5/1, and 14/4), if possible.
- Conduct surveys for Douglas constricted onion within the areas where it was found to occur during the pre-construction survey and install signage, stakes, and/or flagging prior to construction to minimize disturbance and to restrict vehicles and equipment to designated routes.
- Treat identified noxious weed infestations where possible prior to construction either manually, mechanically, and/or chemically.
- Implement measures to minimize the introduction and broadcast of weed seeds during construction. Clean vehicles and other equipment that have been in weed infested areas at established blow or wash stations upon leaving the infested areas, to prevent spreading weeds to uninfested areas during construction.
- Continue to implement weed control efforts in the right-of-way as part of ongoing vegetation management efforts. Utilize information from the pre-construction noxious weed survey conducted for the project (BPA 2013a) to assess whether noxious weeds have spread or increased in abundance as a result of construction activities.

3.5.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

The Proposed Action would result in clearing and crushing of vegetation, the loss of native plants, damage to plant roots from compaction of soils by heavy equipment, soil disturbance, and minor reduced soil productivity in localized areas within the existing right-of-way. Replacement of structures and access road work could cause long-term soil compaction and reduced soil productivity around structures and along roadbeds, although replacement of existing structures and the construction of new structures would occur entirely within the existing right-of-way. In addition, it is likely not possible to entirely avoid impacts to special status plant populations, even though potential impacts would be reduced through implementation of the mitigation

measures identified above. Because of the prolific nature of noxious weeds and the difficulty in controlling them, their unintentional spread into some areas that are not currently infested is likely to occur. However, implementation of the weed control measures identified above would decrease the level of impact. Overall, it is expected that unavoidable impacts to vegetation would be **low-to-moderate**.

3.5.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and construction-related impacts on vegetation would therefore not occur. Continued operation and maintenance of the existing transmission line would have **low** impacts to vegetation, primarily through implementation of BPA’s vegetation management program (BPA 2000). However, maintenance activities would likely increase as existing structures continued to deteriorate, which could lead to more impacts on vegetation than under existing conditions. Impacts to vegetation under the No Action alternative are therefore expected to be **low-to-moderate**.

3.6 FISH

This section describes the existing fish, habitat, and special status fish in the project area, and the potential construction and operation and maintenance impacts from the Proposed Action and No Action alternatives. The fish area of analysis includes all surface waters crossed by the existing transmission line right-of-way or proposed access roads and travel routes, as well as surface waters located within 100 feet of any existing or proposed infrastructure. This distance was selected because it is a reasonable maximum distance within which project actions relating to land disturbance could potentially cause some increase in sediment runoff to streams (Knutson and Naef 1997).

3.6.1 Affected Environment

Fish and Fish Habitat

The existing right-of-way and associated access roads either cross or are within 100 feet of streams in 36 different locations. A complete list of these streams is presented in Appendix C. Water types are identified based on the WDNR stream typing system (Washington Administrative Code [WAC] 222-16-030). However, data about streams located in the project area is limited or absent. Of the 36 streams that are within the immediate right-of-way project area, 26 are intermittent, two are perennial, and the remaining eight streams are “unknown unidentified water.”

Summary information is provided below for named fish-bearing streams in the project area. Several other unnamed streams also contain fish. Proposed project activities in known fish bearing streams are summarized in Table 3-7. There is no essential fish habitat (EFH) in or near the project area for any Pacific salmon species managed under the Magnuson-Stevens Fisheries Conservation and Management Act. All streams are upstream of *anadromous* fish accessible areas and/or are deemed non-essential habitat.

Table 3-7 Known Fish Bearing Watershed Streams¹ within 100 feet of Project Activities

| HUC 5th Field Watershed | HUC 6th Field Watershed | Known Fish-Bearing Streams | Known Fish Species | Proposed Project Activity Structure Location | Proposed Project Activity |
|--|-------------------------|----------------------------------|--------------------|--|---|
| Welsh Creek – Franklin D. Roosevelt Lake | Spring Canyon | Unnamed | Unknown | 6/8 – 7/1 | Planned road reconstruction, planned structures and transmission lines, culvert replacement |
| Upper Wilson Creek | Upper Goose Creek | Unnamed (with intermittent flow) | Unknown | 24/2 – 24/3 | Planned structures and transmission lines |
| | Upper Goose Creek | Sherman Creek | Unknown | 24/3 – 24/4 | Planned structures and transmission lines |
| | Upper Goose Creek | Goose Creek ² | Rainbow trout | 26/8 – 26/9 | Planned structures and transmission lines |

¹ Based on WDNR stream typing system classifications (Washington Administrative Code [WAC] 222-16-030).

² Washington State Department of Fish and Wildlife priority habitat for rainbow trout (WDFW 2008).

Welsh Creek-Franklin D. Roosevelt Lake Watershed (5th field)

The Welsh Creek-Franklin D. Roosevelt Lake Watershed (Figure 3-3) includes six streams located within 100 feet of the project right-of-way, all occurring between structures 1/5 and 3/9. Three streams occur within the Coulee Dam–Franklin D. Roosevelt Lake subwatershed (6th field), in which one is an unidentified intermittent stream, one is an unidentified perennial stream, and the third is an unknown, unidentified stream. The remaining three streams occur within the Spring Canyon subwatershed (6th field), with two being unidentified streams and one being a fish bearing stream. A fish bearing stream is located between structures 6/8 and 7/1, where a culvert would be replaced and the access road would be improved. Site visits to this culvert location in the month of May found shallow stagnant water and indicates that during summer months there is likely no water in the stream channel proximate to the culvert. No other stream specific monitoring data was identified for these fish bearing streams.

Upper Grand Coulee Watershed (5th field)

The Upper Grand Coulee Watershed (Figure 3-3) includes three areas where streams are within 100 feet of the project right-of-way (between structures 8/9 and 9/1, and close to structures 10/3 and 10/4) as part of Northrup Canyon subwatershed (6th field). All are unknown streams.

Upper Wilson Creek Watershed (5th field)

The Upper Wilson Creek Watershed (Figure 3-3) includes 27 streams that are within 100 feet of the project right-of-way (between structures 12/8 and 26/9). Nineteen of these streams occur within Upper Corbett Creek subwatershed (6th field) and are classified as unidentified intermittent streams. Within this subwatershed a proposed reconstruction access road crosses an unknown stream with intermittent flow between structures 16/4 and 16/5. The remaining eight streams occur within the Upper Goose Creek subwatershed (6th field), of which five are non-fish bearing streams. Of the three fish bearing streams, one unnamed stream located between structures 24/2 and 24/3 is classified as an intermittent “Type F” fish bearing stream that flows into Goose Creek. Sherman Creek, located between structures 24/3 and 24/4, is a perennial fish bearing stream that also flows into Goose Creek. Goose Creek, located between structures 26/8 and 26/9 is a seasonal fish bearing stream. Goose Creek has been identified by the Washington Department of Fish and Wildlife (WDFW) as priority habitat for rainbow trout (discussed below).

State Priority Habitat and Species of Concern

The WDFW Priority Habitats and Species (PHS) database was searched to identify special status fish species and *priority habitats* in the project area (WDFW 2008). The state classifies species under three categories:

- Criterion 1: State-listed and *Candidate* Species
- Criterion 2: Vulnerable Aggregations
- Criterion 3: Species of Recreational, Commercial, and/or Tribal Importance

Among all streams identified throughout the proposed project area only Goose Creek is identified by WDFW as priority habitat for rainbow trout. Within Goose Creek, priority habitat for rainbow trout is classified under Criterion 3. No other WDFW PHS is present in the project area.

Federally Threatened and Endangered Fish Species

One fish species protected under the ESA that could occur in Grant and Lincoln Counties (WDFW 2008) is the Columbia River Distinct Population Segment (DPS) of bull trout (*Salvelinus confluentus*). Bull trout is federally listed as *threatened* and requires clean cold water. While some bull trout could occasionally be present in Lake Roosevelt, the project area tributaries are relatively short drainages that feed directly into Lake Roosevelt and are not representative of the pristine cold headwater stream habitat preferred by bull trout. Within the Welsh Creek–Franklin D. Roosevelt watershed all proposed project area streams within the right-of-way corridor are tributaries to the Columbia River and according to StreamNet (2013) have potential habitat for bull trout. However, bull trout are not known to actively reside in Lake Roosevelt and the associated tributary habitat has not been formally identified as critical habitat (USFWS 2002, 2010; NPCC 2000; StreamNet 2013). Thus, it is unlikely that bull trout are in the project area and as such will not be discussed further in this section.

3.6.2 Environmental Consequences—Proposed Action

The following sections describe the potential construction and operation and maintenance impacts on fish from implementing the Proposed Action. Fish and fish habitat could be affected by the Proposed Action if changes occur to water quality or quantity (see Section 3.4, Water Resources); if riparian vegetation that affects shade, cover, and recruitment of wood and terrestrial insects into streams is removed; or if activities directly result in death of or disturbance to fish.

Construction Impacts

Removal of Existing and Installation of New Structures

None of the existing or proposed structures are located in streams so fish would not be directly impacted by structure replacement. However, removal and replacement of structures, including counterpoise replacement, if required, would result in temporary ground disturbances. Erosion of exposed soils could result in indirect impacts to fish and their habitat from sediment deposition into adjacent streams. Increased sediment in streams can affect the suitability of spawning areas and reduce fish egg survival, thereby affecting fish populations. Soil runoff could also elevate turbidity, which affects the food supply and reduces feeding success in streams. In addition, if a hazardous spill from construction equipment (e.g., oil and gas) reached a stream, it could have a toxic effect on fish, their habitat, and their food sources. However, the potential for these impacts would be **low** with the implementation of the mitigation measures identified in Section 3.5.3, which include erosion control BMPs, such as the use of silt fences and geotextile fabric, and maintaining proper vehicle fueling and fuel storage distances from waterbodies.

Loss of riparian vegetation could have adverse effects on streams by reducing shade, future large woody debris supply, and organic input in the form of leaf litter and terrestrial insects. However, the loss of riparian vegetation is unlikely because structures are located away from stream riparian areas and most of the existing right-of-way has limited riparian resources.

Removal and replacement of existing structures could affect priority habitat for rainbow trout within Goose Creek. However, given the above considerations and measures there should be minimal and most likely **no** impacts to fish from removal replacement of existing structures.

Access Roads

Because BPA already reconstructed most of the project area access roads while improving adjacent transmission lines, minimal road improvements are proposed under the Proposed Action. Review of the WDNR stream database (Appendix C) indicates that there are two locations where streams are within 100 feet of proposed access road improvements. A culvert would be replaced at one of these identified stream crossings. Improved access roads and use of those roads would result in a small incremental increase in precipitation runoff and the potential for road-related sediment to enter surface waters. Erosion control BMPs, as described in Section 3.5.3, would be used to minimize impacts on water quality and fish habitat.

One culvert would be replaced under the Proposed Action in an unknown fish-bearing stream that flows into Lake Roosevelt. The culvert would be replaced when the stream channel is dry to avoid potential impacts on water quality. Thus, any potential impacts, such as temporary fish displacement or disruption and short-term increased suspended sediments are not applicable. Although speculative without a formal survey, fish downstream of the culvert (and assuming the stream channel contains water during summer months) could include cutthroat trout and rainbow trout. This stream is not considered Bull Trout habitat (USFWS 2002, 2010; NPCC 2000).

Under the Proposed Action, road reconstruction would also occur between structures 16/3 and 16/8. These activities would occur in the Upper Corbett Creek watershed and crosses an unknown stream with intermittent flow. Given that as much work as possible would occur during the dry season when streamflow, rainfall, and runoff are low (if not absent, in all likelihood), overall, there should be **low** impacts to fish from access road improvements.

Tree Removal

Shade created by riparian vegetation, especially trees, is an important factor in maintaining cool temperatures in streams in the Pacific Northwest. Riparian trees are also the major source of large woody debris to streams. Large woody debris is an important component of fish habitat, serving as a source of pool formation and habitat diversity; it is also important for stream ecology, especially in salmonid streams. Removal of large trees from the riparian area has the potential to reduce both shade and future instream habitat.

For smaller streams, shorter riparian vegetation is generally adequate to maintain stream temperatures and small wood sizes can effectively form habitat in small stream channels so that the loss of future sources of wood is less critical. Natural riparian vegetation, especially large trees, is limited in the project area due to the arid environment.

BPA estimates that 53 trees/shrubs would be removed between structures 1/5 and 1/6, 1/8 and 2/1, 2/4 and 2/7, and at structure 6/2 (see Appendix C). Only two stream waterways exist within this portion of the project area, one being an intermittent unidentified (Type U) waterway and the other a U.S. Bureau of Reclamation canal lacking riparian vegetation. The Proposed Action involves rebuilding an existing transmission line in an area already maintained with low vegetation for safety purposes and, as a result, little or no change would occur to stream shade and temperatures. There would therefore be **low** impacts to fish from tree removal.

Staging Areas and Tensioning Sites

Staging areas would be located outside stream channels in level, open, and already developed or disturbed sites. As a result, **no** impacts to fish, including federally listed fish species, or fish habitat are anticipated as a result of staging areas.

All tensioning areas would be at least 50 feet from stream channels. Therefore, the use of tensioning sites would have **no** impact to fish.

Operation and Maintenance Impacts

Emergency line repair following accidental downing of conductors could require unplanned travel across streams or riparian areas. The resulting disruption could have short-term adverse effects on fish and fish habitat from localized increases in sediment and loss of riparian function (e.g., shade and organic input). However, emergency repairs rarely occur and would be less likely to occur under the Proposed Action. If emergency repairs do occur, the disturbance area would be limited to the extent possible.

The majority of streams (n=26) within the Proposed Project Area are classified as non-perennial streams, with only intermittent flow on a given year. Given this, functioning fish habitat is compromised and furthermore, that in many such streams, fish are often absent due to lack of water. Only two streams are perennial with the remaining eight streams of unknown unidentified water. Operation and maintenance impacts are already minimized given these stream traits. Furthermore, a portion of these maintenance activities are likely to occur during drier summer months when there is reduced if not absent flow in the majority of Proposed Project Area streams; thus, any potential impacts due to sedimentation and fluvial transportation of herbicides is considered **low**.

3.6.3 Mitigation—Proposed Action

If the Proposed Action is implemented, the following mitigation measures would minimize impacts on fish:

- Prepare and implement a Stormwater Pollution Prevention Plan that addresses measures to reduce erosion and runoff and stabilize disturbed areas.
- Implement pollution and erosion control measures prior to construction and maintain them throughout the duration of the Proposed Action.
- Design and construct roads to minimize drainage from the road surfaces directly into water features.
- Minimize erosion, sedimentation, and soil compaction by conducting as much work as possible during the dry season when streamflow, rainfall, and runoff are low.
- Install sediment barriers and other suitable erosion- and runoff-control devices, where needed, prior to ground-disturbing activities at construction sites to minimize offsite sediment movement.
- Limit disturbance areas to the minimum necessary when working near wetland areas. Install stakes or flagging to restrict vehicles and equipment to designated routes and areas.
- Stage construction vehicles and equipment at least 50 feet from any unless authorized by a permit or the vehicle is travelling on an existing road.
- Conduct all culvert installation/replacement work in the dry streambed, when there is no flow so as to avoid any impacts to fish species.

- Complete culvert installation/replacement work between July 1 and September 15, the WDFW in-water work window.

3.6.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

Unavoidable impacts to fish resources in the project area would occur from construction activity, temporary and permanent loss of vegetation from construction and maintenance work, and temporary impacts to aquatic habitat from road work and erosion from unvegetated surfaces. The design of the Proposed Action and implementation of the mitigation measures described in Section 3.5.3 would minimize these potential impacts, resulting in **low** impacts to fish.

3.6.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, operation and maintenance of the existing transmission line including the removal trees with in the right-of-way and other tall vegetation would continue to have impacts on fish, similar to those described for the Proposed Action. Localized impacts from emergency maintenance activities could occur more frequently and be of a greater magnitude than under the Proposed Action as structures continue to deteriorate and more substantial maintenance activities are required. If it were necessary to perform repairs on an emergency basis, it would likely not be possible to plan or time them to minimize impacts to fish and their habitat. However, because these potential disturbances would occur in isolated areas, the No Action Alternative would have **low** impacts on fish.

3.7 WILDLIFE

This section describes the existing wildlife, habitat, and special status wildlife in the project area, and the potential construction and operation and maintenance impacts from the Proposed Action and No Action alternatives. The wildlife resources area of analysis is the same as the project area.

3.7.1 Affected Environment

The project area encompasses a variety of habitats, many of which have been disturbed, degraded, and/or altered by human activities such as agricultural tilling and burning, and development. Some habitat in the project area appears to be fairly high quality, such as the native shrub/scrub/grasslands area that extends from structures 2/9 to 6/4. However, the existing access road system that spans this area and evidence of past human use (such as abandoned car parts) results in most of the area being at least moderately degraded (Figure 3-14). Highly altered and degraded urban land is also present within the project area at both ends of the transmission line where the existing right-of-way exits the city of Grand Coulee and terminates near Creston. Section 3.5, Vegetation, contains additional information regarding habitat quality.



Figure 3-14. Degraded Habitat near Structure 2/10

Table 3-8 shows the quantity of habitat types within the project area. The variety of habitats that exist host a diversity of wildlife species, as described herein. Table 3-9 provides a complete listing of species observed during field reconnaissance by habitat type. Five mammals, 31 birds, and one invertebrate were identified. No reptiles or amphibians were seen, which could be partially due to the cold temperatures and rain that occurred for most of the 3-day observation period.

Table 3-8. Habitat Types in the Project Area

| Habitat Type | Approximate Miles |
|------------------------|--------------------------|
| Agricultural Land | 16.3 |
| Developed Habitat | 1.5 |
| Shrub/Scrub/Grasslands | 9.9 |
| Total | 27.7 |

Table 3-9. Wildlife Species Observed

| Common Name | Scientific Name | Habitat Found |
|------------------------|-------------------------------|--|
| Mammals | | |
| Coyote | <i>Canis latrans</i> | shrub/scrub/grasslands |
| Mule deer | <i>Odocoileus hemionus</i> | agricultural land; shrub/scrub/grasslands |
| Red fox | <i>Vulpes vulpes</i> | shrub/scrub/grasslands |
| White-tailed deer | <i>Odocoileus virginianus</i> | agricultural land; shrub/scrub/grasslands |
| Yellow-bellied marmot | <i>Marmota flaviventris</i> | shrub/scrub/grasslands/cliffs |
| Birds | | |
| American crow | <i>Corvus brachyrhynchos</i> | agricultural land; developed land |
| American kestrel | <i>Falco sparverius</i> | shrub/scrub/grasslands |
| Barn swallow | <i>Hirundo rustica</i> | agricultural land; shrub/scrub/grasslands |
| Black throated sparrow | <i>Amphispiza bilineata</i> | shrub/scrub/grasslands |
| Brewer's blackbird | <i>Euphagus cyanocephalus</i> | agricultural land; developed land; shrub/scrub/grasslands |
| Bullock's oriole | <i>Icterus bullockii</i> | agricultural land; developed land |
| California quail | <i>Callipepla californica</i> | agricultural land; shrub/scrub/grasslands |
| Cedar waxwing | <i>Bombycilla cedrorum</i> | shrub/scrub/grasslands |
| European starling | <i>Sturnus vulgaris</i> | agricultural land |
| House sparrow | <i>Passer domesticus</i> | developed land |
| Killdeer | <i>Charadrius vociferus</i> | agricultural land; shrub/scrub/grasslands |
| Lazuli bunting | <i>Passerina amoena</i> | shrub/scrub/grasslands |
| Loggerhead shrike | <i>Lanius ludovicianus</i> | shrub/scrub/grasslands |
| Magpie | <i>Pica pica</i> | shrub/scrub/grasslands |
| Northern flicker | <i>Colaptes auratus</i> | shrub/scrub/grasslands |
| Olive-sided flycatcher | <i>Contopus cooperi</i> | shrub/scrub/grasslands |
| Osprey | <i>Pandion haliaetus</i> | shrub/scrub/grasslands |
| Red-tailed hawk | <i>Buteo jamaicensis</i> | agricultural land; shrub/scrub/grasslands |
| Ring-necked pheasant | <i>Phasianus colchicus</i> | shrub/scrub/grasslands |
| Rock wren | <i>Salpinctes obsoletus</i> | shrub/scrub/grasslands, rocks/caves |

| Common Name | Scientific Name | Habitat Found |
|--------------------------|--------------------------------------|---|
| Rough-legged hawk | <i>Buteo lagopus</i> | shrub/scrub/grasslands |
| Sage sparrow | <i>Amphispiza belli</i> | agricultural land; shrub/scrub/grasslands |
| Sage thrasher | <i>Oreoscoptes montanus</i> | shrub/scrub/grasslands |
| Spotted towhee | <i>Pipilo maculatus</i> | shrub/scrub/grasslands |
| Turkey vulture | <i>Cathartes aura</i> | developed land |
| Violet-green swallow | <i>Tachycineta thalassina</i> | shrub/scrub/grasslands |
| Western bluebird | <i>Sialia mexicana</i> | shrub/scrub/grasslands |
| Western kingbird | <i>Tyrannus verticalis</i> | agricultural land |
| Western meadowlark | <i>Sturnella neglecta</i> | agricultural land; shrub/scrub/grasslands |
| Willow flycatcher | <i>Empidonax traillii</i> | shrub/scrub/grasslands |
| Yellow headed blackbird | <i>Xanthocephalus xanthocephalus</i> | shrub/scrub/grasslands |
| Invertebrates | | |
| Melissa's blue butterfly | <i>Odocoileus virginianus</i> | shrub/scrub/grasslands |

The greatest proportion of habitat (approximately 781 acres) is composed of agricultural land (Figure 3-4). This habitat type includes croplands, irrigation drainages, and farm structures and provides marginal habitat suitable for human-adapted species, many of which were seen during the field reconnaissance survey. Species commonly observed using agricultural habitats include California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), western kingbird (*Tyrannus verticalis*), and mule deer (*Odocoileus hemionus*). Evidence of rodents (*order rodentia*) and rabbits (*Lepus spp.* and *Sylvilagus spp.*) was also found in agricultural habitats.

Some agricultural habitat appears to be previously cultivated, but now fallow, cropland and contains a mixture of grasses, native wildflowers, and exotic vegetation (Figure 3-5) (see Section 3.5, Vegetation, for additional information about species composition). Some of this land is currently enrolled in the USDA's Farm Service Agency Conservation Reserve Program (CRP; see Section 3.3, Land Use, Recreation, and Transportation, for further details). Species commonly observed using this habitat include white-tailed deer (*Odocoileus virginianus*) and red-tailed hawk (*Buteo jamaicensis*).

Developed habitats are found in many places along the right-of-way, and consist of roads and road edges such as between structures 3/8 and 3/9. The largest areas of developed habitat are at the beginning of the right-of-way from structures 1/5 to 2/7. Figure 3-15 shows an example of developed habitat. Species commonly observed using developed habitats include bullocks oriole (*Icterus bullockii*), American robin (*Turdus migratorius*), and American crow (*Corvus brachyrhynchos*).

Shrub/Scrub/Grasslands habitat (which is sub-divided further in Section 3.5, Vegetation, as grassland-steppe, shrub-steppe, and scabland shrubland) is found mainly between structures 2/8 and 6/4. These areas are considered to be fairly good quality wildlife habitat due to the variations in vegetation height and the presence of sagebrush. However, as stated earlier, this habitat type is somewhat degraded due to the presence of existing roads and abandoned materials such as car parts and broken bottles. Species commonly observed using shrub/scrub/grassland habitats include western meadowlark (*Sturnella neglecta*), killdeer (*Charadrius vociferus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and Melissa's Blue Butterfly (*Lycaeides melissa*).



Figure 3-15. Developed Habitat near Structure 2/5

Cliffs and caves were observed in some shrub/scrub/grassland habitat locations (Figure 3-16). These areas showed evidence of rodent and bird use but would not likely be suitable for bat maternal colonies since the caverns were shallow. Yellow-bellied marmots (*Marmota flaviventris*) were observed in this habitat towards the end of the transmission line at structure 28/5. Some areas within the shrub/scrub/grassland habitat locations also contained rocky areas that are suitable areas for snake hibernacula.

Some wetlands were observed in both shrub/scrub/grasslands and agricultural land (Figures 3-9, 3-10 and 3-11). The discussion of wetlands is presented in Section 3.4, Water Resources.



Figure 3-16. Cliffs and Caves near Structure 2/6

Federally Threatened and Endangered Wildlife Species

Eight wildlife species protected under ESA could occur in Grant and Lincoln Counties. These species are listed in Table 3-10 along with their habitat requirements and the likelihood of occurrence in the project area.

Five of these species—yellow billed cuckoo, northern spotted owl, marbled murrelet, grizzly bear, and pygmy rabbit—are highly unlikely to occur in the project area. The northern spotted owl, marbled murrelet, and grizzly bear are unlikely to occur due to lack of suitable habitat in the project area, while the pygmy rabbit and yellow billed cuckoo once occupied the area but have since been extirpated (WDFW 2012). These species are not discussed further in this document.

The other listed species—gray wolf, greater sage-grouse, and Washington ground squirrel—have the potential to occur in the general vicinity of the project area. The field reconnaissance survey did not focus on locating Washington ground squirrel colonies or sage-grouse *leks* so their presence in the area remains “possible.” Surveys may be conducted during the appropriate active period prior to construction to determine the presence of these species.

Table 3-10. Federally Threatened and Endangered Wildlife Species and Habitats

| Common Name | Scientific Name | Federal Status | Habitat Type | Potential of Occurrence |
|----------------------------|-----------------------------------|----------------|---|---|
| Birds | | | | |
| Greater sage-grouse | <i>Centrocercus urophasianus</i> | Candidate | Inhabit shrub-steppe and are closely associated with sagebrush. Population from 2011 estimated 26 breeding pairs in Lincoln County, outside of the project area. | Possible. Approximately 9.9 miles of potential habitat in project area. |
| Marbled murrelet | <i>Brachyramphus marmoratus</i> | Threatened | Found in coastal areas, mainly in salt water within 2 kilometers of shore. Requires old growth forest for nesting. | Unlikely. Suitable forested habitat not found in project area. |
| Northern spotted owl | <i>Strix occidentalis caurina</i> | Threatened | Found in old growth forests with a high canopy closure and an abundance of logs and other woody debris on the forest floor. | Unlikely. Suitable forested habitat not found in project area. |
| Yellow-billed Cuckoo | <i>Coccyzus americanus</i> | Candidate | Found in moist thickets, overgrown pastures, open woods, orchards, and streamside willow and alder groves, largely in areas with little disturbances. Require large blocks of riparian habitats, particularly woodlands dominated by willow and poplar. | Unlikely. Suitable riparian habitat not found in project area. |
| Mammals | | | | |
| Gray wolf | <i>Canis lupus</i> | Recovery | No particular habitat preference. Uses grassland, shrub, and forest habitats. | Possible. Suitable habitat is present within project area. |
| Grizzly bear | <i>Ursus arctos horribilis</i> | Threatened | Now found mostly in arctic tundras, alpine tundras, and subalpine mountain forests. | Unlikely. Suitable forested habitat not found in project area. |
| Pygmy Rabbit | <i>Brachylagus idahoensis</i> | Endangered | Found in extensive mature stands of sage brush. One population of reintroduced rabbits exists at the Sagebrush Flat Wildlife Area. | Unlikely. Rare species unrecorded in project area. |
| Washington ground squirrel | <i>Urocitellus washingtoni</i> | Candidate | Occupy shrub-steppe and native grassland habitats, especially on sites with deep silty loam soils, which could enhance burrow digging. Captive squirrels were released on the Columbia Basin National Wildlife Refuge and the Columbia Basin Wildlife Area. | Possible. Approximately 9.9 miles of potential habitat in project area. |

Sources: Natureserve 2013; USFWS 2013.

State Priority Habitat and Species of Concern

The WDFW PHS list of species and program database (WDFW 2008) were reviewed to identify special status wildlife species and priority habitats in the project area. WDFW-listed special status wildlife species with the potential to occur in the project area are identified in Table 3-11

below. Of these species, three were observed in the project area during the field reconnaissance survey, 15 are either likely to occur or have the potential to occur in the project area, and 17 species are unlikely to occur due to a lack of suitable habitat. Of the 15 species with the potential to occur in the project area, most are federal or state candidate species or species of concern. Only the ferruginous hawk and greater sage-grouse are listed as threatened by Washington State (WDFW 2008). In addition, priority habitat is identified as present for mule deer in the right-of-way from approximately line mile 13 to line mile 14 along the project right-of-way.

