

Salem-Albany Transmission Line Rebuild Project Environmental Assessment

July 2014



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Acronyms and Abbreviations

APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
BLM	Bureau of Land Management
BMP	best management practice
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
dba	A-weighted decibel
dbh	diameter at breast height
DOE	U.S. Department of Energy
DPS	distinct population segment
DSL	Oregon Department of State Lands
EA	environmental assessment
EFH	essential fish habitat
EIS	environmental impact statement
EMF	electromagnetic fields
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
ESU	evolutionary significant unit
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
kV	kilovolt
µg/m ³	micrograms per cubic meter

mG	milligauss
MOU	memorandum of understanding
N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NOX	nitrogen oxides
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
OCS	Oregon Conservation Strategy
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODOT	Oregon Department of Transportation
ODFW	Oregon Department of Fish and Wildlife
ORWAP	Oregon Rapid Wetland Assessment Protocol
PCBs	polychlorinated biphenyls
PM ₁₀	particulate matter less than 10 micrometers in size
PM _{2.5}	particulate matter less than 2.5 micrometers in size
RCRA	Resource Conservation and Recovery Act
SA1	Salem-Albany No. 1
SA2	Salem-Albany No. 2
SHPO	State Historic Preservation Officer
SR	State Route
TMDL	total maximum daily load
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWR	Upper Willamette River
VOCs	volatile organic compounds

1.1 INTRODUCTION

Bonneville Power Administration (BPA) is proposing to rebuild two of its 115-kilovolt (kV) transmission lines that run between Salem and Albany, Oregon (Figure 1-1). The aging Salem-Albany No. 1 and No. 2 transmission lines require replacement of existing wood-pole structures and other line components to maintain the integrity of the transmission system. In addition, the system of roads for accessing the transmission lines requires improvement for purposes of the proposed rebuild and to improve access for ongoing operation and maintenance.

BPA is a federal agency that owns and operates more than 15,000 miles of high-voltage transmission lines. The transmission lines move most of the Northwest’s high-voltage power from facilities that generate the power to users throughout the region. BPA has obligations to ensure that its transmission system is safe, reliable, and has sufficient capability to serve its customers. For example, the Federal Columbia River Transmission Act directs BPA to construct improvements, additions, and replacements to its transmission system that are necessary to maintain electrical stability and reliability, as well as to provide service to BPA’s customers (16 U.S. Government Code [USC] § 838b(b-d)).

This environmental assessment (EA) was prepared by BPA pursuant to regulations implementing the National Environmental Policy Act (NEPA), which requires federal agencies to assess the impacts their actions may have on the environment. Preparation of this EA assists in meeting those requirements.

1.2 NEED FOR ACTION

BPA needs to ensure the integrity and reliability of the Salem-Albany transmission lines. These lines serve BPA’s utility customers, who in turn provide power to communities in the Willamette Valley in Oregon. No major rebuild work has been done on the lines since they were built in the 1940s. In general, wood poles for transmission lines are expected to have a service life of 55 to 60 years, at which point they are usually replaced due to age, rot, or other forms of deterioration (see Figure 1-2).

Most wood structures on the Salem-Albany transmission lines are over 65 years old and have reached the end of their service life, being physically worn and, in places, structurally unsound. Collapse of these poles could lead to line failure, which presents safety hazards to the public and BPA workers, as well as electrical outages that would adversely affect power deliveries to BPA’s customers in the Willamette Valley. In addition, portions of the existing conductors on both transmission lines are made from copper, which does not meet current BPA standards and for which the hardware is no longer available.



Figure 1-2. Decayed Wood Pole

Along with the condition of the line components, some portions of the Salem-Albany No.1 line are located too close to the edge of BPA's right-of-way, and an evaluation of the 50-percent design found that the conductors could swing outside of the right-of-way and too close to buildings or other adjacent structures. This could cause potential safety issues and needs to be rectified.

BPA also needs to ensure safe and reliable access to the Salem-Albany transmission lines. Year-round access for transporting line crews, material, and equipment to each structure of the line is important in order to sustain routine operations through annual inspections and periodic repair work, and to restore main grid lines in the event of an emergency. Access to the Salem-Albany transmission lines was never adequately established since the 1940s. A large proportion of the structures have no access roads connecting them to local roads, which currently requires BPA workers to drive or walk over ground that can be challenging or even hazardous to traverse, particularly during the rainy season. Access can also entail needing to repeatedly contact landowners for permission to enter properties and potentially damaging lawn, crops, and habitat since no roads are available.

1.3 PURPOSES

The purposes are goals to be achieved while meeting the need for Action. BPA has identified the following purposes:

- Maintain transmission system public safety and reliability to BPA and industry standards
- Continue to meet BPA's contractual and statutory obligations
- Minimize environmental consequences
- Demonstrate cost-effectiveness

1.4 OTHER AGENCIES THAT MIGHT USE THIS EA

The Council on Environmental Quality regulations implementing NEPA allow for the designation of other federal, state, and local agencies and Indian Tribes as cooperating agencies for an EA where appropriate (CEQ, 1981). Agencies or tribes may be designated as a cooperating agency if they have jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project.

BPA offered a cooperating agency agreement to the U.S. Fish and Wildlife Service (USFWS) Ankeny National Wildlife Refuge (NWR). The Salem-Albany No. 1 line runs adjacent to the NWR, and BPA is considering options for access, including a temporary or permanent access road that crosses the NWR. Although Ankeny NWR declined being a cooperating agency, they may still use all or part of this EA to fulfill their NEPA responsibilities if they need to issue BPA an access permit or transfer property (see Section 2.1.4.3 for access road options at Ankeny NWR). BPA and NWR communicated regarding the Proposed Action and the results of environmental surveys and analyses, and have had a number of joint meetings and site visits between 2013 and 2014 to discuss impacts and options.

Other federal, state, and local agencies that may issue permits or make decisions regarding the project may also use this EA to fulfill their applicable environmental review requirements. For example, the existing alignment crosses intermittent and perennial streams, ditches, and wetlands, some of which are likely waters of the US and the state. The U.S. Army Corps of Engineers (USACE) could use relevant information

from this EA to help fulfill its NEPA requirements for Clean Water Act permitting actions related to the project.

Between 2013 and 2014, BPA also held meetings and/or site visits with the Oregon Department of Fish and Wildlife, US Fish and Wildlife, USACE, Oregon Department of State Lands (DSL), and Oregon Department of Environmental Quality (ODEQ) in order to communicate details of the Proposed Action to these agencies, discuss questions and concerns about environmental or land use impacts, and facilitate the relevant permitting processes.

1.5 PUBLIC INVOLVEMENT

To help determine the scope of issues to be addressed in this EA, BPA conducted public scoping outreach. BPA mailed letters on December 4, 2012, to potentially interested and affected landowners, agencies, tribes, and organizations. (A list of all interested parties is included in Chapter 5.)

The public letter provided information about the Proposed Action, requested public comments on issues to be addressed in the EA, and provided information on how to submit scoping comments by mail, fax, telephone, and through the BPA website. The public letter was posted on a project website established by BPA to provide information about the project and the EA process (go to www.bpa.gov/goto/SalemAlbanyRebuild).

BPA determined that five American Indian tribes have a potential interest in this project—the Coquille Indian Tribe, the Cow Creek Band of Umpqua Tribe of Indians, the Confederated Tribes of Grand Ronde, the Confederated Tribes of Siletz, and the Confederated Tribes of the Warm Springs Reservation of Oregon. BPA notified the tribes of the Proposed Action and requested comments on the project and on potential cultural resources in the project area.

The public scoping period began on December 4, 2012, and BPA accepted comments from the public until January 31, 2013. Two public meetings were held in the project area, including one in Monmouth, Oregon, on January 16, 2013, and one in Albany, Oregon, on January 17, 2013. Altogether 60 people attended the scoping meetings. Sixty-two letters, comment forms, e-mails, and in-person communications were received during the comment period. All comments received during the preparation of this Draft EA influenced the environmental review for the project. Comments can be found online in their entirety via the project website. Most comments were regarding concerns about impacts to various land uses—including agriculture, landscaping, recreation, and conservation—and impacts to natural habitats. Examples of comments are summarized below:

Land Use, Transportation, Recreation, and Conservation

- Questions about whether there are options for structure and road placement in consideration of land use
- Concerns about additional tree removal following recent tree removals from vegetation management
- Concerns about the compatibility of transmission lines and access roads with future residential development, recreation, and other land uses
- Requests to receive notification prior to entry to private properties
- Requests to make the construction schedule available to landowners and the public

- Concerns about the construction schedule and impacts to crops and agricultural activities
- Concerns about poles being cut off above the ground and left behind
- Concerns about construction impacts to underground features including septic systems and drain tiles
- Concerns about impacts to landscaping from construction and whether there would be compensation for damage
- Concerns about impacts to existing roads and highway traffic
- Concerns about construction mud and dirt being tracked onto local streets

Environmental (Vegetation, Wildlife, Soils, Water Quality, etc.)

- Concerns about impacts to native habitats including oak woodlands, riparian areas, and wetlands
- Concerns about impacts to sensitive species
- Questions about whether there are options for structure and road placement in consideration of habitat
- Requests to implement mitigation and minimization measures for environmental impacts, including the use of materials that are better for the environment
- Requests to carry out construction when soils are dry to reduce impacts to soils and fields
- Concerns about spreading invasive weeds during construction and requests to wash vehicles to remove weeds
- Concerns about the effects of herbicide spray from vegetation management on private wells and habitat

These topics are addressed in the appropriate sections of this EA.

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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 by the project purposes and provides a summary of the potential environmental consequences.

The Proposed Action is to rebuild two existing BPA 115-kV wood-pole transmission lines—the 24-mile long Salem-Albany No. 1 line and the 28-mile long Salem-Albany No. 2 line. BPA would also improve the access road systems for the lines.

The Proposed Action would involve the following:

- removal and replacement of existing wood-pole structures—most replacements would be with wood-pole structures: on the Salem-Albany No. 1 line, some replacements would be with steel structures
- removal and replacement of conductors, guy wires, overhead ground wires, and counterpoise (see Chapter 6 for glossary of terms)
- reuse of existing fiber optic cable
- improvement and reconstruction of existing access roads
- construction of some new access roads
- identification of travel routes—potentially including some temporary road installation—through farm fields
- installation and replacement of fords, culverts, and access road gates
- acquisition of easement rights for new roads and some existing roads
- establishment of temporary staging areas and tensioning sites (for pulling and tightening conductors)
- installation of temporary guard structures for stringing lines over roads, railroads, and other utilities
- removal of some vegetation along the transmission line rights-of-way and access roads
- revegetation of areas disturbed by construction activities

The transmission lines would remain in the existing transmission line rights-of-way and would continue to be operated at 115 kV. BPA's original intent was to replace all the lines' wood-pole structures with similar structures in the same locations. However, because potential safety issues were identified along the Salem-Albany No. 1 line, a number of replacement structures along this line are now proposed to be located ahead or behind the existing structures (all within the right-of-way) and a number of the existing H-frame wood-pole structures would be replaced with steel single (or mono) poles. The Proposed Action activities are described in detail in the following sections.

The existing transmission lines extend in different routes south from the Salem Substation, in Salem, Oregon, to the Albany Substation, in Albany, Oregon. The Salem-Albany No. 1 line traverses Polk, Marion, Linn, and Benton counties before terminating again in Linn County (Figure 1-1; also see Appendix A). The Salem-Albany No. 2 line traverses Polk and Benton counties before terminating in Linn County.

Both lines are mostly made up of wood-pole structures, with lattice-steel structures at the Willamette and Santiam River crossings along the Salem Albany No. 1 line. The Salem Albany No. 1 line has 241 structures (237 wood-pole and 4 lattice-steel) and the Salem Albany No. 2 line has 301 structures (all wood-pole) (see Tables 2-1 and 2-2). Each transmission line and structure is labeled by mile, as measured from the Salem Substation, and is then numbered sequentially within each mile. For example, structure SA2:10/3 refers to the Salem-Albany No. 2 line, mile 10, and the third structure. On average, there are 10 structures per mile of line.

The transmission lines mostly cross private land, including railroad property, with some small segments crossing state, county and city property. BPA has easements with the underlying landowners for all of the transmission line rights-of-way and for most of the access roads.

The **Salem Albany No. 1 (SA1)** line runs in a 100-foot wide right-of-way for a majority of its length, except where the line parallels segments of other lines. Along the Burlington Northern–Santa Fe (BNSF) railroad, from structures SA1:9/9 to 17/13, the right-of-way is also 100 feet wide. The rail line is located in the center of the right-of-way and the transmission line is located west of the rail line, about 34 feet from the tracks.

Where the Salem-Albany No. 1 line parallels BPA’s Santiam-Toledo lattice-steel 230-kV line, from structures SA1:17/13 to 20/9, it is located in a 400-foot wide right-of-way. Where the Salem-Albany No. 1 line parallels two other BPA transmission lines (including the Salem-Albany No. 2), from structure SA1:23/10 into the Albany Substation, it is located in a 200-foot wide right-of-way.

From line miles 10 to 17, the Salem Albany No. 1 line is in a 100-foot-wide right-of-way; however, it is off-center by about 16 to 25 feet to the east side of the right-of-way (see Figure 2-1). As a result, when the wind blows strongly, the conductor and fiber optic line can swing outside of the right-of-way or too close to buildings or other structures adjacent to the right-of-way.

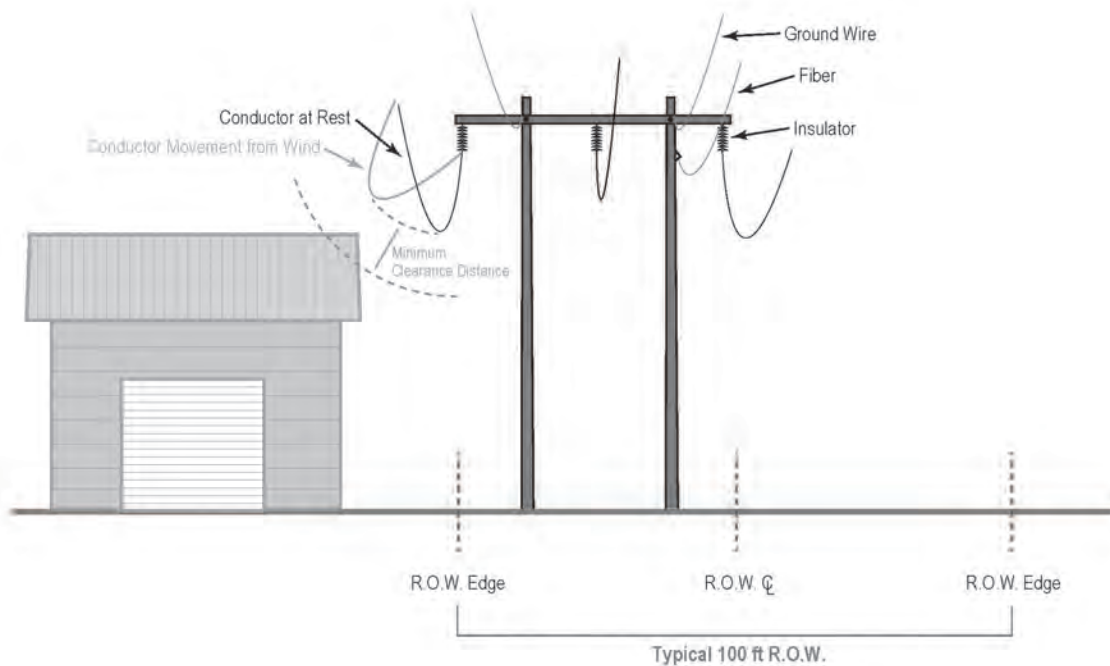


Figure 2-1. Transmission Structure Set Off-Center in Right-of-Way and Conductor Swing (CL=centerline)

The **Salem-Albany No. 2 (SA2)** line runs in a 100-foot wide right-of-way—and is centered in the right-of-way—until about the last half mile where the line it joins several other transmission lines in a 200-foot wide right-of-way.

The existing access road system for the transmission lines is made up of roads that BPA has developed, roads that have been developed by landowners (e.g., driveways, farm roads, etc.), as well as routes-of-travel where BPA drives across unimproved surfaces to towers in farm fields, pastures, or conservation areas such as the Ankeny National Wildlife Refuge. The Salem Albany No. 1 line has about 7 miles of existing access road and uses about 6 miles of routes-of-travel. The Salem Albany No. 2 line has about 15 miles of access road and uses 22 miles of routes-of-travel. BPA has easements with underlying landowners for most of its access road system along the two lines; however, there are several locations where BPA does not have easement rights. Where BPA doesn't have developed access roads and relies on routes-of-travel, BPA needs to coordinate with the landowner to develop temporary access whenever its needs to access the transmission line structures for repairs or maintenance.

Table 2-1. Existing and Rebuilt Transmission Line¹ Elements

Line Element	Existing Transmission Lines	Proposed Rebuilt Transmission Lines
Conductor/Fiber		
Operating voltage (kV)	115	<i>No change</i>
Conductor diameter (inch)	0.78 / 0.66	0.84
Fiber optic cable (miles)	30	<i>No change</i>
Rights-of-Way and Access Roads		
Right-of-Way length (miles)	52	<i>No change</i>
Right-of-Way widths (feet)	100 to 150	<i>No change</i>
Access roads (miles; including routes of travel)	41	65
Structures		
Number of structures	542	<i>No change</i>
Structure height (feet) (excluding river crossings)	43 to 80	50 to 115
Average structure height (feet) (excluding the lattice steel towers at 118 to 170 feet)	53	60 (wood), 74 (steel)
Number of existing lattice-steel structures	4	<i>No Change</i>
Lattice-steel structure height (feet)	118 to 190	<i>No Change</i>

Note: ¹ Includes combined totals for both Salem-Albany No. 1 and No. 2.

Table 2-2. Proposed Action Activities

Proposed Activity	Salem-Albany No. 1	Salem-Albany No. 2	Total
<i>Structure Replacement</i>			
Replacement with wood structures	162	301	463
Replacement with steel monopoles	75	0	75
Total structures to be replaced	237	301	538
Structures moved from existing location (number)	83	3	86
Structures with guy wires (number)	52	47	99
<i>Easement Acquisition</i>			
Acquire easements for existing roads (miles)	3	9	12
Acquire easements for new construction roads (miles)	3	4	7
Acquire easements for routes of travel (miles)	2	3	5
Total new easements	8	16	24
<i>Access Road Work</i>			
Improvements (miles) ¹	6	13	19
New construction (miles)	8	7	15
Reconstruction (miles) ²	1	1	2
Route of travel (miles)	6	22	28
Total access road work (miles)	21	43	64
New or improved stream fords (number)	1	3	4
New or improved culverts, including cleaning (number)	23	45	68
New or replaced gates (number)	51	70	121
<i>Vegetation Removal</i>			
Low-growing vegetation within the right-of-way	As needed for construction	As needed for construction	See Vegetation (Section 3.3)
Trees removed for road construction (number)	10	5	15
Potential mature danger trees (danger trees) (number)	605	154	759
Instances of high brush (number)	615	155	770

Notes:

¹ Improvements to existing access roads could involve light blading, excavating and reshaping ditches, installation or replacement of drainage structures, and gravelling.

² Reconstruction of existing roads could involve the same work as for road improvements (see Note 1), plus vegetation clearing from the road bed, grading, reshaping or widening the road, slope stabilization, and placement of subsurface rock.

2.1.1 REPLACEMENT OF TRANSMISSION STRUCTURES

WOOD-POLE STRUCTURES

All of the wood-pole structures along the two transmission lines would be replaced. On the **Salem-Albany No. 1 line**, 162 wood-pole structures would be replaced (75 structures would be replaced with steel monopole structures; see Steel Monopole discussion below). On the **Salem-Albany No. 2 line**, 301 wood-pole structures would be replaced (see Table 2-2).

The wood structures are either two-pole or three-pole structures (see Figure 2-2) with cross arms. Two-pole (H-frame) structures are not as strong and are used in straight alignments or where the line angle is generally less than 15 degrees. Three-pole structures are stronger and are used where the transmission line changes direction at angles greater than 15 degrees, at the ends of long spans, or at various intervals along stretches of straight alignments to provide increased line strength, as they can independently carry the weight and tension of the conductors. Three-pole structures can also be called angle or dead-end-structures depending on why they are being used.

The new wood-pole structures, on average, would be about 10 feet taller than existing structures. The height of two-pole wood structures would range from 45 to 90 feet. The height of the new three-pole structures would range from 45 to 95 feet. Structure heights at particular locations would depend on the terrain, the length of the span, and other factors. Like most wood poles used for utility or telephone lines, the wood poles would be treated with a preservative called pentachlorophenol (PCP) to lessen wood rot and extend the life of the poles. The cross arms that connect the wood poles would also be replaced.

The wood poles would be replaced in the same holes of the existing poles where possible and in new holes where the structures need to be moved ahead or behind the existing structures. On the **Salem-Albany No. 1 line**, 83 structures would be replaced in slightly different locations (all within the right-of-way); on the **Salem-Albany No. 2 line**, three structures would be replaced in slightly different locations (see Appendix A for a list of structure replacement types and locations relative to existing structure locations).

All the poles would be placed in augured holes about 10 feet deep; existing holes would be cleaned out and re-augured. Where a two-pole structure would be replaced by a three-pole structure, a new hole would be augured. Where an existing structure would be replaced by a new structure in a different location, new holes would be augured and the old holes would be backfilled with soil. No blasting would be anticipated for structure replacement activities. The base diameter of each wood pole is about 24 inches. Holes would be backfilled with gravel and excess soils excavated from new holes would be spread evenly around the structure base for stability and the area would be reseeded with a predominantly native seed mix or a seed mix agreed upon with landowners. Excess soils excavated from existing holes may contain wood preservative and would be properly removed and transported according to all applicable regulations to a permitted facility that accepts these materials. In addition, although there are often requests by landowners to reuse old poles for various purposes, BPA's current policy is generally not to do this because of potential environmental and safety risks except for in special circumstances. However, BPA considers landowners' requests on a case-by-case basis.

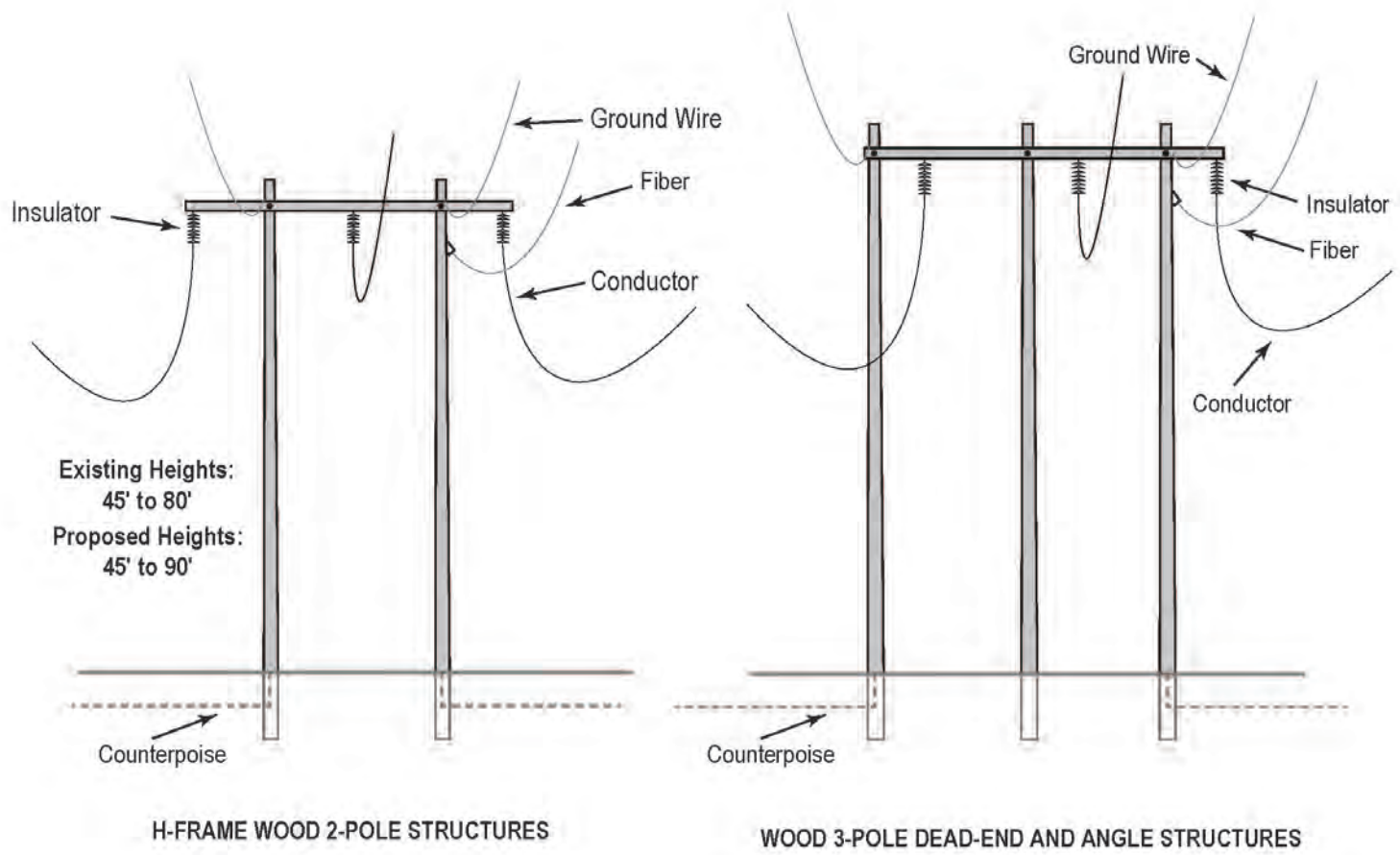


Figure 2-2. Existing and Proposed Wood-Pole Structures

Guy wires to support the new structures would be installed as required. Guy wires connect the wood-pole structures to the ground via anchors to provide extra support and stability. The number of guyed structures would be reduced: only 99 guyed structures are proposed for the rebuilt lines, versus 143 currently. The anchors (made of a metal plate placed in crushed gravel and backfilled with onsite material) would be buried to a depth of about 8 feet. Holes for anchors would be dug with a backhoe; dimensions would be approximately 4 feet by 4 feet. Depending on the height, design, and location of the new structure, anchors could be placed in new locations or in the same location as the old anchor.