Table 3-11. Priority Wildlife Species in Grant and Lincoln Counties¹

| Common Name | Scientific Name | Federal and State Status | Habitat Type | Potential of Occurrence |
|-------------------------|----------------------------------|---|---|---|
| Birds | | | | |
| American White Pelican | <i>Pelecanus erythrorhynchos</i> | State Endangered | Breeds primarily on isolated islands in freshwater lakes and rivers, and forages in shallow areas of inland marshes, lakes, and rivers. | Unlikely. Project area does not contain suitable wetland habitats. |
| Bald Eagle | <i>Haliaeetus leucocephalus</i> | Federal Species of Concern; State Sensitive | Found in forested parts of the state throughout the year. More abundant in the cooler, maritime region west of the Cascade Mountains than in the more arid eastern areas. Common in eastern regions of Washington during winter period. However, nest sites are relatively rare and typically located near major waterways. | Possible. Suitable habitat is present in project area. |
| Black-backed Woodpecker | <i>Picoides arcticus</i> | State Candidate | Breeds and forages in boreal and montane coniferous forests throughout its range. | Unlikely. Project area does not contain suitable forested habitats. |
| Burrowing Owl | <i>Athene cunicularia</i> | Federal Species of Concern; State Candidate | Found in open grassland and shrub-steppe habitats in eastern Washington. | Possible. Suitable habitat is present in project area. |
| Clark's Grebe | <i>Aechmophorus clarkii</i> | State Candidate | Found on inland freshwater lakes in summer. In winter, found south of Washington State. | Unlikely. Project area does not contain suitable water habitats. |

| Common Name | Scientific Name | Federal and State Status | Habitat Type | Potential of Occurrence |
|---------------------|----------------------------------|---|---|--|
| Ferruginous Hawk | <i>Buteo regalis</i> | Federal Species of Concern; State Threatened | Inhabit semi-arid and prairie ecosystems. Nests are built on cliffs, rock outcrops, small trees, transmission line structures, and artificial platforms. | Possible. Nests on powerline structures, trees, and ground near shrub-steppe environments. |
| Flammulated Owl | <i>Otus flammeolus</i> | State Candidate | Associated with mature and old-growth xeric ponderosa pine/Douglas-fir stands. | Unlikely. Project area does not contain suitable forested habitats. |
| Golden Eagle | <i>Aquila chrysaetos</i> | State Candidate | Breeds at higher densities in mountainous, open areas dominated by shrub-steppe communities, but also could nest at lower densities in conifer forests where open spaces occur. | Likely. Suitable habitat is present in project area. |
| Greater Sage-grouse | <i>Centrocercus urophasianus</i> | Federal Candidate; State Threatened | Inhabit shrub-steppe and are closely associated with sagebrush. Population from 2011 is estimated to be 26 breeding pairs in Lincoln County, outside of the project area. | Possible. Leks and nests may occur in shrub-steppe environments. |
| Lewis' Woodpecker | <i>Melanerpes lewis</i> | State Candidate | Breeding habitat is open forest and woodland, often logged or burned, including oak and coniferous forests. | Unlikely. Project area does not contain suitable forested habitats. |
| Loggerhead Shrike | <i>Lanius ludovicianus</i> | State Candidate | Prefers alternating patches of shrub-steppe and grass in relatively undisturbed shrub-steppe habitat. | Confirmed. |
| Peregrine Falcon | <i>Falco peregrinus</i> | Federal Species of Concern; State Sensitive | Desirable habitat includes cliffs and tall, man-made structures surrounded by open landscapes with nearby riparian areas. | Possible. Suitable habitat is found within the project area. |

| Common Name | Scientific Name | Federal and State Status | Habitat Type | Potential of Occurrence |
|---------------------|----------------------------------|--|--|--|
| Pileated Woodpecker | <i>Dryocopus pileatus</i> | State Candidate | Prefers late successional stages of coniferous or deciduous forests but also younger forests that have scattered, large dead trees. | Unlikely. Project area does not contain suitable forested habitats. |
| Sage Sparrow | <i>Amphispiza belli</i> | State Candidate | Commonly associated with big sagebrush shrubland and steppe communities. | Confirmed. |
| Sage Thrasher | <i>Oreoscoptes montanus</i> | State Candidate | Prefers sagebrush plains and shrublands. | Confirmed. |
| Sandhill Crane | <i>Grus canadensis</i> | State Endangered | Approximately 30 territorial pairs nested in Washington in 2011. Breeding habitat includes wetlands and marshes, wet mountain meadow drainages, and mosaics of riparian and agricultural habitats. | Unlikely. No known migration stop-over / staging areas in vicinity of project area; not known to nest in WA. |
| Sharp-tailed Grouse | <i>Tympanuchus phasianellus</i> | Federal Species of Concern; State Threatened | Habitat contains a mix of perennial bunchgrasses, forbs, and a few shrubs. Riparian areas with deciduous trees and shrubs (that provide cover, berries, seeds, buds, and catkins when the ground is snow-covered) provide critical winter habitat. | Possible. Project areas do not contain suitable riparian habitat. |
| Upland Sandpiper | <i>Bartramia longicauda</i> | State Endangered | Suspected to be extirpated as a breeding species in Washington. | Unlikely. Project areas do not contain suitable riparian habitat. |
| Vaux's Swift | <i>Chaetura vauxi</i> | State Candidate | Common in most forested zones in King and Kittitas Counties. Not found in Grant and Lincoln Counties. Nests in a wide variety of habitats as long as suitable cavities are available, including dead trees and chimneys. | Unlikely. Not found in Grant and Lincoln Counties. |
| Western grebe | <i>Aechmophorus occidentalis</i> | State Candidate | Found on inland freshwater lakes in the summer. In winter, occupies nearshore marine waters. | Unlikely. Project areas do not contain suitable water habitats. |

| Common Name | Scientific Name | Federal and State Status | Habitat Type | Potential of Occurrence |
|--------------------------|--------------------------------|---|---|--|
| White-headed Woodpecker | <i>Picoides albolarvatus</i> | State Candidate | Strongly associated with old-growth ponderosa pine forests. | Unlikely. Project area does not contain suitable forested habitats. |
| Yellow-billed Cuckoo | <i>Coccyzus americanus</i> | State Candidate | Found in moist thickets, overgrown pastures, open woods, orchards, and streamside willow and alder groves, largely in areas with little disturbances. Require large blocks of riparian habitats, particularly woodlands dominated by willow and poplar. | Unlikely. Project areas do not contain suitable riparian or forested habitats. |
| Mammals | | | | |
| Black-tailed Jackrabbit | <i>Lepus californicus</i> | State Candidate | Requires mixed grasses, forbs, and shrubs for food, and shrubs or small trees for cover. Prefers moderately open areas without dense understory growth and is seldom found in closed-canopy habitats. | Likely. Suitable habitat is found within project area. |
| Merriam's Shrew | <i>Sorex merriami</i> | State Candidate | Primarily associated with arid shrub-steppe and steppe communities. Potential range includes the project area. Few studies have been carried out. | Possible. Suitable habitat is present in project area. |
| Preble's Shrew | <i>Sorex preblei</i> | Federal Species of Concern; State Candidate | Occupies open areas, woodlands, and forests. Known range is located outside of the project area. | Unlikely. Lack of suitable habitat and range is located outside of the project area. |
| Pygmy Rabbit | <i>Brachylagus idahoensis</i> | Federal Endangered; State Endangered | Found in extensive mature stands of sage brush. One population of rabbits was reintroduced in the Sagebrush Flat Wildlife Area. | Unlikely. Project areas do not contain suitable habitat. |
| Townsend's Big-eared Bat | <i>Corynorhinus townsendii</i> | Federal Species of Concern; State Candidate | Occurs in westside lowland conifer-hardwood forests, montane conifer forests, ponderosa pine forests and woodlands, shrub-steppe, riparian habitats, and open fields. Hibernacula occur mainly in caves, mines, lava tubes, and buildings. | Unlikely. Project area does not contain suitable habitat. |

| Common Name | Scientific Name | Federal and State Status | Habitat Type | Potential of Occurrence |
|----------------------------|--|--|---|--|
| Washington Ground Squirrel | <i>Urocitellus washingtoni</i> | Federal Candidate; State Candidate | Occupies shrub-steppe and native grassland habitats, especially on sites with deep silty loam soils, which could enhance burrow digging. Captive squirrels were released on the Columbia Basin National Wildlife Refuge and the Columbia Basin Wildlife Area. | Possible. Suitable habitat is present in project area. |
| White-tailed Jackrabbit | <i>Lepus townsendii</i> | State Candidate | Known to occur in lower Columbia Basin shrublands and grasslands. Less common than black-tailed jackrabbits. | Likely. Suitable habitat is present in project area. |
| Reptiles | | | | |
| Sagebrush Lizard | <i>Sceloporus graciosus</i> | State Candidate | Commonly found in sagebrush habitats. Also found in pine or fir forests, redwood forests, brushlands, and piñon-juniper woodlands. | Likely. Suitable habitat is present in project area. |
| Striped Whipsnake | <i>Masticophis taeniatus taeniatus</i> | State Candidate | Known Washington sites are limited to the central Columbia Basin shrub-steppe habitat. Known populations are all located outside of the project area. | Unlikely. Known populations are located outside of the project area. |
| Amphibians | | | | |
| Columbia Spotted Frog | <i>Rana luteiventris</i> | State Candidate | Highly aquatic; rarely found far from permanent quiet water; usually occurs at the grassy/sedgy margins of streams, lakes, ponds, springs, and marshes. | Possible. Some wetland habitat in project area may be suitable. |
| Northern Leopard Frog | <i>Lithobates pipiens</i> | Federal Species of Concern; State Endangered | Found in only two areas in the state: in ponds at the Potholes Reservoir and Gloyd Seeps units of the Columbia Basin Wildlife Area in Grant County, outside of the project area. | Unlikely. Project area does not contain suitable aquatic habitat. |
| Western toad | <i>Anaxyrus boreas</i> | State Candidate | Occurs in a wide variety of habitats, ranging from desert springs to mountain wetlands. They range into various upland habitats around ponds, lakes, reservoirs, and slow-moving rivers and streams. | Possible. Some wetland habitat in project area may be suitable. |

| Common Name | Scientific Name | Federal and State Status | Habitat Type | Potential of Occurrence |
|----------------------------|-----------------------------------|--------------------------|---|---|
| Invertebrates | | | | |
| Silver-bordered Fritillary | <i>Boloria selene atrocotalis</i> | State Candidate | Prefers mostly wet meadows, marshes, bogs, and more open parts of shrubbier wetlands. Not present in Grant or Lincoln Counties. | Unlikely. Not present in Grant or Lincoln Counties. |
| Yuma Skipper | <i>Ochlodes yuma</i> | State Candidate | Found in desert seeps and along streams, canals, and so forth, with stands of common reeds. Present in Lincoln County. | Possible. Some wetland habitat in project area may be suitable. |

Notes:

¹ Only those with federal or state listing are included in this table.

Sources: Burke Museum 2013; Opperman et al. 2006; Montana Field Guide 2013; Natureserve 2013; WDFW 2011, 2004, 2008.

3.7.2 Environmental Consequences—Proposed Action

The following sections describe the potential impacts on wildlife, habitat, and special status species from the Proposed Action.

Construction Impacts

Removal of Existing and Installation of New Structures

Impacts to wildlife from the Proposed Action could include incidental mortality from construction equipment. This would be avoided for most wildlife species because animals are typically mobile and would flee if startled by construction equipment. However, small animals, invertebrates, amphibians, and reptiles that are less mobile or that take refuge underground could be harmed or killed by equipment during construction. While some incidental mortality of small common animals may occur as a result of the Proposed Action, impacts would occur at the scale of individuals and would likely have **no** impact on regional populations. Because incidental mortality would not occur for most wildlife species and the remainder that would be affected are common and not subject to population level impacts, incidental mortality impacts to wildlife would be **low-to-moderate**.

Wildlife would be temporarily displaced during construction under the Proposed Action. Noise and construction activities would likely result in some short-term behavior modifications by wildlife in the immediate area. Approximately 0.9 acre of habitat would be lost due to structure replacement. However, this area is not likely a valuable wildlife habitat since these additional individual disturbed areas are small and close to the existing structures. Habitat loss would also result in a temporary loss of vegetation already subject to ongoing vegetation management activities. All temporary disturbance areas would be revegetated using predominantly native seed mix or a seed mix agreed upon with landowners, and once restored, would provide similar or enhanced habitat. Some areas within the shrub/scrub/grassland habitat locations also contained

rocky areas that are suitable for snake hibernacula. Removal of the structures in these areas should be carried out after the snakes have emerged from hibernation, to protect both the snakes and workers.

As stated in Section 3.5.3, disturbed, non-farmed areas would be revegetated with a predominantly native seed mix or a seed mix agreed upon with landowners. Some (about 10 miles) of the potentially affected areas contain suitable habitat for federally and/or state listed T&E species (e.g., sage grouse, ferruginous hawks, ground squirrels, and gray wolf). In response to this possibility, it is anticipated that follow-up biological surveys would be performed prior to project activities to assure that these species do not inhabit the potential habitats within the project area documented during 2013. If no federally-listed species are found in the project area, there would be no mitigation requirements. In addition, WDFW does not anticipate that there would be new or additional impacts to native habitats and wildlife as a result of rebuilding the Grand Coulee-Creston transmission line (Ritter Pers. Comm. 2013).

Certain bird species are relatively more prone to collisions with power lines, especially the overhead ground wires located at the top of the structures (Meyer 1978). Migratory waterfowl have the greatest incidences of mortality from collisions with transmission lines, particularly near wetlands, feeding areas, or open water. Heavy-bodied, less agile birds could lack the ability to quickly negotiate obstacles, making them more likely to collide with overhead lines. However, the wetland habitats in the project area are not expected to attract large numbers of migratory waterfowl so impacts to these species from collisions are expected to be **low**.

Smaller migratory birds are also at risk but are generally not as prone to collision because of their small size, their ability to quickly maneuver away from obstacles, and because they often migrate at high enough altitudes to avoid transmission lines. Raptor species are less likely to collide with power lines, possibly because they have excellent eyesight and tend not to fly at dusk or in low visibility weather conditions.

Bird mortality as a result of collisions with conductors and structures would likely remain at current levels because the structures and transmission line would remain in the same locations, with the exception of structure 2/5 which is proposed to be moved approximately 160 feet. Initially, however, the potential for collisions could be slightly reduced due to the new conductors being slightly larger and more reflective than those currently deployed, but it is likely that any benefit would decrease over time as the conductors weathered and dulled. Birds generally are more likely to strike ground wires, which are much smaller in diameter than conductors and normally span the top of the structure. Ground wires would be replaced in the same location under the Proposed Action.

Indirect impacts from noxious weed infestations of wildlife habitat that would result in the degradation of habitat quality could occur if noxious weeds were allowed to establish in the disturbed areas surrounding the structures. However, vegetation management and mitigation measures specific to the spread of noxious weeds (see Section 3.5, Vegetation) within the project area would minimize that impact.

Impacts to sensitive and priority wildlife (Tables 3-10 and 3-11) would be similar to those for wildlife species in general, **low-to-moderate**. If greater sage-grouse, sharp-tailed grouse, burrowing owls, or Washington ground squirrel were present during construction, they could be directly impacted by disturbances from construction activities. The limited field reconnaissance survey conducted in May 2013 was not likely sufficient nor was performed at the time of year when key federally or state listed T&E species (e.g., sage grouse, ferruginous hawks, ground squirrels, and gray wolf) nests, leks, colonies, or dens could be readily observed and noted, although none of these critical habitat features were found from historical data reviews of the project area. Follow-up surveys targeting the potentially suitable habitats found within the project area are anticipated prior to project activities.

No indirect effects to federally or state listed T&E species are expected. Under the Proposed Action, the wood-pole structures would be replaced with similar structures in the same locations and there would be **no** net increase in the number of available nest structures/hunting perches. Implementation of the mitigation measures identified in Section 3.7.3, including restrictions on construction timing within potentially suitable grouse, squirrel, golden eagle and ferruginous hawk habitats.

No disturbance to wetland species would occur since no work would be carried out in wetland areas.

Access Roads

Use of existing roads during construction would result in a slight increase in noise and activity levels compared to current conditions. On roads requiring improvement, or reconstruction, noise and activity levels would be greater than existing conditions. This would likely result in some short-term behavior modifications by wildlife in the area. However, this disturbance effect would be localized and temporary, resulting in **low** impacts to wildlife.

Tree Removal

A total of 53 trees/shrubs are proposed to be removed from the project right-of-way under the Proposed Action, as shown in Appendix B. Impacts to non-avian wildlife habitat from tree removal would be **low** due to the small number of tree clearing spread throughout the right-of-way. For birds, these trees likely provide perches and limited nesting habitat. Disturbance during the migratory bird nesting season would be avoided through construction timing. Vegetation clearing is proposed to take place from outside of the migratory bird breeding season (February 1 to July 30); therefore, no active nests would be lost.

The limited field reconnaissance survey conducted in May 2013 was not likely sufficient nor was performed at the time of year when key federally- or state-listed T&E species (e.g., sage grouse and ferruginous hawk) nests or leks could be readily observed and noted, although none of these critical habitat features were found from historical data reviews of the project area. Follow-up surveys targeting the potentially suitable nesting habitats found within the project area are anticipated prior to project activities. Overall, impacts to wildlife from tree removal are expected to be **low**.

Staging Areas and Tensioning Sites

Potential impacts at staging areas would be similar to those associated with removal of existing and installation of new structures. BPA would attempt to locate staging areas in industrial or paved areas to minimize impacts to wildlife habitat. If these types of areas are not available, staging areas would be located in disturbed or common habitat types, outside of sensitive habitat areas. These areas would be restored to existing conditions after construction is completed.

Potential impacts at tensioning sites would be the same as those associated with removal of existing and installation of new structures. Disturbances at tensioning sites would only occur within the existing right-of-way and the affected areas would be allowed to return to their previous condition after construction is completed, resulting in **low** impacts to wildlife habitats.

Operation and Maintenance Impacts

The rebuilt transmission line would require less maintenance, compared to the existing transmission line, because the equipment would be newer and less prone to failure. The operations and maintenance activities under the Proposed Action would be the same as those that currently occur, albeit less frequently. Future maintenance activities could involve danger tree removal, which would temporarily displace wildlife from work areas and remove habitat. It is not possible to assess which trees would become danger trees in the future or to know their use by wildlife at that time, so these impacts cannot be quantified. However, at the continued level of disturbance from operations and maintenance activities, impacts would be **low-to-moderate** and would increase as the deteriorating structures require more maintenance.

3.7.3 Mitigation—Proposed Action

The following mitigation measures and BMPs would be implemented to minimize potential construction-related impacts to wildlife and their habitat if the Proposed Action is implemented.

- Inspect trees proposed to be cut for the presence of nesting avian species—cavity nesters, small and large stick nests—prior to cutting to minimize impacts to nesting birds.
- Document all occupied or active nest on powerlines and trees and ensure that no trees containing nests are cut during the nesting season, typically February 1 through July 30.
- Conduct work in rocky areas after snakes have emerged from hibernation (mid-April and when ambient temperatures are greater than or equal to 70°F) to protect both the snakes and workers.
- Conduct at least two roadside surveys for occupied or active golden eagle and ferruginous hawks nesting territories (March and May) and daily during a three week period during early March or early May) for greater sage grouse leks within potentially suitable habitat locations to determine the presence before construction activities begin.
- Conduct walking surveys for Washington ground squirrel during April to June prior to construction to determine the presence of this species within the project area.

3.7.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

Unavoidable impacts to wildlife resources in the project area would be **low** and include the temporary loss of vegetation from construction and maintenance work, and noise and human disturbances from construction and maintenance of project facilities.

3.7.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, operation and maintenance of the existing transmission line, including the maintenance of low-growing vegetation in the right-of-way, would continue to have impacts on wildlife similar to those described for the Proposed Action. The frequency of maintenance requirements would likely increase under the No Action Alternative, as structures continued to deteriorate over time. Older transmission lines would also be more likely to require more frequent emergency repairs, which would not likely be planned or timed to avoid impacts to wildlife, resulting in **low-to-moderate** impacts to wildlife.

3.8 AIR QUALITY

This section describes the existing air quality in the project area, and the potential construction and operation and maintenance impacts from the Proposed Action and No Action alternatives. The air quality area of analysis includes Grant and Lincoln Counties. The agencies with primary air quality jurisdiction in Grant and Lincoln Counties are the EPA and Ecology. Under the Clean Air Act (42 U.S.C. 7401 *et seq.*), the EPA has established national ambient air quality standards (NAAQS) for six **criteria air pollutants**: carbon monoxide (CO), ozone, **particulate matter**, lead, sulfur dioxide, and nitrogen dioxide. Ecology has adopted the standards set by EPA. For each of the six criteria pollutants, the NAAQS represent a maximum concentration above which adverse effects on human health could occur. When an area's air quality exceeds these standards, it is designated a **nonattainment area**.

3.8.1 Affected Environment

Given the rural to low-density urban setting of the project area, the three criteria pollutants of potential interest are CO, ozone, and particulate matter. No part of the project area is within a designated nonattainment area for monitored criteria pollutants (Ecology 2013a).

CO is generally associated with transportation sources (e.g., roads and traffic). The highest ambient CO concentrations often occur near congested roadways and intersections during periods of low temperatures, light winds, and stable atmospheric conditions. The NAAQS standards for CO levels are as follows: 8-hour standard of 9 parts per million and 1-hour standard of 35 parts per million. Ecology does not monitor CO levels for Grant and Lincoln Counties. Vehicles traveling along State Route (SR) 21, SR155, SR174, and county roads are the primary sources of CO in proximity to the transmission line right-of-way. Traffic volumes along the portions of these highways in proximity to the transmission line right-of-way are low (less than 10,000 annual average daily traffic counts; WSDOT 2013a) and congestion is rare; therefore, it

is unlikely that CO levels exceed the NAAQS 8-hour or 1 hour standards for CO levels in this portion of the project area.

Ozone is primarily a product of more concentrated motor vehicle traffic on a regional scale. It is created during warm sunny weather by photochemical reactions involving volatile organic compounds (VOCs) and nitrogen oxides (NO_x). Small amounts of ozone could be produced by the existing transmission lines within the right-of-way as a result of the *corona* effect (i.e., the breakdown of air at the surface of the conductors). Ecology does not monitor ozone in Grant or Lincoln Counties. Ozone concentrations in the project area are, however, anticipated to be below the NAAQS 8-hour average standard of 0.075 parts per million because much of the area is sparsely developed and traffic levels are relatively low.

Particulate matter is generated by industrial emissions, residential wood combustion, motor vehicle tailpipes, and fugitive dust from roadways and unpaved surfaces. The greatest ambient concentrations generally occur near emissions sources. Two forms of particulate matter are regulated by EPA: particulate matter less than 10 micrometers in size (PM₁₀) and particulate matter less than 2.5 micrometers in size (PM_{2.5}). PM_{2.5} has a more severe effect on health than PM₁₀, and can impact locations farther from the emitting source because it remains suspended in the atmosphere longer and travels a greater distance.

Ecology monitors PM_{2.5} levels in Moses Lake, approximately 53 miles southwest of the transmission line right-of-way. A review of data collected by this monitoring station from January 2010 through July 2013 (EPA 2013) show that Ecology's monitoring data have not detected an exceedance of the PM_{2.5} 24-hour standard of 35 micrograms per cubic meter (µg/m³) in this portion of the project area. Ecology does not monitor particulate matter levels in the northern portion of Grant County or in Lincoln County. However, particulate matter levels in this portion of the project area are anticipated to be less than the NAAQS 24-hour standards of 150 µg/m³ for PM₁₀ and 35 µg/m³ for PM_{2.5} because the area is sparsely developed and traffic levels are relatively low. Industrial emissions, residential wood combustion, and fugitive dust from roadways and unpaved surfaces are also expected to be relatively low.

Air quality can have an effect on visibility. Section 106 of the Clean Air Act and its amendments require that air quality be preserved, protected, and enhanced in specific areas of national or regional natural, recreational, scenic, or historic value. These areas are designated as Class 1 areas, and there are eight areas within Washington State that are designated as mandatory Class 1 areas under the Clean Air Act (Ecology 2013b). An additional Class 1 area delineated by the boundaries of the Spokane Indian Reservation was designated in 1991 based upon a request from the Spokane Tribal Council (Ecology 2012b). In these areas, the protection of visibility is required and there are restrictions on the use of the land and resources to avoid damaging visibility, plants, and other resources. There are no Class 1 areas in Lincoln and Grant Counties. The closest designated Class 1 area to the project area is the Spokane Indian Reservation.

3.8.2 Environmental Consequences—Proposed Action

The following sections describe the potential construction and operation and maintenance impacts on air quality from implementing the Proposed Action.

Construction Impacts

Air quality would be primarily affected during construction, if the Proposed Action were implemented. Construction of the access roads would occur over a one- to two-month period (September and October 2014) while the transmission line would be rebuilt over a period of approximately five months (June through October 2015). Construction activities have the potential to temporarily increase particulate matter, CO, NO_x, and VOC levels on a temporary basis within a localized area.

Particulate matter in the form of dust would be the pollutant of most concern generated by construction activities. Fugitive dust could be created during site preparation, including access road work, onsite travel on unpaved surfaces, and other soil-disrupting activities. However, construction activities would only increase dust and particulate levels on a temporary basis in a localized area. Implementation of the mitigation measures described in Section 3.8.3, such as using water trucks or other dust control measures to control dust during construction, would minimize these impacts.

In addition to increased particulates, the operation of heavy equipment, helicopters, and vehicles during construction of the Proposed Action could result in increases in CO, NO_x, and VOC levels. However, these emissions would be short-term and localized, resulting in **low** impacts to air quality. In addition, vehicle and equipment emissions would be relatively small and comparable to current conditions found in agricultural and urban areas within the project area.

Operation and Maintenance Impacts

Air quality could also be slightly affected as a result of the operation and maintenance of facilities associated with the Proposed Action. During operation, the transmission line emits limited amounts of ozone and NO_x as a result of the corona effect. However, these substances would be released in small quantities and would be similar to current levels produced during operation of the existing transmission line. In addition, although there would be occasional vehicle emissions during maintenance activities, the number of vehicle trips is anticipated to be low and would also be similar to or less than existing conditions, given that the condition of the transmission line would be improved under the Proposed Action. Overall, impacts to air quality from operations and maintenance activities would be **low**.

3.8.3 Mitigation—Proposed Action

If the Proposed Action is implemented, the following mitigation measures would be used to minimize potential construction-related impacts to air quality:

- Use water trucks or other dust control measures to control dust during construction.
- Keep construction vehicles at low speeds (15 miles per hour) on unpaved access roads to minimize dust.
- Keep all vehicle engines in good operating condition to minimize exhaust emissions.

- Certify that all construction equipment is in proper working condition according to manufacturer's specifications.
- Shut down idling construction equipment, if feasible.

3.8.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

As noted above, short-term increases in some criteria pollutants would occur during construction of the Proposed Action, and levels of ozone and NO_x similar to existing levels would result from the corona effect throughout operation. Although these impacts are unavoidable, they would not violate air quality standards and are considered **low**.

3.8.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, there would be **no** impacts to air quality from construction activities. Criteria pollutant emissions related to construction vehicle trips, the use of helicopters to string the conductors, heavy equipment operation, and tree removal would be avoided. **Low** impacts to air quality would continue from the corona effect during operation of the existing line. There is also a possibility that the aging transmission line would require increased maintenance over time, resulting in additional emissions of criteria pollutants from increased vehicle use compared with existing conditions. In addition, any downed transmission lines resulting from structure failures would have the potential to cause fires in the vicinity of the downed transmission line, which would result in the release of criteria air pollutants including particular matter and CO.

3.9 CLIMATE CHANGE

This section describes greenhouse gases that could contribute to climate change, and the potential construction and operation and maintenance impacts from the Proposed Action and No Action alternatives.

3.9.1 Affected Environment

Greenhouse gases (GHG) are chemical compounds found in the Earth's atmosphere that absorb and trap infrared radiation as heat. Global atmospheric GHG concentrations are a product of continuous emission (release) and removal (storage) of GHGs over time. In the natural environment, this release and storage is largely cyclical. For 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, available to be taken up again by new plants (Ecological Society of America 2008). In forests, the carbon can be stored for long periods of time, and because they are so productive and long-lived, forests 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, and soils store carbon in the form of decomposing plant material and serve as the largest carbon reservoir on land.

Human activities such as deforestation, soil disturbances, and burning of *fossil fuels* disrupt the natural cycle by increasing the GHG emission rate over the storage rate, which results in a net increase of GHGs in the atmosphere. When forests are permanently converted to cropland, for instance, or when new buildings or roads displace vegetation, the GHG storage capacity of the disturbed area is diminished. Carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄) emissions increase when soils are disturbed (Kessavalou 1998), and burning fossil fuels releases GHGs that have been stored underground for thousands of years and cannot be readily replaced. 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 2009a). Increasing levels of GHGs could increase the Earth’s temperature by 2.0 to 11.5 degrees Fahrenheit by 2100 (EPA 2013b).

The principal GHGs emitted into the atmosphere through human activities are CO₂, CH₄, N₂O, and fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) (EPA 2013b). CO₂ is the major GHG emitted, and the burning of fossil fuels accounts for 84 percent of all U.S. GHG emissions (EPA 2013b; U.S. Energy Information Administration 2009b). CO₂ enters the atmosphere primarily through electricity generation and transportation activities, with lesser quantities from industrial, residential, and commercial activities. CO₂ levels have increased to 379 parts per million within the last century, a 36 percent increase, as a result of human activities (Intergovernmental Panel on Climate Change 2007). A report discussing these specific GHGs in more detail is provided in Appendix H.

3.9.2 Environmental Consequences—Proposed Action

The following sections describe the potential construction and operation and maintenance impacts on climate change from implementing the Proposed Action. GHG emissions resulting from the Proposed Action were calculated using the methodology described in the GHG technical report (see Appendix H). Calculations were prepared for two types of activities that produce GHG emissions: rebuilding the transmission line and ongoing annual operations and maintenance for the estimated 50-year-long operational life of the transmission line. Detailed information about the calculations is presented in Appendix F.

Construction Impacts

GHG emissions from construction activities would occur over approximately five months. The Proposed Action would result in an estimated total of 6,207 metric tons of carbon dioxide equivalent (CO₂e) emissions during construction (see Table 3-12).

Table 3-12. Net Carbon Footprint over 50-Year Life of the Proposed Action

| Type of Activity | CO ₂ e Emissions in Metric Tons |
|---|--|
| Construction (over five months) | 6,207 |
| Operation and maintenance (over the 50-year project life) | 111 |
| Total | 6,318 |

To provide context for this level of emissions, the EPA mandatory reporting threshold for large stationary sources of GHGs is 25,000 metric tons of CO₂e emitted annually (74 FR 56260). This threshold is approximately the amount of CO₂e generated by 4,400 passenger vehicles per year. Comparatively, the emissions during construction of the Proposed Action would be equivalent to the emissions generated by about 1,093 passenger vehicles per year. Given the low contributions, the impacts of construction on GHG concentrations would be **low**.

Operation and Maintenance Impacts

The Proposed Action would result in an estimated total of 111 metric tons of CO₂e emissions for ongoing operations and maintenance activities over the 50-year lifespan of the transmission line (see Table 3-12). Operation and maintenance activities would translate into CO₂ emissions about equal to that of 20 passenger vehicles per year. Because these activities would be similar to existing conditions, GHG emissions from the Proposed Action likely would not represent a substantial change, and would be considered **low**.

3.9.3 Mitigation—Proposed Action

If the Proposed Action is selected, BPA would implement the following mitigation measures to avoid or minimize GHG emissions:

- Locate staging areas as close to construction sites as practicable to minimize driving distances between staging areas and construction sites.
- Encourage the use of the proper size of equipment for the job to maximize energy efficiency.
- Recycle or salvage non-hazardous construction and demolition debris where practicable.
- Dispose of wood poles in the local area where practicable.
- Use local rock sources for road reconstruction/improvement where practicable.

3.9.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

Implementation of mitigation measures described in Section 3.8.3, Air Quality, and Section 3.9.3, Climate Change would help to reduce GHG emissions. However, unavoidable impacts would include slight increases in GHG releases. These impacts would be **low** for the reasons discussed in Section 3.8.2.

3.9.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the existing transmission line would not be rebuilt, so the impacts from construction of the Proposed Action would not occur. Operation and maintenance activities would continue, similar to existing conditions. Maintenance activities would likely increase as existing structures continued to deteriorate, and more structure repair and replacement could be required, resulting in increased GHG emissions. Maintenance of access roads would be needed and road work would likely have to take place as an operations and

maintenance activity. The maintenance activities would result in minor increases in GHG emissions, resulting in **low** impacts to climate change.

3.10 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND PUBLIC SERVICES

This section describes the existing socioeconomics (e.g., population, area economy, and employment and income), *environmental justice populations (minority and low-income)*, sales taxes, and public services in the project area, and the potential construction and operation and maintenance impacts from the Proposed Action and No Action alternatives. The socioeconomics, environmental justice, sales taxes, and public services area of analysis includes Grant and Lincoln Counties and the city of Grand Coulee in which the Proposed Action would occur.

3.10.1 Affected Environment

Population

The populations of Grant and Lincoln Counties in 2010 were 89,120 and 10,570, respectively (Table 3-13). Grant County had a population density of 33.3 persons per square mile and Lincoln County had a population density of 4.6 persons per square mile, which contrast with the state average of 101.2 persons per square mile (Washington OFM 2013; U.S. Census Bureau 2013a). From 2000 to 2010, the total population in Grant County increased by 19.3 percent while Lincoln County only increased by 3.8 percent. The main concentration of residential and commercial activity is located along the first 1.5 miles of the transmission line in the city of Grand Coulee in Grant County. The city of Grand Coulee had a population of 988 in 2010 (Washington OFM 2013; U.S. Census Bureau 2013a). The transmission line extends for about 24 miles through primarily agricultural land and dispersed rural residents in Lincoln County before the terminus at the substation north of the city of Creston.

Table 3-13. Population Characteristics, 2000 and 2010

| Area | Year 2000 Population (number of people) | Year 2010 Population (number of people) | Percent Change from Years 2000 to 2010 | Year 2010 Population per Square Mile (number of people) |
|----------------------|--|--|---|--|
| Grant County | 74,698 | 89,120 | 19.3 | 33.3 |
| Lincoln County | 10,184 | 10,570 | 3.8 | 4.6 |
| City of Grand Coulee | 897 | 988 | 10.1 | 830.9 |
| Washington State | 5,894,121 | 6,724,540 | 14.1 | 101.2 |

Sources: Washington OFM 2013; U.S. Census Bureau 2013a.

Area Economy

The area economy is noticeably based upon recreation in the west and agriculture in the remainder of the project area. Residences and businesses that support recreation are concentrated in the city of Grand Coulee where the project begins, from structures 1/5 to 3/4. Built infrastructure in the city of Grand Coulee is primarily east of the transmission line right-of-way.

The transmission line right-of-way east of the city of Grand Coulee and leading into Lincoln County is mostly agricultural land with some dispersed rural residences outside of the right-of-way. Approximately 63 percent of the land area in Grant County was in farms in 2007, compared to 74 percent in Lincoln County and 35 percent statewide (U.S. Census Bureau 2013a; USDA 2007). A total of 1,858 farms in Grant County with an average size of 586 acres generated approximately \$1.2 billion in agricultural sales in 2007, with crops accounting for 71 percent of sales by value. In Lincoln County, 798 farms with an average size of 1,366 acres generated approximately \$126 million in agricultural sales in 2007, with crops accounting for 93 percent of sales by value.

Employment and Income

There were approximately 41,258 civilians employed in the labor force in Grant and Lincoln Counties in 2011, including about 2,424 construction jobs (U.S. Census Bureau 2013b). Agriculture, forestry, hunting, and mining accounted for 19.5 percent of total employment in Grant County in 2011 compared to 12.5 percent in Lincoln County and 2.5 percent statewide. Employment was also concentrated in education services, and healthcare and social assistance which accounted for 20.1 percent of total employment in Grant County in 2011, compared to 25.7 percent in Lincoln County and 21.0 percent statewide (U.S. Census Bureau 2013b). Grant and Lincoln Counties had seasonally unadjusted unemployment rates in July 2013 of 8.0 percent and 7.2 percent, respectively, compared to a statewide rate of 6.8 percent (Washington Employment Security Department 2013).

Per capita income in Grant County in 2011 was \$20,427, approximately 33 percent of the statewide figure. In Lincoln County, per capita income in 2011 was \$25,317, which was approximately 17 percent of the per capita income for the state as a whole (U.S. Census Bureau 2013b). Median household income was approximately \$44,237 in Grant County and \$46,765 in Lincoln County in 2011, which compares to 25 percent and 21 percent of the statewide median (U.S. Census Bureau 2013b). The share of the population living below the poverty level was greater than the state average in both Grant County and the city of Grand Coulee in 2011, at 20.0 percent and 15.4 percent, respectively, versus 12.5 percent statewide (U.S. Census Bureau 2013b).

Environmental Justice Populations

All projects involving a federal action (e.g., federal funding, permits, or land) must comply with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994). Environmental justice populations are low-income and minority populations protected from the disproportionate

adverse effects of federal projects. The project area for environmental justice was assessed for Grant and Lincoln Counties, the city of Grand Coulee, and four census Block Groups (BG) crossed by the transmission line (see Figure 3-17 and Table 3-14). A census BG is the smallest geographic area for which the U.S. Census Bureau provides consistent sample data and generally contains a population of 600 to 3,000 individuals.

The largest minority populations in Grant and Lincoln Counties in 2010 were Hispanic or Latino populations, at 38.3 percent for Grant County and 2.3 percent for Lincoln County. American Indian or Alaska Native was the largest minority population for the city of Grand Coulee (14.2 percent), which is located near the Colville Indian Reservation. Grand Coulee also had a relatively high number of Hispanic or Latino populations (8.9 percent).

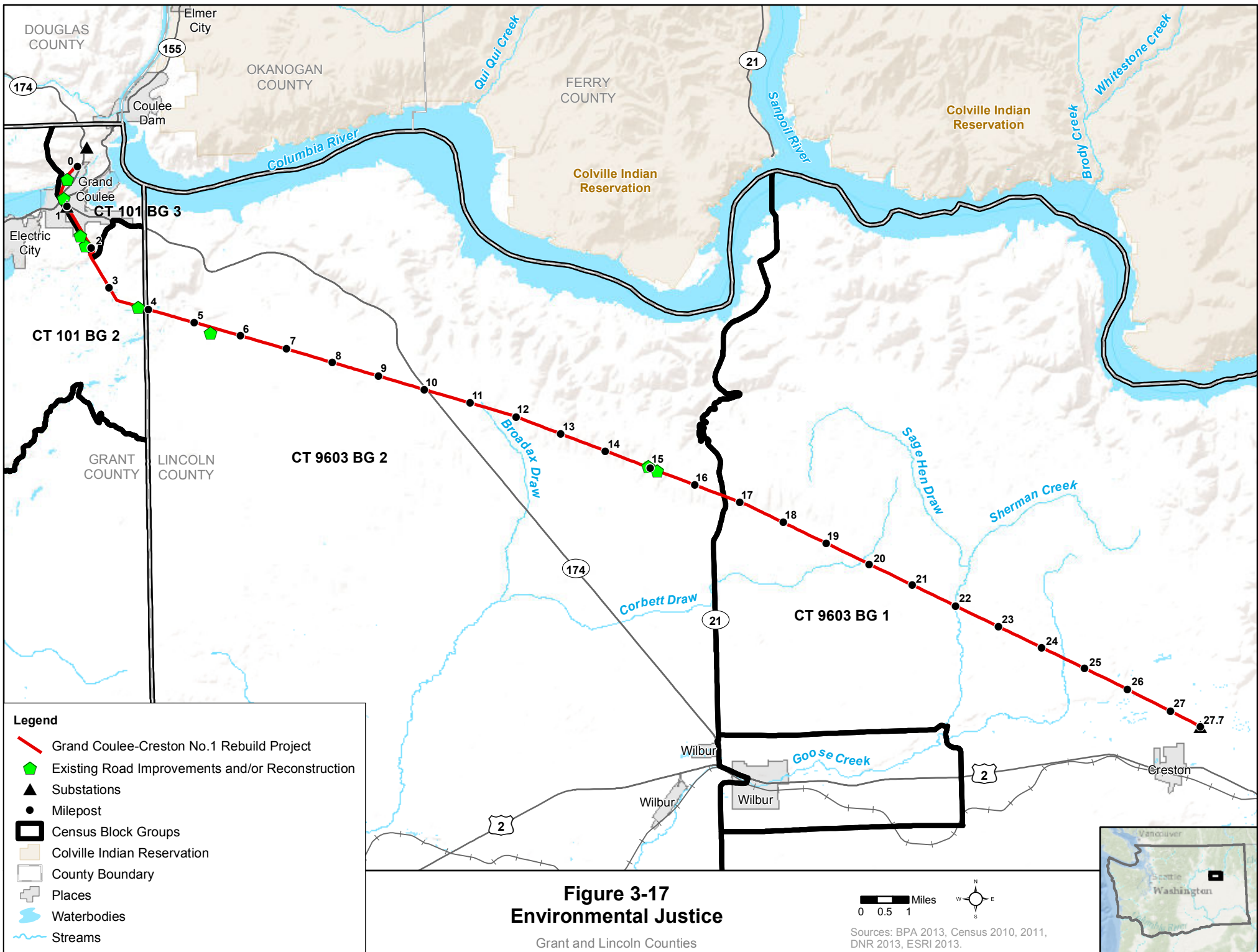
Grant County had the highest population living below the poverty level (20.0 percent), and along with the city of Grand Coulee (15.4 percent), had a higher poverty level than the state of Washington with 12.5 percent.

Census Tract (CT) 101 BG 3 in Grant County, which includes part of the city of Grand Coulee, had the greatest American Indian and Alaska Native population (13.4 percent) and Hispanic or Latino population (8.8 percent) in the project area. CT 9603 BG 1 in Lincoln County had the greatest population living below the poverty level (21.6 percent) in the project area.

Table 3-14. Minorities in 2010 and Percent of Total Population Living below Poverty in 2011

| Area | White (%) | Black or African American (%) | American Indian and Alaska Native (%) | Asian or Pacific Islander (%) | Other Race (%) | Two or More Races (%) | Hispanic or Latino (%) | Total Population Below Poverty (%) |
|----------------------------|-----------|-------------------------------|---------------------------------------|-------------------------------|----------------|-----------------------|------------------------|------------------------------------|
| Grant County | 72.8 | 1.1 | 1.2 | 1.0 | 20.4 | 3.5 | 38.3 | 20.0 |
| Lincoln County | 95.0 | 0.3 | 1.6 | 0.4 | 0.5 | 2.2 | 2.3 | 11.5 |
| Grand Coulee | 76.5 | 1.1 | 14.2 | 0.9 | 3.5 | 3.8 | 8.9 | 15.4 |
| Census Block Groups | | | | | | | | |
| CT 101 BG 3 | 77.4 | 1.1 | 13.4 | 0.8 | 3.5 | 3.8 | 8.8 | 15.4 |
| CT 101 BG 2 | 87.2 | 0.6 | 5.0 | 0.4 | 0.7 | 6.1 | 3.5 | 11.7 |
| CT 9603 BG 2 | 93.3 | 0.0 | 2.1 | 0.8 | 0.2 | 3.6 | 2.1 | 5.4 |
| CT 9603 BG 1 | 96.2 | 0.1 | 1.2 | 0.3 | 0.0 | 2.2 | 0.9 | 21.6 |
| Washington | 77.3 | 3.6 | 1.5 | 7.7 | 5.2 | 4.7 | 11.2 | 12.5 |

Sources: U.S. Census Bureau 2013a and 2013b.



Sales Taxes

The state sales and use tax in Washington is 6.5 percent. Unincorporated Grant and Lincoln Counties had respective local sales and use tax rates in the 3rd quarter of 2013 of 1.4 percent and 1.2 percent, resulting in combined state and county sales and use tax rates of 7.9 percent and 7.7 percent, respectively. The city of Grand Coulee had a local sales tax rate of 1.4 percent and a combined state and city sales and use tax rate of 7.9 percent (Washington Department of Revenue 2013).

Public Services

The primary providers of electricity and gas services in Grant and Lincoln Counties are the Grant County PUD, Inland Power and Light Company, and Ferrellgas. Public water in the project area is provided by municipal systems and water divisions.

Grant County operates the Ephrata Landfill and there are seven dropbox sites throughout the county. There are no operational landfills in Lincoln County and municipal solid waste must be transferred. The county does, however, own and operate a transfer station, located in Lincoln County about 3.5 miles west of Davenport, and about 16 miles east of the Creston Substation.

Fire protection in the project area is provided by either the city of Grand Coulee's Fire Department (for the portion of the project located within the city boundary) or the respective county fire districts (for the remaining parts of the project). Emergency response services are also provided by these fire departments and districts. Police protection in the project area is provided by the city of Grand Coulee's Police Department, the Grant County Sheriff's Department, the Lincoln County Sheriff's Department, and the Washington State Patrol. The Coulee Medical Center in the city of Grand Coulee is located near the project on SR174. In Lincoln County, Lincoln Hospital is located in Davenport west of the project along U.S. Highway 2.

Grant County is served by 13 school districts and Lincoln County is served by 11 school districts, all providing kindergarten through twelfth grade education (MRSC 2013). Students are transported to schools by an extensive system of school-bus routes that traverse most county roads. There are three colleges located on the same campus at Moses Lake in Grant County, which includes Big Bend Community College, Central Washington University, and Heritage University. There are no colleges located in Lincoln County.

3.10.2 Environmental Consequences—Proposed Action

The following sections describe the potential construction and operation and maintenance impacts on socioeconomics, environmental justice, and public services from implementing the Proposed Action.

Construction Impacts

Population

Up to four work crews would be working along the entire transmission line on any given day. Each crew would consist of 4 to 6 contractor employees, for a total 24 transmission workers. Typically, only one crew would be working at any given site; however, up to two crews could work at the stringing sites. Access road improvements would require one additional 6-person crew. As a result, up to 30 contractor employees could work along the entire right-of-way, with up to 12 employees at an individual work site. Crews would be working up to 10 hours per day, 6 days per week, for approximately 5 months. Because of the small size of the workforce, and many of them could commute on a daily basis or would only temporarily reside in the area, **no** impacts would occur to area population levels.

Area Economy, Employment, and Income

The Proposed Action would have a **small**, positive impact on the regional economy during construction through the local procurement of materials and equipment and spending by construction workers. Local purchases would likely include fuel for vehicles and equipment, some equipment rentals, staging area rentals, and other incidental materials and supplies. These direct expenditures would generate economic activity in other parts of the economy through what is known as the multiplier effect, with direct spending generating indirect and induced economic impacts. Indirect impacts consist of spending on goods and services by industries that produce the items purchased as part of the project. Induced impacts include expenditures made by the households of workers involved either directly or indirectly in the construction process. Local purchases, employment of local residents, and the temporary relocation of construction workers to the project area would have **low**, but positive impacts on local businesses.

Construction is expected to cost approximately \$7.7 million, including \$7.5 million for the transmission line work and \$200,000 for the access road work. The project would require up to 30 construction workers each working an average of 60 hours per week for approximately 5 months. The total labor construction payroll, including per diem payments and other allowances, is expected to be approximately \$5.9 million. Estimated local project-related expenditures, employment, and construction-related earnings would be short-term and small relative to the total area economic activity, employment, and income in the two project area counties, and thus would have a **low** impact.

Some short-term impacts on property value and salability could occur on an individual basis during construction due to the presence of construction equipment, activities, and noise. However, the Proposed Action involves replacing an existing transmission line with similar structures in the same locations and would have **no** appreciable impacts on property values over the long term. Impacts on property value and salability would therefore be limited and short-term.

Temporary travel routes within BPA's ROW would cross agricultural fields during construction activities, potentially resulting in a short-term disruption of agricultural production and crop

damage. Travel routes in the right-of-way would be used with the least impact necessary to allow for travel during construction. BPA would coordinate with the local farmers and landowners to minimize potential construction-related disruptions, and temporary travel routes would be restored to pre-project conditions after construction is complete. In addition, BPA has committed to compensating landowners for all revenue losses they would incur as a result of the Proposed Action. Such compensation would ameliorate the impacts of displaced crop production. Because the disruptions would be temporary and landowners would be compensated for revenue losses, the economic impact would be **low**.

Environmental Justice Populations

As described above, construction of the Proposed Action would have a **low** but positive impact on local economic conditions in Grant and Lincoln Counties and the city of Grand Coulee. These benefits could also be realized by minority populations and low-income populations in the project area. Thus, construction of the Proposed Action is expected to have **no** adverse or disproportionate impacts on minority or low-income populations.

Sales Taxes

States cannot tax direct purchases by the federal government; however, Washington State would tax local purchases by BPA contractors constructing the transmission line (Excise Tax Bulletin 316.08.193 and WAC 458-20-17001). The Proposed Action would result in an estimated \$1.8 million in purchases of construction materials for use in Washington, with nearly all (up to 90 percent) of those purchases originating out-of-state. Although most purchases would occur out-of-state, for the purpose of estimating total sales tax revenues, the Washington State sales and use tax rate of 6.5 percent and a local jurisdiction average tax rate of 1.3 percent were used to estimate potential impacts to tax revenues. Assuming total construction material purchases of \$1.8 million, sales and use tax revenues of approximately \$114,400 and \$22,880 would accrue to Washington and the local jurisdictions, respectively, a **low** impact.

Workers would also be taxed on all local purchases of goods in the state, except for purchases of tangible personal property for use outside of Washington by non-resident workers whose states or other jurisdictions are exempt from paying a local sales or “use tax” within that state (RCW 82.08.0273). These revenues are not estimated, but are expected to be positive and relatively **low**.

Public Services

During construction, **guard structures** would be placed over local utility lines and roadways to ensure continued service and safe passage in the event that the conductor or other materials were dropped during project construction. Dust suppression and truck washing for weed management (as described in Section 3.5, Vegetation) would require the use of washing stations and water trucks. However, it is anticipated that a sufficient water supply would be provided by the local water providers with **no** impact on the local water supplies. Construction waste would be recycled or taken to local landfills/transfer stations, with **no** anticipated impact to the operation of these waste facilities.

Increased truck traffic associated with the project would result in minimal localized delays (as described in Section 3.3, Land Use, Recreation, and Transportation). These delays would **not** disrupt the ability of emergency service personnel to respond to emergencies. Construction plans would incorporate fire prevention measures to limit the potential effects of the project on fire departments/districts. Medical facilities are located within the project area, and would likely be able to treat any injuries that occur during construction, without interfering with the ability to serve the larger community. Project construction would take place from June through November, and **no** impacts on schools or school transportation services would be expected.

Operation and Maintenance Impacts

Operation of the Proposed Action would have **low** direct impacts on the local area. Existing BPA staff would be responsible for operation and maintenance of the new transmission line and associated facilities. No existing employees would be required to relocate to the two potentially affected counties.

Once constructed, the Proposed Action would **not** affect the amount of property taxes collected by the counties crossed by the transmission line right-of-way. The underlying land ownership would **not** change nor would the assessed land value. Property owners would continue to pay property taxes in accordance with existing valuations and **no** property devaluations would be likely.

3.10.3 Mitigation—Proposed Action

If the Proposed Action is implemented, the following mitigation measures would be employed to minimize impacts on socioeconomic resources, environmental justice populations, and public services:

- Distribute a schedule of construction activities to all potentially affected landowners.
- Coordinate with local farmers and landowners to minimize potential construction-related disruptions.
- Compensate landowners for the value of commercial crops damaged or destroyed by construction activities.
- Coordinate the routing and scheduling of construction traffic with Washington State Department of Transportation (WSDOT) and county road staff.
- Incorporate fire prevention measures in construction plans to limit the potential effects of the project on fire departments/districts.
- Place guard structures over local utility lines and roadways during construction to ensure continued service and safe passage.

3.10.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

The Proposed Action would have a small, positive impact on the regional economy during construction and limited direct impacts in the local area during operation, resulting in **low** impacts. Impacts on property values and salability would be limited and short-term, and thus would not be affected. The Proposed Action is not expected to disproportionately affect environmental justice populations and would therefore have **no** impacts to environmental justice populations. Sales and use tax revenues from the Project would accrue to Washington and the local jurisdictions. The Proposed Action is not expected to affect the provision of public services, and increased truck traffic during construction would result in minimal localized delays. Overall, the Proposed Action is therefore expected to have **low** impacts to public services and traffic.

3.10.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, there may be the potential for greater costs of electrical service and more frequent disruption of service, because the existing transmission line would likely require more frequent maintenance and upkeep, resulting in **low** impacts. Continued levels of spending locally from operation and maintenance workers and equipment would result in **low** impacts.

3.11 CULTURAL RESOURCES

This section describes the existing cultural resources and historic properties in the project area, and the potential construction and operation and maintenance impacts from the Proposed Action and No Action alternatives. Cultural resources include things and places that demonstrate evidence of human occupation or activity related to history, architecture, archaeology, engineering, and culture. Historic properties, as defined by 36 CFR 800 the implementing regulation of the National Historic Preservation Act (NHPA) (16 USC 470 *et seq.*), are a subset of cultural resources that consist of any district, site, building, structure, artifact, ruin, object, work of art, or natural feature important in human history that meets defined eligibility criteria for the National Register of Historic Places (NRHP).

The NHPA requires that cultural resources be inventoried and evaluated for eligibility for listing in the NRHP and that federal agencies evaluate and consider the effect of their actions on these resources. Cultural resources are evaluated for eligibility for the NRHP using four primary criteria including Criterion A, B, C, and D. These criteria include an examination of the cultural resource's age, integrity, and significance in American culture, among other things.

Historic properties include prehistoric resources that predate European contact and settlement. Traditional Cultural Properties (TCPs) are properties that are eligible for inclusion in the NRHP because of their association with the cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community. The area of analysis for cultural resources includes the existing right-

of-way from Grand Coulee to Creston and the proposed access roads that extend off the right-of-way.

3.11.1 Affected Environment

The earliest evidence of human occupation in eastern Washington dates between 11,000 and 6,400 years ago (Ames et al. 1998). Populations were mainly hunter gatherers who exploited a large range of resources. Through the Holocene, people became more dependent on fewer resources on a seasonal basis and spent more time in fewer locations. There is evidence of increased subsistence use of anadromous fish, especially salmon, and root crops during the mid to late Holocene. Within the last 4,000 years, the archaeological record shows an increasing social complexity with larger trade routes evidenced by the presence of materials not found within the occupation range of certain groups. The region was historically inhabited by the Interior Salish people, a classification based on shared language (Ross 1998), including groups today known as the Spokane, Colville, Methow, Southern Okanogan, Nespelem, Sanpoil, and Nez Perce. The greatest change to traditional lifeways came with the introduction of the horse in the eighteenth century, which allowed people a greater range of travel as well as more contact with neighboring groups.

The nineteenth century brought changes to the region as fur trappers, traders, and eventually settlers entered the area following the Lewis and Clark expedition. Congress created the Washington Territory in 1853. Conflicts between Native American groups and settlers continued into the twentieth century as Native Americans were pushed onto reservations to make room for settlers expanding into the Pacific Northwest.

BPA identified and documented cultural resources in the study area and evaluated them for eligibility for listing in the NRHP. In the first step of identification, BPA conducted a literature review to identify previously recorded cultural sites within the Area of Potential Effect (APE) (Komen and Ives 2013). BPA conducted a field survey within the study area to identify cultural resources on three previously unsurveyed access road segments and to revisit previously recorded cultural resources within the right-of-way (Komen and Ives 2013). Since the Grand Coulee-Creston transmission line shares an extended right-of-way corridor with three other transmission lines, different sections of the right-of-way have been surveyed multiple times in the past for previous BPA projects (Gough 1996; Tromly and Moura 2002; Morgan et al. 2002; Sharley and Komen 2008; Roulette et al. 2011; and Roulette and Easton 2012).

In addition to field surveys, BPA asked potentially affected Tribes to identify concerns about properties of religious and cultural significance (i.e., locations that may not contain cultural materials but have cultural importance for their association with cultural traditions, also known as TCPs) within the project area.

Archaeological Resources

BPA's literature review identified four isolated artifacts and 20 previously recorded sites within the project area, 12 of which were revisited to evaluate the sites and to determine their location in relation to the right-of-way. The sites include precontact lithic scatters, historic debris, rock

cairns, precontact rock alignments, and historic railroads, while the isolated artifacts are two precontact lithic tools, and two historic objects. The right-of-way survey of access roads did not identify any cultural resources.

Built Resources

BPA also evaluated its existing transmission lines for inclusion in the NRHP. BPA prepared a Multiple Property Documentation Form documenting its Pacific Northwest Transmission System for the NRHP, and establishing criteria for evaluation (Kramer 2012). As part of the Transmission Network, the Grand Coulee-Creston transmission line is a potential contributing resource. However, portions of the transmission line have been moved and most of the line does not retain its original equipment. The Grand Coulee-Creston transmission line continues to serve its original purpose but portions have been relocated. As a result, the Grand Coulee-Creston transmission line is not considered eligible for the NRHP.

3.11.2 Environmental Consequences—Proposed Action

The following sections describe the potential construction and operation and maintenance impacts on cultural resources and historic properties from implementing the Proposed Action. Cultural resources surveys for this and other projects identified 25 cultural resource sites within the project area. BPA determined that one of the identified sites is not eligible for listing in the NRHP: the Grand Coulee-Creston transmission line. The remaining 24 sites are unevaluated for listing in the NRHP. Additional consultation with the State Historic Preservation Officer (SHPO) and affected Tribes is ongoing for three sites, which cannot be fully avoided by project design.

Construction Impacts

Impacts to the cultural resources known within the APE are unlikely given BPA's implementation of avoidance strategies and monitoring during construction activities such as restrictions to avoid disturbance to cultural resource sites and use of an archaeological monitor to oversee construction activities next to known sites. The three sites that cannot be fully avoided by project design are not eligible for listing in the NRHP. Construction activities, including removal of existing and installation of new structures and construction, improvement or reconstruction of access roads/travel routes, have the potential to affect cultural resources, including human remains, not currently known to exist in the project area. BPA attempts to avoid known sites whenever possible and uses trained cultural resource monitors on large-scale projects to ensure unidentified sites are not inadvertently affected. Implementation of the mitigation measures described in Section 3.11.3 would ensure that previously undiscovered cultural resources were managed properly, and would minimize both direct and indirect impacts from the Proposed Action. In the event that previously unidentified cultural resources are discovered, potential impacts would be **low-to-moderate**, depending on the level and amount of disturbance.

Operation and Maintenance Impacts

Some impacts to currently unknown cultural resources could occur during the continuing operation and maintenance of the transmission line through ground disturbing activities. Impacts to known resources would be minimized with the mitigation measures identified in Section 3.11.3. Impacts would be **low-to-moderate**, depending on the level and amount of disturbance.

3.11.3 Mitigation—Proposed Action

If the Proposed Action is implemented, the following mitigation measures would be employed to minimize impacts on cultural resources:

- Use existing access roads where possible to limit the possibility of new disturbance.
- Work areas would be restricted to avoid disturbance to 18 cultural resource sites. Work areas would be accessed via specific routes to avoid two cultural resource sites. An archaeological monitor would be employed at seven sites to further ensure impacts were avoided.
- If ground-disturbing activities cause an inadvertent discovery, all activities in the vicinity of the find would be stopped per BPA's Inadvertent Discovery Procedure. Inadvertent discoveries can include human remains, structural remains, Native American artifacts, or Euroamerican artifacts that were previously unknown. The BPA archaeologist, Washington SHPO, and affected Tribes would be notified immediately.
- Operations would stop immediately within 200 feet of the inadvertent discovery if human remains, suspected human remains, or any items suspected to be related to a human burial (i.e., funerary items, sacred objects, or objects of cultural patrimony) are encountered during project construction. The area would be secured around the discovery and the Grant County or Lincoln County Sheriff, the BPA archaeologist, the SHPO, and affected Tribes would be contacted immediately.

3.11.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

The potential cultural resources impacts to unknown resources are unavoidable, because the existence and location of these resources is unknown and they may be discovered during construction of the Proposed Action. Implementation of the mitigation measures described in Section 3.11.3 would minimize those construction-related impacts. Impacts to cultural resources under the Proposed Action are therefore expected to be **low-to-moderate**.

3.11.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the existing transmission line would not be rebuilt and impacts from construction of the Proposed Action would not occur. Operation and maintenance activities would continue and would be similar to existing conditions. However, maintenance activities would likely increase as existing structures deteriorate, and more structure repair and replacement could be required. This could, in turn, result in potential ground disturbances that

would have the potential to affect cultural resources. Impacts would be **low-to-moderate**, depending on the level and amount of disturbance.

3.12 VISUAL RESOURCES

This section describes the existing visual resources in the project area, and the potential construction and operation and maintenance impacts from the Proposed Action and No Action alternatives. The visual resources area of analysis includes the existing transmission line right-of-way and the access road system that extends off of that right-of-way.

3.12.1 Affected Environment

The project area includes residential areas, farmland, and buttes in Grant and Lincoln Counties in northeast Washington. The majority of the area has been previously altered through the construction of transmission corridors, residential and commercial buildings, and agricultural practices. Prominent visual resources within the project area include the buttes near the city of Grand Coulee. More distant visual resources include views of the Columbia River and Cascade Mountains. The Grand Coulee-Creston transmission line right-of-way is in a shared corridor with three other transmission lines, including the Grand Coulee-Bell No. 5 230-kV transmission line, the Grand Coulee-Bell No. 3/Grand Coulee-Westside No. 1 double-circuit 230-kV transmission line, and the Grand Coulee-Bell No. 6 500-kV transmission line. These other three transmission lines have lattice steel structures that are much larger than the Grand Coulee-Creston transmission line's wood-pole structures (Figure 3-18).



Figure 3-18. Looking North at Structure 24/3

The northern portion of the project area within Grant County is the most varied in its visual character. While much of the area is sparsely developed agricultural land there are pockets near the city of Grand Coulee with light industrial development set amidst residential and community resources.

The initial section of the transmission line passes near the small residences and light industrial facilities in the outskirts of the city of Grand Coulee (Figure 3-19). Although there are picturesque views from some of the smaller buttes, the landscape and viewshed in this area has been altered by existing development. In this part of the project area, the Grand Coulee-Creston transmission line is the only line in the right-of-way; however, the general views include the larger steel lattice structures associated with other nearby transmission lines (Figure 3-20). Views of the transmission lines are evident at community resources in the city of Grand Coulee, including the Middle School, Rodeo Grounds, at North Dam Park, and the heritage marker commemorating the visit of President Franklin Roosevelt (Figures 3-21 and 3-22).

The existing transmission line passes through the town and ascends to the buttes to the east of town (Figure 3-23). The combination of the rolling hills and minimal vegetation affords clear views of the transmission lines for several miles (Figure 3-24). In most places, the steel lattice structures and transmission lines are the dominant element in the landscape (Figure 3-25). Although the hills furnish panoramic views of the Cascade Mountains, Columbia River, and the Grand Coulee Dam (3-28, 3-30) the landscape has significantly altered. As the line continues to the south, the project area is characterized by rolling hills used primarily for grazing and limited agriculture. In this part of the project area, the hills limit the views of transmission line to the foreground.



Figure 3-19. Looking South with a View of Residences and Pastures near Structure 1/5



Figure 3-20. Looking North to the Project Start, from Structure 1/8



Figure 3-21. Looking South at Structure 2/5, near a Heritage Marker



Figure 3-22. View of the Grant County PUD Substation and Transmission Line from the Grand Coulee Middle School



Figure 3-23. View of Structure 3/4 and Buttes in the Distance



Figure 3-24. View of Structure 4/2 from Grand Coulee Hill Road



Figure 3-25. View of Structure 6/4 with the Cascade Mountains in the Distance

The southern portion of the project area in Lincoln County is predominately agricultural (Figure 3-26). The landscape is open with rolling hills and very little vegetation, other than planted

crops. The views of the transmission line extend for many miles. As the transmission line nears Creston, there are more trees to provide screening for the line (Figure 3-27).

Throughout the project area there are views of the existing transmission line for motorists, residents, and recreational users. However, there are no State Scenic Highways (WSDOT 2010) within the project area. The primary transportation roadways in the project area that have views of the transmission line are SR 174, SR 55, and SR 21. Other than in the city of Grand Coulee residential development is sporadic. Recreational uses outside of the city consist primarily of informal hunting on agricultural land.

As it is more densely populated, the northern portion of the project area exposes the transmission line to a larger number of viewers than the southern portion. In addition, the topography of the northern portion of the project area furnishes more views of the transmission line. Throughout the project area the landscape has been altered by agricultural and residential uses as well as the existing transmission corridor.



Figure 3-26. Looking North at Structure 24/3



Figure 3-27. Looking South at Structure 28/4

3.12.2 Environmental Consequence—Proposed Action

Construction and operation and maintenance impacts to specific types of viewers are discussed in the following sections. The project area has not been inventoried using a formal visual resources methodology, but the BLM’s Visual Resources Management (VRM) methodology, which analyzes the level of contrast between the existing conditions and the proposed activity, was used to evaluate the level of alteration from the existing environment. In this methodology, project activities that would create a weak-to-moderate level of contrast in an area where the environment was previously altered are assigned a low level of impact while project activities that result in a strong level of contrast in an environment that is minimally altered or highly scenic are assigned a moderate-to-high level of impact.

Temporary impacts would occur from construction activities, including replacing structures, working on access roads, clearing vegetation, and storing construction equipment. Viewers who are sensitive to visual change, including motorists, local residents, and recreational users, could be temporarily affected by the construction work. The Proposed Action would also result in vegetation clearing and soil disturbance that would be visible. This visual impact associated with vegetation clearing and soil disturbance would be temporary until the reestablishment of vegetation.

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

other features of the transmission line are fixed and do not have moving features to attract attention. The Grant County Tap near structure 2/7 and the Wilbur Tap between structures 19/3 and 19/4 (Figure 2-3) would be rebuilt in kind and would look the same as the existing taps, thus resulting in **no** impact.

Motorists

Construction activities, including access road development and vegetation removal, could detract from views in the project area for motorists but the impacts from these activities would be of limited duration and in limited areas of the project.

The existing transmission line right-of-way is visible from SR 21, SR 174, and SR 155 at the intersection with SR 174. This intersection is the area where the rebuilt transmission line would be most visible to motorists. Structures 2/3 and 2/4 are approximately 50 to 100 feet from the SR 174. Structures 2/5 and 2/6 are approximately 100 feet from SR 174. In these locations, the transmission corridor would be visible to the motorists who are moving at slower speeds in this more congested area, but the level of contrast from the existing conditions would be weak-to-moderate as the new poles would be only slightly taller and the conductors slightly more reflective until the materials have weathered.

Outside of the city of Grand Coulee, the majority of the public viewers are traveling at relatively high speeds (50 to 60 mph) which would further limit the view of any particular segment. In these areas the views are also limited by hillsides and curves in the roads. Near the intersection of SR 174 and Birchill Road the transmission line also crosses SR 174. Several of the structures would be visible to motorists, particularly structure 11/8 which is approximately 50 feet from SR 174. In this area the steel lattice structures of the other transmission lines in the right-of-way would continue to dominate the viewshed, with impacts further reduced by the limited viewing times for the motorists.

Although the rebuilt poles would be taller and the reflectors would be temporarily more reflective, the overall dominance of the transmission line would not increase for motorists as the rebuilt transmission line and access road system would continue to be visually subordinate to the existing lattice steel structures that currently dominate the visual landscape within the project area. As the level of contrast from the existing conditions in the majority of the project area would be weak, the overall impacts to motorists would be **low**.

Residents

Short-term impacts from construction activities, including storage of equipment and removal of trees and other vegetation, would temporarily modify the visual landscape for residents. There are relatively few residents in the majority of the project area and the impacts are expected to be temporary and localized. Implementation of mitigation measures identified in Section 3.12.3, such as avoiding the storage of construction equipment and supplies on residential streets, are expected to further reduce impacts to residents.

Although residential viewers are sensitive to changes in their visual environment, the existing transmission line right-of-way is a familiar element in the visual landscape for residents in the

project area. In the city of the Grand Coulee residents in areas where the Grand Coulee to Creston transmission line is the only resource in the right-of-way would experience a greater level of contrast but this portion of the project area is also more heavily developed with other buildings and nearby transmission line corridors creating a strong visual impact. In addition, structure 2/5 is proposed to move from its existing location to approximately 160 feet to the south, which would reduce visual impacts to the residents near the current structure 2/5.

In the city of Grand Coulee, the rebuilt transmission line would also be more noticeable to residents and other users of the community resources such as the rodeo grounds and the parks. However, at these locations there are other activities and facilities occurring at closer distances to engage the attention of the residents and other users. The level of contrast between the existing transmission line and the slightly taller poles and more reflective conductors of the rebuilt transmission line would be weak-to-moderate. Given the minimal level of contrast between the existing facilities and the new transmission line, the impacts to the viewshed experienced by the residents and other users of resources in the city of Grand Coulee would be **low**.

In the majority of the residential areas, the existing level of alteration to the environment is moderate-to-high with other buildings and the transmission line rights-of-way already visible. In most locations, the lattice-steel structures dominate the visual landscape. The rebuilt Grand Coulee-Creston transmission line would continue to appear subordinate to the other lines once the existing line is rebuilt. Although the new structures would be taller the majority of residents would be unlikely to distinguish the difference between the existing and rebuilt features of the Grand Coulee-Creston transmission line. Initially, the new poles would be brighter and the conductors would be more reflective but these would weather over time and be less visible or prone to create glare. The resulting visual contrast in most of the residential areas of the project would be weak and the impacts would be **low**.

Recreation

The primary recreation in the project area is informal use of the right-of-way for hunting. Visual impacts to these recreationists would primarily be the result of construction activities. These impacts would be temporary and short in duration.

Although the quality of views is an important part of recreational experience, the existing transmission line right-of-way is already a prominent element of the landscape in the project area. The contrast created by installing taller poles and more reflective conductors would be weak so visual impacts for recreationists are expected to be **low**.

Operation and Maintenance Impacts

Operation and maintenance work would be similar to practices already implemented along the transmission line. Motorists, residents, and recreationists would continue to observe maintenance activities, including vegetation clearing, conductor replacement, and equipment and BPA personnel during inspections; however, this would be likely to occur with less frequency after the rebuild due to the new equipment and materials. Operation and maintenance would not result in new or different visual resources, resulting in **no** impacts.