Wood-pole structure replacement activities would disturb a 0.1-acre area around the structure within right-of-way. In or near sensitive habitats such as wetlands, disturbance areas would be reduced to about 0.06 acre depending on the specific circumstances.

STEEL MONOPOLE STRUCTURES

Along the Salem-Albany No. 1 line, about 75 steel monopole structures would be used instead of wood-pole structures (see Figure 2-3) where the line is set off center within the right-of-way—parallel to the BNSF railroad and through a North Albany residential area.

Steel poles would be used adjacent to the railroad from structures SA1:10/1 to 13/1, SA1:13/10 to 14/2, SA1:15/2 to 16/5, SA1:16/11 to 17/10, and in the North Albany residential area from structures SA1:21/1 to 21/12 (see Appendix A). No steel monopole structures would be used on the Salem-Albany No. 2 line. The steel monopoles would be placed in the same hole as the east pole of the existing H-frame structures, which is the pole closest to the center of the right-of-way. Installation of the steel poles would generally be similar to the wood-pole installation—existing hole would be re-augured then backfilled—and the construction equipment would be the same. Three of the steel poles (SA1:10/1, SA1:21/4, and SA1:21/5) would require concrete foundations, which means a concrete truck would be required to place concrete in the hole prior to structure installation.

Although more expensive, steel monopoles would allow the line to move toward the center of the right-of-way in these two areas, eliminating safety issues with conductors potentially swinging outside of the right-of-way and too close to buildings or structures, and enabling access up through the right-of-way. Steel monopoles are also advantageous in that they have a smaller footprint, are easier to transport to structures sites, and are generally more durable and less subject to weathering and aging.

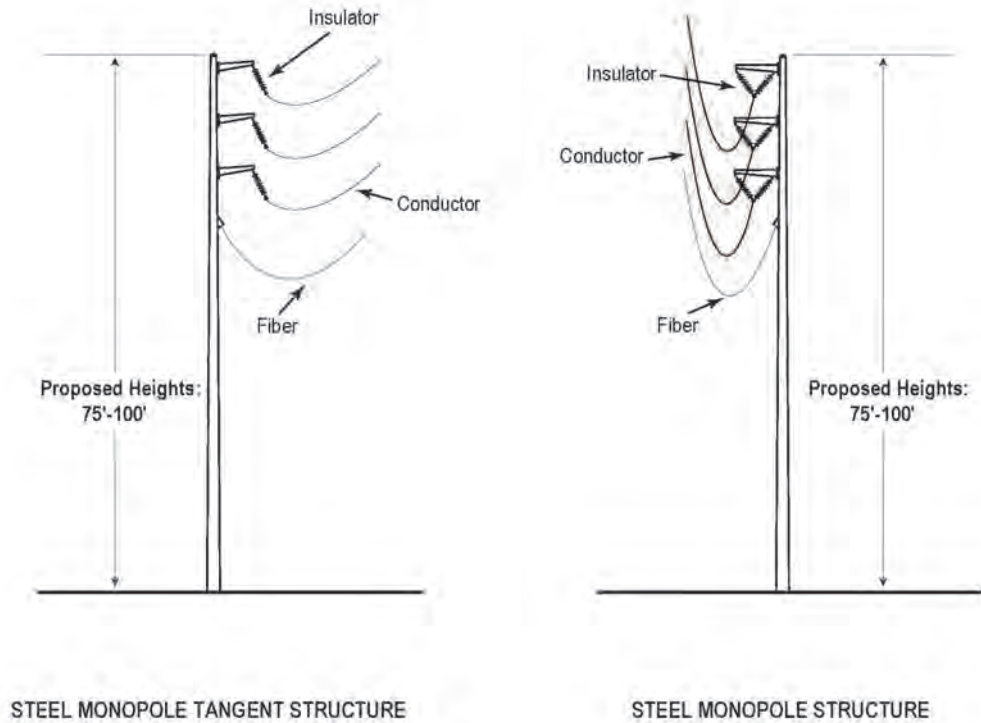


Figure 2-3. Proposed Steel Monopole Structures

LATTICE-STEEL STRUCTURES

There are four existing lattice-steel structures that would be left in place: river crossing structures at the Willamette River crossing (structures SA1:1/1 and 1/2) and the Santiam River crossing (renamed as structures SA1:14/5 and 14/6 in the Proposed Action). No new lattice-steel structures would be built.

2.1.2 CONDUCTORS, OVERHEAD GROUND WIRES AND COUNTERPOISE, AND FIBER OPTIC CABLE,

CONDUCTORS

Conductors are the wires on the structures that carry the electrical current. Alternating-current transmission lines, like the Salem-Albany transmission lines, require three conductors to make a complete circuit (see Figures 2-2 and 2-3). The existing three conductors would be removed and new conductors attached using ceramic insulators, which are bell-shaped devices that prevent electricity from arcing from the conductors to the structures and traveling to the ground. The existing conductors have a diameter of 0.66 to 0.78 inch; the proposed conductors would be larger and heavier, with a diameter of 0.84 inch. The proposed conductors would be made of aluminum and steel and would have a higher electrical capacity than the existing conductors. Using a larger conductor could increase the sag (and swing) in the line, particularly under warmer conditions. This, in turn, could affect whether trees adjacent to the line could present a safety hazard. Some of the towers would be taller to help compensate for increased conductor sag. For safety reasons, the National Electric Safety Code (NESC) establishes minimum conductor heights.

Based on its experience with issues of safety and landform variation, BPA designs exceed the NESC minimum of 19.5 feet for 115-kV transmission line construction. 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.

Prior to removing the conductors, the existing transmission lines would be taken out of service. Then the conductors and overhead ground wires would be detached and removed by reeling the wires onto large spools using a large truck called a puller (see Figures 2-4 through 2-7). Once removed, the old conductors would be delivered to a metal salvage location to be recycled.



Figure 2-4. Removal of an Existing H-Frame Wood-Pole Structure



Figure 2-5. Auguring Holes for a Wood-Pole Structure



Figure 2-6. Installation of an H-Frame Wood-Pole Structure

The conductor would be strung on the structures using either a helicopter and ground crews or trucks and ground crews. A sock line (usually a rope) would be flown or driven in and strung through the pulleys on all of the structures; one sock line for each of the three-phases. The sock line would then 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 (see Figure 2-7).



Figure 2-7. Conductor Tensioning after Conductor Installation

In addition, dampers would be added to the line in certain areas. Dampers are devices that are used to suppress wind induced vibrations on taut conductors for better protection against storms. Dampers would be located within 15 feet of the insulators and would help protect the conductor from wear and premature fatigue failures. Bird diverters (devices that clip onto the conductor to make them more visible) would be placed on conductor spans where an increased risk of bird strikes exists (e.g., over or near wetlands or waterbodies) and where technically feasible.

OVERHEAD GROUND WIRES AND COUNTERPOISE

Existing overhead ground wires run along portions of the transmission lines near substations to protect substation equipment from lightning strikes; this ground wire would be replaced. Ground wire replacement would be located on the transmission lines for the first half mile leading away from the Salem and Albany substations for both lines, and into and out of the Monmouth Substation for Salem-Albany No. 2 line.

In areas of the overhead ground wire, a series of underground wires (counterpoise) would be installed and attached to structures. The counterpoise would take the lightning charge from the overhead ground wire and dissipate it into the earth. The wires would be laid out horizontally from structures within the right-of-way and buried in the ground. Typically, a narrow trench in which the counterpoise would be buried would be excavated by a small backhoe, and the counterpoise would extend up to 25 feet from the structure base. The existing Salem-Albany No. 1 transmission line does not have counterpoise and installation would help meet current design standards. Counterpoise would be located on 13 structures on Salem-Albany No.1 and 42 structures on Salem-Albany No. 2 in areas of the overhead ground wire.

FIBER OPTIC CABLE

The existing fiber optic cable that runs on the two transmission lines would be reused and reinstalled on the new structures. During construction, the cable would be moved to the side and would remain fully functional.

2.1.3 TEMPORARY GUARD STRUCTURES, TENSIONING SITES, AND STAGING AREAS

Guard structures are temporary wood-pole structures with cross-arms placed on either side of a facility (distribution lines, roads, railroad crossings, navigable rivers) to catch conductors, ground wire, or fiber optic cable in the unlikely event that the conductors/wires fall while being removed or installed. Guard structures would be installed during construction and removed after the conductor was strung.

Tensioning sites are used for pulling and tightening the conductor and fiber optic cable to the correct tension once they are mounted on the transmission structures. Tensioning sites would be located about every 2 to 4 miles or about every 22 structures, depending on the length of each span and the terrain. Approximately 64 tensioning sites would be used during installation of the two lines. Tensioning of the new conductors would generally occur near three pole or angle structures and would disturb about a 0.4-acre area from driving and parking of tensioning vehicles, which are typically on ¾- or 1-ton line trucks. The tensioner is a large piece of equipment with drums that the new conductor is fed through to get the proper tension (see Figure 2-8). Tensioning sites are kept within the right-of-way as much as possible, although in instances where the line makes a turn, the site would extend outside the right-of-way.

Staging areas to store and stockpile new and removed materials, as well as other construction-related equipment, would be identified and used during construction. Two to four temporary staging areas would be established within 10 miles of the transmission lines; each staging area would be 5 to 10 acres in size, but would be dependent on the types of sites available for lease and the size needed to accommodate materials and equipment. Staging areas would generally be existing large, leveled, paved sites in commercial or industrial areas, or in disturbed or common habitats.

The construction contractor would identify potential temporary staging areas prior to construction and BPA would complete any required site-specific environmental review once locations were determined.

2.1.4 ACCESS ROADS

The system of roads that provide access to the transmission lines needs improvement to rebuild the lines and to improve the ability to reach the transmission line rights-of-way for ongoing operation and maintenance. Transmission line structures would be accessed from existing roads where possible. Roads leading to the vicinity of the transmission lines are generally multi-use roads (e.g., residential access and country roads).

Typical BPA access roads are built with 14-foot-wide road bed and with 3-foot sides for slopes or drainage ditches. The total disturbance width for typical access road is about 20 feet. Some road and disturbance 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 (see Figure 2-8).

Access road improvements fall into the following categories (also see Table 2-2):

- **New construction** - A total of 15 miles of new permanent access roads would be constructed, including 8 miles for Salem-Albany No. 1 and 7 miles for Salem-Albany No. 2. New construction would involve clearing vegetation, grading and developing the road prism, installation of drainage structures (culverts, drain dips), and gravelling.
- **Reconstruction** - About 2 miles of existing roads would be reconstructed, one for each of the transmission lines. Reconstruction of existing roads could involve removal of vegetation, grading (to reshape or widen the road, ditches), slope stabilization, installation or replacement of drainage structures, placement of subsurface rock, and gravelling.
- **Improvements** – About 19 miles of existing roads would be improved, including 6 miles for Salem-Albany No. 1 and 13 miles for Salem-Albany No. 2. Improvements to existing access roads could involve light blading, reshaping ditches, installation or replacement of drainage structures, and gravelling.
- **Routes of Travel** - About 28 miles of travel routes have been identified, including 6 miles for Salem-Albany No. 1 and 22 miles for Salem-Albany No. 2. Routes of travel are typically routes to towers in the middle of farm fields where no permanent access is developed. Trucks and crews access the tower by driving over the unimproved field surface. If the field is too wet to drive construction vehicles, it is possible that temporary roads would need to be installed the along a travel route. Temporary roads would be installed with removable wetland mats or by laying geotextile fabric and topping with gravel. The temporary road would be removed following construction and the land would be restored to preconstruction conditions.



Figure 2-8. Improved Access Road

FORDS, CULVERTS, AND GATES

Access road work would include the installation or replacement of fords, culverts, and gates. One stream ford would be improved with the placement of rock for the Salem-Albany No. 1 transmission line, and three fords would be improved with rock for Salem-Albany No. 2.

Twenty-three new culverts for access roads to the Salem-Albany No. 1 line and 45 for the Salem-Albany No. 2 line would be installed, repaired, or cleaned. Culvert work that would occur in fish-bearing streams is discussed in Section 3.4, Fish and Wildlife.

A total of 121 gates would be installed or repaired at the entrance to access roads to help restrict unauthorized use or continue a fence to keep livestock contained; 51 gates for Salem-Albany No. 1 and 70 gates for Salem-Albany No. 2. The need for gate locks would be determined in coordination with the underlying landowners.

ACCESS ROAD EASEMENTS

An estimated 24 miles of new easements would be required for access roads. Of this total, 12 miles would be acquired easements for existing roads, 7 miles of easements would be acquired for new road construction, and 5 miles of easements would be acquired for routes of travel. Generally, BPA obtains a 50-foot-wide easement for access road rights. BPA would compensate landowners for any new easement rights acquired for the access roads.

ACCESS ROAD OPTIONS ALONG ANKENY NWR

Along a section of the Salem-Albany No.1 line, BPA is considering three access road options to reach structures SA1:11/6 to 12/4. In this area the line parallels the BNSF railroad, is bounded on the opposite side by the Ankeny NWR, and has no access roads to the structures. BPA has been working with the USFWS and the railroad to identify options to help lessen impacts to the Ankeny NWR. The access road options are as follows:

- **Option 1:** New construction of about 1 mile of gravel access road in the BPA right-of-way, adjacent to Ankeny NWR, with an approach in the county road easement for Wintel Road and BPA right-of-way (Road construction would be as described in Section 2.1.4).
- **Option 2:** New construction of about 1 mile of gravel access road adjacent to the BPA right-of-way on the Ankeny NWR, with an approach in the county road easement for Wintel Road. This would require BPA purchase of about 6 acres of Ankeny NWR property.
- **Option 3:** Establishment of a route-of-travel across Ankeny NWR. For the line rebuild work, this route-of-travel would require installation of a temporary road (using geotextile fabric and gravel) across the wetlands present. The road would be removed following construction. For future access needs, this Option would require development of a Memorandum of Understanding with USFWS to allow for annual line inspections, periodic maintenance, and potential emergency repairs.

Both BPA and the Ankeny NWR prefer Option 1.

2.1.5 VEGETATION REMOVAL AND REPLANTING

As part of the Proposed Action, vegetation would be removed to facilitate construction and ensure safe operation of the line. Vegetation within the existing Salem-Albany transmission line rights-of-way and project access roads generally consists of low-growing shrubs, herbaceous vegetation, saplings, hazelnut trees, and agricultural field crops (primarily grass seed fields).

About 78 acres of grasses, low-shrubs, small saplings, and agricultural crops would be disturbed or cleared for construction activities. About 15 trees would be removed for road construction and about 759 mature trees (including both trees inside and outside the right-of-way) and 770 instances of high brush (saplings both inside and outside the right-of-way) along the transmission line rights-of-way have been identified as potential hazards and could be cut, limbed, or topped to prevent electrical flash-overs (BPA 2014a). The list of identified trees presenting a potential hazard to the line will be further analyzed regarding the appropriate treatment (limbed, cut, or topped): these results will be presented in the Final EA.

Danger trees are trees located outside of the transmission line rights-of-way that have the potential to fall or grow too close to the conductor (either when at rest or when swinging as a result of winds) and cause flash-overs or electrical outages. Identifying danger trees includes determining the type of tree, tree height and growth potential, how the tree leans, stability and health (e.g., root pathogen damage), and whether they are located in areas with severe storm damage potential. Although much of the transmission lines cross agricultural fields where there are no threats of danger trees, they also pass through areas of adjacent woodlands or trees lining the edge of fields where danger trees are often identified. Potential danger trees are visible on both sides of the right-of-way in Figure 2-9. Because danger trees have not been removed along the Salem-Albany lines in at least 10 years, they were identified for removal as part of the Proposed

Action. In addition, trees remain inside the right-of-way that have been identified as a threat due to proximity to the line. Of the total trees identified as presenting a hazard, 605 occur along the Salem-Albany No. 1 line and 154 along the Salem-Albany No. 2 line. Cut trees and limbs could be left in place and the debris scattered or removed depending on the quantity of trees in one given location and the landowner's preference. At the request of the landowner, the cut trees and debris could be removed. In areas where homes are not immediately adjacent to the danger trees, most cut trees would be left in place. Danger trees cut along the railroad right-of-way (structures SA1:9/9 to 17/13) would be removed from the site. An excavator could be used to grub out some of the smaller shrubs growing in the road area. Large mowers or brush cutters (e.g., brush hogs) could also be used to remove vegetation. Any trees or larger limbs growing into the roadway would be cut manually with a chainsaw.



Figure 2-9. Potential Danger Trees

All areas disturbed by construction activities, except permanent road surfaces and areas taken up by structures and guy wires, would be reseeded with a seed mix appropriate to the site and as agreed upon with landowners. Landowners would be compensated for landscaping outside the right-of-way that needs to be removed as a danger tree or brush (compensation for vegetation inside the right-of-way would depend on agreements in easement documents or other applicable land use agreements between the landowner and BPA). The original grade and drainage patterns in sensitive areas would be restored as closely as possible.

2.1.6 CONSTRUCTION ACTIVITIES

Equipment used for removing and installing wood poles and other structural components would include flatbed trucks, line trucks with boom cranes, backhoes, augers, and bucket trucks. In addition, a helicopter could be used to string the wires (e.g., conductors and ground wire) on the structures. All trucks and equipment would be restricted to operating within the workspaces, access roads, and travel routes established for the Proposed Action.

The construction schedule for the Proposed Action depends on the completion and outcome of the environmental review process. If the Proposed Action is implemented, construction would first begin with the Salem-Albany No. 2 transmission line and last about 8 months, with construction potentially beginning in May 2015 and completing in December 2015. Construction of the Salem-Albany No. 1 transmission line would occur a year later, with construction potentially beginning in May 2016 and completing in December 2016. Project construction activities are described below.

On a given day, four to six work crews would be working at various sites along the transmission line on various aspects of removal and construction, including road work, conductor and structure removal, rigging and clearing, siting and framing, installing guy wires, and stringing wire. A single structure site could be visited multiple times throughout the season as construction progresses. Crews would be working up to 10 hours per day, 6 days per week. Each crew would consist of six to eight 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, and pullers-tensioners) to the work site. Typically, only one crew would be working at any given site; however, up to two crews would work at stringing wire. Access road improvements would require an additional six-person crew.

On average, new road construction could be expected to progress at a rate of about 0.25 miles per day. In addition, a rough road could be cut to allow construction vehicles access to the line early in the construction process, with road crews returning later to finish the road for long-term use. Areas with temporary roads would also be visited by road crews at least twice: prior to construction to lay the road, and at the end of the construction to remove the road.

If helicopters are used, they would be used for approximately 3 hours during the construction period for any given line mile, and would pass by each structure three times for each conductor. An alternative to using helicopters to string the conductors would be to use a truck with a basket crane (i.e., “cherry picker”) (see Figure 2-10). Using a basket crane, a worker would be lifted up to the structure cross member, and the worker would then place the string lines into the pulleys. The remainder of the construction process would remain the same.

The mitigation measures presented in the EA include best management practices (BMPs) that 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 Oregon Department of Environmental Quality *National Pollutant Discharge Elimination System Stormwater Construction General Permit No. 1200-C* and associated guidance (ODEQ 2014). Proposed mitigation measures are also presented within the relevant sections of this EA to minimize or reduce impacts to resources.

2.1.7 ONGOING MAINTENANCE AND VEGETATION MANAGEMENT

BPA conducts routine periodic inspections, maintenance, and vegetation management of the 15,000-mile federal transmission system in the Pacific Northwest. BPA has operated and maintained the two Salem-Albany transmission lines since they were built in the 1940s. This ongoing operation and maintenance would continue whether or not the proposed rebuild project was implemented. However, because the Proposed Action is essentially a comprehensive maintenance project and includes replacement of worn parts of the existing transmission lines and improvements to the access road system, the need for future maintenance and repairs would be less frequent and on a smaller scale than currently required, particularly for areas where steel monopoles would replace wood-pole structures.

Typical maintenance on wood-pole transmission lines involves replacing deteriorating structures and insulators. Most maintenance activities are planned a year or so in advance, but occasionally emergency repairs are required due to weather events, fires in the area, or vandalism.

BPA conducts vegetation management along its right-of-way to keep vegetation a safe distance from the conductors, maintain access to structures, and to help control noxious weeds. Vegetation management includes removing tall growing vegetation within the rights-of-way, noxious weed control, and removing select danger trees adjacent to the rights-of-way that have the potential to grow or fall into the line (see Section 2.1.5 for a description of danger trees). Vegetation management is guided by BPA's *Transmission System Vegetation Management Program Final EIS/Record of Decision* (BPA 2000). Depending on the vegetation type, environment, and landowner, a number of different vegetation management methods could be used: manual (e.g., hand-pulling, clippers, and chainsaws), mechanical (e.g., roller-choppers and brush-hog), or chemical (e.g., herbicides).

Vegetation management within the Salem-Albany rights-of-way should occur every 2 to 8 years; danger tree removal is typically managed under a separate program and occurs about every 10 years or when there is an immediate threat. Vegetation management within the right-of-way was most recently conducted along both lines in the winter of 2012-2013; the last comprehensive danger tree survey and removal was over 10 years ago. In areas where steel monopoles are proposed, the number of danger trees or limbs that would need to be removed in the future could be reduced because the conductors would be moved toward the center of the right-of-way, away from adjacent trees.

When line and road maintenance or vegetation management is required for a BPA transmission line, BPA conducts environmental review for those site-specific maintenance activities, as appropriate. Additional information about the importance of vegetation management and safety in BPA's rights-of-way can be found in the two brochures; "*Keeping the Way Clear for Safe, Reliable Service*" and "*Landowner's Guide to Compatible Use of BPA Rights-of-Way*" (<http://www.bpa.gov/PublicInvolvement/LandsCommunity/Pages/default.aspx>).

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, BPA would not rebuild the transmission lines or upgrade access roads, or replace culverts as a single coordinated project. Construction activities associated with the Proposed Action would not occur. However, the reliability and safety concerns that prompted the need for the Proposed Action would remain. As the line continues to deteriorate and fail intermittently, BPA's ability to provide

reliable electric service to its customers in the area would be reduced. BPA would also continue to have inadequate access in the case of an emergency outage or line failure, particularly during the rainy season or inclement weather.

BPA would continue to operate and maintain the existing transmission line in its current condition, replacing aged and rotting structures as they deteriorate, maintaining access roads to allow access to structures on an as-needed basis, and managing vegetation for safe operation. In addition, the safety concerns dealing with the proximity of the line to adjacent structures would persist.

Given the poor condition of the transmission lines, the No Action Alternative would likely result in more frequent and more disruptive repair activities within the corridors than has been required in the past. It might be possible to plan some repairs, but many would likely occur on an emergency basis as various parts of the transmission lines continue to deteriorate.

The overall scale and scope of the repairs that would be done under the No Action Alternative would be smaller than what is planned under the Proposed Action. The maintenance program addresses immediate needs to keep the transmission line functioning, and would likely not include more comprehensive improvements such as access road work to improve water runoff, and general fish-friendly culvert replacements. Access road improvements or construction under the No Action Alternative would be limited to improvements necessary to allow access to specific structures for as-needed repairs and maintenance.

2.3 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 the 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 in Meeting Project Purposes

Purpose	Proposed Action	No Action Alternative
Meet transmission system public safety and reliability standards set by NESC and NERC	The rebuilt transmission lines 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 lines would continue to operate at 115 kV, outdated and physically worn structures and associated equipment would pose a greater risk for electrical outages and unreliable service. Emergency response times could be increased by access roads that are in poor condition.
Continue to meet BPA's contractual and statutory obligations	The rebuilt transmission lines would maintain system reliability and subsequent power delivery to BPA's customers in this Willamette Valley service area.	The existing transmission lines would continue to deteriorate and threaten system reliability and subsequent power delivery to BPA's customers in this Willamette Valley service area.