3.12.3 Mitigation—Proposed Action

If the Proposed Action is implemented, the following mitigation measures would be used to minimize potential construction-related impacts to visual resources:

- Schedule all construction work during daylight hours to reduce the need for nighttime illumination of work areas.
- Use non-reflective conductors and insulators on all replacement structures.
- Avoid storing construction equipment and supplies on residential streets or access roads directly adjacent to residential property, to the greatest extent possible.
- Incorporate erosion control BMPs into the construction of access roads to minimize permanent visual impacts on nearby residential viewers.
- Reseed disturbed, non-farmed areas once construction is complete using a predominately native seed mix or a seed mix agreed upon with landowners.
- Inspect reseeded sites periodically over a 3-year period to verify adequate growth. If necessary, implement contingency measures, such as reseeded, to ensure development of adequate growth and vegetation cover. Monitor areas replanted with woody species until a 70-percent establishment rate is met.
- Require the contractor to maintain clean construction sites to minimize the visual impacts of the temporary use of these areas.

3.12.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

If the Proposed Action is implemented, residents, motorists, and recreational users would experience temporary visual changes from construction activities as well as permanent elements from the development of new access roads. These elements would continue to be visually subordinate to the large, lattice steel structures that currently visually dominate the landscape of the project area; therefore, these unavoidable impacts are expected to be **low**.

3.12.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, no construction-related impacts would occur to visual resource. However, the aging transmission line would continue to deteriorate under the No Action Alternative and could require increased maintenance over time, resulting in visual impacts from maintenance crews. In addition, any downed transmission lines resulting from structure failures would impact visual resources, resulting in **low** impacts.

3.13 PUBLIC HEALTH AND SAFETY

This section describes the existing public health and safety issues in the project area, and the potential construction and operation and maintenance impacts from the Proposed Action and No

Action alternatives. The public health and safety area of analysis is the project right-of-way and access roads located outside of the project right-of-way.

3.13.1 Affected Environment

In Grant and Lincoln Counties, as in the State of Washington overall, the leading causes of fatal, unintentional injury from 2007-2011 were motor vehicle collisions, poisoning, and falls. The rate of unintentional fatal injuries to occupants of motor vehicles in Grant County is elevated (14.2 per 100,000 resident population) compared to the State of Washington average (5.3 per 100,000 resident population) for 2007-2011 (WSDOH 2013a and 2013b). The rate of unintentional fatal injuries to occupants of motor vehicles in Lincoln County was more than three times as high (17 per 100,000 resident population) as the state average rate during 2007-2011. Sources of motor vehicle traffic in the project area include vehicles traveling along state highways and county roads. The project right-of-way crosses SR 21, SR 155, SR 174, and county roads including 1st Street, Alcan Road, Canal Service Road, E Street, F Street, Geid Road, H Street, Llewellyn Road, Man Gollehon Road, Mount View Road, Old Grand Coulee Wilbur Highway, Phlox Street, Sherman Draw Road, Sorensen Road, and Thorson Road. Agricultural equipment is also operated in the project area and could cross the project right-of-way.

3.13.2 Environmental Consequences—Proposed Action

The following sections describe the potential construction and operation and maintenance impacts on public health and safety from implementing the Proposed Action.

Construction Impacts

Potential public health and safety impacts would be associated with the use of heavy equipment; construction traffic entering and traveling across the project right-of-way; potential exposure to hazardous materials, such as fuels and lubricants during construction; potential aircraft hazards; and intentional destructive acts. The risks associated with working in close proximity to high-voltage power lines are discussed below under Operation and Maintenance Impacts.

The use of heavy equipment during construction of the Proposed Action carries the risk of accidental injury to workers. Implementation of the mitigation measures described in Section 3.13.3, such as crew safety meetings at the start of each workday, would reduce these potential impacts. In addition, there would be a risk of collisions between construction vehicles and vehicles driven by the public while construction is ongoing, particularly on the roads crossed by the project right-of-way. The mitigation measures described in Section 3.3.3, Land Use, Recreation, and Transportation, would reduce the risk of collisions between construction traffic and motor vehicles traveling in the project area.

Potential effects associated with the use of construction equipment containing hazardous materials (e.g., fuel, coolants, hydraulic fluids, brake fluids, and other chemicals) during construction of the Proposed Action include the accidental release of toxic materials into the environment from improper use, storage, or disposal of these materials. The effects of such releases could include contamination of vegetation, soil, and water, which could result in indirect

effects to public health and safety. The potential public health and safety impacts associated with accidental spills during construction would be **low**, due to the implementation of mitigation measures described in Section 3.13.3 and BMPs, including a Spill Prevention and Treatment Plan.

Standard construction safety procedures would be employed. Implementation of the mitigation measures described in Section 3.13.3, such as preparing and maintaining a Safety Plan, would reduce the potential health and safety impacts of the Proposed Action.

Overall, impacts to health and safety from construction-related activities are expected to be **low**.

Operation and Maintenance Impacts

The use of heavy equipment during maintenance activities carries the risk of accidental injury to workers. Implementation of the mitigation measures described in Section 3.13.3, such as crew safety meetings at the start of each workday, would reduce these potential impacts.

Waters could become contaminated from chemicals or other pollutants associated with periodic operation and maintenance activities. Construction activities require the use fuel and other chemicals, such as coolants, hydraulic fluids, and brake fluids, to operate heavy equipment and vehicles. The potential risk of water quality impacts associated with accidental spills during construction would be **low**, due to the implementation of BMPs including a Spill Prevention and Treatment Plan.

The heights of the new wood-pole structures would be about 10 feet taller than existing structures, ranging from 50 to 125 feet above ground. While the presence of the taller structures could pose a hazard to any low-flying aircraft, the height of the new wood-pole structures would remain relatively low. Furthermore, the structures would be installed adjacent to existing, taller 230-kV and 500-kV steel structures in the project area, which aircraft currently avoid. Therefore, risks to low-flying aircraft would not change appreciably from current conditions.

Intentional destructive acts (e.g., acts of sabotage, terrorism, vandalism, and theft) sometimes occur at power utility facilities. Vandalism and thefts are the most common types of intentional destructive acts, and recent increases in the prices of metal and other materials have accelerated thefts and destruction of federal, state, and local utility property. Depending on the size and voltage of the line, destroying structures or other equipment could cause electrical service to be disrupted to utility customers and end users. While the likelihood for sabotage on the Proposed Action is difficult to predict, it is unlikely that such acts would occur. Furthermore, given that the Proposed Action would rebuild the existing Grand Coulee-Creston transmission line rather than create a new transmission right-of-way in the project area, the risk of intentional destructive acts would not change appreciably from current conditions, resulting in **low** impacts.

3.13.3 Mitigation—Proposed Action

The mitigation measures described in Section 3.3.3, Land Use, Recreation, and Transportation would reduce the risk of collisions between construction traffic and motor vehicles traveling in

the project area. The following additional mitigation measures would further minimize potential public health and safety risks if the Proposed Action is implemented:

- Keep spill prevention materials on site and with equipment.
- Prepare and implement Spill Prevention and Response Procedures to prevent and contain accidental spills, including notification procedures.
- Conduct crew safety meetings at the start of each workday to review potential safety issues and concerns.
- Conduct monthly meetings between BPA and the contractor to discuss safety concerns.
- Secure the site at the end of each workday, as much as possible, to protect equipment and the general public.
- Comply with all fire safety laws, rules, and regulations of the State of Washington and prepare a fire prevention and suppression plan to meet BPA, local authority, and land manager requirements.
- Construct and operate the new transmission line to comply with the NESC.
- Notify the BPA Contracting Officer's Technical Representative immediately if a hazardous material is discovered that could pose an immediate threat to human health or the environment, and stop work in that area until the site is properly cleaned up.

3.13.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

Potential unavoidable public health and safety risks include increased risks of electrical shocks, accidental releases of fuels or oils, accidental injuries to construction workers, and possible collisions between construction vehicles and vehicles driven by the public while construction is ongoing. Implementation of the mitigation measures listed in Section 3.3.3, Land Use, Recreation, and Transportation and Section 3.13.3, Public Health and Safety would reduce the potential impacts, resulting in **low** impacts to health and safety.

3.13.5 Environmental Consequences—No Action Alternative

Potential construction-related public health and safety risks would not occur under the No Action Alternative. However, the aging transmission line would continue to deteriorate under the No Action Alternative and would remain vulnerable to natural hazards, which could create risks to the safety of the public and maintenance crews. In addition, any downed transmission lines resulting from structure failures would have the potential to cause fires in the vicinity of the downed transmission line. Impacts to public health and safety from the No Action alternative are expected to be **low** but would increase as the deteriorating structures require more maintenance.

3.14 ELECTROMAGNETIC FIELDS (EMF) AND NOISE

This section describes the existing *electromagnetic fields* (EMF), radio and television interference, and noise issues in the project area, and the potential construction and operation and maintenance impacts from the Proposed Action and No Action alternatives. The area of analysis includes the project area within and outside the transmission line right-of-way.

3.14.1 Affected Environment

EMF

All electrical wires, from household wiring to transmission lines, produce EMF. The primary parameters that impact the EMF levels produced by a power line are line voltage, current loading, line configuration, and line routing. Exposure to EMF depends on the design of the line and proximity to the line. The State of Washington has no regulations regarding transmission line electric or magnetic fields, and no nationally recognized regulatory standards/limits exist for electric fields from transmission lines. The NESC does specify a maximum 5-milliampere criterion for maximum permissible induced shock current from large vehicles under transmission lines with voltages 230-kV or greater. BPA designs transmission line projects to meet the NESC exposure criteria within and outside the transmission line right-of-way.

Radio and television interference (*electromagnetic interference*) from high-voltage power lines can be produced from two general sources: conductor corona activity (see the discussion on Noise below) and *spark-discharge activity* on connecting hardware. Interference from these sources is known as electromagnetic interference (EMI). In certain circumstances, EMI can affect other types of communication systems and sensitive receivers. 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. Historically, public complaints of radio and television interference from BPA transmission lines operating at 115-kV are rare.

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

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

in the United States, and Washington does not have a limit for magnetic fields from transmission lines.

Noise

Noise is commonly defined as loud, unwanted, or unexpected sound that disrupts normal human activities or diminishes the quality of the human environment. Audible noise is measured in *decibels* on the A-weighted scale. The *A-weighted decibel scale* (dBA) describes sound that corresponds to human perception. Table 3-15 contains examples of common activities and the associated noise level in dBA.

Table 3-15. Common Activities and Associated Noise Levels

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

Noise within the project area is regulated by local jurisdictions (Grant and Lincoln Counties) for compliance with WAC 173-60. These regulations specify noise limits according to the type of property where the noise would be heard (the receiving property) as well as the land use designation for the area where the noise would be generated (the noise source). Transmission lines are classified as industrial sources for purposes of establishing allowable noise levels at receiving properties. Nighttime noise limits are 50 dBA in residential neighborhoods, 55 dBA in commercial and recreational areas, and 60 dBA in industrial areas. The daytime noise thresholds for residences, commercial and recreational areas, and industrial areas are 60 dBA, 65 dBA, and 70 dBA, respectively.

The noise area of analysis includes the noise-sensitive land uses within 1,000 feet of the transmission line right-of-way. Construction noise generated by the Proposed Action, including temporary disturbances from access road reconstruction/improvement traffic on noise sensitive land uses, would primarily occur within 1,000 feet of the transmission line right-of-way. This buffer was selected because noise-sensitive receptors beyond 1,000 feet from the project right-of-way generally would not experience construction noise levels above the applicable daytime noise thresholds, except for short periods when a helicopter might be heard from greater distances.

Land uses most sensitive to noise within the project area include occupied buildings (e.g., residences, Coulee Medical Center, Grand Coulee Dam Middle School, places of worship, and businesses), a natural area used for recreation (North Dam Park), and other areas where noise can interfere with peoples' use or enjoyment of the environment. North Dam Park and most of the occupied buildings in the project area are within the city of Grand Coulee. Between structures 1/5 and 3/1 in the city of Grand Coulee, there are approximately 147 residences, 29 businesses, one hospital (Coulee Medical Center), North Dam Park, three places of worship, and one school (Grand Coulee Dam Middle School) within 1,000 feet of the transmission line right-of-way. Additional occupied buildings in Grant County outside of the city of Grand Coulee between structures 1/5 and 2/1 include approximately two businesses and seven residences. Approximately 10 dispersed residences in Lincoln County, in primarily agricultural land, are located within 1,000 feet of the transmission line right-of-way. Any temporary disturbances from access road reconstruction/improvement traffic on occupied buildings and North Dam Park would primarily occur within 1,000 feet of the transmission line right-of-way in the city of Grand Coulee and along major roadway crossings in Grant and Lincoln Counties.

Within the project area, *ambient noise* levels vary with the proximity of the transmission line right-of-way to highways and other noise-generating activities. Most of the transmission line right-of-way 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. In particular, vehicles traveling along SR 21, SR 155, SR 174, and county roads generate noise in proximity to the project right-of-way. Other sources of noise include maintenance activities along the project right-of-way. In the city of Grand Coulee, traffic and noise associated with human activity are major contributors to background noise. Sources of audible noise associated with electrical transmission systems include maintenance equipment, transmission line corona (see below), and the hum of electrical transformers. Noise from the existing Grand Coulee–Creston transmission line and adjacent transmission lines contributes to the noise setting, but is overshadowed by other noise sources in the city of Grand Coulee, where most noise-sensitive land uses in the project area are located.

Audible noise from high-voltage transmission lines (i.e., 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. However, historically, public complaints/inquiries related to transmission line audible noise at this voltage level are extremely rare. In addition, BPA designed this 115-kV transmission line to meet applicable state and federal noise regulations.

3.14.2 Environmental Consequences—Proposed Action

Construction Impacts

The primary parameters that impact the electric and magnetic field levels produced by a power line are line voltage, current loading, line configuration, and line routing. The Proposed Action would not appreciably change any of these parameters. Therefore, generally speaking, **no**

changes to the EMF environment in the vicinity of the line are expected. In a few isolated cases, pole heights would need to be increased slightly to raise the conductor-to-ground clearances. In these areas, ground-level EMF would decrease slightly within the project right-of-way. **No** changes are expected beyond the project right-of-way. Thus, impacts to EMF from the Proposed Action are expected to be **low**.

BPA has calculated representative EMF levels for the Proposed Action (see Tables 3-16 and 3-17). The right-of-way segment modeled was selected to represent the maximum change in EMF for the Proposed Action. The data illustrates that the Proposed Action would not significantly change either the electric or magnetic field environment in the project right-of-way, resulting in **low** impacts. Overall, EMF emissions from the Proposed Action are expected to conform to BPA and NESC criteria.

Table 3-16. Representative Right-of-Way Electric Field^{1, 2}

| Right-of-Way Section Description | | Northern Right-of-Way Edge (kV/m) | Maximum on Right-of-Way (kV/m) | Southern Right-of-Way Edge (kV/m) |
|--|-----------------------------|-----------------------------------|--------------------------------|-----------------------------------|
| Grand Coulee-Creston No. 1 Grand Coulee-Bell No. 6 Grand Coulee-Westside No.1 | Existing Conditions | 1.3 | 5.3 | 0.7 |
| Grand Coulee-Bell No. 3 Grand Coulee-Bell No. 5 collocation (entire route of Proposed Action) | With Proposed Action | 1.3 | 5.3 | 0.7 |

¹ Values developed from BPA modeling programs.

² Electric field calculations are for existing 400-foot-wide right-of-way for the five lines.

Table 3-17. Representative Right-of-Way Magnetic Field^{1, 2}

| Right-of-way Section Description | | Northern Right-of-Way Edge (milligauss ³) | | Maximum on Right-of-Way (milligauss ³) | | Southern Right-of-Way Edge (milligauss ³) | |
|--|-----------------------------|---|------|--|-------|---|------|
| Grand Coulee-Creston No. 1 Grand Coulee-Bell No. 6 Grand Coulee-Westside No.1 | Existing Conditions | 6.9 | 19.2 | 52.5 | 153.1 | 7.8 | 15.8 |
| Grand Coulee-Bell No. 3 Grand Coulee-Bell No. 5 collocation (entire route of Proposed Action) | With Proposed Action | 6.9 | 19.2 | 52.5 | 153.1 | 7.8 | 15.8 |

¹ Values developed from BPA modeling programs. Calculation of annual average and annual peak magnetic field levels reported in Table 3-17 are based on historical 2011-2012 annual line loading statistical data obtained from BPA's Supervisory Control and Data Acquisition system.

² Magnetic field calculations are for existing 400-foot-wide right-of-way for the five lines.

³ Based on annual 2011-2012 line load statistics.

Construction activities would result in short-term and intermittent noise impacts as construction progresses along the project right-of-way. Noise would result from construction equipment and vehicles used for road work, vegetation removal, and structure removal and replacement. Helicopters could be used to string a sock line through the structures. Noise associated with helicopter use would be temporary and intermittent. It would generally take less than 10 minutes to string the sock line through each structure and it is estimated that helicopters would not be in any given line mile for more than 3 hours. Although helicopter noise would likely exceed noise thresholds for some noise-sensitive receptors, the impact would be short-term and **low**.

Daytime noise thresholds under WAC 173-60 (which are 60 dBA, 65 dBA, and 70 dBA for residences, commercial and recreational areas, and industrial areas, respectively) would be applicable to the Proposed Action because construction noise would be limited to daylight hours (7:00 a.m. to 5:00 p.m.). Table 3-18 summarizes noise levels generated by typical equipment that would likely be used to construct the Proposed Action. Noise levels at 50 feet from a construction site would range from 80 to 89 dBA (with higher temporary-intermittent levels associated with a helicopter used to string a sock line through the structures). Noise produced by construction equipment would decrease with distance at a rate of about 6 dBA per doubling of distance from the site. Based on that assumed attenuation rate, noise-sensitive properties within 400 feet of construction sites could be exposed to daytime noise levels of 71 dBA, which would exceed the applicable noise thresholds for residences (60 dBA) and commercial and recreational areas (65 dBA). Noise-sensitive properties within 800 feet of construction sites could be exposed to daytime noise levels of 65 dBA, which would exceed the applicable noise threshold level for residences (i.e., 60 dBA). However, noise levels would be further attenuated due to the areas of open space within the project right-of-way. Using a terrain coefficient of 0.005 dBA/m (Rogers 2006), noise-sensitive receptors beyond 1,000 feet from the project right-of-way would not experience non-helicopter construction noise levels above 60 dBA.

Table 3-18. 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.

Although construction activities could exceed applicable noise thresholds for some of the noise-sensitive land uses within the project area (see Section 3.14.1), construction activities at any given location are expected to be relatively short in duration (approximately 1 to 2 days). In addition, implementation of the mitigation measures described in Section 3.14.3, such as having sound-control devices on construction equipment with gasoline or diesel engines, would reduce noise impacts and would ensure that construction noise would only be generated during daylight hours (7:00 a.m. to 5:00 p.m.) , resulting in **low** impacts.

Noise from truck traffic and increased worker trips would temporarily contribute to existing traffic noise on local roads and highways, but is not expected to result in a substantial increase in average traffic noise levels, resulting in **low** impacts.

Audible noise from high-voltage transmission lines occurs as a result of conductor corona activity. For the Proposed Action, no changes to the operating line voltage of the Grand Coulee–Creston transmission line are expected. BPA has calculated audible noise levels (for wet conditions) (see Table 3-19). The data illustrates that the Proposed Action would not significantly change the audible environment near the project right-of-way. The impacted lines would remain compliant with applicable State of Washington noise regulations.

Table 3-19. Right-of-Way Audible Noise¹

| Right-of-Way Section Description | | Northern Right-of-Way Edge (dBA ²) | Maximum on Right-of-Way (dBA ²) | Southern Right-of-Way Edge (dBA ²) |
|---|-----------------------------|--|---|--|
| Grand Coulee-Creston No. 1 | Existing Conditions | 44.1 | 50.8 | 45.7 |
| Grand Coulee-Bell No. 6 | | | | |
| Grand Coulee-Westside No.1 | With Proposed Action | 44.1 | 50.8 | 45.7 |
| Grand Coulee-Bell No. 3 | | | | |
| Grand Coulee-Bell No. 5 collocation (entire route of Proposed Action) | | | | |

¹ Values developed from BPA modeling programs.

² Wet conditions.

Operation and Maintenance Impacts

For the Proposed Action, no changes are expected to the operating line voltage of the Grand Coulee–Creston transmission line. Additionally, the Proposed Action would result in new, properly installed connecting hardware that would reduce risks associated with aging hardware spark-discharge activity. As a result, the Proposed Action is expected to either not change or possibly slightly improve radio and television performance along the impacted line sections. Based on past performance, interference complaints are not expected and any legitimate radio or television interference complaint received by BPA would be investigated. If BPA facilities are determined to be the cause of the interference, BPA would take corrective actions to eliminate the interference.

Periodic noise impacts would occur during maintenance activities and would typically be associated with equipment used to maintain or repair infrastructure (e.g., wood-pole structures and access roads) associated with the Proposed Action. In addition, during periodic vegetation maintenance activities, noise could be generated by various cutting devices (such as chainsaws) used to remove vegetation from the project right-of-way. However, these activities would generate short-term noise. Given that the condition of the Grand Coulee–Creston transmission line would be improved by the Proposed Action, it is anticipated that fewer maintenance activities would have to occur than if it were not implemented.

BPA also conducts routine helicopter inspection patrols of the federal transmission system in the Pacific Northwest, including the transmission lines in the project area. As part of these routine patrols, BPA would continue to use helicopters to fly the line to look for any problems or repair needs. These patrols typically occur two times a year, generally in spring and fall. Any noise experienced by receptors on the ground during these flyovers would be extremely infrequent and limited in duration (i.e., only for the few seconds it would take for the helicopter to pass over the receptor), resulting in **low** impacts.

3.14.3 Mitigation—Proposed Action

To reduce the potential for temporary, adverse noise impacts during construction, the following mitigation measures would be incorporated into contract specifications:

- Locate equipment as far away as is practical from noise-sensitive areas.
- Require all construction equipment powered by gasoline or diesel engines to have sound-control devices that are at least as effective as those originally provided by the manufacturer.
- Require all equipment to be operated and maintained to minimize noise generation.
- Prohibit gasoline or diesel engines from having unmuffled exhaust.
- Distribute the construction schedule to all landowners within 1000 feet of the Proposed Action to inform the landowners of when they might experience construction-related noise.
- Limit construction noise to daylight hours (7:00 a.m. to 5:00 p.m.).
- Turn off construction equipment during prolonged periods of non-use.

The Proposed Action would not increase the overall level of EMF exposure along the right-of-way. The following mitigation measure is prescribed to reduce the potential for radio and television interference:

- Investigate legitimate radio or television interference complaint received by BPA. Take corrective action if BPA facilities are determined to be the cause of the interference.

3.14.4 Unavoidable Impacts Remaining After Mitigation—Proposed Action

Unavoidable noise impacts would include noise that would be experienced by noise-sensitive receptors (e.g., residences and recreational users) during construction activities which would be short-term and would cease upon the completion of construction activities, resulting in **low** impacts.

3.14.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, EMF exposure would remain similar to current conditions and noise associated with construction activities would not occur, resulting in **low** impacts from EMF and noise. Audible noise associated with operation of the transmission line would not change from existing conditions. Noise associated with maintenance would continue as in the past, and could occur more often than under the Proposed Action because of the continued deterioration of the existing line and the likely need for more frequent maintenance activities. Impacts would be **low** but would increase as the deteriorating structures require more maintenance.

3.15 CUMULATIVE IMPACTS

Cumulative impacts are impacts on the environment 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) or person undertakes such other 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 existing development from past actions in the vicinity of the proposed project, as well as present and reasonably foreseeable future development for the area. The past, present, and reasonably foreseeable future actions provide the context in which to assess the cumulative impacts of these actions in combination with the Proposed Action. Potential cumulative impacts are analyzed and described for the environmental resources included in this EA.

3.15.1 Past Actions

The nature and extent of existing development that has resulted from past actions in the vicinity of the proposed project is largely described earlier in this chapter in the “Affected Environment” sections for each environmental resource. In addition, the following actions are also considered.

Regional Land Use Development

The area comprising Grant and Lincoln counties was historically populated by the First Peoples, including the Spokane Tribe. Non-native fur traders and missionaries began to travel through and reside the area in the late-18th century and early-19th century (HistoryLink 2013). The first white settlers began to arrive in the mid-to-late-19th century, primarily with the goal of raising

livestock. The construction of the Great Northern Railway, Northern Pacific Railroad, and the Chicago, Milwaukee & St. Paul Railroad provided easier access for new settlers, and the economy began a shift from ranching to dryland farming. In addition, the Columbia River was navigable and allowed crops to be transported easily out of the area (Grant County 2013b). The development of the Grand Coulee Dam and the Columbia Basin Project, described below, allowed some farmers to convert some dryland farming to irrigated farming.

Most of the area in the vicinity of the Proposed Action has continued to be farmed, ranched, and harvested since the mid-20th century. A network of local roads and state and county highways have been developed in the area, which has facilitated access to land and further development. Typical development in the general vicinity of the Proposed Action has included residential and commercial development, particularly around the city of Grand Coulee, as well as other rural residences and small agricultural facilities in the general vicinity of the Proposed Action.

Energy Generation and Transmission Line Projects

The Grand Coulee Dam is the largest hydroelectric power plant in the United States, with a total generating capacity of 6,809 megawatts. Construction of Grand Coulee Dam began in 1933 and was completed in 1942. The dam forms Lake Roosevelt, which extends upstream 151 miles to the Canadian Border. It has a 600-mile shoreline and a surface area of 82,000 acres. In 1948, Congress designated the Lake Roosevelt National Recreation Area, which is operated by the National Park Service. The dam is also part of the Columbia Basin Project, irrigating more than 600,000 acres, and provides water control on the Columbia River. (USBR 2013).

The Grand Coulee-Creston transmission line was constructed in 1941 to transmit power from the Columbia River area. As described in Chapter 2, the project right-of-way is shared with three other transmission line projects. Collectively, while providing needed power throughout the Pacific Northwest, they introduced a new major element into the landscape. The 83-mile Grand Coulee-Bell No. 3 230-kV transmission line (i.e., Grand Coulee-Bell #3 & 4) was built and energized in April 1943. The 83-mile long Grand Coulee-Bell No.5 230-kV transmission line, was built and energized in July 1952. The 75-mile long Grand Coulee-Westside AVA No. 1 230-kV transmission line (i.e., Grand Coulee-Bell No. 4) was built and energized in December 1972. Finally, the 83-mile long Grand Coulee-Bell No. 6 500-kV transmission line was built and energized in December 2004. In addition to providing regional power, this transmission line system also provided power locally to what are now the Grand County PUD, Avista Corporation, and Inland Power and light electrical systems.

Ongoing maintenance activities occur with regard to these transmission lines, including emergency repairs (as discussed under the No Action alternative) and vegetation control activities generally including herbicide applications to control vegetation and noxious weeds, and mechanical cutting of trees and shrubs as required to keep the right-of-way clear of obstructions.

Transportation Projects

As westward migration and settlements occurred, a growing road and highway system was developed. This system is comprised of major paved federal and state highways, as well as

gravel and dirt county and local roads. The WSDOT has implemented several improvement projects near the project area in recent years (WSDOT 2013b).

A SR 155 Rock Slopes Scaling project in Grant County was completed in May 2011. The project included stabilization of four rock slopes located 5 miles south of Electric City, near the entrance to Steamboat Rock State Park and Northrup Canyon. This project was undertaken because there was a significant rockfall event on the SR 155 slopes in January 2009 and engineers found tension cracks on the slopes were widening, and the slopes were generally becoming more unstable.

WSDOT also implemented the Eastern Region Chip Seal project in 2012. A layer of asphalt oil and gravel (known as “chips”) was applied to roadway surfaces. This sealed the highways from water seepage that could cause cracking and damage to the underlying support layers. Over 155 miles of highway was treated, with work completed on the following highway sections:

- US 2 Grant County Line to Wilbur (MP 207.78 to 220.88)
- Town of Wilbur Street sections
- SR 21 Jct. SR 260 to Vic. US 395 (MP 0.00 to 24.20)
- SR 26 Laurel Rd to Washtucna (MP 61.58 to 83.15)
- SR 26 Lacrosse Airport to Dusty (MP 102.76 to 116.75)
- SR 27 Garfield to Rockford (MP 24.78 to 68.73)
- Town of Fairfield street sections
- SR 261 Snake River to Jct. SR 260 (MP 15.20 to 29.39)
- SR 261 Washtucna to Sutton Rd. (MP 35.83 to 35.83 to 44.85)
- SR 271 Oakesdale to Jct. US 195 (MP 0.00 to 8.37)
- SR 274 SR 27 to Idaho State Line (MP 0.00 to 1.92)
- SR 278 Rockford to Idaho State Line (MP 0.00 to 5.50)
- Town of Rockford street sections

Vegetation control routinely occurs along these local highways, county roads and residential roads in the vicinity of the project area and includes mechanical cutting of trees and shrubs and herbicide applications to control vegetation and noxious weeds.

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 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 city and county staff, were consulted to obtain information about

current and potential future development in the project vicinity. The following describes these current and reasonably foreseeable future actions.

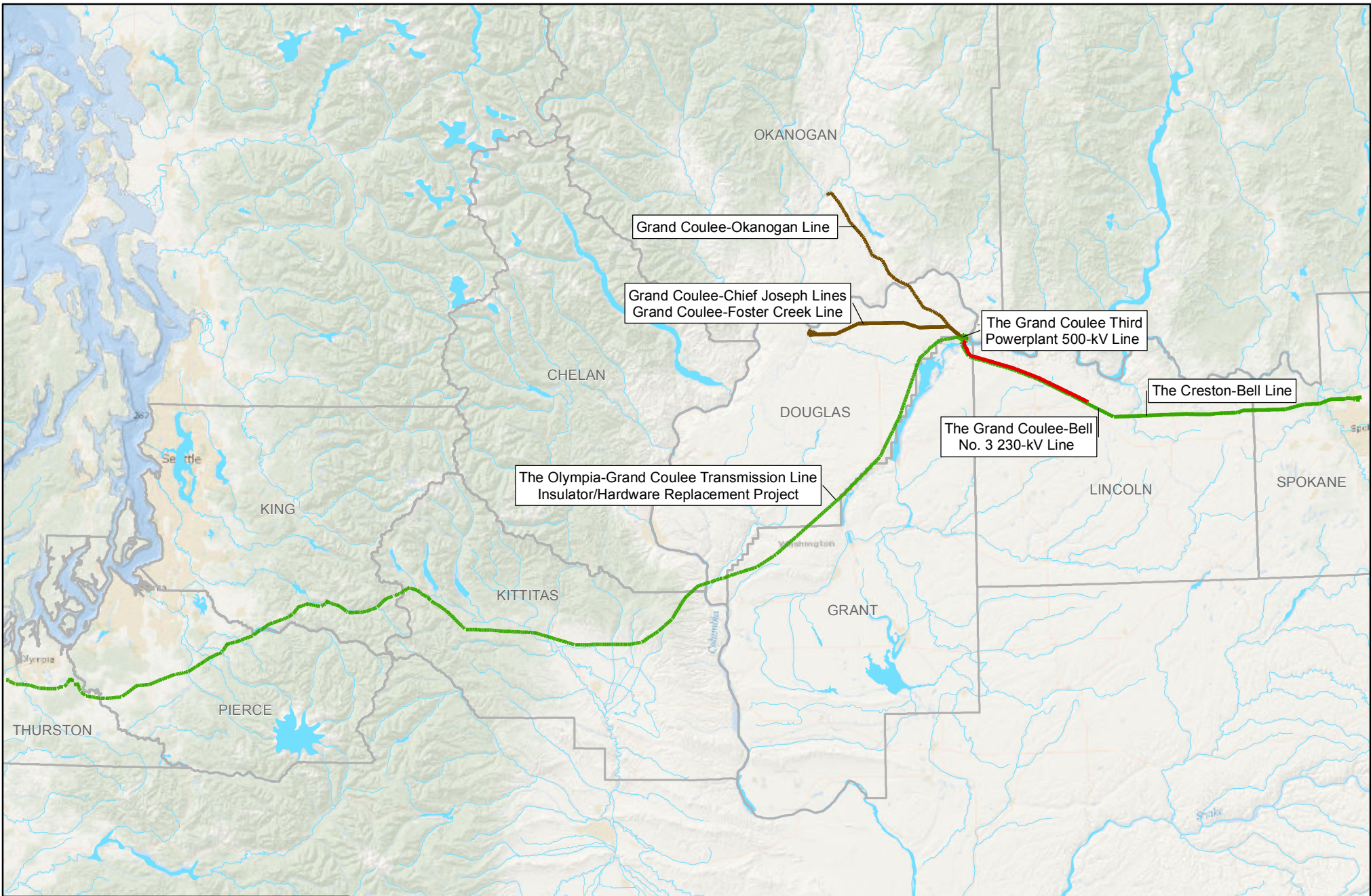
Transmission Line Projects

With regard to federal projects, BPA has identified four projects within the general vicinity of the proposed Grand Coulee-Creston Transmission Line Rebuild Project that have been completed which are included in the cumulative impacts analysis. In addition, BPA identified various minor wood pole replacement and associated access road improvement projects that are proposed to occur in the general vicinity of the Proposed Action. These existing and proposed BPA projects are shown on Figure 3-28. Potential impacts from the Proposed Action taken in conjunction with other past, present, and reasonably foreseeable future actions would constitute **low** impacts to environmental resources for the reasons described in the sub-sections that follow.

The four relatively recently **completed** projects are:

- 1) The Grand Coulee Third Powerplant 500-kV Line (transmission line replacement). This project was constructed in 2013 with a set of six new overhead lines that replaced six existing underground lines at Grand Coulee Dam.
- 2) The Creston-Bell Line (transmission line rebuild). This project rebuilt the 53.8-mile-long 115-kV Creston-Bell transmission line in 2012 with the same design and general location of structures, conducted work on some access roads, and removed some danger trees.
- 3) The Grand Coulee-Bell No. 3 230-kV Line (double circuit transmission line **Reconductoring**). This project commenced in 2012 and was completed in November 2013). The project involved replacing worn conductors and hardware along the 83-mile-long Grand Coulee-Bell No. 3 230-kV double circuit transmission line and improving some roads outside and inside the right-of-way by clearing, grading, widening, and adding rock.
- 4) The Olympia-Grand Coulee Transmission Line Insulator/Hardware Replacement Project. This project involved replacing all insulators and hardware from the Olympia Substation into Grand Coulee which started in September 2013 and was completed in the fall of 2013.

The **proposed** future BPA projects identified within the general vicinity include various minor wood pole replacements and associated access road improvement projects, identified as the Grand Coulee-Chief Joseph, Grand Coulee-Foster Creek, and Grand Coulee-Okanogan Projects as seen in Figure 3-28. These projects are scheduled to begin in 2014 and will originate from the Grand Coulee Substation to the Chief Joseph, Foster Creek, and Okanogan Substations. These projects would involve replacing deteriorating wood poles and associated structural/electrical components utilizing existing holes to minimize ground disturbance, and some access road maintenance, which would be limited to mowing, blading, compacting, shaping, and surfacing existing access road segments. Reconstruction of existing water bars, fords, culverts and drainage ditches could also occur for this project.



Legend

- Grand Coulee-Creston No.1 Rebuild Project
- Reasonably Foreseeable Projects
- Completed Projects
- County Boundary

Figure 3-28
Past, Present, and Reasonably Foreseeable Future BPA Actions



Sources: BPA 2013, ESRI 2013.



Agricultural Development and Activities

Ongoing agricultural activities such as farming and grazing are considered in this discussion. Dryland agriculture primarily for grain or feed crop production is prevalent throughout Grant County and includes land participating in the Conservation Reserve Program (Grant County 2006). While crop production involves habitat disturbance through the mechanical cutting of vegetation, CRP land is generally left fallow and undisturbed. Rangeland in the project area is used for cattle and horse grazing and provides wildlife habitat and open space for recreation.

Land Use Development Projects

To obtain information on potential ongoing or future commercial or residential projects in Grant and Lincoln counties, Grant County and Lincoln County Planning Departments were contacted. They stated that there are no planned private or public projects in Grant County (Hooper Pers. Comm. 2013) or in Lincoln County (Thompson Pers. Comm. 2013) in the foreseeable future.

3.15.3 Cumulative Impacts 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. Cumulative impacts from the combination of these actions could occur for each of the environmental resources. Overall, the Proposed Action in combination with past, present, and reasonably foreseeable future actions would result in **no-to-low** cumulative impacts to assessed resources.

Geology and Soils

Past actions including road improvements and maintenance, and recently completed projects identified by BPA would have low impacts to soils and geology in combination with the Proposed Action since disturbance, subsequent settling of soils, and vegetation reestablishment would have already occurred in these areas by the time the Proposed Action begins in 2014.

The proposed future BPA transmission line projects may include some disturbance of soils but would not occur within the same right-of-way as the Proposed Action. The principal past and ongoing activities that affect soils in the vicinity of the Proposed Action are related to farming and grazing. The addition of the Proposed Action to past and ongoing agricultural activities would constitute a minor increase in impacts to soil and geology and implementation of the mitigation measures described in Section 3.2.3 would minimize cumulative impacts to soils. Cumulative impacts to soils and geology from the Proposed Action in combination with other past, present and reasonably foreseeable projects are therefore considered **low**.

Land Use, Recreation, and Transportation

The geographic area in the vicinity of the Proposed Action has been substantially altered over the past century by a variety of human activities, including dryland farming, livestock grazing, the settlement of small towns and homesteads, construction of connecting roadways, and the development of Grand Coulee Dam and associated transmission lines and substations, as

described above. Since the Proposed Action is to rebuild the existing transmission line, there would be no incremental increase in impacts to land use. Cumulative impacts to land use from the Proposed Action in combination with other reasonably foreseeable projects are therefore considered **low**.

Since there would be no impacts to recreation from the Proposed Action, there would be no increase in impacts when added to other past, present or reasonably foreseeable future projects. There would therefore be **no** cumulative impacts to recreation from the Proposed Action in combination with other reasonably foreseeable projects.

Past actions including road improvements and maintenance, and recently completed projects identified by BPA would no longer create impacts to traffic since construction of these projects has been completed. The proposed future BPA projects have the potential to result in short-term transportation impacts from construction-generated traffic in areas where these projects are close by. However, construction vehicles for these proposed future BPA projects would primarily use different roads than those identified for the Proposed Action. There would therefore be **low** cumulative impacts to traffic from the Proposed Action in combination with other past, present and reasonably foreseeable projects.

Water Resources

Past actions including road improvements and maintenance, and recently completed projects identified by BPA would have low impacts to water resources in combination with the Proposed Action since potential impacts from these projects, such as sediment or hazardous material entering waterbodies, would be temporary and likely finished before construction begins for the Proposed Action.

The potential future BPA projects may include water quality impacts, such as sediment entering waterways, and could potentially affect waters within the same watershed as the Proposed Action. However, impacts from the Proposed Action to water resources is expected to be low, and the potential future BPA projects would likely require similar construction activities and mitigation measures to those described in Section 3.4.3 which would minimize impacts to water resources. In addition, ongoing agricultural activities in the project area are not expected to change from current conditions. Cumulative impacts to water resources from the Proposed Action in combination with other past, present and reasonably foreseeable projects are therefore considered **low**.

Vegetation

Agricultural activities, livestock grazing, vegetation control along roads and utility corridors, and commercial and residential development are responsible for most of the past and ongoing impacts on vegetation in the vicinity of the project area. Agricultural activities, predominantly dryland wheat production, have substantially altered the vegetation in the region by completely removing native vegetation communities in some areas. Livestock grazing occurs in much of the region around the project area and typically results in the introduction and spread of weed species, the degradation of native vegetation communities, and the trampling of riparian and

wetland areas by livestock. In addition, vegetation control activities generally include herbicide applications to control vegetation and noxious weeds, and mechanical cutting of vegetation. The amount of vegetation that would be affected by the Proposed Action is small compared to the area affected by past and ongoing agricultural activities, livestock grazing, vegetation control along roads and other utility corridors, and commercial and residential development in the area. In addition, these past actions are not expected to change measurably from current conditions, resulting in no additional cumulative impacts.

The proposed future BPA projects would likely involve minimal vegetation disturbance since they involve wood pole replacements and associated access road improvements similar to those under the Proposed Action, with similar mitigation measures to those described in Section 3.5.3 which would further minimize impacts to vegetation. Cumulative impacts to vegetation from the Proposed Action in combination with other past, present and reasonably foreseeable projects are therefore considered **low**.

Fish

Past actions including road improvements and maintenance, and recently completed projects identified by BPA would have low impacts to fish in combination with the Proposed Action since potential impacts from these projects, such as sediment or hazardous material entering waterbodies or aquatic habitat disturbance, would be temporary and likely complete before construction of the Proposed Action begins.

The potential proposed future BPA projects may include potential indirect impacts to fish, such as sediment inputs or aquatic habitat disturbance, and could potentially affect waters within the same watershed the Proposed Action. However, impacts from the Proposed Action to fish is expected to be low, and the potential future BPA projects would likely require similar construction activities and mitigation measures to those described in Section 3.6.3 which would minimize impacts to fish. In addition, ongoing agricultural activities in the project area are not expected to change from current conditions. Cumulative impacts to fish from the Proposed Action in combination with other past, present and reasonably foreseeable projects are therefore considered **low**.

Wildlife

As described above, agricultural activities have substantially altered the habitat in the region by completely removing native vegetation communities in some areas. Livestock grazing occurs in much of the region around the project area and typically results in the introduction and spread of weed species, the degradation of native habitat, and trampling of riparian and wetland areas by livestock.

In addition, vegetation control activities including herbicide applications to control noxious weeds, and mechanical cutting of vegetation are ongoing actions that contribute to minor wildlife habitat alterations. The amount of wildlife habitat that would be affected by the Proposed Action is small compared to the area affected by past and ongoing agricultural activities, livestock grazing, vegetation control along roads and other utility corridors, and commercial and

residential development in the area. In addition, these past actions are not expected to change measurably from current conditions, resulting in no additional cumulative impacts.

The potential proposed future BPA projects are expected to produce similar impacts as those described for the Proposed Action and would occur outside of the project area, resulting in low impacts to wildlife habitats. In addition, direct impacts, such as incidental mortality from construction equipment, would be temporary and would not occur in the same area as the Proposed Action. Implementation of the mitigation measures described in Section 3.7.3 would reduce the incremental contribution of the Proposed Action to cumulative impacts to wildlife, and the potential proposed future BPA projects are expected to use similar measures which would minimize impacts to wildlife species and habitats from these projects. Cumulative impacts to wildlife species and their habitats from the Proposed Action in combination with other past, present and reasonably foreseeable projects are therefore considered **low**.

Air Quality

Vehicular traffic, agricultural activities, residential wood burning, and other commercial and industrial facilities in the project area have all contributed to ambient air pollutant emissions. These sources of pollutants are expected to continue at approximately the same rate as under current conditions.

The potential proposed future BPA projects in the general vicinity of the Proposed Action would contribute to air pollutants through emissions from construction equipment, much like those described for this project. However, ongoing and reasonably foreseeable future activities in the project area are not expected to violate NAAQS. While the Proposed Action would contribute a small amount to pollutant levels, it is unlikely that cumulative concentrations would violate the NAAQS. Cumulative impacts to air quality from the Proposed Action in combination with other past, present and reasonably foreseeable projects are therefore considered **low**.

Climate Change

Past actions including commercial and residential developments, road improvements and maintenance, and recently completed projects identified by BPA would have contributed GHG emissions from construction equipment, vehicular traffic, agricultural activities, and other commercial and industrial facility emissions. The potential proposed future BPA projects in the general vicinity of the Proposed Action would also contribute to GHG emissions from construction equipment. All levels of GHG emissions are significant in that they contribute to global GHG concentrations and climate change. However, given the small amount of contribution, the Proposed Action's incremental impact on GHG concentrations when combined with the other reasonably foreseeable future projects and activities proposed for the project area would be low. Cumulative impacts to climate change from the Proposed Action in combination with other past, present and reasonably foreseeable projects are therefore considered **low**.

Socioeconomics, Environmental Justice, and Public Services

Past actions including road improvements and maintenance, commercial and residential developments, and recently completed projects identified by BPA would have low impacts to socioeconomics, environmental justice and public services in combination with the Proposed Action since the direct beneficial impacts from increased economic activity associated with local procurement of materials and equipment and spending by construction workers would be temporary and finished before construction begins for the Proposed Action.

The proposed future BPA projects may contribute minor beneficial impacts similar to those described for the Proposed Action, but are not expected to negatively impact public services since these projects are small and would not require substantial workforces. Cumulative impacts to socioeconomics, environmental justice, and public services from the Proposed Action in combination with other past, present and reasonably foreseeable projects are therefore considered **low**.

Cultural Resources

Impacts to cultural resources in the project vicinity from past development activities may have occurred as a result of inadvertent disturbance or destruction from ground disturbing activities such as road work, farming, site development, forestry operations, or the completed projects identified by BPA.

The proposed future BPA projects may impact cultural resources in the vicinity of the project area from the potential to disturb previously undiscovered cultural resources, although considering that these projects involve replacement of existing structures and some access road improvement activities, potential impacts are considered low. In addition, the mitigation measures for those projects would likely be similar to those identified for the Proposed Action which would minimize impacts to cultural resources. Cumulative impacts to cultural resources from the Proposed Action in combination with other past, present and reasonably foreseeable projects are therefore considered **low**.

Visual Resources

Past actions including road improvements and maintenance, land use development, and recently completed projects identified by BPA would have low impacts to visual resources in combination with the Proposed Action since they are all existing features on the landscape, the appearance of which have not changed in many years and are not anticipated to change appreciably in the future.

The proposed future BPA projects all involve replacement of existing structures and associated access road improvements which would also not appreciably change the current visual landscape. The construction impacts for all projects – the Proposed Action, completed projects and proposed future projects – would be temporary and end immediately after construction is complete. There are therefore **no** cumulative impacts to visual resources from the Proposed Action in addition to other past, present and reasonably foreseeable projects.

Public Health and Safety

Ongoing operation of agricultural equipment and vehicle traffic in the project area would continue to create risks to public health and safety but are not expected to change from current conditions. Construction of past projects has been completed so there would be no additional health and safety risks from these projects.

The proposed future BPA projects in the general vicinity of the Proposed Action would have health and safety risks similar to the Proposed Action and would use similar mitigation measures to those described for the Proposed Action such as conducting crew safety meetings to review risks and spill prevention activities, which would minimize impacts to public health and safety. Cumulative impacts to public health and safety from the Proposed Action in combination with other past, present and reasonably foreseeable projects are considered **low**.

EMF and Noise

The transmission lines currently operating in the vicinity of the project area emit EMF, and the Proposed Action would not increase the overall level of EMF exposure along the project right-of-way. The proposed future BPA projects in the general vicinity of the Proposed Action are not expected to increase voltage and therefore are not expected to contribute to increased EMF exposure. There would therefore be **no** cumulative impacts to EMF from the Proposed Action in addition to other completed and proposed projects.

Cumulative noise impacts typically occur when noise receptors are exposed to more than one noise source at approximately the same time, such as cumulative noise from construction traffic and activities, agricultural activities, and residential uses. Because some noise-sensitive land uses are located within 1,000 feet of the transmission right-of-way and near other sources of ongoing noise (i.e., vehicular traffic), there would be cumulative noise impacts on these noise-sensitive land uses. These cumulative effects, however, would be short-term and would cease upon completion of construction or operation and maintenance activities associated with the Proposed Action. Cumulative impacts to noise from the Proposed Action in combination with other past, present and reasonably foreseeable projects are therefore considered **low**.

Chapter 4

Environmental Consultation, Review, and Permit Requirements

This chapter addresses federal statutes, implementing regulations, and executive orders applicable to the Proposed Action. This EA is being sent to Tribes, federal agencies, and state and local governments as part of the consultation process for the Proposed Action. Persons consulted are listed in Chapter 5, Persons, Tribes, and Agencies Consulted.

4.1 ALL RESOURCES

4.1.1 *National Environmental Policy Act*

BPA prepared this Draft EA pursuant to regulations implementing NEPA (42 U.S.C. 4321 *et seq.*), which require federal agencies to assess the impacts that their actions could 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 EA to determine if the Proposed Action would cause any significant environmental impacts that would warrant preparation of an EIS, or whether it is appropriate to prepare a FONSI.

4.2 LAND USE

4.2.1 *State, Areawide, and Local Plan and Program Consistency*

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 sovereign immunity in 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 practical, strive to meet or exceed the substantive standards and policies of the state and local environmental regulations described herein.

4.2.2 *Farmland Protection Policy Act*

The Farmland Protection Policy Act (FPPA) (7 U.S.C. 4201 *et seq.*) requires that federal agencies avoid the unnecessary and irreversible conversion (directly or indirectly) of farmland to nonagricultural uses by ensuring that their proposed actions are consistent with federal, state, and local programs and policies designed to protect farmland. The act's purpose is to minimize the number of federal programs that contribute to the unnecessary and irreversible conversion of agricultural land to nonagricultural uses. As discussed in Section 3.3, Land Use, Recreation and Transportation of this EA, the Proposed Action would not convert any agricultural land to other uses. Other potential impacts on agricultural lands are also discussed in Section 3.3, Land Use, Recreation and Transportation.

4.2.3 Washington State Growth Management Act

The Washington State Growth Management Act of 1990 (GMA), which was enacted as chapter 36.70a of the Revised Code of Washington, requires that most counties and cities in Washington adopt comprehensive plans, including “a utilities element consisting of the general location, proposed location, and capacity of all existing and proposed utilities, including, but not limited to, electrical lines, telecommunication lines, and natural gas lines.” The 1991 and subsequent amendments to the GMA added more planning requirements. All of the jurisdictions crossed by the project right-of-way have adopted comprehensive plans under the GMA. These plans are discussed below in Sections 4.3.4 through 4.3.6.

4.2.4 Washington State Shoreline Management Act

The state’s Shoreline Management Act (Revised Code of Washington [RCW] Chapter 90.58) identifies “shorelines of the state” and “shorelines of statewide significance.” The shorelines include floodways, land within 200 feet of the ordinary high water mark, floodplains up to 200 feet from the floodway edge, and associated wetlands within the 100-year floodplain. Although the Grand Coulee-Creston No. 1 transmission line is near the Columbia River in the city of Grand Coulee, a designated shoreline of the state (WAC 173-18-040), it is not part of the shoreline (City of Grand Coulee 2013).

4.2.5 Critical Areas Ordinances

GMA requires that all local jurisdictions designate and protect critical areas, which are defined as wetlands, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas. The city of Grand Coulee and Grant and Lincoln Counties have adopted ordinances and plans protecting critical areas. In most cases, the Proposed Action would attempt to be consistent with the provisions of these ordinances and plans because BPA would avoid critical areas and critical area buffers to the maximum extent possible. This Draft EA will be sent to these jurisdictions for comment.

4.2.6 Grant County Comprehensive Plan

The Grant County Comprehensive Plan (Grant County 2006) designates the areas crossed by the existing transmission line as one of the following zoning designations:

- Residential, Low Density - This designation provides for single-family residential housing and duplexes in varying densities ranging from 1 dwelling unit to 4 dwelling units per acre.
- Open Space (Rural) - This designation provides for open, undeveloped areas that are not suitable for intensive development. Such areas could be available for public uses, such as parks or recreation. These areas should generally not include areas designated as resource lands or critical areas.

The Proposed Action would use the existing transmission line right-of-way and would be consistent with the Grant County Comprehensive Plan to the extent practicable.

4.2.7 Lincoln County Comprehensive Plan

The Lincoln County Comprehensive Plan (Lincoln County 1983) designates the areas crossed by the existing transmission line as an Agricultural zone. This zoning designation is intended to protect the agricultural base of Lincoln County, and to maintain agriculture's important position in the county. Non-agricultural developments are only allowed if they are compatible with the current agricultural practices in these areas. The Proposed Action would use the existing transmission line right-of-way and would be consistent with the Lincoln County Comprehensive Plan to the extent practicable.

4.2.8 City of Grand Coulee Comprehensive Plan

The City of Grand Coulee Comprehensive Plan (City of Grand Coulee 2011) designates the areas crossed by the existing transmission line as Residential, Low Density. As with the designation within Grant County, this designation provides for single-family residential housing and duplexes in varying densities ranging from 1 dwelling unit to 4 dwelling units per acre. The Proposed Action would use the existing transmission line right-of-way and would be consistent with the city of Grand Coulee Comprehensive Plan to the extent practicable.

4.3 WATER RESOURCES/QUALITY AND WETLANDS

4.3.1 Clean Water Act

The Clean Water Act regulates discharges into waters of the United States. The various 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. Applicants receiving a Section 404 permit from the USACE are required to obtain a Section 401 water quality certification from Ecology. BPA will consult with Ecology and the USACE to determine if any permits are needed.
- **Section 402** - This section authorizes discharges, including stormwater, into the waters of the United States under the National Pollutant Discharge Elimination System. EPA Region 10 has a general permit for federal facilities for discharges from construction activities. BPA would determine the need to issue a notice of intent to obtain coverage under the EPA general permit and is preparing a stormwater pollution prevention plan to address stabilization practices, structural practices, stormwater management, and other controls (see Section 3.4, Water Resources).
- **Section 404** - Authorization from the USACE under Section 404 when dredged or fill material is discharged into waters of the United States, including wetlands. Impacts on wetlands are described in Section 3.4, Water Resources.

4.3.2 Wetland and Floodplain Protection

The U.S. Department of Energy (USDOE) mandates that impacts on floodplains and wetlands be assessed and alternatives for protection of these resources be evaluated in accordance with Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR 1022.12) and Executive Orders 11988 and 11990. Potential impacts on wetlands from the Proposed Action are discussed in Section 3.4, Water Resources.

Wetland management, regulation, and protection are addressed in several sections of the Clean Water Act, including Sections 401, 402, and 404. Wetlands are also addressed in a combination of other state and federal laws, including the Coastal Zone Management Act, ESA, National Historic Preservation Act (NHPA), Rivers and Harbors Act, and Wild and Scenic Rivers Act. Since construction would occur outside of wetlands, these regulations would not apply.

4.4 VEGETATION, FISH, AND WILDLIFE

4.4.1 Federal Noxious Weed Act

The Federal Noxious Weed Act of 1974 (7 U.S.C. §§ 2801-2814, January 3, 1975, as amended in 1988 and 1994) requires the control and management of non-indigenous weeds that injure, or have the potential to injure, the interests of agriculture and commerce, wildlife resources, or the public health. The spread of noxious weeds would be controlled in compliance with this act.

4.4.2 Endangered Species Act

The ESA of 1973 (16 USC 1531 *et seq.*), establishes a national program for the conservation of threatened and *endangered species*, and the preservation of the ecosystems on which they depend. The ESA is administered by the USFWS for wildlife and freshwater species, and by the National Marine Fisheries Service (NMFS) for marine and anadromous species. The ESA defines procedures for listing species, designating critical habitat for listed species, and preparing recovery plans. It also specifies prohibited actions and exceptions.

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

No federally listed threatened or endangered species have been identified as being potentially affected by the Proposed Action. However, the USFWS lists two candidate species (greater sage grouse and Washington ground squirrel) as potentially occurring in Lincoln and Grant Counties. Potential impacts to special status plant and animal species are discussed in Sections 3.5, Vegetation; 3.6, Fish; and 3.7, Wildlife.

4.4.3 Fish and Wildlife Conservation Act and Fish and Wildlife Coordination Act

The Fish and Wildlife Conservation Act of 1980 (16 U.S.C. 2901 *et seq.*) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife and their habitats. In addition, the Fish and Wildlife Coordination Act (16 U.S.C 661 *et seq.*) requires federal agencies with projects affecting water resources to consult with the USFWS and the state agency responsible for fish and wildlife resources. Fish and wildlife impacts are discussed in Section 3.6, Fish and Section 3.7, Wildlife. There would be no direct impacts to fish since no work would be carried out within streams. For wildlife, temporary displacement disturbance of habitat may occur during construction. BPA will coordinate with the USFWS and relevant state and federal agencies during project development features that require permits, such as culverts that would be installed as part of the Proposed Action. Each agency will be sent copies of the EA.

4.4.4 Magnuson-Stevens Fishery Conservation and Management Act

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

There is no essential fish habitat (EFH) in or near the project area for any Pacific salmon species managed under the Magnuson-Stevens Fisheries Conservation and Management Act. All streams are upstream of anadromous fish accessible areas and/or are deemed non-essential habitat.

4.4.5 Migratory Bird Treaty Act and Federal Memorandum of Understanding

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

BPA (through the USDOE) and the USFWS have a memorandum of understanding (MOU) to address migratory bird conservation in accordance with Executive Order (EO) 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds). EO 13186 directs each federal agency to work with the USFWS to develop mitigation for reducing any adverse effects to migratory bird populations likely to occur as a result of a federal action.

The impacts of transmission lines on migratory birds would be low under the Proposed Action , as described in Section 3.7, Wildlife.

4.4.6 Bald Eagle and Golden Eagle Protection Act

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

Nesting bald eagles are found in forested and riparian parts of the state and generally more abundant in the cooler, maritime region west of the Cascade Mountains than in the more arid eastern areas. The eagles can be common in eastern regions of Washington during winter period, however, nest sites are relatively rare and not likely to be found within the project area. Nesting golden eagles are relatively more common in the eastern regions of Washington but typically occur in cliffs or tree structures. Mitigation measures to avoid and minimize impacts to birds, including eagles are identified in Section 3.7.3, Wildlife.

4.5 AIR QUALITY

4.5.1 Clean Air Act

The federal 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 the state of Washington, EPA has delegated authority to Ecology, which has regulations requiring all industrial activities (including construction projects) to minimize windblown fugitive dust.

Potential impacts from the Proposed Action on air quality would be low and are discussed in detail in Section 3.8, Air Quality and Section 3.9 Climate Change.

4.6 SOCIOECONOMICS, PUBLIC SERVICES, AND ENVIRONMENTAL JUSTICE

4.6.1 Executive Order on Environmental Justice

In February 1994, Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was released to federal agencies. This order states that federal agencies must identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. The Proposed Action would not cause disproportionately high and adverse impacts on minority and low-income populations (see Section 3.10, Socioeconomics, Public Services, and Environmental Justice).

4.6.2 Overhead Power and Communication Lines

WAC 468-34-280 recommends that longitudinal installations of power lines (on public right-of-ways) be of single-pole construction, and that joint-use single-pole construction is generally

desirable and should be used whenever feasible. The proposed project's designs calls for the rebuilt line to be supported by structures composed of two or three wood poles and essentially replace the existing structures in kind. It is not feasible to construct the proposed project with single-pole structures. Single poles would result in twice as much disturbance and be more costly because more poles would be required for the line.

4.7 CULTURAL/HISTORIC RESOURCES

Cultural resources are protected by a number of federal laws. A cultural resource is an object, structure, building, archaeological site, or district that provides irreplaceable evidence of natural or human history. Cultural and historic resources include national landmarks, archaeological sites, and properties listed (or eligible for listing) on the NRHP. In addition, American Indian Tribes are afforded special rights under certain laws, as well as the opportunity to voice concerns about issues under these laws. Laws and other directives for the protection of cultural resources and the rights of American Indian Tribes include the following:

- Antiquities Act of 1906 (16 U.S.C. 431-433);
- Historic Sites Act of 1935 (16 U.S.C. 461-467);
- NHPA of 1966 (16 U.S.C. 470 *et seq.*), as amended, inclusive of Section 106;
- Archaeological Data Preservation Act of 1974 (16 U.S.C. 469 a-c);
- Archaeological Resources Protection Act (ARPA) 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 undertakings on historic properties. Historic properties are properties that are included in or that meet the criteria for listing on the NRHP. If a federal agency plans to undertake a type of activity that could affect historic properties, it must consult with the appropriate State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer and others to make an assessment of adverse effects on identified historic properties. In compliance with Section 106, BPA consulted with the State Historic Preservation Office (SHPO), the Spokane Tribe of Indians and the Confederated Tribes of the Colville Indian Reservation.

If, during construction, previously unidentified cultural resources that would be adversely affected by the Proposed Action are found, BPA would follow the mitigation measures identified in Section 3.11.3.

4.8 TRIBAL CONSULTATION

In addition to the laws and directives mentioned above, the federal government has a general trust responsibility with Tribal governments. BPA recognizes that trust responsibility derives from the historical relationship between the federal government and the Tribes as expressed in treaties, statutes, Executive Orders, and federal Indian case law.

BPA's Tribal Policy follows the principles set forth in the USDOE's American Indian Tribal Government Policy (USDOE Order No. 1230.2—Apr. 8, 1992). BPA fully respects Tribal law, and recognizes Tribal governments as sovereigns. BPA consults with Tribal governments to assure that Tribal rights and concerns are considered prior to BPA taking actions, making decisions, or implementing programs that could affect Tribal resources. BPA recognizes that Tribal interests are not limited to historic properties but could also include fish, wildlife, water resources and wetlands, vegetation, health, socioeconomic characteristics, noise, and visual resources. BPA also recognizes that Tribes could have specific rights reserved under treaties, such as fishing, hunting, gathering, and grazing rights. The United States Army Corps of Engineers (USACE), as a federal permitting agency, could also conduct tribal consultation as part of their permit review process.

BPA has provided notifications to and consulted with Tribes and relevant agencies in the project area, including The Confederated Tribes of the Colville Reservation and The Spokane Tribe of Indians. BPA has reached out to its tribal counterparts to share and gather information, to address tribal concerns, and to invite further consultation. No Tribe has requested formal government-to-government consultation meetings during the Draft EA process.

4.9 PUBLIC HEALTH AND SAFETY

4.9.1 Toxic Substances Control Act

The Toxic Substances Control Act (15 U.S.C. 2601 *et seq.*) is intended to protect human health and the environment from toxic chemicals. Section 6 of the act 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 Proposed Action would not contain PCBs. Any equipment removed that could have PCBs would be handled according to the disposal provisions of this Act.

4.9.2 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) only in a limited fashion and under controlled circumstances in accordance with BPA's *Transmission System Vegetation Management Program Final Environmental Impact Statement*. Herbicides are used on transmission line right-of-ways 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 discussed below.

4.9.3 Resource Conservation and Recovery Act

RCRA (42 U.S.C. 6901 *et seq.*), as amended, is designed to provide a program for managing and controlling hazardous waste by imposing requirements on generators and transporters of this 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 construction and maintenance activities have generated small amounts of the following hazardous wastes: solvents, pesticides, paint products, motor and lubricating oils, and cleaners. Small amounts of hazardous wastes could be generated under the Proposed Action. These materials would be disposed of according to state law and RCRA.

If a hazardous material, toxic substance, or petroleum product is discovered, and could pose an immediate threat to human health or the environment, BPA requires that the contractor notify the Contracting Officer's Technical Representative immediately. Other conditions such as large dump sites, drums of unknown substances, suspicious odors, and stained soil must also be reported immediately. The technical representative would coordinate with the appropriate BPA personnel. In addition, the contractor would not be allowed to disturb such conditions until the technical representative has given the notice to proceed.

4.9.4 Transportation Permits

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

4.9.5 Vertical Clearance and Location

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

4.9.6 Uniform Fire Code

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

4.10 EMF AND NOISE

4.10.1 Federal Communications Commission

Federal Communications Commission regulations require that transmission lines be operated so that radio and television reception would not be seriously degraded or repeatedly interrupted. While the Proposed Action is not expected to increase EMI above existing levels, any complaints about EMI would be investigated.

4.10.2 Maximum Environmental Noise Levels

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 limits relevant to the Proposed Action are regulated by Ecology Maximum Environmental Noise Levels (WAC 173-60), which establish limits on levels and duration of noise. Allowable maximum sound levels depend on the land use of the noise source and the receiving property. In addition, BPA has established a 50 dBA design criterion for corona-generated audible noise from transmission lines at the edge of the right-of-ways. Ecology has interpreted this criterion to meet its noise regulations.

4.11 CLIMATE CHANGE

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 the New Source Review permitting program.
- EPA has issued the Final Mandatory Reporting of Greenhouse Gases Rule (40 CFR 98) that requires reporting of GHG emissions from large sources. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHGs are required to submit annual reports to EPA.
- Executive Orders 13423 and 13514 require federal agencies to measure, manage, and reduce GHG emissions by agency-defined target amounts and dates.
- In Washington State, Executive Orders 07-02 and 09-05 direct state agencies to work with western states and Canadian provinces to develop a regional emissions reduction program designed to reduce GHG emissions to 1990 levels by 2020.

GHG emissions were calculated for the Proposed Action activities that would produce GHG emissions: construction of the transmission line, permanent vegetation removal for roads, and ongoing annual operations and maintenance for the estimated 50-year operational life of the transmission line. GHG emissions would be below EPA's mandatory reporting threshold.

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Chapter 5

Agencies, Organizations, and Persons Consulted

The project mailing list includes Tribes; local, state, and federal agencies; utilities; public officials; and potentially interested or affected landowners. These agencies, organizations, and people will have an opportunity to review and comment on the Draft EA. Specific entities (other than private persons) receiving this Draft EA are listed below by category.

5.1 FEDERAL AGENCIES

National Oceanic and Atmospheric Administration, National Marine Fisheries Service

U.S. Army Corps of Engineers

U.S. Department of the Interior, Fish and Wildlife Service

U.S. Environmental Protection Agency

5.2 STATE AGENCIES

Washington State Department of Archaeology and Historic Preservation

Washington Department of Fish and Wildlife

Washington State Department of Natural Resources, State Lands Archaeology

Washington State Department of Natural Resources, Washington Natural Heritage Program

Washington State Department of Transportation

Washington State Parks and Recreation Commission

5.3 TRIBES

The Confederated Tribes of the Colville Indian Reservation

The Spokane Tribe of Indians

5.4 LOCAL GOVERNMENTS AND UTILITIES

5.4.1 Counties

Grant County

Commissioner Cindy Carter

Director Jeff Tincher, Department of Public Works

Director Dave Nelson, Community Development Department
Sheriff Tom Jones, Sheriff's Office
Craig Hintz, Coordinator for the Noxious Weed Control Board

Lincoln County

Commissioner Rob Coffman
Commissioner Dennis Bly
Commissioner Scott Hutsell
Jim Degraffenreid, Land Services Director
Director Rick Becker, Department of Public Works
Lincoln County Emergency Services, Sheriff's Office
Kevin Hupp, Coordinator Noxious Weed Control Board
Chairman Scott Hutsell, District 2

5.4.2 Cities

Mayor Christopher Christopherson, City of Grand Coulee
Mayor Blake Angstrom, City of Creston

5.4.3 Utilities

Rick Campos, Avista Inland Power and Light
Grant County Public Utility District

Chapter 6

Glossary and Acronyms

6.1 GLOSSARY

A-weighted decibels – logarithmic measurement of sound based on the decibel but weighted to approximate the human perception of sound. Commonly used for measuring environmental and industrial noise levels.