Table 2-3. Comparison of the Proposed Action and No Action Alternative in Meeting Project Purposes

Purpose	Proposed Action	No Action Alternative
Minimize environmental impacts	The environmental impacts due to rebuilding the lines would be minimized by designing the Proposed Action to avoid sensitive resources, where possible, and to minimize potential adverse impacts through the mitigation measures described in Chapter 3. (See Table 2-4 for a summary of impacts for each resource).	The environmental impacts of rebuilding the lines would not occur in the two construction seasons as is proposed for the Proposed Action. However, impacts to the environment would still occur, but would be spread over time as structures need replacement and road repair is required. As some of these repairs would likely be done on an emergency basis, there may not be time to accommodate planning efforts to coordinate with landowners or avoid or lessen impacts to environmental resources. Therefore, impacts to resources would likely be greater over time with the No Action Alternative than with the Proposed Action. (See Table 2-4 for a summary of impacts for each resource).
Demonstrate cost-effectiveness	Environmental review, design and engineering, and construction costs are estimated at \$30.8 million. Implementation of the Proposed Action would reduce the maintenance costs for the transmission lines because the new structures and equipment would require less maintenance than the aged ones.	The cost of rebuilding the lines would not occur at one time, but would be spread over years as repairs are required. Because repairs and mobilization of construction crews would be done on an as-needed basis, the No Action Alternative would be less efficient and could eventually cost more than 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
Land Use, Recreation, Habitat Conservation, and Transportation,	Direct impacts from vehicle and equipment use of agricultural land such as disturbance of soil and ground cover, damage or removal of crops, and displacement of livestock from grazing areas. Impacts to local residents from the removal or damage of landscaping during construction activity. Short term disruptions to local traffic and access. Short term disruptions to recreation and habitat conservation from traffic delays, access closures, dust and noise from construction activity. Long-term impacts to habitat conservation through new or improved access roads and danger tree removal.	Presence of repair vehicles would be intermittent and unplanned, but the number of repairs would increase over time due to age and deterioration of the line. Repair visits would have similar impacts to local traffic, residents, recreation, and landscaping as for the Proposed Action, but would be unpredictable in their timing. Long-term impacts to habitat conservation through danger tree removal would still occur.

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 soil compaction and disturbance impacts to soils from clearing, grading, vegetation (including danger tree) removal, and soil compaction during construction. Long-term soil compaction in new access roads. Indirect impacts associated with soil erosion.	Intermittent repair activities would result in soil compaction and rutting due to the lack of adequate access roads. Repair visits would occur throughout the year and access during wet weather would result in more severe soil disturbance than that which would occur during dry weather.
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. Long-term loss of vegetation from the relocation of structures, construction of new roads, and danger tree removal. Indirect impacts from the introduction and spread of noxious weed species and disturbance to plant communities from erosion and sedimentation.	Danger trees would still be removed. Damage to vegetation from heavy maintenance vehicles needed for repairs could occur over a larger area as drivers follow the most accessible routes to the line during different seasons and from year to year, particularly during wet weather when access is more difficult. Soil compaction and exposure from driving heavy maintenance vehicles in the absence of adequate access roads could result in long-term impacts by facilitating the influx of invasive and noxious weeds and degrading the vegetative community.
Fish and Wildlife	Direct impacts from in-water work for ford crossings and culvert installations. Indirect impacts from changes to water quality from sediment entering streams or accidental hazardous spills from construction equipment. Temporary displacement of wildlife during transmission line construction and disturbance of habitat. Construction of access roads would lead to permanent impacts from loss of habitat. Indirect impacts from noxious weed infestation of habitat.	No road and drainage improvements would occur and failing culverts would not be replaced. Fish habitat would experience increased turbidity in some areas and fish passage would potentially be limited. Repair access would be intermittent and unplanned, possibly occurring during high flow conditions or periods when Endangered Species Act (ESA)-listed species are present. Danger tree removal and subsequent reductions in stream shading would still occur. Downed power lines could create electrocution risk for wildlife or result in wildfire.
Water Resources	Direct temporary impacts to water from the installation of ford crossings and culverts, through turbidity and sedimentation. Indirect impacts from ground disturbance resulting in erosion, sediment transport, and turbidity to surface perennial or intermittent waters. Temporary impacts from leaching of pentachlorophenol (PCP) associated with new treated wood poles and from herbicides used to control vegetation following disturbance.	Line failures would likely occur during inclement weather when soils are more prone to erosion. Emergency repair activities with heavy vehicles and equipment could occur without access roads that minimize damage to riparian vegetation and cause soil erosion, resulting in stormwater runoff and increased turbidity in streams. The failing culverts would not be replaced and other improvements to stream flow would not be implemented.

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

Environmental Resource	Proposed Action	No Action Alternative
Wetlands and Floodplains	Direct impacts to wetland vegetation from construction equipment. Construction of access roads would permanently fill some wetlands. Construction would temporarily impact wetlands around structures and at tensioning sites.	No scheduled permanent fill of wetlands would occur. No permanently graveled surfaces would be installed within the floodplain. Line failures would likely occur during inclement weather when wetland soils are more prone to erosion. Emergency repair activities with heavy vehicles and equipment could occur without proper access roads that minimize damage to wetlands by reducing or avoiding compaction, rutting, and erosion. This could result in changes to hydrology and facilitate the establishment of noxious weeds.
Visual Quality	Direct impacts to viewers who are sensitive to visual change, particularly local residents and recreational users. Temporary impacts from the presence of construction equipment. Permanent impacts from removal of danger trees.	No alterations to the viewscape along the rights-of-way. Interruptions to the viewscape would be intermittent and unplanned.
Air Quality and Greenhouse Gases	Direct temporary and localized impacts from operation of construction equipment releasing emissions and dust. Direct impacts from greenhouse gas (GHG) emissions from construction equipment, increased worker traffic, and continued operations and maintenance.	Impacts would be less in any given year because construction vehicle emissions and dust would be intermittent and less concentrated. The need for access for repairs would increase over time due to deterioration of the line, resulting in potentially higher emissions and dust over time.
Socioeconomics, Environmental Justice, and Public Services	No impacts to population levels or environmental justice populations. Direct short term beneficial impacts from increased economic activity associated with local procurement of materials and equipment and spending by construction workers. Short term low negative impacts to property values while construction is underway. Temporary disturbances to public services from presence of construction equipment and increased traffic.	Impacts to population levels and environmental justice populations would be the same as the Proposed Action. No large groups of workers would be present at one time leading to no short-term disruptions to public services. Maintenance costs to BPA would increase over time due to ongoing need for repairs. No short-term increases in local revenues for businesses due to concentrated influx of workers.
Cultural Resources	Direct impacts from possible disruption of previously unrecorded cultural resources during construction or operation and maintenance activities.	No potential long-term impacts from construction of roads. Emergency repair activities could increase risk of damaging cultural resources if appropriate mitigation cannot be implemented.

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

Environmental Resource	Proposed Action	No Action Alternative
<p>Noise, Public Health and Safety, and Electric and Magnetic Fields</p>	<p>No increases in electric and magnetic field exposures during operation and maintenance. Temporary direct noise impacts from construction equipment, truck traffic, and occasional use of helicopters.</p> <p>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.</p>	<p>No helicopter noise. Less construction vehicle noise on a yearly basis.</p> <p>Conductors and fiber optic lines would continue to be located too close to structures along the edge of the rights-of-way at some locations, and the conductor would continue to swing outside of the rights-of-way in some locations on warm windy days. These areas would continue to be a safety issue for adjacent landowners and would present integrity issues for the transmission line. BPA would not be able to ensure transmission system reliability, particularly in hilly and wetland areas. Work in these areas could be precarious during inclement weather, presenting a safety hazard to workers.</p> <p>Danger trees would still be removed.</p> <p>Downed lines occurring due to age and deterioration of the lines would potentially result in hazards such as fires or electrocution.</p>

Chapter 3 **AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION MEASURES**

This chapter includes an analysis of the potential impacts of the Proposed Action and the No Action Alternative on the human and natural environment. This chapter first describes the affected environment for each resource and the potential impacts of the Proposed Action on that resource, as well as the mitigation measures to reduce impacts. Next, the chapter describes potential cumulative impacts to each resource with the addition of the Proposed Action. Finally, the chapter describes the potential impacts of the No Action Alternative by resource. Based on the analysis in this EA, impacts on specific resources are characterized as high, moderate, low, or no impact.

3.1 LAND USE, RECREATION, HABITAT CONSERVATION, AND TRANSPORTATION

This section describes the land use (including land ownership and transportation), recreation, habitat conservation, and transportation found within the affected area, as well as potential impacts of the Proposed Action on these resources. The No Action Alternative is discussed at the end of Chapter 3.

BPA's website contains brochures that provide information for landowners with property near transmission lines. These brochures include *Power Lines and Crops can be Good Neighbors* (BPA 2010a), *Living and Working Safely Around High-Voltage Power Lines* (BPA 2007), *Keeping the Way Clear for Safe, Reliable Service* (BPA 2010b), *Landowner's Guide for Compatible Use of BPA Rights-of-Way* (BPA 2011), and *Landowner's Guide to BPA Projects: Before & During Construction* (BPA undated). BPA's website provides access to these brochures at the following link:

<http://www.bpa.gov/PublicInvolvement/LandsCommunity/Pages/default.aspx>

3.1.1 AFFECTED ENVIRONMENT

LAND USE

The affected environment for land use includes all those resources within and adjacent to the transmission line right-of-way and project access roads, as well as any additional project elements, such as tensioning sites extending outside of the rights-of-way.

The existing transmission lines extend south from the Salem Substation in Salem, Oregon, to the Albany Substation in Albany, Oregon. The northern portion of Salem-Albany No. 1 begins in Polk County; traverses southward through Marion, Linn, and Benton counties; before terminating again in Linn County, Oregon (Figure 3-1). Salem-Albany No. 1 is also located near the town of Millersburg, Oregon. The northern portion of Salem-Albany No. 2 also begins in Polk County, traverses west and then southwest/south through Benton County, before terminating in Linn County, Oregon (Figure 3-1). Salem-Albany No. 2 also traverses near but outside of unincorporated Eola, Adair Village, and the town of Monmouth, and travels through the city of Independence, Oregon.

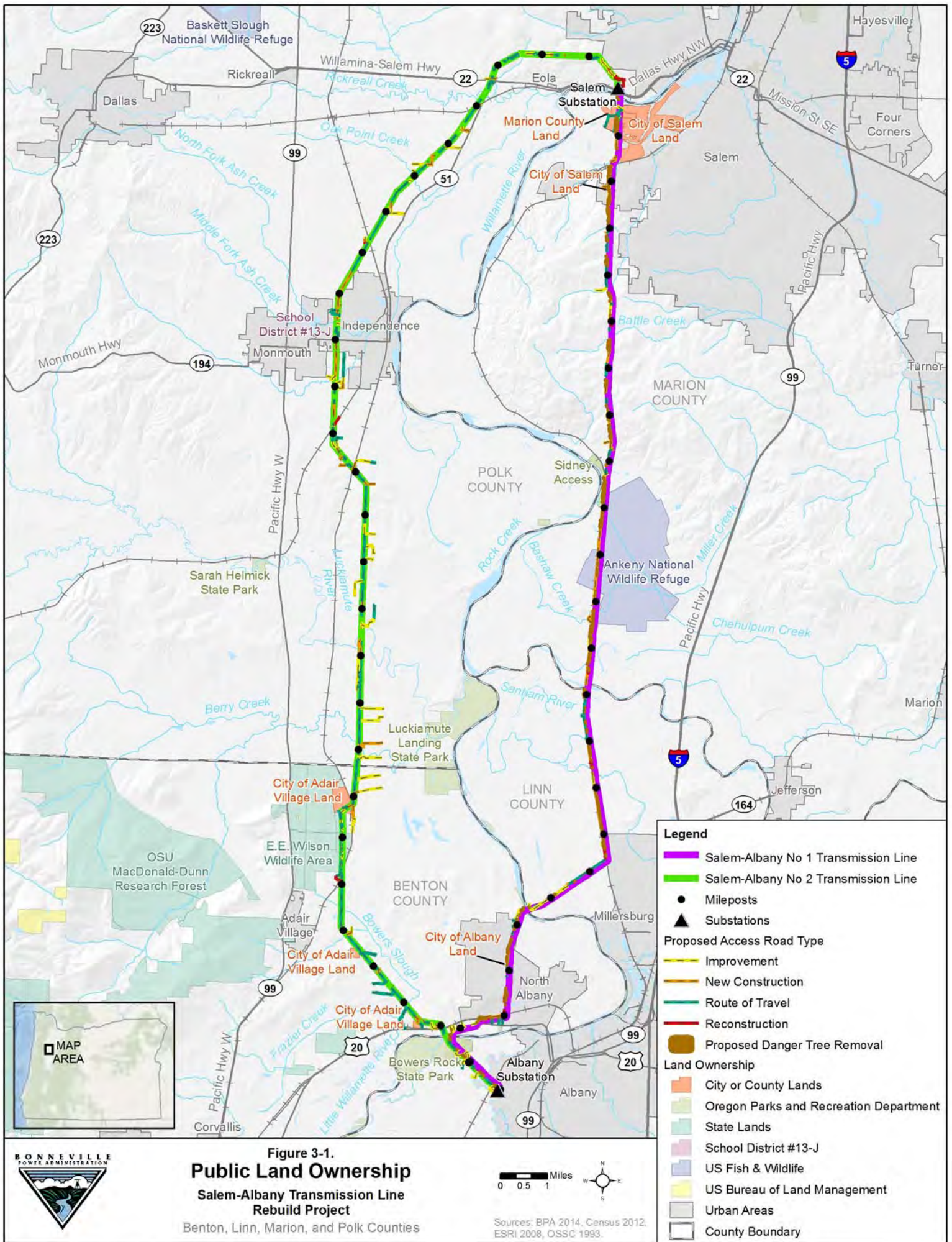
Most of the land crossed by the transmission lines is privately owned. The Salem-Albany No. 1 line also crosses publicly owned land managed by Marion County, the City of Salem, the Oregon Parks and Recreation Department, and U.S. Fish and Wildlife Service (USFWS). The Salem-Albany No. 2 line also crosses land managed by Oregon Department of Parks and Recreation, ODFW, School District #13-J, and the city of Adair Village (outside of the city's boundaries) (Figure 3-1).

Land uses adjacent to the Salem-Albany transmission lines include agriculture (including hazelnuts, ryegrass, hay/pasture, and cultivated crops), conservation and recreation areas (public lands), commercial and industrial uses, and residential uses (see Figure 3-2).

Agriculture. The majority of the length of Salem-Albany No. 1 and No. 2 (71.1 and 80.5 percent, respectively) intersects land used for agricultural purposes. Currently, more than 96 percent of the Willamette Valley is under private ownership, and over 40 percent is used for agricultural production. More than 100 types of crops are grown, including over 480,000 acres of grass seed (USFS 2014). Agricultural land use in the affected environment includes production of row crops, orchards, berry fields, and annual and perennial grasses, as well as use of land for pasture and associated residential purposes.

Common species found in areas producing row crops, orchards, and berry fields in the affected area include Christmas trees (*Abies* spp.), common oat (*Avena sativa*), field mustard (*Brassica rapa*), hazelnut (*Corylus avellana*), pumpkin (*Cucurbita maxima*), peppermint (*Mentha x piperita*), hybrid poplar (*Populus x euramerica*), radish (*Raphanus sativa*), tall cultivated wheat (*Triticum aestivum*), blueberry (*Vaccinium* spp.), and corn (*Zea mays*). Areas managed for annual and perennial grasses may include fescue (*Schedonorus arundinaceus*), orchard grass (*Dactylis glomerata*), red fescue (*Festuca rubra*), annual ryegrass (*Lolium multiflorum*), and perennial ryegrass (*Lolium perenne*). Unmanaged pasture lands also occur, which include uncut hay, organic debris, and may include exotic plants such as tansy ragwort (*Senecio jacobaea*), thistle (*Asteraceae* spp.), Himalayan blackberry (*Rubus armeniacus*), as well as other common shrubs. Some pasture lands in the affected area are seasonally wet.

Both lines cross land classified as Prime Farmland and Farmland of statewide importance—these classifications identify land most suitable for producing “food, feed, fiber, forage, and oilseed crops” as determined by the Natural Resources Conservation Service (NRCS) (Prime Farmland), and the states (Farmland of Statewide Importance) (NRCS 2007), and are based primarily on soil type



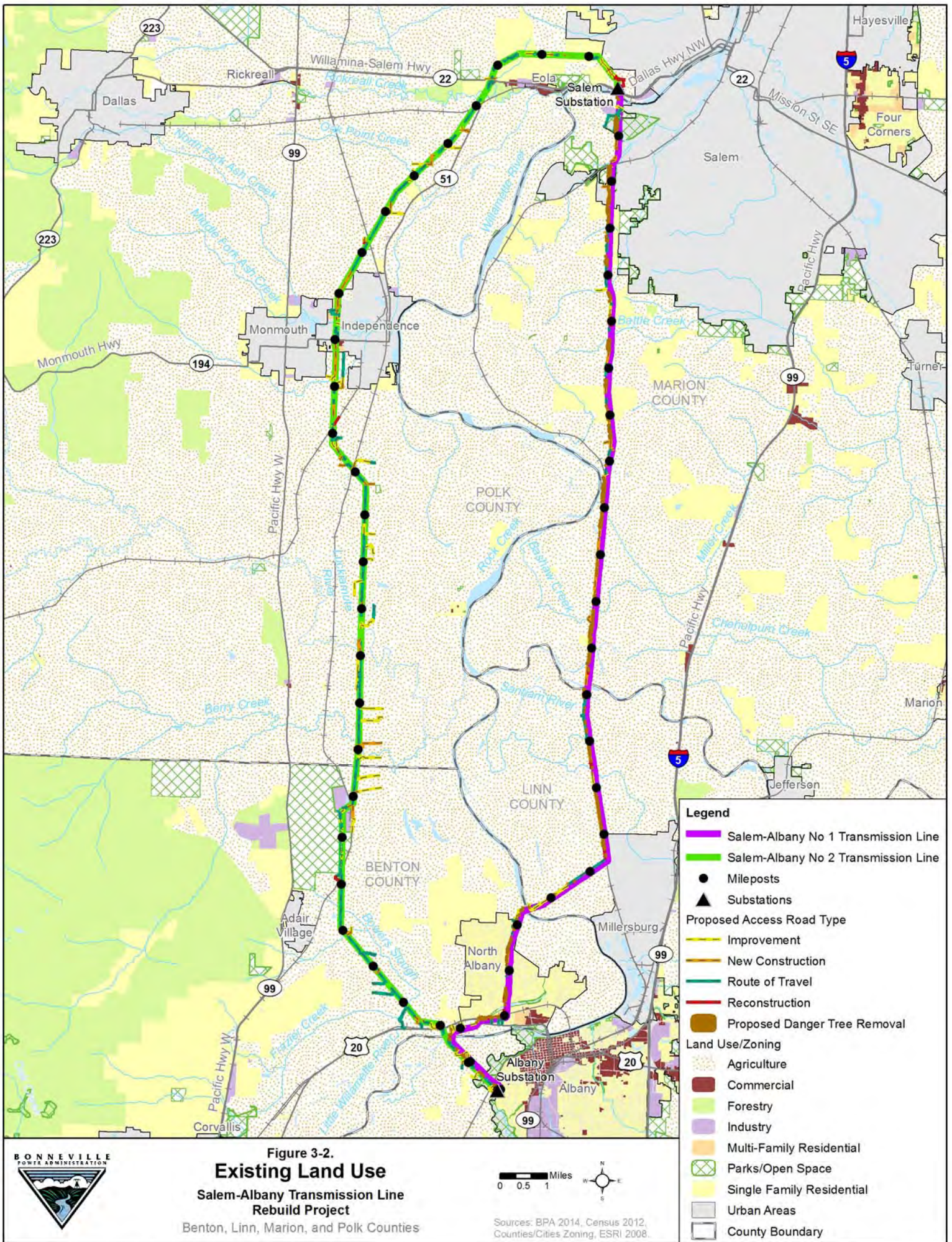
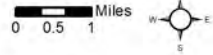


Figure 3-2.
Existing Land Use
 Salem-Albany Transmission Line
 Rebuild Project
 Benton, Linn, Marion, and Polk Counties



Sources: BPA 2014, Census 2012, Counties/Cities Zoning, ESRI 2008.

- Legend**
- Salem-Albany No 1 Transmission Line
 - Salem-Albany No 2 Transmission Line
 - Mileposts
 - ▲ Substations
 - Proposed Access Road Type**
 - Improvement
 - New Construction
 - Route of Travel
 - Reconstruction
 - Proposed Danger Tree Removal
 - Land Use/Zoning**
 - Agriculture
 - Commercial
 - Forestry
 - Industry
 - Multi-Family Residential
 - Parks/Open Space
 - Single Family Residential
 - Urban Areas
 - County Boundary

Residential and Public Uses. Salem-Albany No. 1 crosses through several areas of single-family housing within Marion County (and outside of the boundaries of the city of Salem) as well as within the city of Albany. The wooden poles are fixtures within yards and gardens of residential homes. In some cases, residents have landscaped around the poles (Figure 3-3). Residential areas crossed by Salem-Albany No. 2 consist of single- and multi-family housing and are located in the unincorporated community of Eola, the city of Independence, and within the city of Albany where Salem-Albany No. 2 joins with Salem-Albany No. 1.

Town halls (Independence City Hall, Monmouth City Hall, Adair Village City Hall, Salem City Hall, Millersburg City Hall, and Albany City Hall) and libraries (Independence Library, Monmouth Library, West Salem Library, Salem Library, and Downtown Albany Library) are located approximately 1 mile or more from the project corridor.

Public uses within close proximity to the transmission lines are Central High School and the Talmadge Junior High School in the city of Independence, located approximately 150 feet and 600 feet west, respectively, from Salem Albany No. 2.



Figure 3-3. Residential Garden Area in the Salem-Albany No. 1 Right-of-Way.

Commercial and Industrial. A Marion County solid waste facility is located adjacent to Salem-Albany No. 1 at structures SA1:1/2 to 2/2. Other lands classified as industrial are the substations used by the Salem-Albany lines and the City of Adair's Industrial Planned Development Zone, which is crossed by the Proposed Action between SA2: 21/3 and 21/8; it is not in industrial use at this time. Commercial uses adjacent to Salem-Albany No. 2 include a restaurant at structure SA2:10/13 and a bowling alley and shopping center at structures SA2:11/1 to 11/2.

RECREATION AND HABITAT CONSERVATION

Public lands, used for recreation and habitat protection and conservation, are crossed by the Proposed Action (see Figure 3-2). A total of 11 conservation or recreation areas would be located within 1,000 feet of the Proposed Action, with seven of these crossed by either the existing Salem-Albany No. 1 or No. 2 transmission lines. Table 3-1 summarizes the conservation and recreation areas located within 1,000 feet of the Proposed Action.

Table 3-1. Recreation and Conservation Areas within 1,000 feet of the Proposed Action

Park Description	Distance from Proposed Action
<p>Eola Bend is located within Marion County and accessible from Minto-Brown Island Park. The park features picnic tables, wildlife viewing, a footpath, interpretive signs, and 60 acres of restored vegetation (Marion County 2013).</p>	<p>0.2 mile crossed by Salem-Albany No. 1 at structure 1/2.</p>
<p>Minto-Brown Island Park is an 890-acre park located at 2200 Minto Island Road SE in Salem. The park contains trails for roller blading, walking, biking, and jogging (City of Salem 2014).</p>	<p>0.4 mile crossed by Salem-Albany No. 1 at structure 1/2 and structures 2/2 through 2/6.</p>
<p>Willamette River Greenway Sidney Access Point is managed by the Oregon Parks and Recreation Department and is located on the bank of the Willamette River at river miles 102 through 101.25. The site offers fire rings, picnic tables, and rustic camping opportunities (Willamette Riverkeeper undated).</p>	<p>Between 5 feet (at its closest point) and 1,000 feet (at its farther point) west of Salem-Albany No. 1 at structures 9/6 to 10/4.</p>
<p>Ankeny National Wildlife Refuge is managed by the U.S. Fish and Wildlife Service, and contains 1,765 acres of cropland, 600 acres of riparian forests, and 500 acres of shallow water seasonal wetlands. Major public use activities within the Refuge include hiking, environmental education and interpretation, photography, and wildlife/wildlands observation (USFWS 2012a).</p>	<p>0.9 mile crossed by Salem-Albany No. 1 at structures 11/5 to 12/4.</p>
<p>Riverview Heights Park is a 1-acre park located at 1901 Crittendon Loop NW in Albany. Park amenities include BBQ grills and basketball courts (City of Albany 2012b).</p>	<p>0.06 mile crossed by Salem-Albany No. 1 at structure 21/5.</p>
<p>Hazelwood Park is a 3-acre park located at 1999 Queen Avenue SW in Albany. Park amenities include picnic tables and green space (City of Albany 2012c).</p>	<p>Less than 0.01 mile crossed by Salem-Albany No. 1 at structure 24/14.</p>
<p>Eola Heights Park is located in West Salem, off of Eola Drive. Park amenities include a playground, picnic tables, and an open field (Polk County 2014).</p>	<p>400 feet north of Salem-Albany No. 2 at structure 1/10.</p>
<p>E. E. Wilson Wildlife Area covers approximately 1,788 acres and is located about 10 miles north of Corvallis. The area is managed by ODFW and offers hunting, fishing, and wildlife viewing opportunities.</p>	<p>1.2 miles crossed by Salem-Albany No. 1 at structures 21/8 to 23/10.</p>
<p>Bowers Rock State Park is managed by the Oregon Parks and Recreation Department and is located along the Willamette River at river miles 122 through 123. The park has limited public access via a primitive trail located on the west side of the Willamette River (Willamette Riverkeeper 2014).</p>	<p>0.5 mile crossed by Salem-Albany No. 1 at structures 23/9 to 24/3, and 0.6 mile crossed by Salem-Albany No. 2 at structures 27/3 to 27/8.</p>

The four larger conservation and recreation areas crossed by the Proposed Action are the Ankeny National Wildlife Refuge (NWR), E.E. Wilson Wildlife Area, Minto-Brown Island Park, and Bowers Rock State Park.

Management plans applicable to the affected area are the *Willamette Valley NWRs Final Comprehensive Conservation Plan* (USFWS 2011), the *E.E. Wilson Wildlife Area Management Plan* (ODFW 2008a), and the *Minto-Brown Island Park Revised Master Plan* (City of Salem 1995). In addition, an Environmental Assessment was prepared to analyze the environmental effects of floodplain restoration within Minto-Brown Island Park (USDA 2009). The primary management direction of the Ankeny NWR is the protection of wintering areas for dusky Canada geese (*Branta canadensis*) and other migratory waterfowl (USFWS 2011). ODFW manages the natural habitats within the E.E. Wilson Wildlife Area to conserve and enhance native wildlife and production of game species, and provides wildlife-related recreation and education opportunities to the public (ODFW 2008a). The city of Salem manages Minto-Brown Island Park in accordance with the philosophy of the Revised Master Plan, which emphasizes preserving the pastoral and rural qualities of the park and preserving natural habitat (City of Salem 1995). Bowers Rock State Park does not have a management plan, but concepts to restore native habitat to the park are currently being investigated (see Section 3.4, Fish and Wildlife).

The Willamette Valley Scenic Bikeway suggests a route for cyclists on public roads through the Willamette Valley, with interpretive support provided by the Oregon Parks and Recreation Department. The Salem-Albany No. 1 transmission line crosses or is near the Willamette Valley Scenic bikeway at numerous locations, including structures SA1:3/4 to 3/5 (near Minto-Brown Island Park), SA1:9/3 to 10/8 (near Ankeny NWR), and SA1:13/6 to 13/8.

TRANSPORTATION

The existing Salem-Albany transmission lines intersect numerous residential streets north of Albany and county roads through farmlands in the affected area. In addition, the transmission lines intersect U.S. Highway (Hwy) 20 (Albany-Corvallis Hwy No. 031) and two state highways: State Routes 22 (Willamina-Salem Hwy No. 030) and 51 (Monmouth-Independence Hwy No. 193).

State Route 22 is classified as a Rural Other Principal Arterial, which means that the highway serves a high volume of traffic consisting mainly of statewide and interstate travelers. The portion of State Route 22 within the affected area serves as an expressway between Salem and communities west of Salem, such as Dallas. State Route 22 intersects with State Route 51, which is classified as an Urban Other Principal Arterial serving a high volume of urban traffic between Salem and the communities of Monmouth and Independence. U.S. Hwy 20 is classified as a Rural Minor Arterial. Rural Minor Arterials serve a lower volume of traffic than Principle Arterials and provide as a link between cities and larger towns (ODOT undated). The portion of the highway within the affected area serves commuters between Albany and Corvallis.

3.1.2 ENVIRONMENTAL CONSEQUENCES — PROPOSED ACTION

LAND USE

Impacts to land use would include permanent removal of land from use due to tower footprints (where towers would be replaced in new locations) and road footprints (where new roads would be constructed or existing roads widened), removal of landscape or agricultural vegetation, and temporary disruption of uses and traffic during construction activities. Impacts by land use (agriculture, residential and public uses, and commercial/industrial) are described below.

Agriculture. About 107 acres of agricultural land would be temporarily impacted—impacts would occur as a result of construction vehicle movement and temporary staging of equipment and supplies around structure locations, and the use of travel routes or temporary roads through fields. Potential temporary impacts to agricultural land use would include disturbed or compacted soil and ground cover, damaged or removed crops, displacement of livestock from grazing areas, and disruptions to farming activities such as irrigation or cultivation. In addition, clay drain tiles could be crushed and septic tanks could collapse if construction traffic were to drive directly above these features, particularly when soils are wet: however, BPA is working with landowners to identify these features during the project planning process to avoid them. Other temporary impacts to agricultural uses adjacent to the rights-of-way could include localized increases in dust on crops or orchard trees and erosion or agricultural soils.

Soil disturbances could provide a pathway for invasion by nonnative species, including noxious weeds, into crop land (see Section 3.3, Vegetation for more discussion on noxious weeds). Noxious weed surveys would be completed prior to project construction to identify where infestations exist, to treat them prior to construction and to identify where vehicle wash stations would be useful in reducing the risk of spreading seeds and propagules to uninfested locations. In addition, post-construction noxious weed surveys would be completed to determine if construction activities resulted in new infestations in the affected area, which would be treated.

Construction BMPs would be followed and activities would be coordinated with landowners to help minimize impacts. In addition, landowners would be compensated for any unavoidable crop damage (in the rights-of-way, this only includes crops that are currently allowed). Because impacts would be limited to one construction season, the affected area is limited to the area around structures and access roads, and mitigation measures would reduce impacts, the Proposed Action would have **low** temporary impacts on agricultural land use.

For the most part, agricultural land uses in the Proposed Action rights-of-way, such as orchards and cultivated croplands, would be able to continue as normal after project construction. Most new structures would be placed in the same locations as the old structures. Where steel monopoles would replace H-frame wood poles on Salem-Albany No. 1, or where structures would be removed and not replaced, the affected area would be reduced. However, there would be areas where structures would be moved and where access roads would be built or widened, affecting new or additional areas. Approximately 45 acres of agricultural land would be removed from production (most of which are Prime Farmlands and Farmlands of Statewide Importance). Most of these impacts would be a result of the construction of permanent access roads and widening of existing access roads. These long-term changes from agricultural use to roads would be a **moderate** impact on agricultural land use because new roads would be located along the edges of fields, impacts would occur in small segments along the length of the transmission line rights-of-way, and the acreage of agricultural land that would be removed from production (45 acres) is a small percentage (less than 0.01 percent) of the total agricultural land (979,821 acres) present within Benton, Linn, Marion, and Polk counties (ODFW 2002).

Residential and Public Uses. In areas where the line goes through residential areas and through backyards, long term impacts would include structure footprint changes where structures would be moved to slightly different locations (to be centered on the right-of-way) and access road construction and improvement. In addition, trees and landscaping would be disturbed or removed, both inside the right-of-way and as danger trees. Temporary impacts would include noise and dust due to construction activities in close proximity to residents, construction workers present on residential properties, and temporary removal of fences. In the

North Albany area where the Salem-Albany No.1 line runs through backyards, effects of construction activities would be pronounced as fences and landscaping would be removed and the presence of large trucks and equipment would be prominent in backyards. Although intrusive, these impacts would be short-term.

Ground that would be disturbed during construction would be reseeded, and landowners would be compensated for landscaping outside of the rights-of-way that would be removed or damaged. Compensation for permissible landscaping inside the rights-of-way would be determined based upon easement documents or other applicable land use agreements. In areas where the transmission line would be moved to the center of the right-of-way, there would be fewer danger trees on the side currently closer to the line, but potentially more danger trees and shrubs on the side currently further from the line. Therefore, in those areas more landscaping on the side currently further from the line could be removed or damaged during construction than on the side currently closer to the transmission line.

An increase of traffic on public and private roads during construction could potentially disrupt local access to landowners, homeowners, or public uses (such as the Central High School and the Talmadge Junior High School in the city of Independence) for brief periods of time as construction vehicles pass through. This disturbance during construction (noise, dust, traffic, presence of workers, fences removal, etc.) would be of temporary duration (limited to the construction season; 1 to 3 hours per structure and 4 days per mile of access road construction/improvements).

Where steel monopoles would replace H-frame wood pole structures on the Salem-Albany No. 1 line in the North Albany residential area (from structures SA1:21/1 to 21/12), or where structures would be moved, there would be a long-term increase in the usable space in the right-of-way for uses currently allowed under land use agreements with BPA. However, there would be areas where structures would be moved and where access roads would be built or widened, temporarily affecting a total of about 28 acres of areas within residential zones within North Albany, Polk County, and Marion County, but primarily within the right-of-way and outside of land that is currently in residential use. Since these areas are largely within the rights-of-way and any impacts outside of the right-of-way are cited to avoid land in active residential use, this would not directly impact residential lands aside from indirect disturbances during construction. Likewise, the approximately 6 acres of land that would be permanently impacted by construction and improvement of access roads in areas with residential zoning would occur inside the right-of-way or outside of lands with current residential use. Thus, lands would not be converted from residential land use for the Proposed Action.

After construction, disturbance to landowners (entering backyards) for emergency and standard repairs to the transmission lines could still be needed, but would be expected to occur less frequently and on a smaller scale than currently required, because the line and structures would be new and less likely to need repair.

Overall impacts to residential and public uses would be *moderate*, because although impacts during construction would be temporary and the changes from the existing line footprint would be minimal, work and impacts would be in close proximity to residents and would cause disruption and loss of landscaping.

Commercial/Industrial. The commercial and industrial uses adjacent to the rights-of-way may experience temporary impacts from construction activities—increases in noise and/or dust in the vicinity as well as access closures and reductions in on-street parking. Because the impacts would be short-term (1 to 3 hours

while the structures are being replaced), and current land uses would not be altered, the Proposed Action would have a **low** impact on commercial and industrial land uses.

RECREATION AND HABITAT CONSERVATION

Construction of the Proposed Action would be limited to brief, temporary disturbances to recreational uses (such as roller blading, walking, biking, jogging, picnicking, rustic camping, hiking, environmental education and interpretation, photography, and wildlife/wildlands observation) near the right-of-way because construction activities would primarily occur within existing BPA easement through or near recreational areas.. Impacts to recreational uses and habitat conservation adjacent to the rights-of-way would be limited to temporary inconveniences associated with traffic delays, access closures to portions of the parks during the removal and installation of conductors, reductions of on-street parking, and dust and noise from construction activity. Noise during the construction period could disturb wildlife and discourage people from visiting conservation and recreation areas such as Eola Bend, Minto-Brown Island Park, Willamette River Greenway Sidney Access Point, Ankeny National Wildlife Refuge, Riverview Heights Park, Hazelwood Park, Eola Heights Park, E.E. Wilson Wildlife Area, and Bower's Rock State Park, and other areas where noise can interfere with peoples' use or enjoyment of the environment. The long-term experiential impacts to users of the Willamette Valley Scenic Bike Route would be small where it is crossed by the Salem-Albany No. 1 line since most of the line would look similar to the existing line except where wood poles would be replaced by steel structures. Construction activities associated with the transmission line rebuild and road work would result in brief disruptions to bike route use due to noise, dust, and the presence of machinery, which could create obstacles to riders. These impacts would occur at three main areas along the bike route: unincorporated areas where the line crosses River Road S from structures SA1:3/3 to 3/5; Riverside Drive S/Sidney Road S/Buena Vista Road S intermittently from structures SA1:9/2 to 11/4; and Talbot Road S from structures SA1:13/5 to 13/7. Because disruptions to recreation and habitat conservation areas would be temporary and intermittent during the construction season and limited to the right-of-way and adjacent area, impacts would be **low**.

Construction within the E.E. Wilson Wildlife Area would be scheduled outside of the September through October hunting season, and would be consistent with the *E.E. Wilson Wildlife Area Management Plan*, which recognizes BPA's easement and the access agreement in place between ODFW and BPA for BPA to maintain Salem-Albany No. 2 (ODFW 2008a). Approximately 17 cottonwood trees have been identified as potential danger trees along the transmission line through the E.E. Wilson Wildlife Area, and would likely need to be removed since cottonwood and willow tend to be less hardy and long-lived than other species and present a greater hazard to the line. The loss of tree habitat in the wildlife area could adversely affect ODFW's goal of conserving and enhancing native wildlife, although effects would only occur along the existing right-of-way and the edges of adjacent woodlands, with available adjacent woodland habitat extending away from the affected areas. Tree removal would also be restricted to outside the bird nesting season. In addition, a number of short spur roads (typically about 100 feet long or less) are proposed to be improved with gravel off of the main road that parallels the transmission line. Laying gravel on these routes of travel would alter small amounts of wildlife habitat along the right-of-way, although these areas have been disturbed previously by BPA inspection and maintenance vehicles. Wildlife habitats in the Wildlife Area are already widely disturbed through other past activities, and additional impacts to habitat could therefore have a relatively greater effect than in other areas. However, because alterations to wildlife habitat are limited to the transmission line right-of-way and the adjacent area, and with seasonal

restrictions to tree removal and construction activities, impacts to the Wildlife Area would be **low-to-moderate**.

Although the effects during construction would be inconsistent with the *Minto-Brown Island Park Revised Master Plan's* philosophy of preserving the park's pastoral and rural qualities and preserving natural habitat (City of Salem 1995; see Section 3.1.1), the impact would be **low** since it would cease at the end of the construction season. The permanent road that would be constructed to access structures SA1:2/2 to 2/5 within Minto-Brown Island Park would be utilized for operation and maintenance, but would not impact park visitors or land use because it would be contained within BPA's existing right-of-way and would be hidden from view from the rest of the park by forested vegetation. The road would, however, alter wetland habitat in this area. In addition, tree habitat would be affected since approximately 43 danger trees have been identified as potential hazards in this same area, which is bounded on both sides by a large woodland. Impacts to natural habitat preservation at the park would be **low-to-moderate** since wetland and woodland habitat are available adjacent to the right-of-way and in other areas of the park.

At Bowers Rock State Park, surveys have identified approximately seven cottonwood trees that would likely need to be removed as danger trees along the right-of-way, which would remove tree habitat at the park. Since the area is close to the Willamette River, tree removal could affect nesting and roosting habitat for raptors such as osprey, which have been observed nesting at the park. However, additional tree habitat is available in adjacent woodlands and riparian areas in the park. Other habitat impacts could include an access road that would be improved with gravel, a portion of which could reduce a small area of potentially suitable habitat for western pond turtle. Turtle habitat at the park has been previously disturbed by gravel pit and agricultural activities and at present are of relatively low quality. This area will be surveyed in 2014 to identify suitable habitat, and BPA would work with park biologists to determine appropriate mitigation measures, if needed. Potential reductions in habitat at Bowers Rock State Park would be a **low** impact since effects would be small and would occur in a previously disturbed area.

Section 3.3, Vegetation, describes the measures that would be taken to reduce the likelihood that construction vehicles would introduce or spread invasive weeds within the conservation and recreation areas crossed by the Proposed Action.

Temporary construction impacts to Ankeny NWR would include indirect noise and visual impacts to users of Ankeny NWR during the proposed May through December 2016 construction period, as well as potential wildlife injury or mortality, plant removal or disturbance, and habitat disturbance from construction vehicles and equipment. Potential danger tree removal along the right-of-way would have long-term impacts by reducing tree habitat: construction of roads adjacent to the Refuge would also have a long-term indirect effect on Refuge wildlife management since there would be a small reduction in wildlife habitat in the vicinity. Temporary construction impacts to conservation at Ankeny NWR would be **low-to-moderate**, and long-term impacts would be **low**: see Appendix C for a more detailed description of these impacts to conservation on the Ankeny NWR.

The three access road options for accessing structures adjacent to the railroad through the Ankeny NWR would impact the Ankeny NWR differently. With access road **Option 1**, neither the road nor its approaches would be located on the Refuge. No public access would be permitted on the road and the road would be gated. Impacts of Option 1 on Ankeny NWR land use would be due to temporary construction activity disturbance and would not change the ability to manage the area for habitat. Because there would be no

change in land use and only temporary impacts on wildlife conservation and recreation, Option 1 would have a **low** impact.

Under **Option 2**, a new permanent road would change about 2.14 acres of Refuge land that is currently managed for agriculture, waterfowl forage, and vernal pool to a road bed, which is inconsistent with Ankeny NWR's management direction to protect waterfowl wintering habitat and support other wildlife conservation, as well as facilitate agricultural production. The USFWS would evaluate the appropriateness and compatibility of the transmission line access road with the policies and procedures in Part 603 National Wildlife Refuge System Uses, as well as rights-of-way-specific regulations and policies found in 50 Code of Federal Regulation (CFR) 25.21, 29.21, and 29.22; 340 FW 3; and 603 FW 2; and Specialized Uses policy found at 5 RM 17. The USFWS regulations address opening refuges and allowing uses (50 CFR 25.21) and rights-of-way crossing refuges, including application procedures; nature of interest granted; terms and conditions; disposal, transfer, or termination of interest; payments; and appeals (50 CFR 29.21 and 29.22). The USFWS policy states that, "It is the policy of the Service to discourage the types of uses embodied in right-of-way requests" (340 FW 3.3). All new and reauthorized Refuge uses, for periods longer than 10 years, must include terms and conditions that allow for future modifications to those terms and conditions to ensure compatibility (603 FW 2.11 H. (3)). The USFWS specialized uses policy (5 RM 17) defines a ROW as a, "Use that will encumber real property by granting a right to use that may alter the landscape due to construction of a facility."

The USFWS appropriate use policy applies to all proposed and existing uses in the National Wildlife Refuge System (Refuge System) only when the Refuge System has jurisdiction over the use. The appropriate use procedure (Chapter 1; 603 FW 1) describes the initial decision process the refuge manager follows when first considering whether or not to allow a proposed use on a refuge. The refuge manager will decide if a new or existing use is an appropriate refuge use.

Because the potential reduction of up to 6 acres of waterfowl foraging habitat and vernal pool habitat supporting streaked horned lark would not support Ankeny NWR's management objectives, but since the loss of 6 acres represents about a 0.3 percent reduction in forage habitat provided by grass fields, Option 2 would have a **moderate** impact on wildlife conservation in the Ankeny NWR.

Under **Option 3**, a temporary access road would be constructed across Ankeny NWR for use during the construction period, impacting a total of 2.14 acres of Refuge land. This access would cause a temporary disruption to the land uses of wildlife forage, agriculture, and conservation; however, construction timing restrictions would be considered to minimize this temporary impact by occurring at a time that is most compatible with wildlife and agricultural uses during the initial construction of the Proposed Action. As with Option 2, the USFWS would evaluate the appropriateness and compatibility of the transmission line access road with the policies and procedures in Part 603 National Wildlife Refuge System Uses, as well as rights-of-way-specific regulations and policies found in 50 CFR 25.21, 29.21, and 29.22; 340 FW 3; and 603 FW 2; and Specialized Uses policy found at 5 RM 17. A memorandum of understanding between BPA and USFWS would detail the parameters under which the temporary road would be removed and become an overland travel route for future maintenance requirements. However, during emergency repairs and outages, BPA may need to utilize the overland travel route during times when wintering waterfowl are present.

Because approximately 0.1 percent of the total foraging habitat in the Ankeny NWR would be unavailable for just one construction season, but since streaked horned lark habitat would be affected, and additional impacts could occur over the same ground from year to year from inspection and maintenance activities,

with potentially greater impacts for emergency repair, impacts to wildlife conservation from a temporary road under Option 3 with wetland mats would be **low-to-moderate**. With geotextile fabric and gravel, impacts could be **moderate** since habitat recovery could take longer and potentially be less successful if weeds should become established and the habitat degraded.

TRANSPORTATION

During construction there would be a temporary increase in traffic on nearby roads from construction vehicles moving to job sites and long-bed semi-trucks and other vehicles delivering construction equipment and materials. Deliveries of equipment and materials to construction areas would cause short-term traffic delays along nearby city and county roads, state highways, and transmission line access roads. Landowners may experience disruptions to daily activities from construction and delivery vehicles driving and parking on private roads serving as access roads. In particular, farmers driving farm equipment may need to get around construction vehicles utilizing access roads and overland travel routes. Traffic delays could also be experienced at roads near construction staging areas.

At roadway crossings, removal of old conductors, stringing of new conductors, and structure replacement could affect traffic flow through brief (less than 1 hour) lane closures (conductor work could be done by helicopter or by workers on the ground). Replacement of structures near (within 75 feet) U.S. Hwy 20 (SA1:23/1 and SA2:27/1), State Route 22 (SA1:1/1, SA2:4/4, and SA2:4/5), and State Route 51 (SA2:4/8, SA2:10/13, and SA2:11/1) could require closure of one traffic lane for short periods (1 to 3 hours) while structures are being replaced. In addition, 124 approaches for turning off of main roads onto access roads would be improved or constructed. Most of these occur on county or city roads, while eight would occur off of state highways, including five on Highway 51 and three on Highway 2. Construction-related traffic would not be expected to decrease the level of service on roadways.

Two structures located in close proximity (10 feet) to the railroad right-of-way would be removed under the Proposed Action. These structures are located at SA1:3/4 and SA1:9/8. When removing these structures, and when removing and replacing the conductor where the transmission line is adjacent to the railroad right-of-way, construction crews may need to work within close proximity to the train tracks. Because BPA would coordinate with the railroad to ensure that construction activities do not take place at the same time that trains are scheduled to pass through the right-of-way, there would be **no** impacts to rail transportation along the railroad right-of-way during construction.

Overall, impacts on transportation would be **low** because traffic delays would be brief and localized on local streets or rural roads in the construction area.

3.1.3 MITIGATION – PROPOSED ACTION

The following mitigation measures have been identified to reduce or eliminate impacts to land use, transportation, and conservation and recreation:

- Maintain access to residences, farms, and businesses during construction.
- Distribute the proposed schedule of construction activities to all potentially affected landowners and post in recreational areas along the rights-of-way.
- Conduct construction activities in coordination with agricultural activities to the extent practicable.
- Avoid construction at E. E. Wilson Wildlife Area during the September through October hunting season.

- Instruct equipment operators and construction crews to leave gates as they were to avoid disturbances to livestock and to stay within the rights-of-way to minimize impacts to crops.
- Coordinate with landowners regarding locations of new or temporary access roads and gates, to limit potential agricultural disruptions.
- Compensate landowners for the value of commercial crops damaged or destroyed by construction activities as required in easement documents or other applicable land use agreements.
- Landowners would be compensated for landscaping outside of the rights-of-way that would be removed or damaged. Compensation for permissible landscaping inside the rights-of-way would be determined based upon easement documents or other applicable land use agreements.
- Employ traffic-control flaggers and post warning signs of construction activities and merging traffic, when necessary, for short interruptions of traffic.
- Prepare a notice about construction activities and a proposed schedule for posting on the Oregon Department of Transportation's (ODOT) traffic advisory web site called Trip Check (www.tripcheck.com).
- Coordinate with ODOT on road construction activities and transmission line crossings of U.S. Hwy 20, State Route 22, and State Route 51.
- Coordinate with BNSF Railroad on removal and installation of conductors where the lines cross the railroad and structure removals and installation in the railroad right-of-way.
- Repair damage to roads caused by construction.

3.1.4 UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION

Unavoidable impacts to land use and recreation would include disruptions to land use and traffic during construction, removal of land from use for new tower locations and new or widened roads, and removal of some landscape trees.

3.2 GEOLOGY AND SOILS

This section describes the existing geology and soils found within the affected environment, as well as potential impacts of the Proposed Action on these resources. The No Action Alternative is discussed at the end of Chapter 3.

3.2.1 AFFECTED ENVIRONMENT

The affected environment for geology and soils consists of the 20-foot wide corridor centered on project access roads and the 100-150 foot wide rights-of-way for both transmission lines, as well as tensioning sites where they extend outside of the rights-of-way.

GEOLOGY AND TOPOGRAPHY

The Proposed Action is located in the Willamette Valley physiographic province. The geology and soils along the Proposed Action rights-of-way consist of unconsolidated river and stream sediments comprised of gravel, sand, silt, and clay predominantly derived from shales and sandstones of Eocene age. Alluvial deposits of the Willamette River floodplain extend to a depth of about 50 to 75 feet. The “gravel” of this formation averages about 3 inches in diameter but often ranges up to cobble size at 10 inches or more in diameter. Material composition is mostly basalt, but andesite, dacite, quartz and diorite also common. This formation consists of gravels, sand, silt, clay and peat deposited in stream channels and on modern floodplains. Material sources are rock formations of the stream headwaters and all the formations through which the stream courses. Deposits within the stream channel itself are generally gravel and sand. However, within the channels of slower moving streams, the deposits are of a smaller particle size, ranging from silt to clay.