Access road – roads that provide access to the transmission line corridor and structure sites during construction and operation and maintenance.

Ambient noise – background noise generated by existing noise sources in the surrounding area.

Anadromous - migratory fish that are born in fresh water, migrate to the ocean to grow into adults, and then return to fresh water to spawn.

Angle structures – structures that support the transmission line at points where it changes direction at an angle of 15 degrees or more.

Arc – an electrical discharge from the transmission line to surrounding objects (such as vegetation).

Auger – a tool for boring holes in the ground.

Best management practices – the practices determined by the discipline to be the most effective at achieving a specific goal.

Candidate Species – plants or animals for which there is sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

Capacity – the ability to store an electrical charge.

Carbon dioxide equivalent – a measurement used to compare the global warming potential of a typical greenhouse gas, based on concentrations of carbon dioxide.

Circuit – the pathway for an electrical current.

Conductor – the wire cable strung along a transmission line through which electricity flows.

Counterpoise – a weight that counterbalances the weight of the transmission lines, typically underground wires that extend horizontally from each structure and that connect with ground wire to provide lightning protection.

Corona – an electrical field around the surface of a conductor, insulator, or hardware caused by ionization of the surrounding air.

Criteria air pollutants – refers to six common air pollutants for which the EPA is required by the Clean Air Act to set National Ambient Air Quality Standards, including particle pollution/particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead.

Particulate matter – a mixture of microscopic solids and liquid droplets suspended in air. It is made up of a number of components including acids, organic chemicals, metals, soil or dust particles, and allergens.

Cultural resources – historic, archaeological, or paleontological resources that are protected under federal statutes, regulations, and executive orders.

Culvert – a device used to carry or divert water from a drainage area in order to prevent erosion.

Cumulative impacts – impacts on the environment 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) or person undertakes such other actions.

Current – the flow of an electrical charge through the transmission line conductor.

Dampers – devices attached to insulators in order to minimize vibration of the conductors in windy conditions.

Danger trees – trees located off the transmission line corridor that are a current or future hazard to the transmission line.

Dead-end structure – a structure that can independently carry the weight and tension of conductors and is typically used on a straight alignment, at angles greater than 15 degrees, or over river crossings.

Decibel – a logarithmic ratio of sound relative to a reference level.

Direct impacts – effects caused by the action and occur at the same time and place.

Disconnect switches – switches or circuit breakers used to isolate equipment or to redirect current in a substation.

Electromagnetic field – the physical field around the electric wire or conductor that is produced when electric transmission is occurring.

Electromagnetic interference – interference of an electrical device caused by the presence of an electromagnetic field.

Endangered Species - a plant or animal species in danger of extinction within the foreseeable future throughout all or a significant portion of its range.

Environmental justice – The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Erosion – the movement of soil and surface sediments caused by wind and water.

Floodplain – the flat land that is adjacent to a surface water that is periodically flooded.

Fossil fuels – fuels derived from hydrocarbon deposits in the Earth’s crust; typically combusted for energy (e.g., natural gas, oil, and coal).

Greenhouse gas – chemical compounds that absorb and trap infrared radiation as heat (e.g., carbon dioxide, nitrous oxide, methane, and fluorinated gases).

Ground rod – a metal rod embedded in the ground to make a ground connection to the earth

Ground wire – wires placed above the conductors to route lightning-strike electricity to the ground.

Groundwater – water that is stored beneath the Earth’s surface in soil pores or rock formations.

Guard structures - a temporarily installed piece of equipment that prevents the conductor or overhead ground wires which are being pulled from coming into contact with existing overhead electric supply lines, communication lines, roads, highways, and railroads crossed by the transmission line.

Guy wire and anchor – a tensioned cable and anchor that tethers a structure to the ground to provide extra stability.

Indirect impacts – effects that may be caused by a project, but would occur in the future or outside the project area and are reasonably foreseeable.

Insulator – a component made of non-conductive materials that connects the conductor to the suspension structure and prevents the transmission of electrical current from the conductor to the ground.

Kilovolt– one thousand volts of electrical power.

Lattice-steel structure – a transmission tower constructed with angle steel.

Lek - traditional breeding area for sage and sharp-tailed grouse where male grouse assemble to establish dominance and display to attract females during the breeding season (also referred to as strutting-ground).

Line Truck – a truck used to transport wooden poles and other large equipment.

Low-income population – a group of low-income residents who live in geographic proximity that could be disproportionately affected by a federal action.

Magnetic fields – the magnetic influence of electric currents and magnetic materials, often encountered as an invisible force created by permanent magnets which pull on materials such as iron, cobalt, nickel and attract or repel other magnets.

Minority population – a group of minority persons who live in geographic proximity that could be disproportionately affected by a federal action.

Mitigation – measures that would reduce the impacts of the Proposed Action on a resource by reducing the impact, avoiding it completely, or compensating for the impact.

Nonattainment area – an air basin that is not in compliance with applicable air quality standards for a specific pollutant.

Nonnative – a species that has been introduced and has acclimated to an area outside of its normal distribution range.

Noxious weeds – nonnative plants that have been identified by state law as damaging to natural or human resources.

Outage – the loss of electric power to an area caused by a natural or human disturbance to the electrical system.

Prime farmland – land that has the best combination of physical and chemical characteristics (soil quality, growing season, and moisture supply) for production food, feed, forage, fiber, and oilseed crops and is also available for these land uses.

Priority habitats – a habitat designated for protection because of its rarity or functional significance.

Puller – a truck with spools used to remove conductors and overhead ground wire.

Pulling and tensioning – the process of installing and tightening new conductors.

Reconductoring – replacing the cable or wire on a transmission line.

Right-of-way – the corridor of land in which transmission structures and conductors are established, operated, and maintained.

Riparian – refers to vegetation or habitat situated on the banks of rivers and streams.

Shoe-fly – a temporary transmission line built to bypass a construction area.

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

Spark-discharge activity – an electric discharge accompanied by a spark that occurs when an electric field creates an ionized electrically conductive channel in air producing a brief emission of light and sound.

Special status species – plant or wildlife species that have been identified for protection and/or management under federal or state law.

Staging area – the area cleared and used to store and assemble materials and equipment.

Stormwater runoff – precipitation water that runs off non-permeable surfaces into a drainage, sewer, or stormwater system.

Stringing – installing the conductor and wires.

Structure – a type of support used to hold up transmission or substation equipment.

Substation – the fenced site that contains the terminal switching and transformation equipment that transforms voltage.

Surface water – open water bodies such as rivers, lakes, and streams.

Switch platform – a metal platform for an operator to stand on and safely operate the associated disconnect switch

Tap – a line that connects to an existing transmission or distribution line without breakers at the tap point, resulting in an additional terminal on the existing line.

Tensioner – a large piece of equipment that has many drums that the new conductor is fed through to get the proper tension.

Threatened species – a plant or animal species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Travel route – either a route through farm fields (temporary travel route) or existing non-public roads in good condition that may require improvement for use (permanent travel route).

Upland – land above the floodplain that supports precipitation-dependent vegetation.

Watershed – a geographic area that is drained by a river and its tributaries. Separated from other watersheds by an elevated boundary such as a mountain.

Wetland – land that is permanently or periodically saturated with water. May be connected to a surface water or groundwater source. Indicators of wetlands include plant species adapted to such conditions, characteristic soil colors and chemical properties, and physical evidence of flooding or waterlogged soils.

6.3 ACRONYMS AND ABBREVIATIONS

| | |
|---------|--|
| ADT | Average Daily Traffic |
| APE | area of potential effect |
| BLM | Bureau of Land Management |
| BMP | best management practice |
| BPA | Bonneville Power Administration |
| CFR | Code of Federal Regulations |
| CH4 | methane |
| CO | carbon monoxide |
| Corps | U.S. Army Corps of Engineers |
| CRP | Conservation Reserve Program |
| DAHP | Washington Department of Archaeology and Historic Preservation |
| dBA | A-weighted decibel |
| EA | Environmental Assessment |
| Ecology | Washington State Department of Ecology |
| EFH | essential fish habitat |
| EIS | environmental impact statement |
| EMF | electromagnetic fields |
| EMI | electromagnetic interference |
| EO | Executive Order |
| EPA | U.S. Environmental Protection Agency |
| ESA | Endangered Species Act of 1973 |
| FEMA | Federal Emergency Management Agency |
| FONSI | Finding of No Significant Impact |
| FPA | Forest Practices Act |
| FPPA | Farmland Protection Policy Act |
| FSA | Farm Service Agency |
| FTA | Federal Transit Administration |
| GHG | greenhouse gas |
| GMA | Growth Management Act |
| HFCs | hydrofluorocarbons |
| IPL | Inland Power & Light |

| | |
|-------------------|--|
| kV | kilovolt |
| MOU | memorandum of understanding |
| N ₂ O | nitrous oxide |
| NAAQS | national ambient air quality standards |
| NEPA | National Environmental Policy Act |
| NESC | National Electric Safety Code |
| NHPA | National Historic Preservation Act |
| NLCD | National Land Cover Database |
| NMFS | National Marine Fisheries Service |
| NO _x | nitrogen oxides |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NWCB | Noxious Weed Control Board |
| NWI | National Wetlands Inventory |
| PCB | polychlorinated biphenyl |
| PHS | Priority Habitats and Species |
| PM ₁₀ | particulate matter less than 10 micrometers in size |
| PM _{2.5} | particulate matter less than 2.5 micrometers in size |
| PFCs | perfluorocarbons |
| PUD | Public Utility District |
| RCRA | Resource Conservation and Recovery Act |
| Reclamation | U.S. Bureau of Reclamation |
| right-of-way | right-of-way |
| SHPO | State Historic Preservation Officer |
| TCP | Traditional Cultural Properties |
| U.S.C. | United States Code |
| USACE | United States Army Corps of Engineers |
| USDA | United States Department of Agriculture |
| USDOE | United States Department of Energy |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| VOC | volatile organic compound |
| VRM | Visual Resources Management |

| | |
|-------|--|
| WAC | Washington Administrative Code |
| WDFW | Washington Department of Fish and Wildlife |
| WDNR | Washington State Department of Natural Resources |
| WHPA | Wellhead Protection Areas |
| WSDOH | Washington State Department of Health |
| WSDOT | Washington State Department of Transportation |

Chapter 7

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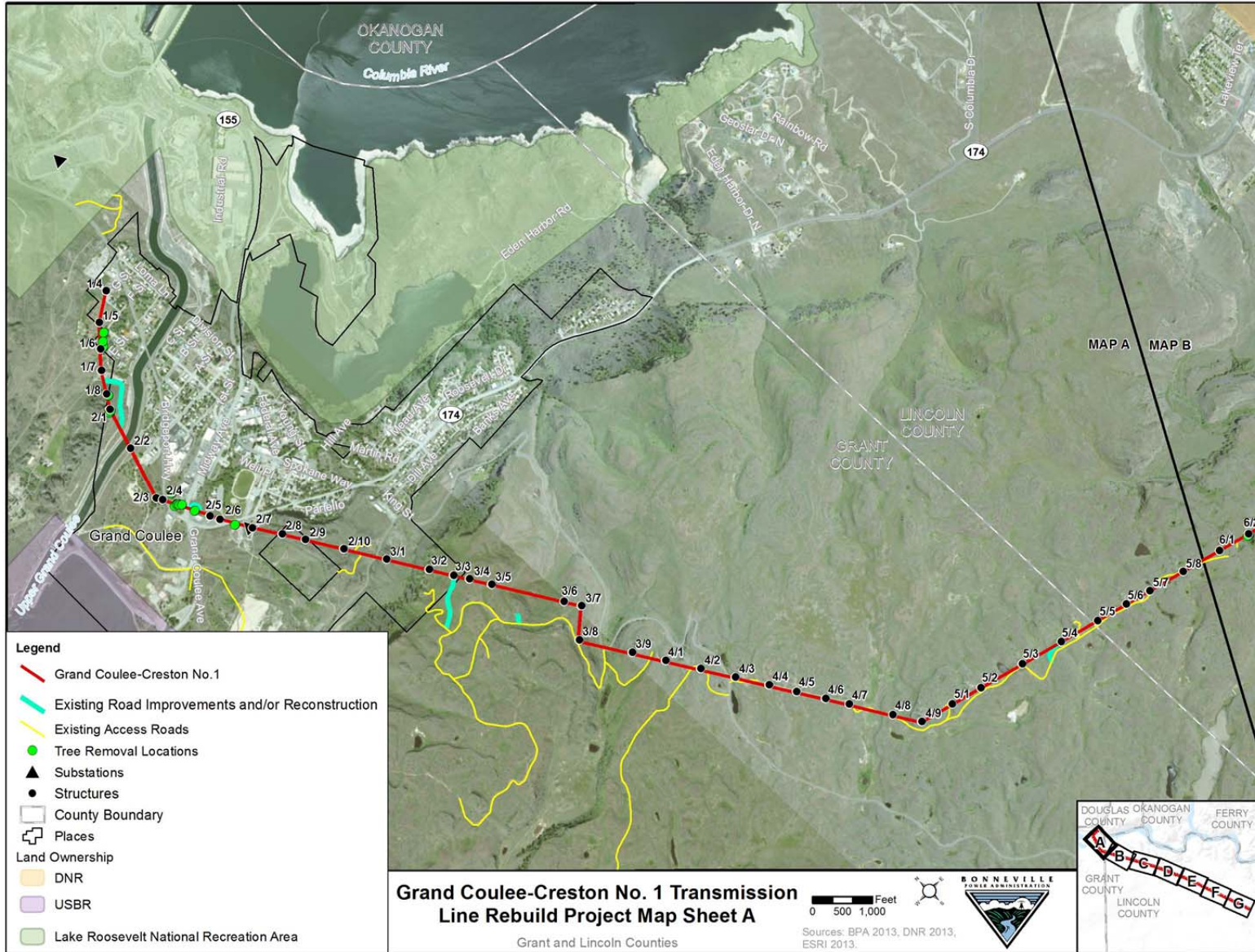
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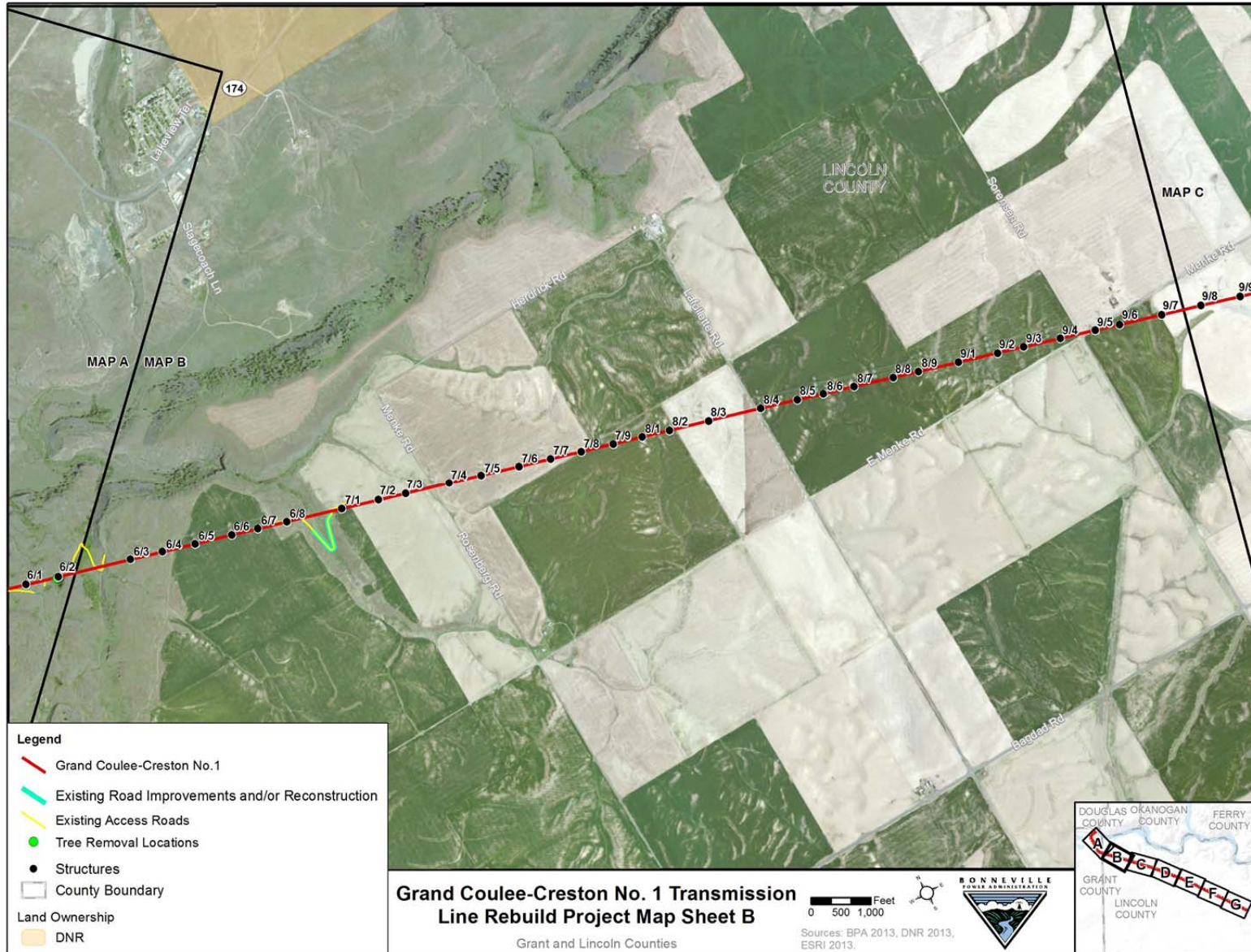
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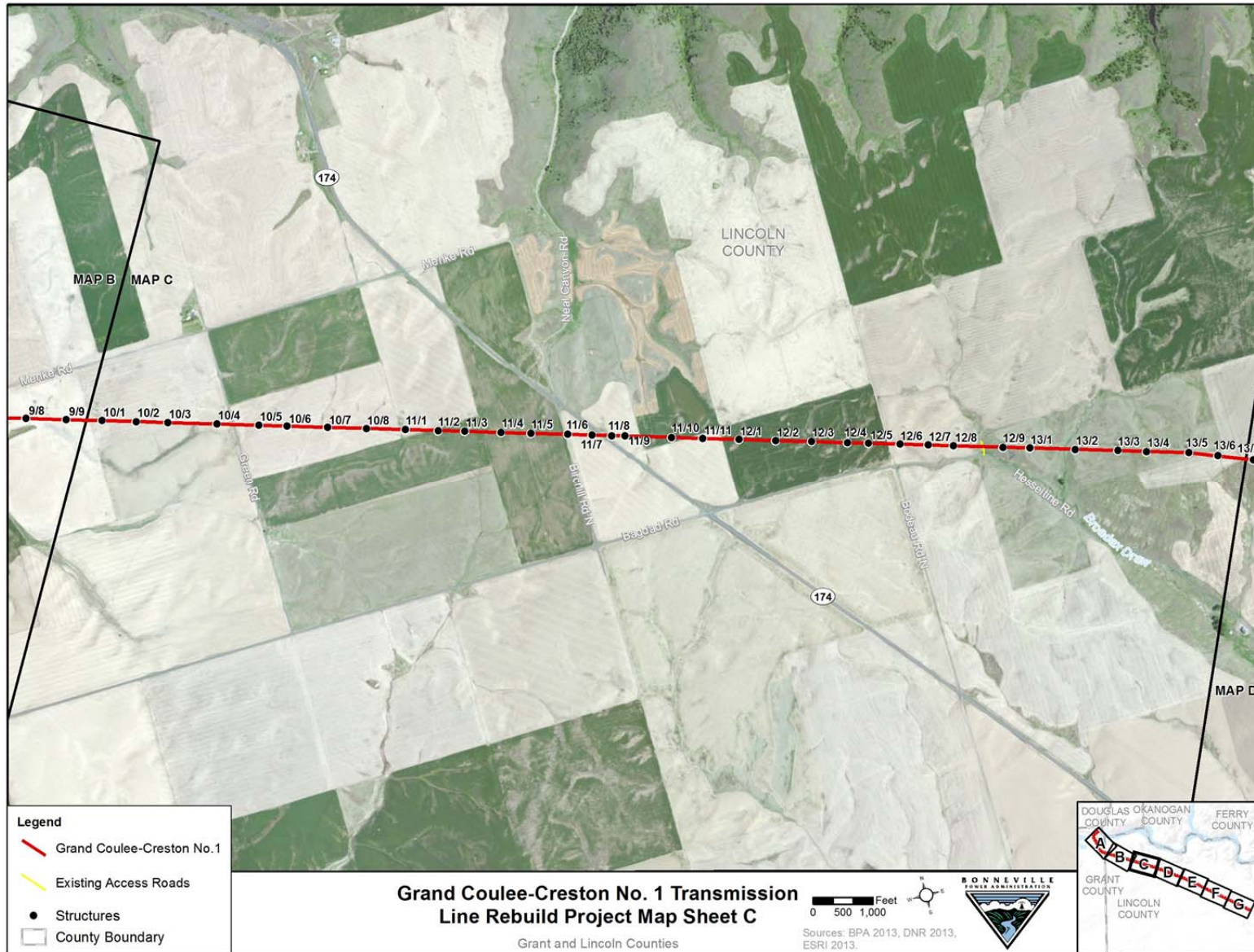
APPENDIX A
MAP BOOK

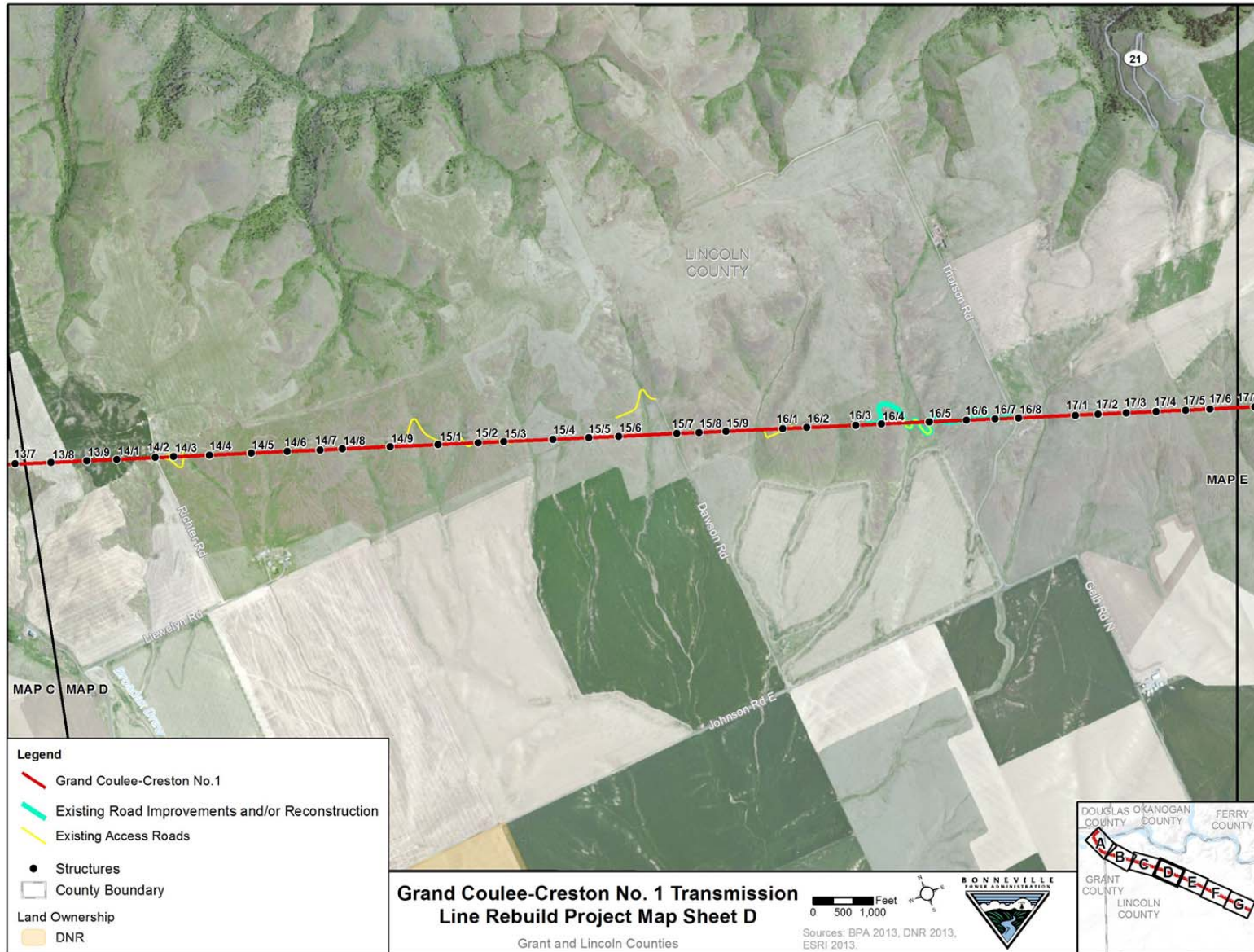
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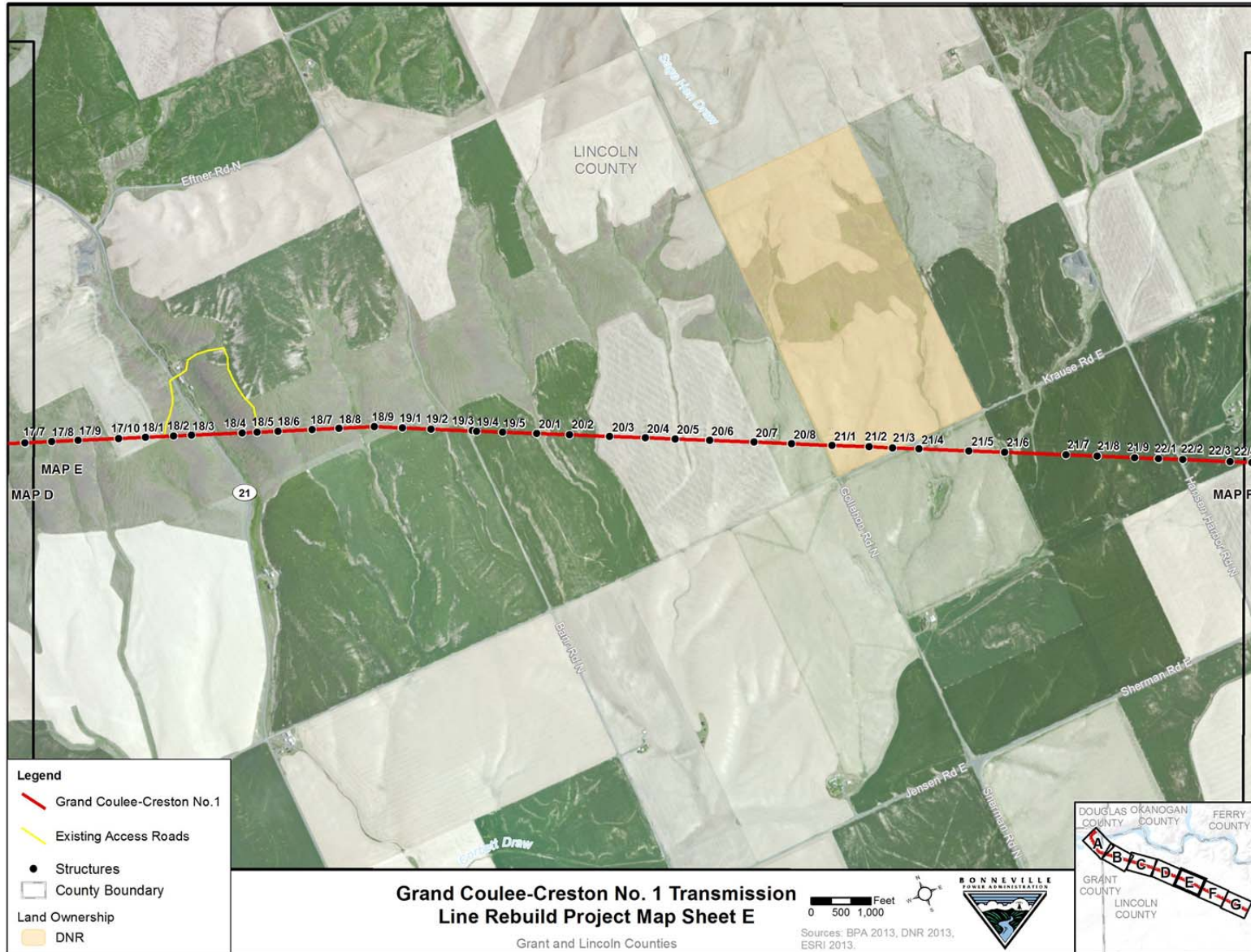




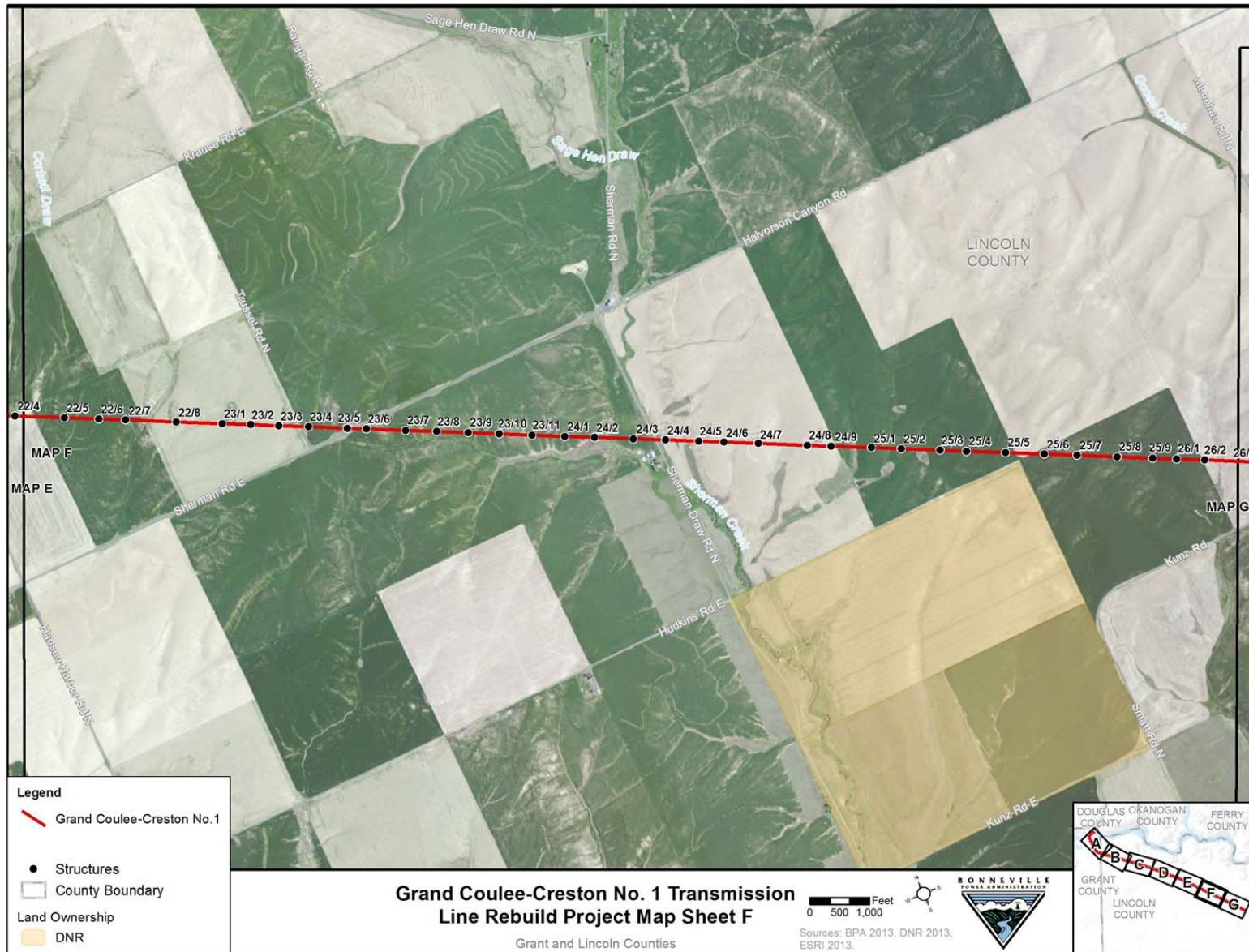
Date: 9/11/2013 9:11 AM Analyst: NJH Map Document: LocationMapbook.mxd Project Number: 40266007