The bedrock of the Willamette syncline (a concave geological fold, with layers that dip downward towards the center of the structure), which is composed of marine sediments and Columbia basalt, is exposed in the Salem Hills. The valley is divided into two more or less natural subdivisions by the Salem Hills-Eola Hills topographic high area. This geomorphic unit consists of remnants of the oldest stable geomorphic surfaces in the area, including the Salem Hills. Typical remnant landforms have rounded hill and valley topography with as much as 200 feet of local relief. Slope gradients range up to 20 percent on landscapes that have not been recently modified. The bedrock formation trends downward from the Salem Hills resulting in a trough that dips to the northeast. This bedrock formation is exposed extensively in the Salem Hills south of Salem.

The Salem-Albany No. 1 right-of-way is characterized by mostly flat and gentle topography, with a minimum elevation of approximately 131 feet near structure SA1:2/4 and a maximum elevation of approximately 939 feet at structure SA1:8/2. The Salem-Albany No. 2 right-of-way is also characterized by mostly flat and gentle topography with a minimum elevation of approximately 152 feet near structure SA2:4/9 and a maximum elevation of approximately 839 feet at structure SA2:2/9. River and large stream crossings have the steepest terrain in the affected area, with local relief of up to 10 to 15 feet in these locations.

SOILS

Fifty-four different soil map units are present within 50 feet of the structures within the Salem-Albany No. 1 and No. 2 rights-of-way (USDA 2010). These soils are susceptible to low-to-moderate levels of erosion when exposed to water or wind (USDA 2010). Primary soil map units comprising more than 0.75 linear miles of the Project Area are listed below in Table 3-2. All map units listed are designated as prime farmlands or farmlands of statewide importance except for the Jory silty clay loam 7 to 12 percent slopes map unit.

Table 3-2. Primary Soil Map Units Comprising More than 0.75 Linear Mile of the Project Area

Transmission Line	Soil Series
Salem-Albany No.1	Cloquato silt loam, Dayton silt loam, Jory silty clay loam 12 to 20 percent slopes, Nekia silty clay loam 2 to 7 percent slopes, Amity silt loam, Newberg fine sandy loam, Wapato silty clay loam, Jory silty clay loam 7 to 12 percent slopes, Malabon silty clay loam (rarely flooded) 0 to 3 percent slopes and Wellsdale-Willakenzie-Dupee complex 2 to 12 percent slopes
Salem-Albany No. 2	Dayton silt loam, Woodburn silt loam 0 to 3 percent slopes, Amity silt loam, Willamette silt loam 3 to 12 percent slopes, Concord silt loam, Helmick silt loam 3 to 12 percent slopes, Amity silt loam 0 to 3 percent slopes, Woodburn silt loam 3 to 12 percent slopes and Nekia silty clay loam 2 to 12 percent slopes.

LANDSLIDE HAZARD AREAS AND REGIONAL FAULTS

Along Salem-Albany No. 1, mapped landslide hazard areas are located in the Salem Hills between structures SA1:3/2 and 4/3 and structures SA1:8/4 and 9/6. Along Salem-Albany No. 2 a single mapped landslide hazard area is located in the Eola Hills between structures SA2:2/11 and 3/8.

Regional faults are mapped only along Salem-Albany No. 1 at structures SA1:6/5, 14/2, 19/4, 22/8, and 22/6. These regional features are associated with the Corvallis Thrust Fault complex.

3.2.2 ENVIRONMENTAL CONSEQUENCES—PROPOSED ACTION

BPA analyzed how the Proposed Action could impact geology and soils in the affected area. During construction, impacts to soils would occur in the construction areas around structures, along access roads, and in reeling and tensioning sites. These impacts would occur as a result of excavation during structure replacement and road work, and from the compaction caused by the movement of heavy equipment. Other soil impacts could include contamination from leaching of wood pole preservatives or accidental equipment spills. Ground that has been cleared of vegetation could be susceptible to erosion and establishment of noxious weeds (Section 3.3, Vegetation). Ground compaction could degrade the soil structure and reduce soil productivity and the soil’s ability to absorb water. Soil erosion could be increased by removing vegetation, exposing soils, and increasing runoff in compacted areas. The extent of impacts at any one site would depend upon soil quality, the amount of surface water flowing across the site, steepness of topography in the area, amount of time that soils are bare and unvegetated, and the type of structure erected, including whether guy wires would be needed to anchor the structure in place.

STRUCTURE AND TRANSMISSION LINE REPLACEMENT

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 the structure would be temporarily compacted but would stabilize as they become settled and as vegetation becomes reestablished. At most structure sites, construction activities would temporarily disturb an area approximately less than 0.2 acre, for a total disturbance of 113 acres across the Proposed Action. In sensitive habitats, such as wetlands, the disturbance area around structures would be reduced to approximately 0.06 acre to protect these areas. Disturbance at reeling and tensioning sites would temporarily impact a total of approximately 25.9 acres. Soil compaction could be greater early and late in the construction season when soils may hold more moisture from the rainy season and are more susceptible to compaction and rutting; however, the majority of the construction season would occur during the drier summer months.

The relatively flat to rolling topography of the project area reduces the potential for erosion, which would be highest during heavy rainfall or strong winds. Until vegetation becomes reestablished, soil erosion due to wind and water could occur; however, once vegetation is established erosion would be unlikely. Prompt mulching and seeding of exposed soils would further reduce the potential for erosion from disturbed sites. Construction during the dry summer season would also reduce this risk; water trucks would be used to reduce erosion from wind during the dry season. Erosion resulting from the Proposed Action would likely be less than what is experienced in the surrounding area from farming practices because the relative amount of soil disturbance would be low, and all disturbed areas would be stabilized and reseeded. Under the Proposed Action, operation and maintenance repairs would likely be reduced from existing conditions, as the structures and access roads would be new, further reducing the opportunity for soil disturbance. Erosion and compaction impacts at staging areas would not occur since the area used would be level and already paved or graveled.

The existing structure holes would be used for the new structures, thus limiting potential impacts, except for where structures would be relocated, or where H-frame structure would be replaced by monopoles (see Section 2.1.1.2). At most structure sites, after the old structure is removed, the excavated hole would be slightly enlarged and backfilled with gravel to provide stability for the new structure; any additional soil removed by the auger would be spread evenly around the structure sites. At structure sites determined to be within sensitive areas, the augured soil would be removed from the site and disposed of at an appropriate waste disposal site. Since a relatively small amount of soil would be disturbed, impacts would be temporary, most construction activities would take place during the dry season, and BMPs would be employed to reduce compaction, disturbance, and erosion, soil impacts from the Proposed Action would be low.

The wood-pole structures would be treated with a wood preservative called pentachlorophenol (PCP) that is commonly used for treatment of utility poles. PCP contains chlorinated dibenzodioxins and chlorinated dibenzofurans that have the potential to leach into soils or water (if the wood pole is in contact with water, such as wetlands). PCP can move through the pole and leach from the bottom of the pole into the soil near the underground portion of the pole (EPA 2008). PCP tends to move through the pole rapidly for the first few years of use, and then becomes relatively constant with time, has a tendency to rapidly degrade in the environment, and concentrations decrease rapidly with distance from the wood. PCP concentrations decrease by as much as two orders of magnitude between 3 and 8 inches from the wood pole, but that migration is dependent upon localized factors such as soil type, soil chemistry, local weather and topography, initial level of pole treatment, and the age of the pole (Electrical Power Research Institute

1995). In wetlands, wooden structures would be placed inside corrugated metal pipes, which would contain PCPs and prevent them from leaching into surrounding soils. Because PCP does not tend to travel far from the structure, it generally degrades rapidly in the environment, and in areas where leaching potential is higher, structures would be placed in pipes, potential soil contamination impacts from the Proposed Action would be low (also see Section 3.6, Wetlands and Floodplains).

ROAD CONSTRUCTION AND ROUTES OF TRAVEL

Construction, reconstruction, and improvement of access roads would permanently impact 78 acres of soils. Additionally, 41 acres of soils would be disturbed for routes of travel. Areas that are temporarily disturbed would be revegetated following completion of construction, and erosion control practices would be employed during construction. On the 78 acres of soil where roads are constructed, soils under the access roads would become compacted over the long-term, but soil erosion would be minimized since soils would be stabilized by a gravel top layer (14 feet wide) for the roadway. In addition, the reduction in soil erosion as a result of road improvement measures (and the improved road network for emergency repairs) would have a positive impact on soils, because the improved roads would be more stable and better capable of handling stormwater, and thus would be less likely to erode, particularly during a storm event. Of the three access road options near or across the Ankeny NWR, Option 3, that would install a temporary road, would have the least short-term impact because it would not require excavation and grading—Option 1, that would build a new road within BPA right-of-way, would likely have the least long-term impact because it would provide a stable access route for maintenance vehicles. Due to stabilization of temporary and permanent disturbance areas, and the relatively small area of impact, construction of access roads would have a low impact on soils.

TREE REMOVAL

Soil impacts due to danger tree cutting, limbing, or topping would include minor soil compaction and disturbance from vehicles used to transport workers and felled trees. Trees removed for access road work would likely have roots as well as the tree removed and would cause soil excavation and disturbance. Soil impacts would be greater if tree work should occur during the rainy season. Danger tree removal would allow roots, as well as low ground cover vegetation, including shrubs and grasses, to be left in place. Access to the majority of locations for danger tree removal would be through areas not currently within BPA's rights-of-way; once trees are removed these routes would not be regularly accessed by BPA (danger tree survey and removal occurs approximately once every 10 years). Because soil compaction would generally be minor, temporary, and occur in isolated areas along the transmission line rights-of-way, and tree removal for access roads would be limited to about 15 trees and would be in the same footprint as new road construction, impacts to soils from tree removal would be low.

3.2.3 MITIGATION MEASURES

The following mitigation measures have been identified to reduce or eliminate impacts to geology and soils:

- Place new structures in existing structure holes to the maximum extent practicable to reduce ground disturbances.
- Conduct project construction, including danger tree removal, to the extent practicable, during the dry season when soil moisture, rainfall, and runoff are low to minimize erosion and compaction.

- Install sediment barriers and other appropriate erosion-control devices, and retain vegetative buffers where possible, to minimize erosion.
- Control runoff and prevent erosion on access roads by using low grades and installing water bars, drain dips, and outlet ditches.
- Properly space and size culverts.
- Use water trucks on an as-needed basis to minimize dust and reduce erosion due to wind.
- Assist farm operators in restoring the productivity of compacted soils through tilling or scarifying in agricultural lands.
- Reseed disturbed areas with an appropriate seed mix as soon as work in an area is completed.
- After construction, inspect and maintain access roads to ensure proper function and nominal erosion levels.

3.2.4 UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION

Even with the implementation of mitigation measures, some erosion would occur during construction, soil would be disturbed, and in areas of new roads, soil would be permanently compacted.

3.3 VEGETATION

This section describes the existing vegetation found within the affected environment, as well as potential impacts of the Proposed Action on these resources. The No Action Alternative is discussed at the end of Chapter 3.

3.3.1 AFFECTED ENVIRONMENT

The affected environment for vegetation consists of the 20-foot right-of-way centered on project access roads, the 100-150-foot rights-of-way for both lines, any tensioning sites that extend outside of the rights-of-way, and areas with danger trees that would be removed.

ECOREGIONS

The affected environment lies entirely within the Willamette Valley ecoregion. The climate is characterized by wet winters and warm, dry summers. Average annual precipitation here ranges from 37 to 59 inches, with about 2 to 6 inches falling as snow (ODFW 2006). The Willamette Valley has been extensively modified in the last two centuries. Historically, the area supported native oak woodlands and oak savannah, coniferous forests, wetlands and grasslands (including wet prairie), and riparian forest (Franklin and Dyrness 1973; ODFW 2006). However, European colonization of the Willamette Valley resulted in clearing for agricultural uses such that most of these native habitats are now gone, with small fragments remaining (ODFW 2006). Currently, more than 96 percent of the Willamette Valley is under private ownership, and more than 40 percent is used for agricultural production; more than 100 types of crops are grown, including more than 480,000 acres of grass seed (USFWS 2014).

VEGETATION COMMUNITIES

Habitat conditions within the affected area typically reflect the highly disturbed, intensely managed conditions within the existing rights-of-way and the BNSF Railroad right-of-way, actively managed agricultural lands, as well as urban, rural, and residential development (Table 3-3).

Vegetation in the Proposed Action's existing rights-of-way consists either of crops or of meadow grasses, herbaceous plants, shrubs, and tree saplings resulting from vegetation management practices intended to keep low-growing vegetation in the rights-of-way consistent with BPA's *Transmission System Vegetation Management Final EIS and Record of Decision* (BPA 2000). Representative species identified during field surveys include bracken fern (*Pteridium aquilinum*), blue wildrye (*Elymus glaucus*), creeping bentgrass (*Agrostis stolonifera*), velvet grass (*Holcus lanatus*), western sword fern (*Polystichum munitum*), fringed cup (*Tellima grandiflora*), common snowberry (*Symphoricarpos albus*), and Himalayan blackberry (*Rubus armeniacus*). Vegetation cover types in the land adjacent to the project rights-of-way were determined by dominant plants and land uses in the field and a review of the Willamette Valley Land Use Land Cover GIS data (ODFW 2002). The following vegetation communities were identified within and adjacent to the project area, based on field data collected during winter 2013-2014 and supplemented by Willamette Valley Land Use Land Cover GIS data, which provides vegetation data (BPA 2014b; ODFW 2002):

- **Agricultural/Pastoral** communities, including row crops, orchards and berry fields, annual grasses, perennial grasses, and unmanaged pasture. These communities are dominant within the project

area, and are traversed by about 64 percent of the rights-of-way. Agricultural and pastoral land is further addressed in Section 3.1.

- **Riparian and wetland** communities, including those dominated by black hawthorn (*Crataegus douglasii*), cottonwood (*Populus* spp.), and willow (*Salix* spp.) species, as well as herbaceous wetlands dominated by invasive reed canary grass. These types are traversed by about 21 percent of the rights-of-way. (Field delineated wetlands are discussed in Section 3.6, Wetlands and Floodplains).
- **Oak woodlands**, comprising about 8 percent of the land adjacent to the rights-of-way, including forests classified as oak, oak/Douglas fir forest with greater than 50 percent oak, Douglas fir/oak forest with greater than 50 percent Douglas fir, oak-madrone, and Douglas fir/oak forest with urban areas.
- **Upland forests**, comprising about 3 percent of the land adjacent to the rights-of-way, including mixed conifer and mixed deciduous forest. These forest types include maple/alder/fir with hardwoods, and maple/alder/fir forests that include some residential or suburban development, and Douglas fir.

Table 3-3. Typical Vegetation Communities and Species Occurring in and Adjacent to the Rights-of-Way

Vegetation	Description and Typical Species	Percent of Area Adjacent to Rights-of-Way
<i>Vegetative Community: Agricultural/Pastoral</i>		64%
Row crops, orchards, and berry fields	Common species include Christmas trees, common oat, field mustard, hazelnut, pumpkin, peppermint, hybrid poplar, radish, tall cultivated wheat, blueberry, and corn.	7%
Annual and perennial grasses;	Common species include fescue, orchard grass, red fescue, annual ryegrass, and perennial ryegrass.	48%
Unmanaged pasture lands	Unmanaged pasture contains uncut hay, organic debris, and may include exotic plants such as tansy ragwort, thistle, Himalayan blackberry, as well as other common shrubs.	9%
<i>Vegetative Community: Riparian and Wetland</i>		22%
Black Hawthorn Riparian and Hedgerows (includes Wetlands)	This cover type is dominated by black hawthorne hedgerows and unmanaged pasture that has reverted to brushy habitat. Other common species include volunteer apple (<i>Pyrus fuscus</i>) or cherry (<i>Prunus</i> spp.), Indian plum (<i>Oemleria cerasiformis</i>), Himalayan blackberry, Poison oak (<i>Toxicodendron diversilobum</i>), willow, Red-osier dogwood (<i>Cornus sericea</i>), and others.	19%
Cottonwood Riparian	Occurs along major streams and rivers in the project area. Common species include cottonwood (<i>Populus trichocarpa</i>), willow, alder (<i>Alnus rubra</i>), pacific dogwood (<i>Cornus nuttali</i>), black hawthorn, red-osier dogwood, chokecherry (<i>Prunus virginiana</i>), western Hazel (<i>Corylus cornuta</i>), serviceberry (<i>Amelanchier alnifolia</i>), rose (<i>Rosa</i> spp), and snowberry.	<1%
Willow Riparian	Common plants noted in the field in the project area included willows such as Sitka willow (<i>Salix sitchensis</i>), associated with Oregon Ash (<i>Fraxinus latifolia</i>), Oregon crabapple (<i>Malus fusca</i>), rose, Himalayan blackberry, red-osier dogwood, and ninebark. Cottonwood may also occur.	<1%
Herbaceous Wetlands including Reed Canarygrass Wetlands and Bottomland Pasture	Invasive reed canarygrass (<i>Phalaris arundinacea</i>) occurs frequently, often as a dominant species, in wetlands in the project area. Native wetland plants such as small-fruited bulrush (<i>Scirpus microcarpus</i>), cattails (<i>Typha latifolia</i>), American speedwell (<i>Veronica americana</i>), soft rush (<i>Juncus effusus</i>), dagger-leaf rush (<i>Juncus ensifolius</i>), and one-sided sedge (<i>Carex unilateralis</i>), slough sedge (<i>Carex obnupta</i>), dense sedge (<i>Carex densa</i>), tufted hairgrass, tall fescue, velvet grass, fuller's teasel (<i>Dipsacus fullonum</i>), and oval broom sedge (<i>Carex ovalis</i>). Plants noted during field visits also included introduced species of bentgrass (<i>Agrostis</i> spp.).	1%

Table 3-3. Typical Vegetation Communities and Species Occurring in and Adjacent to the Rights-of-Way

Vegetation	Description and Typical Species	Percent of Area Adjacent to Rights-of-Way
<i>Vegetative Community: Oak Woodlands</i>		8%
Oak or Oak-Douglas Fir Forest	Overstory is dominated by Oregon white oak (<i>Quercus garryana</i>), or includes Oregon white oak in combination with big leaf maple and Douglas-fir (<i>Pseudotsuga menziesii</i>). Typical shrub species include: oceanspray (<i>Holodiscus discolor</i>), baldhip rose (<i>Rosa gymnocarpa</i>), poison oak, serviceberry, beaked hazel, trailing blackberry (<i>Rubus ursinus</i>), Indian plum, snowberries, wedge-leaf ceanothus (<i>Ceanothus cuneatus</i>), and oval-leaf viburnum (<i>Viburnum ellipticum</i>). Typical herbaceous species include: western fescue (<i>Festuca occidentalis</i>), Alaska oniongrass (<i>Melica subulata</i>), blue wildrye, and long-stolon sedge (<i>Carex inops</i>).	7%
Oak-Madrone Forest	Overstory is the same as Oak or Oak-Douglas Fir forest, but also includes any occurrence of madrone (<i>Arbutus menziesii</i>). Understory species are similar to those listed above for Oak-Douglas Fir forest	1%
<i>Vegetative Community: Upland Forest (Mixed Conifer/Mixed Deciduous Forest)</i>		3%
Mixed Conifer/Mixed Deciduous Forest	<p>Outside of the rights-of-way, vegetation is a mature second-growth forest comprised mainly of Douglas fir, big-leaf maple (<i>Acer macrophyllum</i>), and Oregon white oak with lesser occurrences of grand fir (<i>Abies grandis</i>), Pacific madrone, western redcedar (<i>Thuja plicata</i>), and western hemlock (<i>Tsuga heterophylla</i>).</p> <p>Some areas of upland forest include grassy areas with native grasses include blue wildrye and California brome (<i>Bromus carinatus</i>). Introduced pasture grasses also occur, of which creeping bentgrass, velvet grass, and orchard grass were noted in the field.</p> <p>Forbs include tough-leaf iris (<i>Iris tenax</i>) and Douglas aster (<i>Symphyotrichum subspicatus</i>).</p> <p>Woody plants present could include tall Oregon-grape (<i>Berberis aquifolium</i>), Oregon white oak, and poison hemlock (<i>Conium maculatum</i>).</p> <p>Vegetation management within the rights-of-way forestalls the development of tree species; therefore, the dominant vegetation within the rights-of-way is primarily herb and shrub species. Vegetation noted within the rights-of-way include bracken fern, blue wildrye, creeping bentgrass, velvet grass, western sword fern, fringedcup, common snowberry, and Himalayan blackberry.</p>	3%
<i>Vegetative Community: Urban or Unvegetated</i>		3%
Urban or Unvegetated Areas	Dominant species include ornamentals as well as dominant species from other upland categories. Open water, defined as all rivers, streams, and farm ponds large enough to fit in the scale of the map, are also included in unvegetated areas. These waters are generally associated with the riparian and wetland vegetation types described above.	3%

STRATEGY HABITATS

The Oregon Conservation Strategy describes strategy habitats, which are managed with a priority for conservation due to their importance for ecological values and species conservation (ODFW 2006).

Vegetative strategy habitats that occur within the affected area are grasslands (including grass-dominated upland prairie), oak woodlands, wetlands, and riparian habitats.

- Grassland strategy habitats are dominated by grasses, forbs, and wildflowers, have well-drained soils and often occur on dry slopes. Oak savannahs are grasslands with scattered Oregon white oak trees, generally one or two trees per acre. These habitats are extremely rare in the affected area but may be found in pastures.
- Oak woodlands are characterized by an open canopy dominated by Oregon white oak. Douglas-fir may also occur. The understory is relatively open with shrubs, grasses, and wildflowers. This habitat type is maintained by fire, which removes small conifers. These habitats are present within the affected area. Oak woodlands once covered almost 400,000 million acres in the Willamette Valley, but now cover less than 7 percent of its historic habitat (ODFW 2006). The Oregon Conservation Strategy utilized existing plans, spatial analysis, and expert review to identify key Conservation Opportunity Areas and actions to conserve these key habitats. The ODFW is responsible for implementation of the Conservation Strategy. In addition, a group of interested parties including agency personnel, researchers, wildlife biologist, and planners formed the Oregon Oak Communities Working Group in 1999. This group meets two to four times a year to share information on restoration and management techniques, restoration projects, research findings, and grant and financial incentive opportunities and assists landowners in meeting management goals as well as increasing the overall understanding of oak communities in the Willamette Valley (ODFW 2006).
- Wetlands are areas that are covered with water during all or part of the year. Specific wetland types that are discussed in the Conservation Strategy and may be present in the Proposed Action vicinity are marshes, off-channel habitat, seasonal ponds and vernal pools, wet prairies, and wet meadows. Wetlands occur within the affected area, and are discussed in this section as well as Section 3.6, Wetlands and Floodplains.
- Riparian habitats are areas adjacent to rivers and streams or on nearby floodplains and terraces. Riparian habitats also include springs, seeps, and intermittent streams, and vary from sparsely vegetated areas to mature forests. Riparian areas occur within the affected area, and are discussed in this section, as well as Section 3.4, Fish and Wildlife and Section 3.5, Water Resources.

NOXIOUS WEEDS

Noxious weeds are plant species designated by federal or state law. In Oregon, the Oregon Department of Agriculture (ODA) divides noxious weeds into three categories: A, B, and T. A-listed weeds are of known economic importance whose presence is imminent or which occur in the state in small enough infestations to make eradication or containment possible. B-listed weeds are of known economic importance and are regionally abundant. T-listed weeds are priority noxious weeds designated by the Oregon State Weed Board as a target for which the ODA would develop and implement a statewide management plan (ODA 2010).

Noxious weeds noted during the vegetation reconnaissance survey conducted in winter 2014 included reed canarygrass, poison hemlock, and Canada thistle. Weed surveys will also be conducted in summer 2014 and the results incorporated into the Final EA.

SPECIAL-STATUS PLANTS

Special-status plants are those species that have been identified for protection and/or management under the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*), or by the Oregon Department of Agriculture (ODA 2014). A total of 17 special-status plant species may occur within project counties, of which 13 may occur in the affected area based on the availability of suitable habitat. Four species, Clackamas corydalis, Coast Range fawn lily, golden paintbrush, and white bark pine either do not have suitable habitat within the vicinity of the Proposed Action or are considered extirpated from the area (Natureserve 2014); therefore, they are not analyzed in Section 3.3.2. Table 3-4 lists state and federal special-status plant species documented in counties within the affected area, and provides a description of the habitat where these species typically occur.

A special-status plant survey will be conducted during spring and summer 2014 for the entire length of the existing project rights-of-way excluding cultivated areas, and along access roads located outside of the project rights-of-way. The results of the surveys would be included in the Final EA. Table 3-5 shows the special status plant species that have potential to occur within habitat areas that will be surveyed.