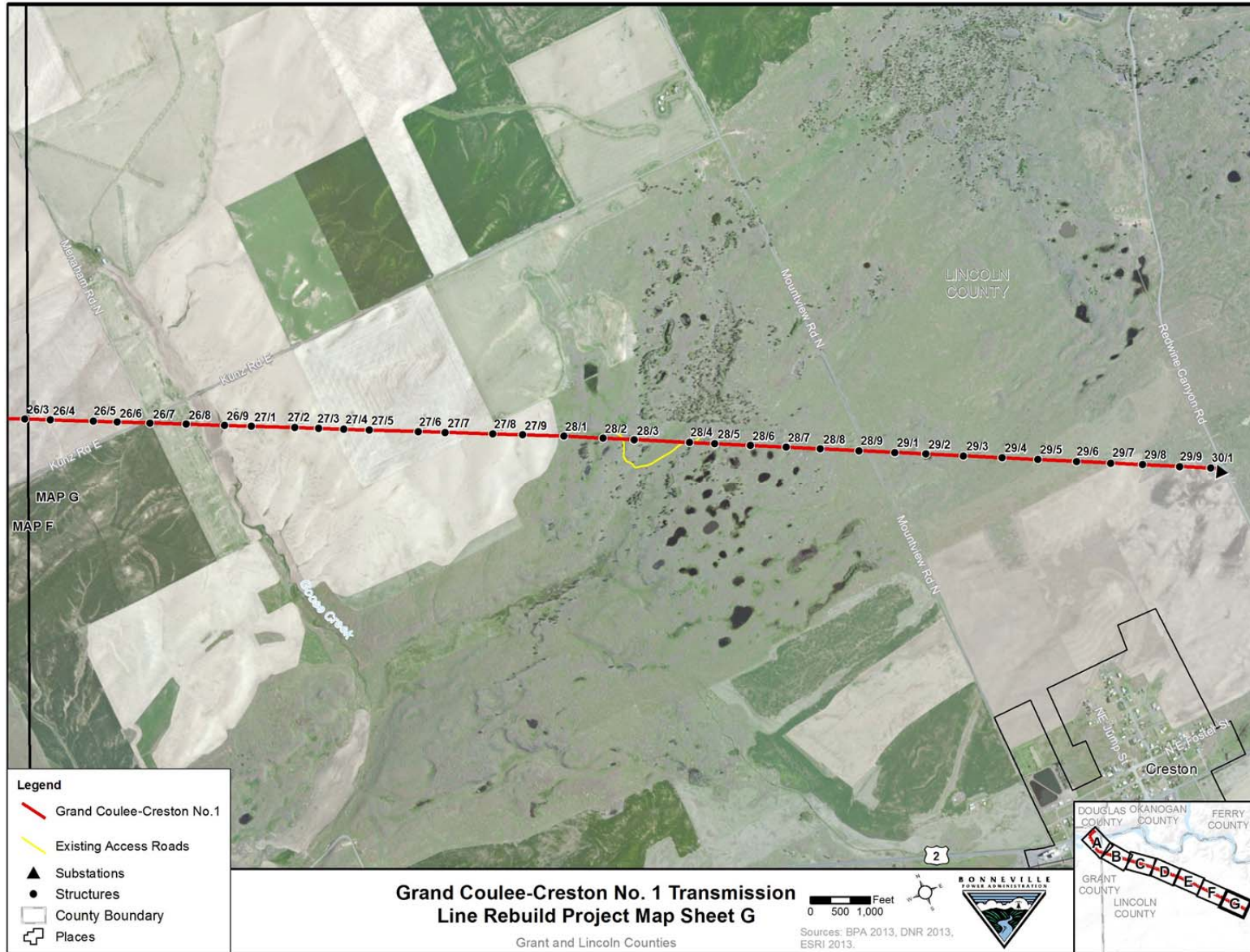




Date: 9/11/2013 GIS Analyst: NJH Map Document: LocationMapbook.mxd Project Number: 4026607



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Date: 9/11/2013 GIS Analyst: NJH Map Document: LocationMapbook.mxd Project Number: 40266007

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APPENDIX B
VEGETATION MANAGEMENT

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| Project: Grand Coulee – Creston | | | Total # Of 'C' Trees: 103 | | | Date: 6/12/2013 |
|---------------------------------|-----|---------------|------------------------------------|---------------------------|------------------------------------|---------------------------|
| Number of Trees | DBH | Species | Direction from Center Line (A.O.L) | Distance from Center Line | Distance from Tower +/- & Tower ID | Tree Number (GPS Point #) |
| 14 | 18 | Am. elm | Right | 0 - 25 | -175' 1/2 | 9 |
| 3 | 8 | Am. elm | Left | 0 - 50 | -170' 1/2 | 10 |
| 1 | -8 | SS | Left | 0 - 50 | -55' 1/2 | 11 |
| 3 | 15 | Walnut | Right | 0 - 25 | +250' 1/2 | 13 |
| 3 | 10 | Catalpa | Right | 0 - 50 | +315' 1/2 | 12 |
| 1 | 14 | JP | Left | 0 - 25 | -35' 1/3 | 16 |
| 8 | -8 | Elm | Right | 0 - 25 | +0' 1/3 | 19 |
| 7 | -8 | Elm | Right | 0 - 25 | +8' 1/3 | 18 |
| 1 | 14 | JP | Left | 0 - 25 | +8' 1/3 | 15 |
| 8 | -8 | Am. elm | Right | 0 - 25 | +12' 1/3 | 17 |
| 1 | 12 | JP | Left | 0 - 25 | +40' 1/3 | 14 |
| 1 | 20 | Black locust | Left | 0 - 50 | -130' 1/6 | 8 |
| 1 | 10 | PP | Left | 0 - 25 | -10' 1/6 | 6 |
| 1 | 47 | Willow | Left | 0 - 50 | +160' 1/6 | 7 |
| 1 | -6 | Hwd. | Left | 0 - 25 | +15' 1/8 | 5 |
| 1 | 8 | Hwd. | Right | 0 - 50 | +20' 2/1 | 4 |
| 1 | -8 | Hwd. | Right | 0 - 50 | +60' 2/1 | 3 |
| 1 | 11 | Locust | Right | 0 - 50 | +225' 2/4 | 20 |
| 3 | -8 | Aspen | Right | 0 - 25 | +250' 2/4 | 21 |
| 1 | -8 | Am. elm | Right | 0 - 25 | +250' 2/4 | 22 |
| 1 | -8 | Apple | Left | 0 - 25 | +270' 2/4 | 23 |
| 4 | -8 | PP | Left | 0 - 25 | +288' 2/4 | 24 |
| 1 | -8 | Black locust | Left | 0 - 25 | +305' 2/4 | 25 |
| 1 | 10 | Black locust | Left | 0 - 25 | +350' 2/4 | 27 |
| 1 | 10 | Black locust | Left | 0 - 25 | +355' 2/4 | 26 |
| 1 | -8 | Am. elm | Right | 0 - 50 | -110' 2/5 | 28 |
| 13 | -8 | Black locust | Right | 0 - 25 | -300' 2/7 | 29 |
| 20 | 8 | Service berry | Right | 0 - 25 | -35' 6/2 | 36 |

Notes: All data was collected using a digital Data Collector (Trimble NOMAD) by BPA on June 5, 2013.
Individual stationing for each danger tree was recorded.
“Tree Number” represents the order in which trees were visited.
These numbers are arbitrarily assigned. See associated maps for location of trees listed by tree number.

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APPENDIX C
WDNR STREAM DATABASE

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| Watershed (5th field) | Subwatershed (6th Field) ^{1/} | Stream Description |
|--|---|---|
| Welsh Creek- Franklin D Roosevelt Lake | Coulee Dam- Franklin D Roosevelt Lake | <ol style="list-style-type: none"> 1. Unnamed stream crosses within 100 feet of ROW between structures 1/5 and 1/6. This stream is within Grand Coulee city limits in Grant County, about 100 feet south of F Street. This is an intermittent Type U water that flows into the Upper Grand Coulee Canal. It is a tributary to the Columbia River that has Bull Trout Potential per StreamNet. 2. Upper Grand Coulee Canal crosses within 100 feet of ROW between structures 2/1 and 2/2. This stream is within Grand Coulee city limits in Grant County, about 250 feet south of Canal Service Road. This is a perennial Type U water that flows between the Columbia River and Banks Lake. It is a tributary to the Columbia River that has Bull Trout Potential per StreamNet. 3. Unnamed stream crosses within 100 feet of ROW between structures 3/8 and 3/9. This stream is in Grant County, and parallels Grand Coulee Hill Road. This is an unknown Type U water that flows into Columbia River. It is a tributary to the Columbia River that has Bull Trout Potential per StreamNet. |
| | Spring Canyon | <ol style="list-style-type: none"> 4. Unnamed stream crosses within 100 feet of ROW between structures 6/2 and 6/3. This stream is in Lincoln County. This is an unknown Type U water that flows into Columbia River. It is a tributary to the Columbia River that has Bull Trout Potential per StreamNet. 5. Unnamed stream crosses within 100 feet of ROW between structures 6/8 and 7/1. This stream also crosses through a proposed reconstruction access road. This stream is in Lincoln County, about 2,000 feet west of Rosenberg Road. This is an unknown Type F water that flows into Columbia River. It is a tributary to the Columbia River that has Bull Trout Potential per StreamNet. 6. Unnamed stream crosses within 100 feet of ROW between structures 7/3 and 7/4. This stream is in Lincoln County, about 100 feet west of Rosenberg Road. This is an unknown Type U water that flows into Columbia River. It is a tributary to the Columbia River that has Bull Trout Potential per StreamNet. |
| | Kaufman Creek- Franklin D Roosevelt Lake | 0 |
| | Total | 6 |
| Upper Grand Coulee | Northrup Canyon | <ol style="list-style-type: none"> 1. Unnamed stream crosses within 100 feet of ROW between structures 8/9 and 9/1. This stream is in Lincoln County, about 1,000 feet north of Menke Road. This is an unknown Type U water that flows into Northrup Creek. 2. Unnamed stream crosses within 100 feet of ROW between structures 9/8 and 9/9. This stream is in Lincoln County, about 800 feet south of Menke Road. This is an unknown Type U water that flows into Northrup Creek. 3. Unnamed stream crosses within 100 feet of ROW between structures 10/3 and 10/4. This stream is in Lincoln County, about 600 feet west of Green Road. This is an unknown Type U water that flows into Northrup Creek. |
| | Total | 3 |

| Watershed (5th field) | Subwatershed (6th Field) ^{1/} | Stream Description |
|-----------------------|--|---|
| Upper Wilson Creek | Upper Corbett Creek | <ol style="list-style-type: none"> 1. Broadax Draw crosses within 100 feet of ROW between structures 12/8 and 12/9. This stream is in Lincoln County, about 100 feet north of Hesseltine Road. This is an intermittent Type U water that flows into Corbett Draw. 2. Unnamed stream crosses within 100 feet of ROW between structures 15/6 and 15/7. This stream is in Lincoln County, about 400 feet west of Dawson Road. This is an intermittent Type U water that flows into Corbett Draw. 3. Unnamed stream crosses within 100 feet of ROW between structures 15/9 and 16/1. This stream is in Lincoln County. This is an intermittent Type U water that flows into Corbett Draw. 4. Unnamed stream crosses within 100 feet of ROW between structures 16/2 and 16/3. This stream is in Lincoln County. This is an intermittent Type U water that flows into Corbett Draw. 5. Unnamed stream crosses within 100 feet of ROW between structures 16/4 and 16/5. This stream also crosses through a proposed reconstruction access road. This stream is in Lincoln County. This is an intermittent Type U water that flows into Corbett Draw. 6. Unnamed stream crosses within 100 feet of ROW between structures 16/8 and 17/1. This stream is in Lincoln County. This is an intermittent Type U water that flows into Corbett Draw. 7. Unnamed stream crosses within 100 feet of ROW between structures 17/6 and 17/7. This stream is in Lincoln County. This is an intermittent Type U water that flows into Corbett Draw. 8. Unnamed stream crosses within 100 feet of ROW between structures 17/8 and 17/9. This stream is in Lincoln County. This is an intermittent Type U water that flows into Corbett Draw. This is within 100 feet of structure 17/8. 9. Unnamed stream crosses within 100 feet of ROW between structures 17/9 and 17/10. This stream is in Lincoln County. This is an intermittent Type U water that flows into Corbett Draw. 10. Unnamed stream crosses within 100 feet of ROW between structures 18/3 and 18/4. This stream is in Lincoln County, about 100 feet east of State Highway 21. This is an intermittent Type U water that flows into Corbett Draw. 11. Unnamed stream crosses within 100 feet of ROW between structures 18/8 and 18/9. This stream is in Lincoln County, about 1,900 feet west of Bahr Road. This is an intermittent Type U water that flows into Corbett Draw. 12. Unnamed stream crosses within 100 feet of ROW between structures 20/1 and 20/2. This stream is in Lincoln County, about 1,300 feet east of Bahr Road. This is an intermittent Type U water that flows into Corbett Draw. 13. Unnamed stream crosses within 100 feet of ROW between structures 20/2 and 20/3. This stream is in Lincoln County. This is an intermittent Type U water that flows into Corbett Draw. 14. Unnamed stream crosses within 100 feet of ROW between structures 20/5 and 20/6. This stream is in Lincoln County. This is an intermittent Type U water that flows into Corbett Draw. 15. Unnamed stream crosses within 100 feet of ROW between structures 20/7 and 20/8. This stream is in Lincoln County, about 900 feet west of Gollehon Road. This is an intermittent Type U water that flows into Corbett Draw. |

| Watershed (5th field) | Subwatershed (6th Field) ^{1/} | Stream Description |
|-----------------------|--|---|
| | | <p>16. Unnamed stream crosses within 100 feet of ROW between structures 21/4 and 21/5. This stream is in Lincoln County, about 300 feet south of Krause Road. This is an intermittent Type U water that flows into Corbett Draw.</p> <p>17. Unnamed stream crosses within 100 feet of ROW between structures 21/6 and 21/7. This stream is in Lincoln County, about 1,000 feet south of Krause Road. This is an intermittent Type U water that flows into Corbett Draw.</p> <p>18. Corbett Draw crosses within 100 feet of ROW between structures 22/2 and 22/3. This stream is in Lincoln County, about 400 feet east of Hansen Harbor Road. This is an intermittent Type U water that flows into Corbett Draw.</p> <p>19. Unnamed stream crosses within 100 feet of ROW between structures 22/7 and 22/8. This stream is in Lincoln County. This is an intermittent Type U water that flows into Corbett Draw.</p> |
| | Upper Goose Creek | <p>20. Unnamed stream crosses within 100 feet of ROW between structures 23/8 and 23/9. This stream is in Lincoln County, and is 800 feet south of Sherman Road. This is an intermittent Type N water that flows into Goose Creek.</p> <p>21. Unnamed stream crosses within 100 feet of ROW between structures 24/2 and 24/3. This stream is in Lincoln County, and is 600 feet west of Sherman Draw Road. This is an intermittent Type F water that flows into Goose Creek.</p> <p>22. Sherman Creek crosses within 100 feet of ROW between structures 24/3 and 24/4. This stream is in Lincoln County, and parallels Sherman Draw Road. This is a perennial Type F water that flows into Goose Creek.</p> <p>23. Unnamed stream crosses within 100 feet of ROW between structures 25/1 and 25/2. This stream is in Lincoln County. This is an intermittent Type N water that flows into Goose Creek. This is within 100 feet of structure 25/2.</p> <p>24. Unnamed stream crosses within 100 feet of ROW between structures 25/4 and 25/5. This stream is in Lincoln County. This is an intermittent Type N water that flows into Goose Creek.</p> <p>25. Unnamed stream crosses within 100 feet of ROW between structures 26/2 and 26/3. This stream is in Lincoln County, about 1,300 feet north of Kurtz Road. This is an intermittent Type N water that flows into Goose Creek.</p> <p>26. Goose Creek crosses within 100 feet of ROW between structures 26/8 and 26/9. This stream is in Lincoln County, about 600 feet south of Kurtz Road. This is an intermittent Type F water that flows into Goose Creek. This is within 100 feet of structure 26/9.</p> <p>27. Unnamed stream crosses within 100 feet of ROW between structures 28/3 and 28/4. This stream is in Lincoln County. This is an unknown Type N water that flows into Goose Creek.</p> |
| | Total | 27 |
| Project Area Total | | 36 |

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APPENDIX D

**COMMON PLANT SPECIES OBSERVED WITHIN THE
PROJECT CORRIDOR**

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| Scientific Name | Common Name | Family | Comments |
|--|-------------------------|-----------------|--|
| <i>Achillea millefolium</i> | common yarrow | Asteraceae | Grassland/Shrubland-steppe |
| <i>Acroptilon</i> sp. | knapweed | Asteraceae | Disturbed/Roadside |
| <i>Agastache</i> sp. | horsemint | Lamiaceae | Riparian Woodland and Shrubland |
| <i>Agropyron cristatum</i> | crested wheatgrass | Poaceae | Disturbed/Roadside, Steppe and Grassland |
| <i>Allium acuminatum</i> | tapertip onion | Liliaceae | Scabland Shrubland |
| <i>Allium constrictum</i> | Grand Coulee onion | Liliaceae | Scabland Shrubland |
| <i>Allium</i> sp. | wild onion | Liliaceae | Scabland Shrubland |
| <i>Amelanchier alnifolia</i> | service berry | Rosaceae | Shrubland-steppe |
| <i>Amsinkia</i> sp. | fiddleneck | Boraginaceae | Shrubland-steppe |
| <i>Antennaria microphylla</i> | little leaf pussytoes | Rosaceae | Vernal Pools |
| <i>Apocynum androsaemifolium</i> | bitter dogbane | Apocynaceae | Shrubland-steppe |
| <i>Arabis</i> sp. | rockcross | Brassicaceae | Shrubland-steppe |
| <i>Artemisia ludoviciana</i> | silver wormwood | Asteraceae | Vernal Pools |
| <i>Artemisia rigida</i> | prarie sagewort | Asteraceae | Scabland Shrubland |
| <i>Artemisia tridentata</i> | big sagebrush | Asteraceae | Shrubland-steppe |
| <i>Astragalus</i> sp. | milkvetch | Fabaceae | Steppe and Grassland |
| <i>Balsamorhiza hookeri</i> | hooker's balsam root | Asteraceae | Scabland Shrubland |
| <i>Balsamorhiza sagittata</i> | arrowleaf balsam root | Asteraceae | Shrubland-steppe |
| <i>Bromus</i> sp. | brome | Poaceae | Grassland/Shrubland-steppe |
| <i>Bromus tectorum</i> | cheat grass | Poaceae | Grassland/Shrubland-steppe |
| <i>Cardaria draba</i> | white top | Brassicaceae | Riparian Woodland Shrubland |
| <i>Carex</i> spp. | sedge | Cyperaceae | Vernal Pools |
| <i>Castilleja lutescens</i> / <i>C. flava</i> ssp. <i>rustica</i> | stiff yellow paintbrush | Scrophularaceae | Shrubland-steppe |
| <i>Cenchrus longispinus</i> | mat sandbur | Poaceae | Disturbed/Roadside, Steppe and Grassland, Class B Weed |
| <i>Centaurea diffusa</i> | diffuse knapweed | Asteraceae | Disturbed/Roadside, Steppe and Grassland, Class B Weed |
| <i>Centaurea</i> sp. | star thistle | Asteraceae | Disturbed/Roadside |

| Scientific Name | Common Name | Family | Comments |
|------------------------------------|------------------------|----------------|--|
| <i>Chaenactis douglasii</i> | dusty maidens | Asteraceae | Scabland Shrubland |
| <i>Chondrilla juncea</i> | rush skeletonweed | Asteraceae | Disturbed/Roadside, Steppe and Grassland, Class B Weed |
| <i>Chorispora tenella</i> | purple mustard | Brassicaceae | Disturbed/Roadside |
| <i>Chrysothamnus viscidiflorus</i> | stickyleaf rabbitbrush | Asteraceae | Shrubland-steppe |
| <i>Cirsium</i> spp. | thistle (native) | Asteraceae | Shrubland-steppe |
| <i>Cirsium arvense</i> | Canada thistle | Asteraceae | Disturbed/Roadside, Steppe and Grassland, Class C Weed |
| <i>Cirsium vulgare</i> | bull thistle | Asteraceae | Disturbed/Roadside, Steppe and Grassland, Class C Weed |
| <i>Clarkia pulchella</i> | deerhorn clarkia | Onagraceae | Shrubland-steppe |
| <i>Collinsia</i> sp. | blue-eyed mary | Polemoniaceae | Vernal Pools |
| <i>Collomia</i> sp. | collomia | Polemoniaceae | Shrubland-steppe |
| <i>Conium maculatum</i> | poison hemlock | Apiaceae | Disturbed/Roadside, Steppe and Grassland, Class B Weed |
| <i>Convolvulus arvensis</i> | field bindweed | Convolvulaceae | Disturbed/Roadside, Steppe and Grassland, Class C Weed |
| <i>Cornus sericea</i> | red-stem dogwood | Cornaceae | Riparian Woodland Shrubland |
| <i>Crepis</i> sp. | hawksbeard | Asteraceae | Shrubland-steppe |
| <i>Dalea purpurea</i> | dalea | Fabaceae | Shrubland-steppe |
| <i>Delphinium</i> sp. | delphinium | Ranunculaceae | Shrubland-steppe |
| <i>Descurainia sophia</i> | flix weed | Brassicaceae | Disturbed/Roadside, Steppe and Grassland |
| <i>Dodecatheon</i> sp. | shooting star | Primulaceae | Riparian Woodland Shrubland |
| <i>Draba verna</i> | spring draba | Brassicaceae | Vernal Pools |
| <i>Eleocharis</i> sp. | spike rush | Cyperaceae | Vernal Pools |
| <i>Elymus elymoides</i> | squirrel tail grass | Poaceae | Scabland Shrubland |
| <i>Elymus</i> sp. | wild rye (various) | Poaceae | Grassland/Shrubland-steppe |
| <i>Epilobium brachycarpum</i> | tall annual willowherb | Onagraceae | Disturbed/Roadside |
| <i>Ericameria nauseosa</i> | rubber rabbitbrush | Asteraceae | Shrubland-steppe |
| <i>Eriogonum compositum</i> | buckwheat | Polygonaceae | Grassland/Shrubland-steppe |
| <i>Eriogonum</i> sp. | buckwheat | Polygonaceae | Shrubland-steppe |

| Scientific Name | Common Name | Family | Comments |
|--|-------------------------------|----------------------------|--|
| <i>Eriogonum sphaerocephalum</i> | round-headed desert buckwheat | Polygonaceae | Shrubland-steppe |
| <i>Eriogonum thymoides</i> | thyme desert buckwheat | Polygonaceae | Scabland |
| <i>Eriophyllum lanatum</i> | Oregon sunshine | Asteraceae | Shrubland-steppe |
| <i>Festuca idahoensis</i> | Idaho fescue | Poaceae | Grassland/Shrubland-steppe |
| <i>Frasera albicaulis</i> | whitestem frasera | Gentianaceae | Vernal Pools |
| <i>Gaillardia aristata</i> | blanket flower | Asteraceae | Grassland/Shrubland-steppe |
| <i>Galium</i> sp. | bedstraw | Rubiaceae | Shrubland-steppe |
| <i>Gypsophila paniculata</i> | baby's breath | Caryophyllaceae | Grassland/Shrubland-steppe, Class C Weed |
| <i>Hesperostipa comatacomate</i> | needle and thread | Poaceae | Grassland/Shrubland-steppe |
| <i>Hypericum perforatum</i> | St. John's wort | Hypericaceae | Grassland/Shrubland-steppe, Class C Weed |
| <i>Iris</i> spp. | iris | Iridaceae | Vernal Pools |
| <i>Juncus</i> sp. | rush | Juncaceae | Vernal Pools |
| <i>Kochia scoparia</i> | kochia | | Class B Weed |
| <i>Lactuca serriola</i> | wild lettuce | Asteraceae | Grassland/Shrubland-steppe |
| <i>Lappula squarrosa</i> | stickseed | Boraginaceae | Disturbed/Roadside |
| <i>Lepidium perfoliatum</i> | clasping pepperweed | Brassicaceae | Disturbed/Roadside, Grassland/Shrubland-steppe |
| <i>Lewisia rediviva</i> | bitter root | Montiaceae (Portulacaceae) | Scabland Shrubland |
| <i>Leymus</i> sp. | wildrye (various) | Poaceae | Grassland/Shrubland-steppe |
| <i>Linaria dalmatica</i> ssp. <i>dalmatica</i> | dalmation toadflax | Plantaginaceae | Disturbed/Roadside, Grassland/Shrubland-steppe |
| <i>Lomatium</i> spp. | desert-parsley species | Apiaceae | Grassland/Shrubland-steppe |
| <i>Lupinus sericeus</i> | silky lupine | Fabaceae | Shrubland-steppe |
| <i>Maianthemum stellatum</i> | false lily of the valley | Ruscaceae (Liliaceae) | Riparian Woodland Shrubland |
| <i>Malus</i> sp. | apple | Rosaceae | NA |
| <i>Matricaria perforata</i> | scentless mayweed | Asteraceae | Class C Weed |
| <i>Myosotis stricta</i> | strict forget me not | Boraginaceae | Vernal Pools |

| Scientific Name | Common Name | Family | Comments |
|-------------------------------------|----------------------------|----------------------------------|----------------------------------|
| <i>Nestotus stenophyllus</i> | narrowleaf mock goldenweed | Asteraceae | Scabland Shrubland |
| <i>Pellaea glabella</i> | Brewer's cliff brake | Pteridaceae | Scabland Shrubland |
| <i>Penstemon gairdneri</i> | Gairdner's penstemon | Scrophularaceae | Scabland Shrubland |
| <i>Phacelia</i> sp. | phacelia | Boraginaceae | Shrubland-steppe |
| <i>Philadelphus lewisii</i> | mock orange | Hydrangeaceae | Shrubland-steppe |
| <i>Phlox diffusa</i> | spreading phlox | Polemoniaceae | Scabland Shrubland |
| <i>Phlox</i> sp. | phlox | Polemoniaceae | Grassland/Shrubland-steppe |
| <i>Pinus ponderosa</i> | ponderosa pine | Pinaceae | Grassland/Shrubland-steppe |
| <i>Plectritis</i> sp. | plectritis | Valerianaceae | Shrubland-steppe |
| <i>Poa bulbosa</i> | bulbus blue grass | Poaceae | Shrubland-steppe |
| <i>Poa secunda</i> | curly blue grass | Poaceae | Scabland Shrubland |
| <i>Populus tremuloides</i> | quaking aspen | Salicaceae | Riparian Woodland Shrubland |
| <i>Potentilla gracilis</i> | five finger cinquefoil | Rosaceae | Grassland/Shrubland-steppe |
| <i>Potentilla recta</i> | sulfur cinquefoil | | Class B Weed |
| <i>Prunus virginiana</i> | choke cherry | Rosaceae | Riparian Woodland Shrubland |
| <i>Prushia tridentatatridentate</i> | bitterbrush | Rosaceae | Riparian Woodland Shrubland |
| <i>Pseudoroegneria spicata</i> | bluebunch wheatgrass | Poaceae | Shrubland-steppe |
| <i>Ranunculus testiculatus</i> | bur buttercup | Ranunculaceae | Disturbed/Roadside |
| <i>Ribes cereum</i> | wax current | Grossularaceae | Shrubland-steppe |
| <i>Robinia pseudoacacia</i> | black locust | Fabaceae | Shrubland-steppe |
| <i>Rosa</i> sp. | wild rose | Rosaceae | Riparian Woodland Shrubland |
| <i>Rubus</i> sp. | blackberry | Rosaceae | Riparian Woodland Shrubland |
| <i>Sambucus ceruleacerulean</i> | blue elderberry | Adoxaceae (Caprifoliaceae) | Riparian Woodland and Shrubland |
| <i>Sarcobatus vermiculatus</i> | grease wood | Sarcobataceae (Chenopodaceae) | Shrubland-steppe (only one obs.) |
| <i>Scrophularia</i> sp. | figwort | Scrophularaceae | Riparian Woodland Shrubland |
| <i>Sedum lanceolatum</i> | lace leaf stone crop | Crassulaceae | Scabland Shrubland |
| <i>Selaginella</i> sp. | spike moss | Selaginellaceae | Scabland Shrubland |

| Scientific Name | Common Name | Family | Comments |
|---------------------------------|---------------------|------------------------------|---|
| <i>Senecio integerrimus</i> | columbia ragwort | Asteraceae | Scabland Shrubland |
| <i>Senecio jacobaea</i> | tansy ragwort | Asteraceae | Class B Weed |
| <i>Sisymbrium altissimum</i> | tall tumble mustard | Brassicaceae | Disturbed/Roadside, Grassland/Shrubland-steppe |
| <i>Sphaeralcea coccinea</i> | scarlet globemallow | Malvaceae | Shrubland-steppe |
| <i>Symphoricarpos</i> sp. | snowberry | Caprifoliaceae | Shrubland-steppe |
| <i>Taraxacum officinale</i> | dandelion | Asteraceae | Disturbed/Roadside, Vernal Pools |
| <i>Toxicodendron rydbergii</i> | Western poison ivy | Anacardiaceae | Riparian Woodland Shrubland |
| <i>Toxicoscordion venenosum</i> | death camas | Melanthiaceae (Liliaceae) | Vernal Pools |
| <i>Tragopogon dubius</i> | salsify | Asteraceae | Shrubland-steppe |
| <i>Tribulus terrestris</i> | puncturevine | Zygophyllaceae | Class B Weed |
| <i>Ulmus americana</i> | American elm | Ulmaceae | Disturbed/Roadside |
| <i>Urtica</i> sp. | stinging nettle | Urticaceae | Riparian Woodland Shrubland |
| <i>Verbascum thapsus</i> | mullein | Scrophularaceae | Disturbed/Roadside |
| <i>Viola</i> sp. | violet | Violaceae | Riparian Woodland Shrubland |