Table 3-4. Special-Status Plants with Potential to Occur in Project Area

Common Name (<i>Scientific Name</i>)	Habitat Description	ONHIC Status †	State Status	Federal Status	Likelihood of Occurrence in Project Area and Survey Plan
Bradshaw's lomatium (<i>Lomatium bradshawii</i>)	Willamette Valley low elevation grasslands and prairies. Habitat type is described as wet, seasonally flooded prairies and grasslands common around creeks and small rivers. Most documented occurrences in Oregon are south of Albany, although a few have been recorded between Salem and Albany west and east of the affected area. Known occurrences in Baskett Slough and Finley NWR.	1	Endangered	Endangered	Possible; suitable habitat is present, Historical occurrence at the north end of the project, in the vicinity of the Salem substation to structures SA2:2/9 and SA1: 4/1 flowering period is mid-April through May. Surveys planned for 2014.
Kincaid's lupine (<i>Lupinus sulphureus ssp. kincaidii</i>)	Upland prairie remnants and ecotones between grassland and forest. It usually occurs in heavy, well-drained soils at elevations below 838 meters (2,750 feet).	1	Threatened	Threatened	Possible; Historical occurrence at the north end of the project, in the vicinity of the Salem substation to structures SA2: 2/9 and SA1:4/1; two observations in E.E. Wilson Wildlife Area about 0.8 mile west of structure SA2:21/1 in two locations in 2007 ² . Flowering period is mid-April through June. Surveys planned in 2014.
Nelson's checker-mallow (<i>Sidalcea nelsoniana</i>)	Typically found in open prairie remnants along the margins of streams, sloughs, ditches, roadsides, fence rows, drainage swales, and in fallow fields west of the Cascade Mountains, in the Willamette Valley, and occasionally in the Coast Range and north to Lewis County, Washington. Found at sites with seasonally wet soils and within a hydrologic regime where reed canarygrass also thrives. Often found on heavy, poorly draining alluvial clays with hydric characteristics. Occasionally, the species occurs in the understory or at the edges of ash woodlands or among woody shrubs. Found at elevations from about 43 to 610 meters (140 to 2,000 feet).	2	Threatened	Threatened	Possible; a similar species (meadow checkermallow) was noted during winter 2014 field visits, and plants have been observed at Ankeny NWR about 0.75 mile east of the affected area (USFWS Pers. Comm. 2014). Often occurs with reed canarygrass, which is abundant in wet areas in the rights-of-way. Four observations were recorded in an ephemeral wet area west of a fishing pond in E.E. Wilson Wildlife Area about 1 mile west of structure SA2:21/1 in four locations in 2007. There were also historical observations 0.1 to 2 miles east of structure SA2:11/1; however, this population is thought to be extirpated. Flowering period is May through September. Surveys planned in 2014.

Table 3-4. Special-Status Plants with Potential to Occur in Project Area

Common Name (Scientific Name)	Habitat Description	ONHIC Status †	State Status	Federal Status	Likelihood of Occurrence in Project Area and Survey Plan
Peacock larkspur* <i>(Delphinium pavonaceum)</i>	Low, nearly flat areas in moist, silty soils of the Willamette River floodplain at elevations ranging from 45 to 120 meters (150 to 400 feet). It occurs in native wet prairies, on the edges of ash and oak woodlands, and along roadsides and fence rows.	1	Endangered	Species of Concern	Possible; seven known occurrences of this species within about one mile of the affected area, including observations within Ankeny NWR. Flowering period is April through June. Surveys planned in 2014.
Shaggy horkelia <i>(Horkelia congesta ssp. Congesta)</i>	Willamette Valley species that occurs in meadows and open woods at 150 to 2,100 feet in elevation. (Also endemic to the Umpqua Valley, Klamath Mountains ecoregion)	1	Candidate	Species of Concern	Possible. Not recorded within the Project. Flowering period April to July.
Tall bugbane <i>(Cimicifuga elata)</i>	Occurs in or at margins of moist conifer forests or mixed conifer-deciduous forests west of the Cascade Mountains in Oregon, Washington, and British Columbia, usually on northerly aspects, in filtered light. Occurrences in Oregon are scattered to the west of the Cascades between Portland and Medford. Typically the dominant conifer is Douglas fir; bigleaf maple or red alder are often present in the overstory. Elevation 50 to 5,600 feet.	1	Candidate	-	Possible; limited suitable habitat exists within the affected area. Surveys planned in 2014.
Thin leaved peavine <i>(Lathyrus holochlorus)</i>	Occurs in the Willamette Valley (also the Umpqua Valley) at low elevation roadsides, fencerows, creek banks, forest edges, oak savannahs, shrublands and grasslands from 100 to 2,000 feet in elevation.	1	-	Species of Concern	Possible; many known occurrences in Willamette Valley, including seven within about 0.5 miles of the Project, and suitable habitat exists. Flowering period April to June. Surveys planned 2014.
Water howellia <i>(Howellia aquatilis)</i>	In the Willamette Valley, known from only one population south of Corvallis but was historically widespread. Also occurs in Washington, Idaho, Montana, and California. Occurs mainly in small, vernal, freshwater wetlands and ponds that are usually filled with water in late fall, winter, and early spring, then dry up, at least in part, by the end of the growing season. The species is also found in oxbow sloughs and on the margins of marshy areas. In Oregon, found at elevation 20 to 250 feet.	1	Threatened	Threatened	Possible; historical observations in the vicinity of the north end of the Project, from the Salem substation to structure SA2:3/1 and SA1:4/1. Flowering period is June through August. Surveys planned in 2014.

Table 3-4. Special-Status Plants with Potential to Occur in Project Area

Common Name (Scientific Name)	Habitat Description	ONHIC Status †	State Status	Federal Status	Likelihood of Occurrence in Project Area and Survey Plan
Wayside aster (<i>Eucephalus vialis</i>)	The majority of the known populations are in the Willamette Valley in coniferous forests (normally dominated by Douglas-fir), especially in dry sites, at elevations of 500 to 1,500 feet.	-	Threatened	-	Possible; limited suitable habitat exists in the project area; no known occurrences in the project vicinity. Flowering period is July through September. Surveys planned 2014.
White rock larkspur (<i>Delphinium leucophaeum</i>)	Found on the edges of oak woodlands, in dry roadside ditches, on basalt cliffs, along riverbanks and bluffs, on moist rocky slopes, and in moist lowland meadows in the Willamette Valley and Lewis County, Washington. It inhabits loose, shallow soils along slopes ranging from horizontal plateaus to vertical cliffs, in open exposed areas to fairly deeply shaded spots 50 to 1,050 feet in elevation. Only known occurrences are near Portland.	1	Endangered	Species of Concern	Unlikely; suitable habitat exists, but the species is extremely rare and is not known to occur in the Project vicinity; flowering period is May through June. Surveys planned 2014.
White-topped aster (<i>Sericocarpus rigidus</i>)	Found in the Willamette Valley, western Washington, and British Columbia. Occurs in open, grassy, seasonally moist prairie and savannah habitats, at elevations ranging from about 100 to 750 feet.	1	Threatened	Species of Concern	Possible; flowering period is late July through September. Surveys planned 2014.
Willamette Valley daisy (<i>Erigeron decumbens</i>)	Endemic to the Willamette Valley. Inhabits both seasonally flooded bottomland prairies and well-drained upland prairies at elevations ranging from 100 to 1,100 feet.	1	Endangered	Endangered	Possible; historical observations in the vicinity of the north end of the Project, from the Salem substation to structure SA2:3/1 and SA1:4/1. Flowering period is July through early July. Surveys planned 2014.
Willamette Valley larkspur (<i>Delphinium oregonum</i>)	At low elevations (150 to 1,400 feet) in Willamette Valley, is most commonly found in wet prairies with shrubby or Oregon ash overstory, also roadsides, fencerows, dry oak woodlands, open hillsides, and well-drained native prairies.	1	Candidate	-	Possible; suitable habitat occurs within the Project area; Flowering period May through July; surveys planned 2014.

Source: Oregon Flora Project 2011 unless otherwise noted. ¹ ORBIC 2014, ODA 2013, ² Hammond 2001-2010; USFWS 2006; USFWS 2013; BPA 2010c; BPA 2014b).

† ONHIC rankings: 1. Taxa threatened with extinction or presumed extinct throughout entire range. 2. Taxa threatened with extirpation or presumed extirpated from Oregon. 3. Taxa needing more information before status is determined. 4. Taxa of conservation concern and requiring continued monitoring. ex – presumed extinct.

Table 3-5. Vegetation Types Included in Special Status Plant Survey Areas and Species with Potential to Occur in Habitats to be Surveyed (colored cells indicate suitable habitat)

Survey Areas	Bradshaw's lomatium	Clackamas corydalis	Drooping bulrush	Golden paintbrush	Gorman's aster	Kincaid's lupine	Lesser bladderwort	Nelson's checker-mallow	Peacock larkspur	Racerned goldenweed	Shaggy horkelia	Tall bugbane	Thin leaved peavine	Tooth cup	Thompson's mistmaiden	Tri-colored Monkey Flower	Water howellia	White rock larkspur	White-topped aster	Willamette Valley daisy	Willamette Valley larkspur
Agricultural																					
Annual Row Crops, Annual and Perennial Grasses (Agricultural)																					
Orchards, Vineyards, Berries, and Christmas trees																					
Unmanaged Pasture																					
Wetland and Riparian																					
Black Hawthorn Riparian, Hedgerows and Brushy Fields																					
Cottonwood Riparian																					
Willow																					
Reed Canary Grass Wetland																					
Cattail - Bulrush																					
Ash / Cottonwood – Maple Bottomland Pasture Mosaic																					
Prairie Remnants																					
Hairgrass Prairie																					
Forests																					
Oak / Douglas Fir - > 50% Oak																					

Table 3-5. Vegetation Types Included in Special Status Plant Survey Areas and Species with Potential to Occur in Habitats to be Surveyed (colored cells indicate suitable habitat)

Survey Areas	Bradshaw's lomatium	Clackamas corydalis	Drooping bulrush	Golden paintbrush	Gorman's aster	Kincaid's lupine	Lesser bladderwort	Nelson's checker-mallow	Peacock larkspur	Racerned goldenweed	Shaggy horkelia	Tall bugbane	Thin leaved peavine	Tooth cup	Thompson's mistmaiden	Tri-colored Monkey Flower	Water howellia	White rock larkspur	White-topped aster	Willamette Valley daisy	Willamette Valley larkspur
Douglas Fir, Douglas Fir / Oak - < 50% Oak																					
Oak - Madrone or Douglas Fir - Madrone																					
Maple/Alder/Fir - Hardwoods Dominant																					
Unclassified Forest																					
Urban and Developed																					
Recreational Fields, Parks																					
Urban & Industrial																					
Water																					
Water - rivers, lakes and ponds																					
Gravel Bars and Sand																					

3.3.2 ENVIRONMENTAL CONSEQUENCES — PROPOSED ACTION

The following sections describe how the Proposed Action could alter or damage vegetation other than cultivated crops in the affected environment. (For impacts to cultivated crops, see Section 3.1).

GENERAL VEGETATION

Construction of the Proposed Action would temporarily disturb 180 acres of vegetation and result in the loss of 78 acres of vegetation in the long-term (Table 3-6); however much of these disturbed areas would be inside the currently maintained rights-of-way, which is herbaceous/shrub maintained vegetation, pasture, or other agricultural vegetation. Impacts to maintained rights-of-way and agricultural vegetation types account for 59 percent of temporary project impacts and 58 percent of permanent impacts.

Temporary construction impacts to vegetation would occur through direct clearing or crushing for construction activities including replacing structures and associated hardware such as, guy wire anchors and counterpoise; and tensioning sites. Additional temporary indirect impacts could include soil compaction from the use of heavy equipment and exposed soils from excavation, clearing, and disturbance. Soil compaction could adversely affect plant growth by reducing water infiltration and storage. Compaction could also inhibit germination of seeds in the upper soil horizon and result in the development of bare-soil areas, or foster compaction-tolerant weeds. Exposed soils could be more susceptible to weed establishment and to stormwater erosion, particularly in sloped areas, both of which could degrade the surrounding plant community and lead to long-term effects. However, as discussed in Section 3.2, disturbed areas would be promptly mulched and reseeded to reduce these risks, and soils would eventually recover as vegetation becomes reestablished. Potential for fire from use of vehicles and combustion engines would be avoided by avoiding parking vehicles on dry grass.

Long-term impacts would involve the loss of vegetation to the installation of structures in new locations and the construction or widening of permanent access roads and associated road features such as culverts. Conversely, long-term impacts would also include a small increase in vegetative cover over the 9 miles where H-frame structures would be replaced by monopoles and in the locations where structures would be removed and not replaced or relocated.

Soil disturbances resulting from construction could provide a pathway for invasion by nonnative species, including noxious weeds, which could preclude growth of desirable vegetation. Because mitigation would reduce long-term effects of disturbance and help vegetation reestablish, most of the impacts would be temporary, and affected areas are spread out in small areas along the rights-of-way, impacts to general vegetation would be **low**.

The majority of vegetation impacted, outside of agricultural and residential lands, would be in wetland plant communities (23 percent of permanent impacts and 17 percent of temporary impacts; Table 3-6). All of the wetland vegetation communities do not necessarily contain jurisdictional wetlands, which are addressed in Section 3.6. Impacts to jurisdictional wetlands would be mitigated through the purchase of mitigation banking credits. Also, although wetlands are considered a strategy habitat under the ODFW conservation plan, the affected wetlands generally provide a lower quality habitat and greater challenges for conservation efforts because most of them are highly disturbed (farmland) or dominated by invasive species such as reed canarygrass.

Impacts to forest and woodland vegetation from rebuilding the lines and road work would be avoided to the extent practicable. Although construction of permanent project features would occur in existing right-of-way that goes through 1 acre of mixed upland forest and 5 acres of oak forest, and temporary clearing for project construction would occur in existing right-of-way that goes through 3 acres of oak forest and 1 acre of mixed forest, most of these activities would not involve tree clearing since activities associated with the transmission line rebuild would primarily be restricted to within the right-of-way (with the possible exception of tensioning sites and road work). Road construction would require removal of only about six Oregon white oak trees and nine conifer trees within these areas. Tree removal would affect approximately 759 trees and 770 instances of high brush identified as potential hazards to the transmission line, with the vast majority occurring along the Salem-Albany No. 1 line (605 danger trees and 615 instances of high brush). The majority of trees and high brush marked as potentially hazardous include cottonwoods (*Populus* spp.), big leaf maple (*Acer macrophyllum*), Oregon white oak (*Quercus garryana*), Oregon ash (*Fraxinus latifolia*), Douglas-fir (*Pseudotsuga menziesii*), and noble fir (*Abies procera*) (BPA 2014a). Where possible, tree removal would be reduced as much as possible by limbing and topping trees while still maintaining the safety and security of roadways and the transmission lines.

Since tree removal would primarily occur along the edges of woodlands and upland forests and not impact entire communities, and removal would be minimized to the extent practicable, impacts to more common woodlands and upland forests would be **low** (danger tree removal in oak woodlands is discussed in Section 3.3.2, and danger tree removal in riparian/wetland plant communities is discussed in Section 3.6.2).

Potential accidental spills of hazardous materials (e.g., hydraulic fluids and petroleum products) that would be used during construction could result in impacts to any vegetation community including mortality, reduced viability for some species, and reduced potential for successful revegetation within spill areas. Because potential spills would be small and localized, and BMPs would be implemented (Section 3.3.3) to reduce the possibility of spills affecting vegetation, the impact to general vegetation would be **low**.

Table 3-6. Vegetation Community Impacts

Vegetation Community	Permanent Impacts (acres)	Temporary Impacts (acres)
Currently maintained Right-of-way, herbaceous and shrub vegetation (excluding agricultural crops)	8	35
Agriculture (much is within right-of-way)	Row crops: 5 Unmanaged pasture: 7 Annual and perennial grasses: 33 Total Agriculture: 45	Row crops: 12 Unmanaged pasture: 16 Annual and perennial grasses: 79 Total Agriculture: 107
Riparian and Wetland*	18	31
Oak Forest	5**	3**
Upland Forest	1**	1**
Unvegetated	1	3
Total Impact Acreage	78	180
Potential Danger Trees (to be cut, limbed, or topped)	759 trees	-

Table 3-6. Vegetation Community Impacts

Vegetation Community	Permanent Impacts (acres)	Temporary Impacts (acres)
Trees Removed for Road Work	15 trees	-
Potential High Brush (to be cut)	770 saplings or tree branches	-

* Acreage data presented in this section is based on GIS vegetation data (Northwest Habitat Institute 2014) in combination with field verified wetland data. Impacts to jurisdictional wetlands are discussed in Section 3.6.2, Wetlands and Floodplains

**Impacts in forested areas would involve specific tree removal, as listed at the bottom of this table. Acreages reported for impacts represent areas of impact within these habitat types, but would not necessarily involve tree removal due to careful siting of project features by the road engineer and BPA's forester.

OREGON STRATEGY HABITATS

Grassland strategy habitats are not anticipated to be affected because they are extremely rare in the affected environment. Impacts to wetlands and riparian habitats are further discussed in Section 3.6.

Potential impacts to oak woodlands would include road reconstruction, new road construction, and danger tree removal in Oregon white oak habitat or mixed hardwood habitat along both lines. A danger tree field survey took place in May and June of 2014 and identified 66 Oregon white oak trees as potential danger trees, including 61 on Salem-Albany No. 1 and 5 on Salem-Albany No. 2, primarily due to close proximity to the lines (BPA 2014a). Twenty-one instances of Oregon white oak saplings or low-hanging branches were also identified as potentially creating a hazard as high brush. The majority of Oregon white oak trees marked as potential danger trees or high brush occurred within Salem-Albany No. 1 line miles 3, 4, 5, 8, 13, 19, 21, and 22; and in Salem-Albany No. 1 line mile 3.

Impacts to Oregon white oak habitat would be minimized through specific tree selection by BPA's forester and, where possible, BPA would top or trim Oregon white oak trees rather than completely removing them. This is often an option for oak trees and other hardwoods since they grow slowly and are less prone to wind damage. To further protect oak habitat, Oregon white oak trees that are adjacent to road work areas and would not need to be removed would be flagged to be protected. In addition, danger tree removal along transmission lines affects trees along a linear path, which results in the removal of individual trees rather than an entire woodland. Since woodlands adjacent to the transmission line would remain, and losses of mature trees would be reduced with the minimization measures stated above, impacts to Oregon white oak trees and woodlands would be expected to be ***moderate***.

Impacts to strategy grasslands (including grass-dominated upland prairie) are expected to be ***low***, because very little of this habitat type would be expected to be found within the maintained rights-of-way or the adjacent areas disturbed by agricultural or residential land use; plant surveys to be conducted in the spring and summer 2014, will help verify this assumption. Additional information regarding strategy habitats will be added to the Final EA based on plant surveys. Impacts to riparian habitats and wetlands are discussed in detail in Sections 3.4, Fish and Wildlife; 3.5, Water Resources; and 3.6, Wetlands and Floodplains.

SPECIAL-STATUS PLANTS

Due to the currently managed or previously disturbed nature of the majority of vegetation potentially impacted by the Proposed Action, special-status plants that are most likely to be encountered, and

impacted, are those that occur in disturbed areas. Project activities that are most likely to impact special-status plants are construction and reconstruction of access roads due to the larger area affected.

For all species discussed below, the relative likelihood of finding each species is assessed along with potential impact levels. Because of the disturbed and fragmented nature of the majority of potential habitat, the high density of weeds, and the rarity of these species, the likelihood of affecting a large number of individuals is small. If any populations are identified through field surveys, they would be avoided to the extent practicable, reducing the risk of impacts. If avoidance to a particular population would not be possible, BPA would work with USFWS to determine the necessary mitigation measures to reduce impacts to federally listed species, and coordinate with ODFW for state-listed species. Results of the field surveys will be reported in the Final EA. Potential impacts to those species are as follows:

- **Nelson's checkermallow** is known to occur near the affected area and is found in roadside ditches, drainage swales, and in seasonally wet areas where reed canarygrass also thrives. All of these are areas that would be potentially impacted by construction activities associated with the Proposed Action. The likelihood of encountering this species is relatively greater than other special-status species given its tolerance for disturbance in an already disturbed environment and the amount of potential habitat affected; however, if found, large or numerous populations would not likely be found since it is a rare plant; therefore, with avoidance or other mitigation measures, impacts are anticipated to be *no-to-moderate*.
- **Peacock larkspur, thin leaved peavine, and Willamette Valley larkspur** are known to occur near the affected area and are found along roadsides and in fence rows, which would be potentially impacted by construction activities associated with the Proposed Action. Seven known occurrences of peacock larkspur are within about one mile of the affected area, including observations within Ankeny NWR. There are many known occurrences of thin leaved peavine in Willamette Valley, including seven within about 0.5 miles of the affected area. Suitable habitat for Willamette Valley larkspur occurs within the affected area. The likelihood of encountering these species is relatively greater than other special-status species given their occurrence along roadsides and fence rows and the amount of potential habitat affected; however, with avoidance or other mitigation measures, impacts are anticipated to be *no-to-moderate*.
- **Water howellia** is likely to occur in freshwater wetlands or ponds and on the margins of marshy areas, which are found within the affected area. Historical observations of this species were made in the vicinity of the north end of the affected area, from the Salem substation to structure SA2:3/1 and SA1:4/1. Although suitable habitat may occur, the likelihood of encountering this species is relatively less than other special-status species since known observations are historical, and any potential habitat in the affected area would primarily be in ditches. With avoidance or other mitigation measures, impacts are anticipated to be *no-to-low*.
- **White rock larkspur** is found in dry roadside ditches, which occur frequently within the affected area, however, the species is extremely rare and is not known to occur in the Proposed Action vicinity. The likelihood of encountering this species is relatively less than other special status species due to its rarity and lack of known occurrence; impacts are anticipated to be *no-to-low* through avoidance.

The likelihood of encountering, and therefore impacting, species that are generally found in less disturbed areas, including Bradshaw's lomatium, Kincaid's lupine, shaggy horkelia, tall bugbane, wayside aster, white-

topped aster, and Willamette Valley daisy, is **no-to-low** due to the lack of undisturbed habitat. Any available potential habitat is fragmented and not likely to support large populations of these species, further reducing the potential for impacts.

NOXIOUS WEEDS

Construction would expose soils through soil disturbance and excavation, creating areas susceptible to weed establishment, particularly where populations exist nearby. Weeds could also colonize disturbed soils along new, reconstructed, and improved roads, which could provide new avenues for weed dispersal. Construction vehicles, machinery, and supplies could transport weed seeds or propagules from infested areas to new locations in construction areas. If conditions are appropriate, these species could take advantage of disturbed soils and the lack of competing vegetation in recently cleared areas and establish new populations.

Noxious weed surveys will be completed in 2014: the results of this survey would serve as a reference for existing conditions prior to project construction. This information would be used to identify where infestations exist to treat them prior to construction and to identify where vehicle wash stations would be useful in reducing the risk of spreading seeds and propagules to uninfested locations. In addition, post-construction noxious weed surveys would be completed in order to determine if construction activities resulted in new infestations in the affected area, and these new infestations would be treated. With mitigation, the risk of spreading noxious weeds would be reduced, and impacts to native plant communities would be **low**.

3.3.3 MITIGATION – PROPOSED ACTION

The following mitigation measures have been identified to reduce or eliminate impacts to vegetation:

- Flag vegetation clearing limits in sensitive areas such as wetlands and riparian areas.
- Demarcate construction areas with silt fencing or other barriers in sensitive areas to prevent vehicle turnaround, material storage, or other disturbance outside designated construction areas.
- Cut or crush vegetation rather than blade in areas that would remain vegetated, to maximize the ability of native plants to re-sprout and maintain soil integrity.
- Reseed disturbed areas in coordination with the underlying landowner or with a seed mix that matches the surrounding habitat as closely as possible in order to restore preconstruction conditions.
- Clearly mark danger trees and demarcate danger tree removal disturbance limits in oak habitat areas.
- Use rights-of-way or roads to access and remove danger trees to reduce impacts to the surrounding plant community.
- Top or trim Oregon white oak trees rather than remove where possible. Flag Oregon white oak trees that are adjacent to road work areas but do not need to be removed.
- Conduct construction activities in coordination with agricultural activities to the extent practicable.
- Conduct a preconstruction noxious weed survey of rights-of-way and access roads; treat identified noxious weed infestations as directed by the State of Oregon in the spring prior to construction.
- Conduct a post-construction noxious weed survey; treat any existing or new noxious weed infestations

- Implement noxious weed control measures in coordination with the county weed board and landowners.
- Clean vehicles and other equipment that have been in weed infested areas at portable wash stations upon leaving the infested areas to prevent spreading weeds to uninfested areas during construction.
- Use weed-free mulch, if mulch is used for erosion control
- Equip all vehicles with basic fire-fighting equipment, including extinguishers and shovels, to potentially put out small fires.

3.3.4 UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION

Unavoidable impacts would include permanent vegetation loss in tower relocation footprints, permanent vegetation loss (including some trees) in access road widening and new access road footprints; the removal of trees adjacent to the right-of-way (including Oregon white oak trees); and the temporary disturbance of vegetation during construction.

3.4 FISH AND WILDLIFE

This section describes the fish and wildlife found within the affected environment, as well as potential impacts of the Proposed Action on these resources. The No Action Alternative is discussed at the end of Chapter 3.

3.4.1 AFFECTED ENVIRONMENT

The affected environment for fish and wildlife consists of habitats, including water bodies, crossed or adjacent to the project.

ODFW WILDLIFE HABITAT CATEGORIES

Under their Fish and Wildlife Habitat Mitigation Policy, ODFW has developed wildlife habitat categories that are ranked according to the relative importance of a particular habitat (ODFW 2014a). The purpose of these categories is to provide guidance in assessing impacts to wildlife habitats in Oregon, and to identify mitigation measures for those impacts. ODFW habitat categories were assigned to wildlife habitats in the affected area of the Proposed Action. The field-collected information that was used to assign habitat categories within the project vicinity included data collected during wetland delineation surveys, site-specific vegetation characterization, and reconnaissance-level field visits (additional field data characterizing rare plants and noxious weeds in the project area will be collected in summer 2014). The resulting dataset identified the assigned habitat categories within the project area. Habitat categories identified within the project area include Categories 2 through 6; no Category 1 habitats (irreplaceable, essential and limited habitat) were identified in the project area or immediate vicinity. The majority of the Salem-Albany transmission lines cross Categories 5 and 6 habitats, since the rights-of-way are currently maintained or cross agricultural areas. The habitat types identified within the project area with their corresponding ODFW habitat categories are shown below:

ODFW Category 6 (Habitat that has low potential to become essential or important habitat)

- BPA maintained rights-of-way
- Urban

ODFW Category 5 (Habitat having high potential to become either essential or important habitat)

- Annual grasses (agricultural)
- Orchards and berry fields
- Perennial grasses (agricultural)
- Row crops

ODFW Category 4 (Important habitat)

- Ash/cottonwood
- Black hawthorn riparian hedgerows
- Cottonwood riparian
- Douglas fir/oak (>50% Douglas fir)
- Douglas fir
- Gravel bars/sand
- Isolated or disturbed wetlands
- Maple/Alder/Fir

- Unmanaged pasturelands (agricultural)

ODFW Category 3 (Essential habitat, or important and limited habitat)

- Douglas fir/oak (<25% oak)
- Douglas fir/oak (<25% oak)
- Field delineated PSS or PEM wetlands
- Hardwoods – ash, big leaf maple, cottonwood (>75% hardwood)
- Hardwoods/oak/Douglas fir (<25% oak)
- Oak Douglas fir (>50% oak)
- Oak madrone
- Reed canary wetland
- Waterway (not Salmon Critical Habitat)

ODFW Category 2 (Essential and limited habitat)

- Conservation areas
- Hardwood/oak/Douglas fir 25-50
- Hardwoods/oak (25-50% oak)
- Oak (>75% oak)
- Oak/hardwood riparian (<25% oak)
- Oak/hardwood riparian (25-50% oak)
- Upland critical habitat
- Waterway (salmonid critical habitat)

FISH AND FISH HABITATS

The Proposed Action falls entirely within United States Geological Service (USGS) designated Willamette River Basin, which drains to the Columbia River and ultimately to the Pacific Ocean. Watersheds and water courses are discussed in detail in Section 3.5, Water Resources. The majority of streams that intersect the affected area are dominated by silty to muddy substrates that reflect adjacent topography and their location within the Willamette Valley. Riparian vegetation within the existing project rights-of-way at stream crossings generally includes low-growing herbaceous plants and shrubs, although adjacent vegetation outside the rights-of-way includes mature trees at the larger stream crossings.

COMMON FISH SPECIES

Watersheds in the affected area provide habitats that support a variety of native fish, including salmon (*Oncorhynchus sp.*), lamprey (*Lamptera sp.*), minnows, suckers (*Cypriniformes sp.*), sculpin (*Cottidae sp.*), sand roller (*Percopsis transmontana*), three-spine stickleback (*Gasterosteus aculeatus*), chiselmouth (*Acrocheilus alutaceus*), and peamouth (*Mylocheilus caurinus*) (Hulse et al. 2002). Bull trout (*Salvelinus confluentus*) were historically present in the general affected area (North Santiam watershed) but are now considered locally extinct (ODFW 2005b). Non-native fish that have become established in the affected area include brown bullhead (*Ameiurus nebulosus*), mosquitofish (*Gambusia affinis*), common carp (*Cyprinus carpio*), yellow perch (*Perca flavescens*), bass (*Micropterus sp.*), crappie (*Pomoxis sp.*), and sunfish (*Lepomis sp.*) (Hulse et al. 2002).

SPECIAL-STATUS FISH SPECIES

The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) maintain lists of fish and wildlife species protected under the Endangered Species Act (ESA) that may occur in Benton, Linn,

Marion, and Polk counties (USFWS 2014; Interagency Special-Status Sensitive Species Program 2014). Species receiving protection under the ESA are designated as endangered or threatened. Candidate or proposed species could be included on the ESA list in the future. Areas designated as critical habitat for listed species also receive protection under the ESA. At the state level, the Oregon Department of Fish and Wildlife (ODFW) maintains lists of species considered threatened, endangered, or candidates for listing. Database searches, federal and state species lists, and personal communications with state and federal agencies were used to determine whether species or habitats are likely present within the affected area.

Two fish species listed as threatened under the ESA occur within the affected area, and an additional species of federal/state concern has the potential to occur. The two ESA-listed species of fish that occur within the affected area are the Upper Willamette River (UWR) ‘spring’ Chinook salmon and Upper Willamette River (UWR) ‘winter’ steelhead. The Pacific lamprey is listed as a federal species of concern and state vulnerable species. These species and their likelihood of occurrence within the affected area are provided in Table 3-7 and discussed in further detail below. In 2014, USFWS proposed to delist the Oregon chub from the Federal list of Endangered and Threatened Wildlife (50 CFR 17). In addition, this species is documented to occur approximately 2 miles from the affected area in nearby streams, but is not documented in any streams being crossed by the Proposed Action; therefore, this species is not further discussed in this EA.

Table 3-7. Special-Status Fish Species in Streams Near or Crossed by the Project.

Species	Scientific Name	Population / Stock	Federal Status	Critical Habitat	ODFW ¹ Status	Distribution in Vicinity of Affected Area
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Upper Willamette River ESU, spring run	Threatened	Designated within affected area	Sensitive Critical	Present
Steelhead	<i>Oncorhynchus mykiss</i>	Upper Willamette River ESU, winter run	Threatened	Designated within affected area	Sensitive Vulnerable	Present
Pacific Lamprey	<i>Lampetra tridentate</i>	Lower Columbia / Willamette Rivers	Species of Concern	None	Sensitive Vulnerable	Unknown but likely

¹ODFW Status: Sensitive Critical – species that are imperiled with extirpation from a specific geographic area of the state because of small population sizes, habitat loss or degradation, and/or immediate threats. Critical species may decline to a point of qualifying for threatened or endangered status if conservation actions are not taken. Sensitive Vulnerable species are facing one or more threats to their populations and/or habitats. Vulnerable species are not currently imperiled with extirpation from a specific geographic area or the state, but could become so with continued or increased threats to populations and/or habitats.

Chinook Salmon, Upper Willamette River (UWR) Evolutionary Significant Unit

The UWR Chinook salmon evolutionary significant unit (ESU) was listed as threatened (64 Federal Register [FR] 14308; 70 FR 37160) and critical habitat has been designated in the affected area (70 FR 52630). Protected fish include all naturally spawned spring-run populations of Chinook salmon residing in streams in the UWR Basin of western Oregon, upstream of Willamette Falls (64 FR 14308), including the Willamette River and its tributaries. (A fall run also occurs, but is not protected under the ESA).

Upper Willamette River spring Chinook salmon are found in large river basins. These fish typically return to freshwater from March through June and spawn in late summer. Juveniles generally out-migrate from

freshwater in their second spring and adults return between ages 3 to 6 years to spawn in natal freshwater rivers.

Within the range of the Upper Willamette River ESU for spring Chinook salmon, tributary dams block passage to most historical habitats, and have altered habitat quality in downstream reaches. Hatchery fish make up a substantial portion of natural spawning within the Willamette Basin (ODFW 2005a). West-side tributaries to this section of the Willamette River, including the Luckiamute River, have documented presences of adult Chinook; however, uncertainty remains as to how these fish contribute or are related to independent populations assigned to the overall UWR Chinook salmon ESU (Myers et al. 2006). It is possible that west-side populations functioned as dependent populations to larger, primary population groups in east-side tributaries to the UWR (Myers et al. 2006).

Juvenile and young-of-the-year Chinook salmon are known to rear throughout the Willamette River year-round. These fish migrate laterally and use floodplain and off-channel habitats for feeding and refuge when mainstem water levels and velocities rise. Many of these habitats may be dry for a large portion of the year, but are highly supportive of juvenile salmonids when flooded, providing both food sources and refugia (Junk, Bayley, and Sparks 1989). Infrastructure and channel modifications have often blocked access to these habitats, which were more prevalent historically than they are now (Benner and Sedell 1997). Habitat that could support juvenile and young-of-year salmon would contain surface water, have a direct surface water connection to a fish-bearing water body during such an event, and have exit pathways and slopes that indicate minimal risk of stranding when floodwaters escape.

Steelhead Trout, Upper Willamette River Distinct Population Segment

The UWR 'winter' steelhead distinct population segment (DPS) is federally threatened (64 FR 14517; 70 FR 37160) and critical habitat has been designated in the affected area (70 FR 52630). The DPS includes all naturally spawned populations of winter-run steelhead in the Willamette River and its tributaries upstream from Willamette Falls to the Calapooia River.

Upper Willamette River winter steelhead are widely distributed in small to moderate sized streams. Steelhead are anadromous rainbow trout and exhibit a migratory life history similar to Pacific salmonids. Young steelhead rear an average of two years in freshwater and spend one to three years in the ocean where they mature. After maturing in the ocean, winter-run steelhead spawn shortly after arriving at their freshwater spawning areas from December through March. Unlike other salmon, steelhead are iteroparous, meaning they do not die after spawning and can subsequently return and spawn in later years. In some streams, anadromous steelhead and resident (freshwater) trout populations are interrelated.

Within the UWR ESU for winter steelhead, Detroit Dam in the North Santiam, Foster Dam in the Upper South Santiam, and Mercer Dam in Rickreall Creek have blocked passage to part of these basins, and have reduced downstream habitat quality to the point that usage of habitat is likely less than half of what was historically used (ODFW 2005b). All of the affected area is downstream from the above mentioned barriers to steelhead.

Pacific Lamprey

Pacific lamprey is a Federal species of concern and an Oregon state sensitive species. They are anadromous with habitat and spawning requirements similar to salmonids and were historically distributed wherever salmon and steelhead occur (USFWS 2008). After spending 1 to 3 years in the marine environment, Pacific lamprey migrate to freshwater between February and June where they overwinter and remain for a year

prior to spawning. Pacific lamprey spawn in low gradient sections of water, with gravel and sandy bottoms between March and July when temperatures are between 10 and 16 degrees C (50 and 60 degrees F). Embryos hatch in approximately 19 days and drift downstream to low velocity areas where they burrow into substrate and grow for three to seven years, after which they begin their transition to the juvenile phase. This transformation occurs over a period of months prior to juveniles migrating to the ocean between late fall and spring where they mature into adults.

Distribution of Pacific lampreys in the Lower Columbia/Willamette has been severely reduced by passage barriers in the Willamette River basin. Dams preclude Pacific lamprey occurrences in 48 percent of the North Santiam subbasin (ODFW 2005b).

WILDLIFE AND WILDLIFE HABITATS

The Proposed Action is located within the central portion of the Willamette Valley ecoregion. Historically the Willamette Valley was a mix of wildlife habitats containing wetlands, woodland, oak savanna, riparian and bottomland hardwoods, and native prairie grasslands (Campbell 2004). Today, the Willamette Valley is a mix of farmland and urban areas with few remaining habitats for wildlife (USFWS 2012a). Land use in the affected area is dominated by agricultural and urban development, which provide habitat for a limited number of species. The remaining wildlife habitat present is comprised of Oregon white oak; black hawthorn, willow, and cottonwood riparian; native wetlands; upland forest; and invasive reed canarygrass wetlands (described in Section 3.3, Vegetation).

The affected area contains four parks that provide high quality or restorable wildlife habitat, these include: Bower Rock State Park, Minto-Brown Island Park, Ankeny National Wildlife Refuge (NWR), and the E.E. Wilson Wildlife Area. Each of these parks is described in greater detail below.

Bowers Rock is an undeveloped state park that encompasses nearly 600 acres of floodplain habitat along the Willamette River (river miles 121 to 123). This park is currently owned and managed by the Oregon Parks and Recreation Department; restoration concepts to restore function to side channels, alcoves, floodplains, and wetlands on the property are currently being investigated (Calapooia Watershed Council 2014). The Salem-Albany No.1 line crosses 0.5 mile of this park from structures SA1:23/9 to 24/3 and the Salem-Albany No.2 transmission line crosses 0.6 acre of the park from structures SA2:27/3 to 27/8. Potential wildlife habitat in Bowers Rock near the Salem-Albany No. 1 transmission line is impacted by adjacent land uses, is lacking in native vegetation, and has compacted soil; therefore it is of low-to-moderate quality.

The Minto-Brown Island Park encompasses approximately 900 acres and is crossed for 0.4 mile by the northern end of the Salem-Albany No.1 line, at structure SA1:1/2 and structures SA1: 2/2 to 2/6. Minto-Brown Island Park is managed under an ODFW agreement that requires a portion of farmers' crops remain unharvested to provide food for waterfowl and wildlife in the park (City of Salem 2014).

The Ankeny NWR was established in 1965 under the Migratory Bird Conservation Act to preserve historic waterfowl habitat in the Willamette Valley and offset the excessive hunting pressure on geese, especially the dusky Canada goose. The NWR is managed to provide feeding and nesting areas for migratory waterfowl, wintering range for the dusky Canada goose, production habitat for several species of ducks, and to protect, restore and enhance populations of threatened and endangered species (USFWS 2014). The Salem-Albany No.1 transmission line crosses 0.9 mile of the Ankeny NWR at its western extent from

structures SA1:11/6 to 12/4, and is adjacent to the Refuge for an additional 1.0 mile from structures SA1:10/6 to 11/6 and 0.3 mile from structures SA1:13/1 to 13/4.

The E.E. Wilson Wildlife Area encompasses approximately 1,788 acres situated on the Willamette Valley floor. This wildlife area is managed by ODFW to protect and enhance populations of fish and wildlife historically found in the woodlands, grasslands and wetlands (ODFW 2008a). The Salem-Albany No.2 transmission line crosses 1.2 miles of the E.E. Wilson Wildlife Area from structures SA2:21/8 to 22/10; most of the habitat in this area is seasonally or permanently inundated and contains high concentrations of invasive plant species (BPA 2010c).

In addition to the specific management goals described above, Ankeny NWR and the E.E. Wilson Wildlife Area are managed utilizing the Oregon Conservation Strategy (OCS), which is an overreaching strategy for conserving fish and wildlife species within the state of Oregon (ODFW 2006). The OCS identifies specific Conservation Opportunity Areas where high-priority species and habitat can be addressed. The Ankeny NWR contains two Oregon Conservation Strategy Habitat Areas (WV-03 and WV-16) and provides extensive restored shallow-water seasonal wetlands that are heavily used by migrating and wintering waterfowl and shorebirds (ODFW 2006). The E.E. Wilson Wildlife Area contains one Oregon Conservation Strategy Habitat Areas (WV-19) which provides migratory stopover areas for waterfowl and shorebirds (ODFW 2006). High priority fish and wildlife species identified in the OCS with potential to occur in the action area include 12 birds (one goose, one owl, one goatsucker, one woodpecker, and eight passerine species), three amphibians (Western painted turtle [*Chrysemys picta*], Western pond turtle [*Actinemys marmorata*], and northern red-legged frog [*Rana aurora*]), one fish (Oregon chub [*Oregonichthys crameri*]), and one mammal (Western gray squirrel [*Sciurus griseus*]). General wildlife species present in the affected area include birds, mammals, amphibians, reptiles, and invertebrates, and are discussed in more detail below.

BIRDS

The vegetative communities – including riparian areas along rivers and streams, Oregon white oak woodlands, and wetlands – within the affected area provide foraging and nesting opportunities for many species of migratory birds as well as perching and nesting opportunities for raptors. The streams, rivers, wetlands, and woodlands in the affected area provide suitable wintering and breeding habitat for many species of migratory birds, particularly on public lands. Typical bird species expected to occur in the affected area are identified in Table 3-8.

MAMMALS

The affected area provides habitat for a variety of mammalian species (Table 3-10). Given the surrounding agricultural and urban setting, available habitat is limited. However, the public lands, woodlands along the rights-of-way, and sections of the rights-of-way themselves do provide some diversity and complexity in habitat structure not present within adjacent agricultural lands.

AMPHIBIANS AND REPTILES

Amphibians and reptiles are a diverse group with diverse habitat requirements. The streams, rivers, wetlands, and woodlands in the affected area provide habitat for many species of amphibians and reptiles, particularly on public lands. Typical amphibians and reptiles that would be expected to occur in the affected area are identified in Table 3-8.

INVERTEBRATES

Due to the loss of historical native prairies in the Willamette Valley, many local invertebrates are at risk of decline in population size. Common species that would be expected to occur in the affected area are identified in Table 3-8.

Table 3-8. Typical Wildlife Species in the Willamette Valley

Type	Typical Species
Mammals	Columbian black-tailed deer (<i>Odocoileus columbianus</i>), Roosevelt elk (<i>Cervus canadensis roosevelti</i>), coyote (<i>Canis latrans</i>), cougar (<i>Puma concolor</i>), fox (<i>Vulpes</i> sp.), beaver (<i>Castor canadensis</i>), raccoon (<i>Procyon lotor</i>), skunk (<i>Mephitis mephitis</i>), opossum (<i>Didelphis virginiana</i>), rabbit (<i>Sylvilagus</i> sp.), and a variety of bats, mice, voles, moles, shrews, and gophers
Birds	Canada goose, ruddy duck (<i>Oxyura jamaicensis</i>), northern pintail (<i>Anas acuta</i>), bald eagle (<i>Haliaeetus leucocephalus</i>), osprey (<i>Pandion haliaetus</i>), northern harrier (<i>Circus cyaneus</i>), Killdeer (<i>Charadrius vociferous</i>), red-tailed hawk (<i>Buteo jamaicensis</i>), American kestrel (<i>Falco sparverius</i>), red-winged blackbird (<i>Agelaius phoeniceus</i>), Cackling goose (<i>Branta hutchinsii</i>), mallard duck (<i>Anas platyrhynchos</i>), European starling (<i>Sturnus vulgaris</i>), spotted towhee (<i>Pipilo maculatus</i>), song sparrow (<i>Melospiza melodia</i>), and great blue heron (<i>Ardea Herodias</i>)
Amphibians and Reptiles	Western pond turtle, rough-skinned newt (<i>Taricha granulosa</i>), northwest salamander (<i>Ambystoma gracile</i>), Pacific coast aquatic garter snake (<i>Thamnophis atratus</i>), Pacific tree frog (<i>Pseudacris regilla</i>), Western toad (<i>Bufo boreas</i>), invasive bull frog (<i>Ranacatesbeiana</i>), red-legged frog (<i>Rana aurora</i>), and garter snake species (<i>Thamnophis</i> sp.)
Invertebrates	Common spiders, bugs, beetles, butterflies, and other invertebrates.

Sources: ODFW 2008b; USFWS undated; USFWS 2012b.

SPECIAL-STATUS WILDLIFE SPECIES

The USFWS prepared a list of wildlife species protected under the ESA that may occur in Polk, Marion, Linn, and Benton counties (USFWS 2014; Oregon Wildlife Explorer 2014a-d). The ODFW maintains lists of species considered threatened or endangered, or candidates for listing, at the state level. Federal species of concern are identified by the USFWS but do not receive protection under the ESA. These species have potentially declining populations and could require additional management or protection in the future. State sensitive species are those recognized by ODFW as naturally-reproducing wildlife species that are facing one or more threats to their populations and/or habitats within the state (ODFW 2008b). All species included on the USFWS and ODFW species lists with the potential to occur in the affected area are discussed here.

Ten federal, state, and special-status species do or could occur in the affected area: bald eagle, streaked horned lark, purple martin, tree swallow (*Tachycineta bicolor*), Oregon vesper sparrow, long-eared myotis, long-legged myotis, Fender’s blue butterfly, western painted turtle, and western pond turtle. Bald eagles were delisted from the ESA, but still receive protections under the Bald and Golden Eagle Protection Act (16 USC 668, 668d). The streaked horned lark is listed as threatened and Fender’s blue butterfly is listed as endangered under the ESA and the Oregon vesper sparrow, tree swallow, long-eared myotis, long-legged myotis, and western pond turtle are federal species of concern. The purple martin and western painted turtle are state sensitive species.

Eight federal, state, and special-status species—marbled murrelet, yellow-billed cuckoo, northern spotted owl, red tree vole, Canada lynx, Taylor’s checkerspot, Oregon spotted frog, and the Oregon giant earthworm—would not or are unlikely to occur in the affected area. Habitat features that would support

these species do not exist in the affected area and/or few historical occurrences of these species have been documented.

Federal, state and special-status wildlife species are listed in Table 3-9 along with their potential distribution within in the affected area based on their required habitat features and are discussed in more detail below.

Bald Eagle

While no longer protected by the ESA, the bald eagle is still protected under the Federal Bald and Golden Eagle Protection Act and MBTA (USFWS 2012d). The Willamette Valley does support foraging, roosting, and nesting habitat for bald eagles, and bald eagles have been observed flying in the area during site visits (Isaacs and Anthony 2011; Hempy-Mayer, Pers. Comm. 2014). The large number of river crossings does support potential bald eagle breeding habitat: 90 percent of recently used nests have been found to occur within two miles of aquatic habitat (Issacs and Anthony 2011). Also, the breeding population in Oregon and specifically along the Willamette River has increased substantially between 1978 and 2007 (Issacs and Anthony 2011). However, while there are nine documented bald eagle nest sites within about 3 miles of the affected area, the closest was identified in 2006 along the Willamette River approximately 0.7 mile northeast of the Salem Substation. Bald eagle nesting sites in Oregon are well documented: annual comprehensive state-wide surveys of bald eagle nests took place in Oregon between 1971 and 2007, with no nests documented over this period any closer to the affected area (ORBIC 2013; Isaacs and Anthony 2011). Also, foraging and roosting bald eagles are common at Ankeny NWR (USFWS Pers. Comm. 2014). Therefore, while there is potential for bald eagles to use foraging and roosting habitat in the affected area, the evidence indicates they are unlikely to use the area for nesting habitat.

Streaked Horned Lark

The streaked horned lark was listed in 2013 under the federal ESA as a threatened species throughout its range and critical habitat was designated in the Willamette Valley (USFWS 2013). Critical habitat has been designated in the middle of Ankeny NWR, east of the Salem-Albany No.1 transmission line, with sightings of individuals and pairs by Ankeny NWR personnel (Selvaggio, Pers. Comm. 2014). This sub-unit on the Ankeny NWR is currently occupied and is consistently utilized by streaked horned larks (USFWS 2013b). Streaked horned larks have also been documented in the vicinity of Salem-Albany No.1 transmission line in the southern portion east of the line by Albany Road, and west of the line in the E.E. Wilson Management Area. The three documented occurrences outside of the Ankeny NWR are over 15 years old. Streaked horned lark surveys are scheduled for spring 2014 in suitable habitat within the affected area. The survey results will be included in the Final EA.

Primary constituent elements of streaked horned lark critical habitat include:

- Areas having a minimum of 16 percent bare ground that have sparse, low stature vegetation that is composed primarily of forbs less than 12 inches in height.
- Large (300-acre), flat (0 to 5 percent slopes) open landscape that provides visual access to open areas such as open water or fields.
- If areas are smaller than described above, they still must provide visual access to open water or fields.

Historically, nesting habitat in the affected area was limited to prairies and sandy beaches and spits along the Willamette Rivers. Today, the streaked horned lark nests in a broad range of habitat including native prairies, fallow and active agriculture fields, wetlands mudflats, and sparsely vegetated edges of grass fields, gravel roads or shoulders of lightly traveled roads. Wintering streaked horned lark habitat is very similar to breeding habitat. In general, habitat used by the streaked horned lark is flat with substantial areas of low-stature vegetation comprised primarily of grasses and forbs. Even though streaked horned larks utilize a variety of habitats, populations are vulnerable because their preferred habitats are often subject to frequent human disturbance. However, these activities that threaten the species are often required to maintain available habitat (USFWS 2013a).