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APPENDIX E

**SPECIAL STATUS PLANT SPECIES IN GRANT AND LINCOLN
COUNTIES**

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| <i>Scientific Name</i> Common Name | Listing Status | Nearby Occurrence | Potential to Occur in Project Area | Habitat Conditions | Flowering Period | Comments |
|--|----------------|-------------------|------------------------------------|--|---|--|
| <i>Aliciella leptomeria</i> Great Basin gilia | WT | NO | NO | Open habitats on gravelly bluffs, in sandy swales and on caliche, from 470 to 1140 feet (ft) with big sagebrush etc. | May | Less than 10 recent occurrences of the species in WA. |
| <i>Allium constrictum</i> Grand Coulee onion (constricted Douglas' onion) | WS | YES | YES | Vernally moist areas on flat basalt lithosol and around the margins of rocky vernal ponds; less common on drier lithosols, and rarely on driest lithosols. Elevations from 2070-2550 ft; within shrub-steppe vegetation in areas with little or no shade | May | Nearby occurrences. |
| <i>Ammannia robusta</i> Grand redstem | WT | NO | NO | Riverine emergent wetland | May - June | |
| Nuttall's pussy-toes | WS | NO | NO | Dry, open areas with sandy or gravelly soil along rivers, creeks, or lake shores, usually in ponderosa pine forests. | May - June | |
| <i>Artemisia campestris</i> var. <i>wormskioldii</i> Wormskiold's northern wormwood | WE, FC | NO | NO | The area is arid, generally supporting shrub-steppe vegetation | Early April, occasionally throughout the season | Only two known sites with sparse veg cover. One site is in an area of shifting sand. Expected to occur just within Cola R. floodplain. |
| <i>Astragalus arrectus</i> Palouse milk-vetch | WT | YES | YES | Grassy hillsides, sagebrush flats, river bluffs, and open ponderosa pine/Douglas fir forests in grassy or shrub dominated openings growing on all aspects in soil ranging from rocky and dry to moist and rich. | April - July | |
| <i>Astragalus geyeri</i> Geyer's milk-vetch | WT | NO | NO | Depressions in mobile or stabilized dunes, sandy flats, and valley floors. Associates: gray rabbitbrush (<i>Chrysothamnus nauseosus</i>) and Indian ricegrass (<i>Oryzopsis hymenoides</i>). | April - July | Only two known sites in in southern Grant Co., WA, |

| <i>Scientific Name</i> Common Name | Listing Status | Nearby Occurrence | Potential to Occur in Project Area | Habitat Conditions | Flowering Period | Comments |
|--|----------------|-------------------|------------------------------------|---|------------------|---|
| <i>Astragalus microcystis</i> Least bladdery milk-vetch | WS | YES | YES | Occurs in eastern WA, on gravelly to sandy areas, from riverbanks to open woods. Associates: common gaillardia (<i>Gaillardia aristata</i>), scarlet gilia (<i>Gilia aggregata</i>), and white sweet-clover (<i>Melilotus alba</i>). Elevations from 1400 to 6200 ft. | April - August | Plants from lower elevations and from lake shores tend to have longer stems, wider leaflets, more numerous flowers, and larger pods than those in the mountains. The species occurs from subalpine to alpine zones in the Olympic Mountains and at relatively low elevations in eastern WA. |
| <i>Camissonia minor</i> Small-flower evening-primrose | WS | NO | MAYBE | Gravelly basalt, sandy soils and cryptogamic crust from 460 to 1140 ft elevation. Associates: big sagebrush | May - early June | Range is at the southern end of Grant Co, all in Hanford. |
| <i>Camissonia pygmaea</i> Dwarf evening-primrose | WS | DISTANT | MAYBE | Sagebrush-steppe; unstable soil or gravel in steep talus, dry washes, banks and road cuts. | June | |
| <i>Carex comosa</i> Bristly sedge | WS | NO | NO | Marshes, lake shores, and wet meadows. | May - June | Wetland obligate. |
| <i>Carex flava</i> Yellow sedge | WS | NO | NO | Wet meadows, forested wetlands, bogs and shores of streams and lakes. | July - August | Only 23 known occurrences in WA - obligate wetland species. |
| <i>Carex sychnocephala</i> Many-headed sedge | WS | NO | NO | Occurs on moist or wet ground adjacent to marshes or along lake shores | June - August | |
| <i>Carex vallicola</i> Valley sedge | WS | NO | NO | Moist or moderately dry slopes from the foothills to mountains from 4300 to 6800 ft, often with sagebrush or aspen. <i>Carex hoodii</i> is the most frequent sedge associate in the sagebrush habitats. Typically found in treeless communities where tall sagebrush (<i>Artemisia tridentata</i>) is abundant at elevations usually dominated by subalpine fir (<i>Abies lasiocarpa</i>) and Douglas fir (<i>Psuedotsuga menziesii</i>). | April - July | Moist, concave microsites with gravelly loam where sagebrush is thickest. 10 occurrences in WA. |

| <i>Scientific Name</i> Common Name | Listing Status | Nearby Occurrence | Potential to Occur in Project Area | Habitat Conditions | Flowering Period | Comments |
|---|----------------|-------------------|------------------------------------|--|------------------|---|
| <i>Corispermum pallidum</i> Pale bugseed | WX | NO | NO | This species appears to be nearly restricted to the sand deposits of the Quincy Basin in Grant County. | Unknown | Appears to be extirpated. |
| <i>Cryptantha gracilis</i> Narrow - stem cryptantha | WS | NO | MAYBE | Talus and pockets of silt; 1250-2680 ft associated with sagebrush. Requires steep somewhat unstable open substrates. | May - June | Recently added to rare plant list. |
| <i>Cryptantha leucophaea</i> Gray cryptantha | WS, FSC | NO | NO | Sandy substrate along the Columbia River. | May - June | Restricted to unstable sand dunes. |
| <i>Cryptantha scoparia</i> Miner's candle | WS | NO | MAYBE | South facing slopes and ridges between small canyons with fine, dry silt and talus at 1200 to 1280 ft elevation. Sites may be a little more alkaline than surrounding areas. Associates: common woolly sunflower (<i>Eriophyllum lanatum</i>), cheatgrass (<i>Bromus tectorum</i>), snow buckwheat (<i>Eriogonum niveum</i>), big sagebrush (<i>Artemisia tridentata</i>), bluebunch wheatgrass (<i>Pseudoroegneria spicata</i>), soft brome (<i>Bromus mollis</i>), chaparral willowherb (<i>Epilobium minutum</i>), and winterfat (<i>Eurotia lanata</i>). | April - June | Dry, open shady slopes and ridges with silt and talus in Benton, Yakima, Grant, and Kittitas Counties. |
| <i>Cryptantha spiculifera</i> Snake River cryptantha | WS | NO | YES | Occurs on dry, open, flat or sloping areas in stable or stony soils; where overall cover of vegetation is relatively low. Associates: <i>Artemisia rigida</i> , <i>Artemisia tridentata</i> , <i>Chrysothamnus nauseosus</i> , <i>Eriogonum sphaerocephalum</i> , <i>Salvia dorrii</i> , <i>Lupinus sericeus</i> , <i>Agropyron spicatum</i> , and <i>Poa secunda</i> . | May - July | Northern WA, the taxon has been found in the Okanogan Highlands, Eastern Cascades and Columbia Basin physiographic provinces. |
| <i>Eatonella nivea</i> White eatonella | WT | NO | NO | Occurs in the shrub - steppe vegetation type, on poorly developed soils in dry, sandy or volcanic desert areas. Known WA occurrences are located in fine, pea - sized gravel that is derived from basalt and is deep red in color. Sparsely vegetated sites, usually with no apparent cryptogram layer. | May - July | |
| <i>Eleocharis rostellata</i> Beaked spike-rush | WS | NO | NO | Vernally moist areas on flat basalt lithosol and around the margins of rocky vernal ponds. It is less common on drier lithosols, and rarely seen on the driest lithosols. Elevations from 2070 - 2550 ft; within shrub-steppe vegetation. | June - August | In WA, the species is known from streambanks, lake margins, around springs and in marshes. |

| <i>Scientific Name</i> Common Name | Listing Status | Nearby Occurrence | Potential to Occur in Project Area | Habitat Conditions | Flowering Period | Comments |
|--|----------------|-------------------|------------------------------------|---|------------------|--|
| <i>Erigeron piperianus</i> Piper's daisy | WS | NO | NO | Dry, open places, often with sagebrush | May - June | Regional endemic, occurring only in the Columbia Basin of WA., not near the project. |
| <i>Gilia inconspicua</i> Shy gilly-flower | WR1 | NO | NO | Historic only. | May - June | |
| <i>Hackelia cinerea</i> Gray stickseed | WS | NO | NO | Open or sparsely forested areas, especially on cliffs or talus, or other exposed rock, often in mossy cracks. | May - July | |
| <i>Hackelia hispida</i> var. <i>disjuncta</i> Sagebrush stickseed | WS | NO | NO | Rocky talus at elevations of 600 to 2100 ft. | May - June | Regional endemic; known only from Grand Coulee, Moses Coulee, and that portion of the west facing wall of the Columbia River canyon from the mouth of the north to just above Rock Island Dam. |
| <i>Isoetes nuttallii</i> Nuttall's quillwort | WS | NO | NO | Terrestrial in wet ground or seepages and in mud near vernal pools. Low to middle elevations. | April - June | |
| <i>Juncus uncialis</i> Inch-high rush | WS | NO | MAYBE | Found in WA at elevations of 2100 to 2290 ft; in swales, moist places and vernal pools. Many sites occur in channeled scablands and mound and swale topography. Associates include: Geyer onion (<i>Allium geyeri</i>), Douglas onion (<i>Allium douglasii</i> var. <i>constrictum</i>), meadow popcorn-flower (<i>Plagiobothrys scouleri</i>), and denseflower knotweed (<i>Polygonum watsonii</i>). | June | Vernal pools. |
| <i>Lipocarpa aristulata</i> Awned halfchaff sedge | WT | NO | NO | Prefers wet soil at elevations of 328 to 1312 ft. In WA, has been found along shorelines and islands below high water on silty substrates from 360 to 420 ft. | Unkno wn | |

| <i>Scientific Name</i> Common Name | Listing Status | Nearby Occurrence | Potential to Occur in Project Area | Habitat Conditions | Flowering Period | Comments |
|---|----------------|-------------------|------------------------------------|--|------------------|---------------------|
| <i>Lomatium serpentinum</i> Snake Canyon desert-parsley | WS | NO | NO | Found at lower elevations just above river level growing in moderately deep sandy or rocky soil; mostly within rock crevices or clefts on open moderate to steep slopes. Sites in WA are located in shady areas on old flood plains, atop granite outcrops, on basaltic ledges along rapids, and on basalt talus. Usually found in sparsely vegetated areas with no overstory. Associates: blue-bunch wheatgrass (<i>Agropyron spicatum</i>) and Sandberg's bluegrass (<i>Poa sandbergii</i>). | April - July | |
| <i>Lomatium tuberosum</i> Hoover's desert-parsley | WS, FSC | NO | MAYBE | Loose talus; typically on east to north facing slopes (45 - 60 degrees) within the big sagebrush/bluebunch wheatgrass vegetation. | March - April | |
| <i>Lupinus lepidus</i> var. <i>cusickii</i> Prairie lupine | WR2, FSC | NO | NO | Historic only | July | |
| <i>Micromonolepis pusilla</i> Red poverty-weed | WT | NO | NO | Desert regions with saline and alkaline soil | April - July | |
| <i>Mimulus suksdorfii</i> Suksdorf's monkey-flower | WS | DISTANT | MAYBE | Occurs in open, moist, or rather dry places, from the valleys and foothills to moderate or occasionally rather high elevations in the mountains. | Begins mid-April | Distant occurrence. |
| <i>Minuartia nuttallii</i> ssp. <i>fragilis</i> Nuttall's sandwort | WT | NO | NO | Open, gravelly benches or limestone talus from open sagebrush hills to alpine slopes at an elevation of 5413 to 7874 ft. In WA, this taxon has been found in desert ridges (raised basalt) in rocky to gravelly or sandy soil. | May - August | |
| <i>Minuartia pusilla</i> var. <i>pusilla</i> Annual sandwort | WR1 | NO | NO | Found in plains, open pine forest, chaparral slopes, and dry rock cliffs at an elevation of 25 to 7900 feet and was observed in WA at an elevation of 800 ft. | April - June | |
| <i>Myosurus clavicaulis</i> Mousetail | WS | NO | MAYBE | Round in hard, bare, dessicated clay, in sparsely vegetated areas of shallow vernal pools, from 275 to 2400 ft elevation. Associates at one or more sites include: popcorn-flower (<i>Plagiobothrys</i> spp.), annual hairgrass (<i>Deschampsia danthonioides</i>), white-flower navarretia (<i>Navarretia leucocephala</i>), and mousetail (<i>Myosurus minimus</i>). | May - June | Vernal Pools. |

| <i>Scientific Name</i> Common Name | Listing Status | Nearby Occurrence | Potential to Occur in Project Area | Habitat Conditions | Flowering Period | Comments |
|--|----------------|-------------------|------------------------------------|---|------------------|---|
| <i>Nicotiana attenuata</i> Coyote tobacco | WS | NO | NO | Dry, sandy bottom lands, dry rocky washes, and in other dry open places. | June - September | |
| <i>Oenothera cespitosa</i> ssp. <i>cespitosa</i> Cespitose evening-primrose | WS | NO | NO | Occurs as scattered individuals or colonies in open sites on talus or other rocky slopes as well as along the flat river terrace of the Columbia River. | Apr - June | Fewer than 10 known occurrences in WA |
| <i>Oxytropis campestris</i> var. <i>wanapum</i> Wanapum crazyweed | WE, FSC | NO | NO | Big sagebrush/bluebunch wheatgrass association in an open community dominated by shrubs and grasses. | May | The taxon is known only from Saddle Mountain, Grant Co., WA. |
| <i>Pediocactus nigrispinus</i> Snowball cactus | WS | NO | NO | Thin, rocky soil on ridge tops, desert valleys, and low mountains, and is found at elevations from 1000 to 4000 ft in WA. Associates include scabland sagebrush (<i>Artemisia rigida</i>), thyme-leaf wild buckwheat (<i>Eriogonum thymoides</i>), curly blue grass (<i>Poa secunda</i>), hairy balsamroot (<i>Balsamorhiza hookeri</i>), onion (<i>Allium</i> spp.), desert-parsley (<i>Lomatium</i> spp.), desert yellow fleabane (<i>Erigeron linearis</i>), narrow-leaf mock goldenweed (<i>Haplopappus stenophyllus</i>), carpet phlox (<i>Phlox hoodii</i>), and Douglas' cluster lily (<i>Brodiaea douglasii</i>). | May - July | This variety of <i>P. simpsonii</i> is the only pincushion cactus that is found in WA. This taxon is locally abundant and known from about 20 occurrences in WA, but has a limited overall range. Collecting pressure makes it difficult to ascertain rarity. |
| <i>Pellaea glabella</i> ssp. <i>simplex</i> Smooth cliff-brake | WR2 | NO | NO | Dry to mesic crevices of calcareous rocks in the steppe, montane, and subalpine zones. | None | This fern species has been found in western Grant County. |
| <i>Penstemon eriantherus</i> var. <i>whitedii</i> Fuzzytongue penstemon | WS | YES | YES | Occurs on west facing slopes of small canyons, and in dry and rocky habitats in the foothills of the Cascade Range and in the Columbia Basin from 525 to 3835 ft elevation. Observed in antelope bitterbrush/Indian ricegrass (<i>Purshia tridentata</i> / <i>Oryzopsis hymenoides</i>), purple sage/wheatgrass (<i>Salvia dorrii</i> / <i>Agropyron spicatum</i>) and rabbitbrush/bluebunch wheatgrass (<i>Chrysothamnus nauseosus</i> / <i>Agropyron spicatum</i>) plant communities | May - June | |

| <i>Scientific Name</i> Common Name | Listing Status | Nearby Occurrence | Potential to Occur in Project Area | Habitat Conditions | Flowering Period | Comments |
|---|----------------|-------------------|------------------------------------|--|------------------|--|
| <i>Penstemon wilcoxii</i> Wilcox's penstemon | WS | NO | NO | Found in shrubby areas, open forest, forested slopes, moist soil and rocky hills at elevations of 2300 to 4200 ft. It has been. Associates include oceanspray (<i>Holodiscus discolor</i>), mallow-leaf ninebark (<i>Physocarpus malvaceus</i>), rose (<i>Rosa</i> sp.), and snowberry (<i>Symphoricarpos albus</i>). | May - June | Less than 5 WA populations consisting of 100 to 1500 individuals. |
| <i>Phacelia tetramera</i> Dwarf phacelia | WS | NO | NO | Observed growing in salt encrusted soil, alkaline clay, and cracked bare alkaline silt in vernal moist wetlands and shrub-steppe areas. Occasionally found directly beneath greasewood (<i>Sarcobatus vermiculatus</i>). | April - June | There are less than five known occurrences in WA. |
| <i>Pilularia americana</i> American pillwort | WT | NO | MAYBE | Found in the middle zones of vernal pools from 1930 to 2310 ft elevation. Associates include mosses, annual hairgrass (<i>Deschampsia danthonioides</i>), tiny mouse-tail (<i>Myosurus minimus</i>), fine-branched popcornflower (<i>Plagiobothrys leptocladus</i>), neckweed (<i>Veronica peregrina</i>), Geyer's onion (<i>Allium geeyeri</i>), toad rush (<i>Juncus bufonius</i>), needle spikerush (<i>Elocharis acicularis</i>), fruit-leaf knotweed (<i>Polygonum polygaloides</i> ssp. <i>confertiflorum</i>), Pacific foxtail (<i>Alopecurus saccatus</i>), whitehead navarretia (<i>Navarretia leucocephala</i>), elegant calico-flower (<i>Downingia elegans</i>), and bractless hedgehyssop (<i>Gratiola ebracteata</i>). | late June | Wetlands. |
| <i>Polemonium pectinatum</i> Washington polemonium | WT, FSC | NO | YES | Occurs within an arid to semi-arid environment; on coulee floors, upland creek terraces, midslope depressions, in draws with ephemeral creeks, and on a biscuit in biscuit scablands. Can be found in big sagebrush/Idaho fescue, big sagebrush/bluebunch wheatgrass, and Idaho fescue/snowberry associations. | May | |
| <i>Polycytenium fremontii</i> var. <i>fremontii</i> Fremont's combleaf | WT | YES | YES | Grows in gravelly clay, sagebrush desert, damp or wet meadows, near shallow ponds, stony swales, dried vernal pools, and banks and beds of vernal streamlets. Occurs on a plateau, close to a road in the shallow silty loam soil of a vernal pond depression within sagebrush steppe and lithosol communities at an elevation of 2300 ft. | May - June | Moist areas within sagebrush steppe in Grant Co. Nearest occurrence over 5-miles away. |

| <i>Scientific Name</i> Common Name | Listing Status | Nearby Occurrence | Potential to Occur in Project Area | Habitat Conditions | Flowering Period | Comments |
|---|----------------|-------------------|------------------------------------|--|------------------|---|
| <i>Polygonum austiniiae</i> Austin's knotweed | WT | NO | NO | Dry to moist flats or banks, from the sagebrush plains into the lower mountains, often in ponderosa pine (<i>Pinus ponderosa</i>) forest. In WA, the species occurs with thyme buckwheat (<i>Eriogonum thymoides</i>) and very sparse grass | June - August | Disjunct in WA; central OR, to northeast CA, east to southern ID to south-central MT and WY. Reported also for eastern BC. In WA, the species is known from Grant Co. |
| <i>Rorippa columbiae</i> Persistentsepal yellowcress | WE, FSC | NO | NO | In WA, only known from two segments of the Columbia River: the arid Hanford Reach in the Columbia Basin east of the Cascade Mountains, and the cooler, wetter Lower Columbia Reach within the Columbia Gorge west of the Cascade Mountain Crest. Appears to be adapted to periodic catastrophic flooding and unstable substrates typical of riparian areas. | April - October | Riparian |
| <i>Rotala ramosior</i> Lowland toothcup | WT | NO | NO | Found in riparian wetlands growing below high water often located in a community of small emergent annuals. | June - August | This community type in Washington has been flooded by large hydroelectric developments and is now largely restricted to free-flowing reaches of the Columbia River. |
| <i>Silene spaldingii</i> Spalding's silene | WT, FLT | NO | NO | Open grasslands with a minor shrub component and occasionally with scattered conifers. Most commonly in the Idaho fescue/snowberry association at 1900 - 3050 ft elevation. | July | |
| <i>Spiranthes porrifolia</i> Western ladies-tresses | WS | NO | NO | Wet meadows, along streams, in bogs, and on seepage slopes. Elevation 60 - 6800 ft. Associates include: ponderosa pine (<i>Pinus ponderosa</i>), Douglas fir (<i>Pseudotsuga menziesii</i>), Garry oak (<i>Quercus garryana</i>), bitterbrush (<i>Purshia tridentata</i>), slim-leaved onion (<i>Allium amplexans</i>), Burke's larkspur (<i>Delphinium burkei</i>), harvest brodiaea (<i>Brodiaea coronaria</i>), common evening primrose (<i>Oenothera villosa</i>), birdsfoot trefoil (<i>Lotus corniculatus</i>), moth mullein (<i>Verbascum blattaria</i>), chicory (<i>Cichorium intybus</i>), knapweed (<i>Centaurea diffusa</i>), white sweet-clover (<i>Melilotus alba</i>), rabbit-foot clover (<i>Trifolium arvense</i>), and everlasting pea (<i>Lathyrus latifolius</i>). | May - August | |

| Scientific Name Common Name | Listing Status | Nearby Occurrence | Potential to Occur in Project Area | Habitat Conditions | Flowering Period | Comments |
|--|-----------------------|--------------------------|---|---|-------------------------|--|
| <i>Stuckenia filiformis</i> ssp. <i>occidentalis</i> Western fineleaf pondweed | WR1 | NO | NO | This taxon is typically found in shallow, standing, or slow moving water. In Washington it was found from 1074 to 3550 ft elevation. | June-August | |
| <i>Thelypodium sagittatum</i> ssp. <i>sagittatum</i> Arrow thelypody | WS | YES | YES | Found in moist swales in shrub-steppe areas. It occurs in moist, often alkaline meadows that dry by midsummer. Associated species include dense silky-bent (<i>Apera interrupta</i>), tall annual willowherb (<i>Epilobium brachycarpum</i>), alkali popcorn-flower (<i>Plagiobothrys leptocladus</i>), coastal salt-grass (<i>Distichlis spicata</i>), and pale spike-rush (<i>Eleocharis macrostachya</i>). | June - July | Known in WA from less than five occurrences. |

Notes:

Listing Status

WE = Washington State; Endangered. In danger of becoming extinct or extirpated from Washington.

WT = Washington State; Threatened. Likely to become Endangered in Washington.

WS = Washington State; Sensitive. Vulnerable or declining and could become Endangered or Threatened in the state.

WR1 = Washington State; Review group 1. Of potential concern but needs more field work to assign another rank.

WR2 = Washington State; Review group 2. Of potential concern but needs more field work to assign another rank.

WRX = Washington State; Possibly extinct or extirpated from Washington.

FC = Federal Candidate. Sufficient information exists to support listing as Endangered or Threatened.

FLT = Federal Listed Threatened. Likely to become Endangered.

FLE = Federal Listed Endangered. In danger of extinction.

FSC = Federal Species of Concern. An unofficial status, the species appears to be in jeopardy, but insufficient information to support listing.

Potential to Occur in Project Area

NO = Species has little to no potential for occurrence based on historical range, and lack of habitat conditions, and known occurrences in the vicinity of the project.

MAYBE = Species has some potential to occur based on historical range, habitat conditions, and known occurrences in the vicinity of the project.

YES = Species is known to occur in the project area and required habitat conditions are present.

Sources:

WDNR 2013, Burke Museum of Natural History and Culture 2013, ODA 2013

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APPENDIX F
GREENHOUSE GASES

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Introduction

Greenhouse gases (GHG) are chemical compounds found in the Earth's atmosphere that absorb and trap infrared radiation as heat. They are released both naturally and through human activities such as deforestation, soil disturbance, and burning of fossil fuels. These activities disrupt the natural cycle by increasing the GHG emission rate over the storage rate, which results in a net increase of GHGs in the atmosphere. The resulting buildup of heat in the atmosphere due to increased GHG levels causes warming of the planet through a greenhouse-like effect (EIA 2009a). The average temperature on Earth has risen by 1.5 degrees Fahrenheit over the past century (EPA 2013a). Most of the warming has been caused by GHG emissions (EPA 2013a). Scientists predict that the temperature will rise another 2 to 11.5 degrees Fahrenheit over the next century (EPA 2013a).

The principal GHGs emitted into the atmosphere through human activities are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases (EPA 2012).

- **Carbon dioxide** is the major GHG emitted (EPA 2013b; Houghton 2010). CO₂ enters the atmosphere as a result of such activities as land use changes, the burning of fossil fuels (e.g., coal, natural gas, oil, and wood products), and the manufacturing of cement. CO₂ emissions resulting from the combustion of coal, oil, and gas constitute 84 percent of all U.S. GHG emissions (EPA 2013b). Before the industrial revolution, CO₂ concentrations in the atmosphere were roughly stable at 280 parts per million. By 2010, CO₂ levels had increased to 390 parts per million, a 40 percent increase, as a result of human activities (EPA 2013a).
- **Methane** is emitted during the processing and transport of fossil fuels, through intensive animal farming, and by the degradation of organic waste. Concentrations of CH₄ in the atmosphere are presently 2.5 times greater than preindustrial levels (EPA 2013a).
- **Nitrous oxide** is emitted during agricultural and industrial activities and during the combustion of fossil fuels and solid waste. Atmospheric levels of N₂O have increased 18 percent since the beginning of industrial activities (EPA 2013a).
- **Fluorinated gases**, including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆), are synthetic compounds emitted through industrial processes. They sometimes replace ozone-depleting compounds such as chlorofluorocarbons (CFCs) in insulating foams, refrigeration, and air conditioning. Although fluorinated gases are emitted in small quantities, fluorinated gases have the ability to trap more heat than CO₂ and are considered gases with a high global warming potential (EPA 2013).

While models predict that atmospheric concentrations of all GHGs will increase over the next century due to human activity, the extent and rate of change is difficult to predict, especially on a global scale. As a response to concerns over the predicted increase of global GHG levels, various federal and state mandates address the need to reduce GHG emissions, including those described below.

- The federal **Clean Air Act** establishes regulations to control emissions from large generation sources such as power plants: limited regulation of GHG emissions occurs through a review of new sources.

- The U.S. Environmental Protection Agency (EPA) has issued the **Final Mandatory Reporting of Greenhouse Gases Rule** that requires reporting of GHG emissions from large sources. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHGs are required to submit annual reports to EPA, although no other action is required (40 CFR Parts 86, 87, 89 et al. Final Rule October 30, 2009).
- **Executive Orders 13423 and 13514** require federal agencies to measure, manage, and reduce GHG emissions by agency-defined target amounts and dates.
- In **Washington State, Executive Orders 07-02 and 09-05** direct state agencies to work with western states and Canadian provinces to develop a regional emissions reduction program designed to reduce GHG emissions to 1990 levels by 2020.

Activities that would contribute to greenhouse gas emissions

The Proposed Action would involve rebuilding the existing Grand Coulee-Creston No. 1 transmission line. Under the No Action Alternative, the transmission line would not be rebuilt and ongoing operation and maintenance activities would continue. Implementation of the Proposed Action would contribute to an increase in GHG concentrations through the following activities, each discussed in more detail below:

- **Construction:** use of gasoline and diesel-powered vehicles, including cars, trucks, construction equipment, and helicopters;
- **Ongoing operation and maintenance:** use of gasoline and diesel-powered vehicles for routine patrols, maintenance project work (vegetation management and site-specific repairs of roads and transmission line structures and associated hardware), emergency maintenance, and resource review; and
- **Ongoing operation and maintenance:** use of helicopters for aerial inspections of the transmission line corridor.

Methods used to calculate greenhouse gas emissions

Construction

Project construction would take approximately 5-6 months (June 2015 through November 2015), with peak construction activity, including road and structure installation, occurring during a 4-month-long period. Non-peak construction activities would include installing and removing BMPs, establishing staging areas, moving equipment and materials into and out of the project area, and site preparation and 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 4-month-long peak construction period and the 1-month-long non-peak period based on estimates of vehicle round trips per day.

Overestimating the number of round trips ensures that GHG emission estimates are conservatively high. The number of round trips was deliberately overestimated using the following assumptions.

- All workers would travel in separate vehicles to and within the project area each day.
- A maximum number of workers would be required to construct the project.
- The round-trip distance to the project area is the distance from Spokane, Washington, to the Grand Coulee Substation and back (about 176 miles round trip)¹.
- All workers would travel the full length of the project area each day. Although this is true for some workers such as inspectors, other workers could be localized.
- Fuel consumption is based on the average fuel economy for standard pickup trucks of 17 miles per gallon (EPA 2013c). Again, this is likely an overestimation as more efficient vehicles may be occasionally used.
- Average helicopter fuel consumption is estimated by BPA pilots at 1 mile per gallon.

Up to 40 construction workers would be at work on the transmission line during the peak construction period (4 months) and an estimated 10 workers could be present during the non-peak construction period (1 month).

BPA staff would travel to the transmission line for various purposes, such as road inspection, work inspection, staff meetings, environmental compliance monitoring, and meetings with landowners. An estimated one round trip every three weeks from the Portland, Oregon BPA Headquarters during the 5-month-long construction period would result in a total of 7 round trips at an estimated 672 miles per trip.

Helicopters may be used to replace the conductor. After the equipment (puller and tensioner) is positioned, a sock line (usually a rope) is strung through all of the structures using a helicopter. It was assumed that the helicopter would be used for approximately 1 month (20 work days) to perform this work. An estimated two round trips from the Spokane Airport each day would result in a total of 40 round trips at an estimated 164 miles per trip.

Fuel consumption and GHG emissions would also result from operation of on-site heavy construction equipment. Heavy construction equipment may include augers, bulldozers, excavators, graders, heavy-duty trucks, and front-end-loaders. Similar to the transportation activities listed above, increased use of heavy construction equipment would occur during peak construction.

Although it is difficult to develop an accurate estimation of total fuel consumption associated with heavy construction equipment operation, the following assumptions were used.

- A maximum of 40 equipment machines would be in operation during peak construction and 10 equipment machines would be in operation during off-peak construction.

¹¹ The distance to the Grand Coulee Substation was chosen as part of developing a conservative estimate as the substation is the furthest point of the project from Spokane. Workers would likely travel fewer miles to reach most project work areas.

- 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) (AFDC 2013).

GHG emissions associated with equipment operation were overestimated to account for all potential construction activities and associated material deliveries to and from the construction site. They are also expected to account for the low levels of GHG emissions related to temporary soil disruption and damaged vegetation from construction activities, which were not estimated separately in this analysis. GHG emissions that result from soil disturbance are short-lived and return to background levels within several hours (Kessavalou et al. 1998). Emissions from decomposing vegetation would also be relatively short-lived where vegetation would be allowed to reestablish following construction.

Operations and Maintenance

During operation and maintenance of the transmission line, the following annual activities would result in GHG emissions:

- routine patrols (access road, structure, and vegetation inspections): 1 round trip per year, from the BPA Spokane office, 176 miles round trip;
- maintenance of roads and structures and associated hardware: 1 round trip per year, from the BPA Spokane office, 176 miles;
- emergency maintenance to address line outages, landslides, and other unpredicted events: 0.25 round trips per year (approximately 1 trip every 4 years), from BPA Spokane office, 176 miles round trip;
- natural resource review: 0.25 round trips per year (approximately 1 trip every 4 years), from the BPA Portland office, 676 miles round trip; and
- aerial inspections by helicopter: 2 round trips from Spokane Airport to Grand Coulee Substation, 164 miles round trip.

Vegetation management activities, including mowing along roadsides and weed control, would be conducted during most years. Because vegetation management does not include permanent vegetation removal, this activity was not included in GHG calculations.

Calculations of GHG emissions include operations and maintenance work for the estimated 50-year life span of the rebuilt transmission line.

Results

GHG emissions were calculated using the estimated values described above for two types of activities: construction of the Proposed Action and ongoing annual operations and maintenance

for the estimated 50-year life span of the transmission line. Each type of activity is discussed separately below.

Construction Emissions

Table F-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 6,207 metric tons of CO₂e (equivalent carbon dioxide) emissions². All GHG emissions associated with construction activities would occur in the first year.

Table F-1. Estimated Greenhouse Gas Emissions from Project Construction

| Estimated GHG Emissions of Construction Activities | CO₂ (metric tons) | CH₄ (CO₂e)¹ (metric tons) | N₂O (CO₂e)¹ (metric tons) | Total CO₂e (metric tons)³ |
|---|-------------------------------------|---|---|--|
| Peak construction transportation | 318.8 | 208.8 | 1,248.3 | 1,776.0 |
| Off-peak construction transportation | 19.9 | 13.1 | 78.0 | 111.0 |
| BPA employee transportation | 2.5 | 1.7 | 9.9 | 14.1 |
| Helicopter operation | 6.1 | 0.3 | <0.1 | 15.1 |
| Peak construction: equipment operation | 4,007.3 | 4.2 | 26.8 | 4,038.3 |
| Off-peak construction: equipment operation | 250.5 | 0.3 | 1.7 | 252.4 |
| TOTAL³ | 4,613.8 | 228.3 | 1,364.7 | 6,206.8 |

¹ CO₂ emission factors calculated from DOE and EIA 2011. CH₄ and N₂O emission factors from EPA 2013b.

² CH₄ and N₂O emissions have been converted into units of equivalent carbon dioxide (CO₂e) using the IPCC global warming potential (GWP) factors of 21 GWP for CH₄ and 310 GWP for N₂O (ICBE 2000).

³ The sum of the individual entries may not sum to the total depicted due to rounding.

Operations and Maintenance Emissions

Table F-2 displays the contribution to GHG emissions that would result from operations and maintenance activities. Proposed Action operations and maintenance would result in an estimated 111 metric tons of CO₂e emissions over the life of the project. Given this estimate, the impact of operations and maintenance activities on GHG emissions would be *low*.

² CO₂e is a unit of measure used by the IPCC that takes into account the global warming potential of each of the emitted GHGs using global warming potential factors. See Table F-1.

Table F-2. Estimated Greenhouse Gas Emissions from Operations and Maintenance for the Life of the Project

| Type of Operation and Maintenance Activity | CO ₂ (metric tons) | CH ₄ (CO ₂ e) (metric tons) ¹ | N ₂ O (CO ₂ e) ¹ (metric tons) | Total CO ₂ e (metric tons) ³ |
|--|-------------------------------|--|---|--|
| Routine patrols | 4.6 | 1.2 | 18.0 | 23.8 |
| Maintenance work | 4.6 | 1.2 | 18.0 | 23.8 |
| Emergency maintenance | 1.1 | 0.3 | 4.5 | 6.0 |
| Natural resource review | 4.4 | 1.2 | 17.3 | 22.9 |
| Helicopter surveys | 34.2 | 0.6 | 0.1 | 34.9 |
| TOTAL³ | 48.9 | 4.5 | 57.9 | 111.4 |

¹ CO₂ emission factors calculated from DOE and EIA 2011. CH₄ and N₂O emission factors from EPA 2013b.

² CH₄ and N₂O emissions have been converted into units of equivalent carbon dioxide (CO₂e) using the IPCC global warming potential (GWP) factors of 21 GWP for CH₄ and 310 GWP for N₂O (ICBE 2000).

³ The sum of the individual entries may not sum to the total depicted due to rounding.

Summary of Results

To summarize, the Proposed Action would result in an estimated total of 6,207 metric tons of CO₂e emissions during the construction phase, and an estimated 111 metric tons of CO₂e emissions from ongoing operation and maintenance activities over the life of the project.

To provide context for this level of emissions, EPA’s mandatory reporting threshold for annual CO₂ emissions is 25,000 metric tons of CO₂e, roughly the amount of CO₂ generated by 4,400 passenger vehicles per year. The project construction emissions would be equivalent to the emissions from approximately 1,093 passenger vehicles per year. Project operation and maintenance emissions would be equivalent to the emissions from approximately 20 passenger vehicles per year. All levels of GHG emissions are significant in that they contribute to global GHG concentrations and climate change, but given the small anticipated contribution from the project, the project’s impact on GHG concentrations would be *low*.

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