The nesting season for streaked horned larks begins in mid-April and ends in late August. Young streaked horned larks are cared for until they are approximately four weeks of age, at which point they become independent. This species exhibits a strong natal fidelity (return each year to the location they were born) to nesting sites (USFWS 2013). Therefore, sites utilized by streaked horned lark would be expected to remain in use by this species. Known habitat use in the affected area is currently limited to the population on the four sites identified above; however, the existing right-of-way could be utilized by the species, as could the proposed roads.

Purple Martin

The purple martin is classified as Sensitive in the Critical category by ODFW, meaning they are imperiled and have been extirpated from a specific geographic area due to small population size, habitat loss or degradation, and/or immediate threats. If conservation actions are not taken this species may decline to the point of qualifying for threatened or endangered status. The purple martin is the world's largest swallow and is an uncommon summer resident in Oregon, principally inhabiting the Coast Range and the Willamette Valley (Horvath 1999). Purple martins nest in unoccupied tree snag cavities that are at least 20 feet from large live trees. Nests colonies have been recorded in open water, grassy fields, and recent clearcuts and burns, with most martins nesting over water (Horvath 1999). This species, where present, occurs from March through June/July, at which point they begin their migration to their wintering grounds in South America. The most recent confirmed sighting of a purple martin in the vicinity of the affected area was in 1998 in the E.E. Wilson Management Area, approximately 0.60 mile west of Salem-Albany No.2 transmission line (ORBIC 2013). In addition, purple martin sightings have been made at Ankeny NWR (USFWS Pers. Comm. 2014). The immediate area along the right-of-way would not provide appropriate nesting habitat for the purple martins, as it is maintained and tree snags are generally removed; however, tree snags could be nearby, and the birds may forage in the affected area.

Oregon Vesper Sparrow

The Oregon vesper sparrow is classified as Sensitive in the Critical category by ODFW, and is designated as an OCS species in the Willamette Valley; it is also designated as a species of concern under the ESA. The Oregon vesper sparrow was once abundant in the Willamette Valley, but is now rare across most of the region with the present population occurring in the low foothills and buttes along the periphery of the Valley (OWIa, undated). This species has an affinity for short statue grasslands which include a wide variety of grassland and agricultural habitats. This ground nesting bird places their nest on flat ground or in a shallow depression located next to a clump of vegetation, crop residue, dirt clod, or at the base of a shrub or tree (WDFW 2012). The species, where present, occurs from mid-March through September. Given the rarity and site fidelity of the species, habitat management areas located near existing breeding territories

are more likely to be discovered and used than areas that are distant from known populations (OWIa, undated). In Oregon, nearly all detections of Oregon vesper sparrows are in young Christmas tree farms with extensive grass and weed cover, or in lightly grazed pastures with scattered shrubs and grass heights of less than 1-2 feet (WDFW 2012). The most recent observation of the Oregon vesper sparrow in the vicinity of the affected area was a bird call identification in 1996 approximately 370 feet east of structure SA2:16/8 (ORBIC 2013). It is unlikely that this species would nest in the affected area, but they could use it for foraging.

Tree Swallow

The tree swallow is a federal species of concern, with no state listing for Oregon. Natureserve ranks them as secure both globally and in Oregon, which means the species population is stable (Natureserve 2014). Tree swallows most frequently nest in unoccupied tree snag cavities over open water, but can also be found in snags in open woodlands (Turner and Rose 1989). Individuals frequently return to the same nesting site every year. Tree swallows are a summer resident of Oregon, and can occur from February through October, at which point they begin their migration to their wintering grounds in South America (Terres 1980; Smith and Smith 1990). Insects are the primary food source.

Tree swallows are frequently observed at Ankeny NWR hunting over the wetlands and are considered abundant (USFWS Pers. Comm. 2014). The immediate area along the right-of-way would not provide appropriate nesting habitat for tree swallows, as it is maintained and tree snags are generally removed; however, tree snags could be nearby, and the birds could forage in the affected area.

Long-Eared Myotis and Long-Legged Myotis

The long-eared and long-legged myotis have been identified as federal species of concern and the long-legged myotis is classified as Vulnerable in the Critical category by ODFW. The long-eared and long-legged myotis are commonly associated with conifer forests, but may also inhabit riparian forests and agricultural land (Hayes and Wiles 2013). Day roosts include loose bark on trees, snags, stumps and downed logs, as well as cliffs and tree cavities. Night roosts include bridges, abandoned buildings, caves, mines, and trees in riparian habitat. Large conifer snags in intermediate stages of decay are used for maternity roosts (Hayes and Wiles 2013). Caves and mines are used as hibernacula, with hibernation beginning in September/October. Riparian areas near water are favored for foraging, but forest edges and open meadows are also utilized. The rights-of-way would not provide appropriate roosting habitat for the long-eared and long-legged myotis, as it is maintained and tree snags are generally removed; however, they may forage in the affected area, particularly in proximity to water features.

Fender's Blue Butterfly

Fender's blue butterfly is listed as endangered under the ESA with designated critical habitat. Fender's blue butterfly uses upland prairies, grasslands, and wet prairies. Known occurrences and designated critical habitats for these species do not occur with the affected area, nor were larval host plants identified within the existing transmission line rights-of-way in recent surveys (Hammond 2002-2010; USFWS 2006; USFWS 2013; BPA 2010c; BPA 2014b). The closest known invertebrate location to the affected area is a population of Fender's blue butterfly at the Basket Slough NWR, located approximately five miles from the affected area (ORBIC 2013). The dispersal distance (distance a butterfly will travel to feed) of the Fender's blue butterfly is 1.24 miles, making it highly unlikely that members of the Basket Slough NWR population would disperse into the affected area. That being said, there is a slight possibility that an undocumented

population of Fender's blue butterfly could occur on private property in the vicinity of the affected area. Fender's blue butterfly requires Kincaid's lupine to complete their lifecycle. Surveys for Kincaid's lupine would be conducted in summer 2014 and the results of the rare plant surveys, including any sightings of Fender's blue butterfly, will be included in the Final EA.

Western Pond Turtle and Western Painted Turtle

The western pond turtle has been identified as a federal species of concern and a state sensitive species. Factors limiting western pond turtles include the loss of aquatic and terrestrial habitat (OW1b, undated). In the Willamette Valley, western pond turtles are most abundant south of Salem, which is outside of the affected area. Within the affected area western pond turtles could typically occupy intermittent and permanent aquatic habitat that occurs within 200 meters of oak savanna and upland prairie, which is used for nesting and overwintering. Known habitat and pond turtle occurrences have been documented within Bowers Rock State Park, E.E. Wilson Wildlife Area, and Thornton Lake. Pond turtle surveys are scheduled for spring 2014 in suitable habitat within the affected area. The results of these surveys will be included in the Final EA.

The western painted turtle has been classified as Sensitive in the Critical category by ODFW. Threats to painted turtle in Oregon are similar to those described above for the pond turtle. Painted turtles spend most of their time in shallow, slow-moving streams, lakes and rivers, preferably with a soft muddy bottom with vegetation and submerged logs. In Oregon, western painted turtles are distributed in north-central and north-eastern Oregon, and in the northern portion of the Willamette Basin, north of Salem (Gervais et al. 2009). Therefore it is unlikely that this species would occur in the affected area, the nearest known occurrence of the western painted turtle was before 1984 in the Ankeny NWR, east of Salem-Albany No. 1 (ORBIC 2013).

Table 3-9. Special-Status Wildlife Species with Potential Occurrence in Affected Area.

Type	Species	Scientific Name	Federal Status	State Status	Critical Habitat	Distribution in Vicinity of Affected area
Birds	Bald eagle	<i>Haliaeetus leucocephalus</i>	Delisted	None	Not Applicable	Known to occur. The presence of the Willamette River in the vicinity of the affected area provides nearby feeding habitat, Occurrence at Ankeny NWR is common (USFWS 2009), but there are no documented nesting sites within 1 miles of project features (ORBIC 2013).
	Streaked horned lark	<i>Eremophila alpestris strigata</i>	Threatened	None	Designated in proximity of affected area	Known to occur. Occurs in open fields with large patches of bare ground and sparse vegetation. Current distribution in Oregon is limited to the Willamette Valley and lower Columbia River islands. Critical habitat has been designated in Ankeny NWR, east of the Salem-Albany No.1 transmission line, with sightings of individuals and pairs by Ankeny NWR personnel (Selvaggio, Pers. Comm. 2014)
	Purple martin	<i>Progne subis</i>	None	Sensitive Critical	None designated	Likely. This species is an uncommon local summer resident in the Willamette Valley. The last confirmed siting in the affected area was in 1998 in the E.E. Wilson Management Area, approximately 0.60 mile west of Salem-Albany No.2 transmission line (ORBIC 2013). Sightings have also occurred recently at Ankeny NWR (USFWS Pers. Comm. 2014).
	Oregon vesper sparrow	<i>Poocetes gramineus affinis</i>	Species of Concern	Sensitive Critical	None designated	Possible. The affected area is at the northern end of this species summer breeding range. This species is a ground-nesting, ground-foraging bird of most of the grassland, agricultural land, and shrubs steppe habitats of Oregon (ODFW 2014b). The last confirmed siting in the affected area was in 1996 approximately 370 feet east of Salem-Albany No.2 transmission line on agricultural land (ORBIC 2013).
Birds	Tree swallow	<i>Tachycineta bicolor</i>	Species of Concern	None	None designated	Likely. Found nesting near water in adjacent snags. This species is a common resident of Ankeny NWR during the spring and fall months

Table 3-9. Special-Status Wildlife Species with Potential Occurrence in Affected Area.

Type	Species	Scientific Name	Federal Status	State Status	Critical Habitat	Distribution in Vicinity of Affected area
						(USFWS undated). The conservation status of this species is secure in the affected area; therefore this species is not addressed in additional detail in this document ³ .
Mammals	Red tree vole	<i>Arborimus longicaudus</i>	Candidate	Sensitive Vulnerable	None designated	Unlikely. Found in late-successional forests and feed on conifers, principally Douglas-fir needles. Expanses of land without suitable forest cover can be a barrier to tree vole movement and population connectivity. Patches of mixed conifer/Douglas-fir forest does occur around miles 20 and 21; however, this habitat is fragmented and not connected to other suitable habitats. There is no documented presence of this species within the affected area (ORBIC 2013).
	Long-legged myotis, Long-eared myotis, Pacific western big-eared bat, Silver-haired bat, Fringed myotis, Yuma myotis	<i>Myotis volans</i> , <i>M. evotis</i> , <i>Corynorhinus towsendii</i> , <i>Lasionyceteris noctivagans</i> , <i>M. thysanodes</i> , <i>M. yumanensis</i>	Species of Concern	Sensitive Vulnerable ¹	None designated	Possible. The long-legged myotis and long-eared myotis are common statewide and could occur in the affected area. Both of these species are associated with conifer forests, which are limited in the affected area. The remaining species are uncommon in Oregon and would be unlikely to occur in the affected area.
Invertebrates	Fender's blue butterfly	<i>Icaricia icarioides fender</i>	Endangered	None	Designated outside of affected area	Possible. Not expected to occur in the affected area due to a lack of upland prairie habitat containing Kincaid's lupine or nectar species in the area (BPA 2010c). Furthermore, all known occurrences are outside the affected area at a distance that exceeds the species 1.24-mile dispersal area (ORBIC 2013; Hammond 2002-2010). However, it is possible that an unknown location could occur on private property within the vicinity of the affected area.
	Oregon giant	<i>Megascolides</i>	None	Sensitive	None	Unlikely. Not expected to occur in the affected

Table 3-9. Special-Status Wildlife Species with Potential Occurrence in Affected Area.

Type	Species	Scientific Name	Federal Status	State Status	Critical Habitat	Distribution in Vicinity of Affected area
	earthworm	<i>macelfreshi</i>		Critical	designated	area due to the high percentage of agriculture lands and the low occurrence of undisturbed soil found in mixed forests of Douglas firs, grand firs, and bigleaf maples. Furthermore, the last confirmed report of this species in the affected area was in Salem in 1950 (ORBIC 2013 and Xerces undated).
Amphibians and Reptiles	Western pond turtle	<i>Actinemys marmorata</i>	Species of Concern	Sensitive Critical	None designated	Known to occur. Nearest known occurrences are in the E.E. Wilson Wildlife Management Area near Salem-Albany No. 2 and in Bowers Rock State Park in the affected area of both lines. It may also occur in Thornton Lake (SA1: 22/2 to 22/3) (ORBIC 2013, Hemy-Mayer, Pers. Comm. 2014, and ETLNA 2014). Found in both intermittent and permanent aquatic habitats. Most common in stagnant or slow-moving waters associated with muddy bottoms that include basking sites (i.e., logs and mud banks). Nesting occurs in areas with sparse vegetation consisting of grass or forbs. Terrestrial over-wintering sites include shrubby, open, and forested environments with access to some solar radiation. (Rosenberg et al. 2009)
	Western painted turtle	<i>Chrysemys picta</i>	None	Sensitive Critical	None designated	Unlikely. Nearest known occurrence was recorded pre-1984 in the Ankeny NWR, east of Salem-Albany No. 1 (ORBIC 2013). Found in marshy ponds, small lakes, slow-moving streams and quiet off-channel portions of rivers. They prefer waters with muddy bottoms containing aquatic vegetation as well as open ground for nesting and logs for basking.

¹ Long-legged myotis and fringed myotis

3.4.2 ENVIRONMENTAL CONSEQUENCES — PROPOSED ACTION

The following sections analyze how the Proposed Action could impact fish and wildlife or alter their habitat in the affected environment.

ODFW WILDLIFE HABITAT CATEGORIES

In general, activities related to rebuilding the transmission lines and improving existing access roads would occur primarily in habitat classified as ODFW Categories 5 and 6 since the majority of impacts would occur within the maintained rights-of-way, in agricultural areas within the rights-of-way, or along existing roadways. Other impacts would result from the long-term alteration of habitats from danger tree removal and access road construction and reconstruction, which could affect Category 5 habitats (agricultural areas); Category 4 habitats, including black hawthorn riparian hedgerows and isolated or disturbed wetlands; Category 3 habitats, including reed canary and other field-delineated wetlands; and Category 2 habitats such as Oregon white oak forest. Overall, impacts to wildlife habitats using ODFW habitat categories as guidance would be ***low-to-moderate*** depending on impacted acreages and the habitat category. (For a more detailed analysis regarding the potential impacts to these wildlife habitats as a result of the Proposed Action, see Section 3.3, the following discussion in Section 3.4, Section 3.6, and Appendix C).

FISH

Potential impacts to fish could include both direct and indirect impacts. Direct impacts to fish could occur through in-water work involving ford crossings and culvert installations. Indirect impacts primarily entail potential increased sedimentation to streams due to newly exposed soil, danger tree removal along streams and accidental release of hazardous materials into waterways. The extent of the impacts to fish from the Proposed Action depends on the fish species present at the time of construction and the level of habitat disturbance. Potential impacts from the Proposed Action to fish in the affected area are described below.

The Proposed Action rights-of-way or roads span 58 ditches, streams, and rivers, 28 of which are perennial and 30 intermittent (Appendix B). Perennial streams crossed by the affected environment include the Willamette River (which is crossed four times), as well as Ash Creek, Bradshaw Creek, Battle Creek, Bowers Slough, Calapooia River, Calloway Creek, Croisan Creek, Laurel Creek, Luckiamute River, McNary Creek, Oak Point Creek, Pettijohn Creek, Rickreall Creek, Santiam River, Soap Creek, and South Fork Ash Creek (Figure 3-4). Thornton Lake is also crossed by the Proposed Action. Thirty of these streams may or do contain fish (StreamNet 2014; ODFW 2014c). All work within 100 feet of streams is detailed in Appendix B.

Seventeen new culverts would be installed along Salem-Albany No. 1, three culverts would be replaced, and three culverts would be cleaned. Thirty-six new culverts would be installed along Salem-Albany No. 2, seven culverts would be replaced, improvements would be made to one culvert, and one culvert would be cleaned. Activities that have the potential to directly impact fish in the affected area are primarily related to in-water work in fish-bearing streams. BPA is consulting with ODFW to identify where fish passage is needed for stream crossings of fish-bearing streams. Twenty-four streams in the affected area have been identified as having currently or historically provided habitat to native migratory fish (ODFW Pers. Comm. 2014) (Table 3-10). Twenty-two proposed new or improved culverts or other in-stream work could affect

some of these fish-bearing streams and would require consultation with ODFW to determine if fish passage or improved fish passage is needed. Culverts proposed in waterways determined to support salmon would be designed to be fish passable.

Table 3-10. Culvert work in Fish-Bearing Streams

Stream	Tributary To	Nearest Structure Span	In-Water Work	Likely Native Migratory Fish Presence ¹	Stream Type
Unnamed tributary	Pettijohn Creek	SA1:3/2 to 3/3	New culvert 44 feet from Pettijohn Creek	Yes	Perennial
Unnamed tributaries	Willamette River	SA1:10/5 to 10/6	Two new culverts	Possible (floodplain connectivity)	Intermittent
Unnamed tributary	Sydney Ditch	SA1:10/12	New culvert	Yes	Ditch
Unnamed tributary	Bashaw Creek	SA1:12/6	New culvert	Yes	Intermittent
Unnamed tributary	Rickreall Creek	SA2:4/9	New culvert	Possible (floodplain connectivity): Steelhead, Chinook	Intermittent
Unnamed tributary	Hayden Slough	SA2:8/1	Culvert to be improved	Possible (floodplain connectivity)	Ditch
Unnamed tributary	Hayden Slough	SA2:8/8	One new culverts and one culvert to be improved	Possible (floodplain connectivity)	Intermittent
Unnamed tributary	Ash Creek	SA2:10/10 to 10/11	Two new culverts	Possible (floodplain connectivity)	Intermittent
South Fork Ash Creek	Ash Creek	SA2:11/9 to 11/10	Culvert repair	Yes: Chinook, steelhead	Perennial
Unnamed tributary	Talmadge Creek	SA2:12/9	One new culvert and one improved culvert	Yes	Intermittent
Field drainage	Undetermined	SA2:13/10	One new culvert	Possible	Intermittent
Field drainage	Undetermined	SA2:15/6	One new culvert	Possible	Intermittent
Unnamed Tributary	Luckiamute River	SA2:17/3 to 17/4	Bank stabilization	Yes: steelhead, Yes: Chinook; steelhead and Chinook critical habitat	Perennial
Unnamed Tributary	Soap Creek	SA2:20/8 to 21/1	New culvert	Yes	Perennial
Bowers Slough	Willamette River	SA2:23/7	New culvert	Yes	Perennial

Table 3-10. Culvert work in Fish-Bearing Streams

Stream	Tributary To	Nearest Structure Span	In-Water Work	Likely Native Migratory Fish Presence ¹	Stream Type
Calloway Creek	Bowers Slough – tributary to Willamette River (Muddy Creek basin)	SA2:24/1 to 24/2	Clean culvert	Yes (Bowers Slough is used by fall and spring Chinook salmon up to river mile 1.4a)	Perennial
Unnamed Tributary	Bowers Slough	SA2:27/6	New culvert	Yes	Perennial

Sources: StreamNet 2014; FishNet 2014.

¹ Likely native migratory fish presence based on preliminary review by ODFW (ODFW Pers. Comm. 2014). Consultation with ODFW regarding fish passage requirements is ongoing. Results will be included in the Final EA.

At all culvert repair or installation locations, potential direct impacts to fish species present could include displacement or fish mortality due to construction equipment or material entering streams, or failure to capture and relocate fish in areas dewatered to allow for culvert installation. Indirect impacts to fish present in the affected area from these activities would be the same as described above for replacement of existing structures.

Impacts to adult ESA-listed salmonids and their habitat would be avoided through adherence to ODFW’s in-water work windows (discussed in Section 3.4.3). During these times, returning adult salmon are likely absent from tributaries in the affected area. Although spring Chinook salmon would potentially occur in the mainstem Willamette River during the in-water work window, no in-water work is proposed for this waterbody. Juvenile salmonids are more numerous, have a greater geographic distribution, and inhabit fresh water for a longer duration than adult salmonids; therefore, impacts to juvenile salmonids would be possible during the in-water work window.

Impacts to fish in smaller intermittent streams would be minimal due to construction timing restrictions. Given the summer in-water work window, it is reasonable to assume the majority of intermittent streams in the Project Area will be dry or with minimal low flow and/or isolated stream sections with standing stagnant water. Considering temperature requirements for Pacific lamprey and salmonids, these intermittent streams typically exhibit elevated water temperatures during the summer that are not conducive for rearing salmonids. Furthermore, during summer months intermittent streams can become disconnected from drainage systems due to minimal or no stream discharge. Salmonids use smaller tributary streams but are known to migrate to larger stream systems during summer months, in part due to diminishing stream flows (Groot and Margolis 1991). Based upon these premises it is anticipated that the majority of intermittent streams in which work will occur will be absent of fish, resulting in **low** potential impacts to fish in intermittent streams.

Potential indirect impacts to fish species could be due to sedimentation, removal of shade trees, or accidental release of hazardous construction materials. Erosion from ground disturbing activities, the creation of new areas where vegetation is removed (access roads), and equipment moving across a stream or connected wetland with temporary wetland matting could increase sediment load and/or sediment deposition, which in turn could cause fish gill abrasion or clogging, reduce egg to emergent survival, reduce

available food organisms, or reduce foraging success. These activities could also reduce the area's ability to support vegetation after construction, providing a long-term increase in erosional capability. However, such impacts are most commonly associated with prolonged and increased exposure levels. This type of exposure is not anticipated to occur because in-water work would be conducted during the in-water work window and appropriate BMPs would be implemented for both in-water and upland work to avoid erosion, sedimentation, and related impacts to fish.

Currently, danger trees could be removed within the riparian areas of 12 perennial and 8 intermittent streams—many of which are likely fish-bearing—including the Santiam River, the Calapooia River, and all four crossings of the Willamette River (no danger trees were identified at the Salem-Albany No. 2 crossing of the Luckiamute and Calapooia rivers). Removal of vegetation within or adjacent to streams (e.g., for access road construction or danger tree removal) has the potential to reduce stream shading, thereby increasing water temperatures. However, proposed vegetation removal within and adjacent to the transmission lines would be a small proportion of the existing riparian corridor and would be unlikely to result in a system wide effect. Discrete locations where trees are removed could experience an increase in water temperature due to reduced shading. Increased water temperature could negatively affect growth and reproduction of cold water fish species. Tree stumps would remain and would provide soil stabilization and erosion prevention benefits.

If accidental spills of petroleum fuel products, hydraulic oil, or other hazardous materials typically associated with construction activities entered a stream it could cause death or injury to fish or aquatic invertebrates that fish depend on for food.

Additionally, the development of compacted surfaces for new or widen access roads could reduce watershed-wide infiltration while increasing runoff and erosion potential, although these effects would be low due to the relatively small amount (78 acres) of permanent disturbance that would be spread out across the watershed over the 52 miles of project transmission lines.

Overall, given the relatively small amount riparian vegetation to be removed or permanent compact surface areas created, and with the use of in-water work windows, fish isolation, and erosion control measures, the resulting impacts to fish are anticipated to be *low-to-moderate*.

WILDLIFE

GENERAL

Impacts to wildlife from the Proposed Action could include habitat alterations, loss, and degradation from access road work, relocation of structures, and danger tree removal; potential increase in bird collisions with change of conductor configuration in some locations; incidental mortality from construction equipment, tree removal, and ground disturbance; and temporary displacement of wildlife near work areas.

Permanent removal of potential habitat due to new road beds and structure footprints, would include 45 acres of agricultural, 18 acres of riparian and wetland (8.7 of which is jurisdictional wetland), 3 acres of oak habitat (including the removal of about six Oregon white oak trees), 1 acre of upland forest habitat (including the removal of about nine trees), and 8 acres of currently maintained areas within the rights-of-way. Although the habitat that would be removed provides some structural diversity to wildlife species,

most is in existing right-of-way and is already disturbed and degraded; permanent habitat impacts would be anticipated to be **low-to-moderate**.

Temporary impacts to habitat would be due to construction activities and would include 107 acres in agricultural, 31 acres in riparian and wetland, 3 acres in oak woodland, 1 acre in upland forest habitat, and 35 acres in currently maintained areas within the rights-of-way. Ground temporarily disturbed during construction would be reseeded (see Section 3.3), to help restore habitat. To the extent practicable, these activities would occur within the maintained rights-of-way where the habitat is already disturbed, though some road work and tensioning sites would occur outside of the maintained rights-of-way. The effects to wildlife habitat from these temporary construction activities are anticipated to be **low-to-moderate**, as sensitive habitats could be affected but would be restored upon completion of the Proposed Action.

The trees that would be removed along the transmission lines and access roads could impact tree-dependent wildlife habitat, as well as directly cause mortality or injury to species, especially nesting birds, during tree felling. Treed areas provide perching, nesting, and foraging opportunities for a variety of bird species. Impacts to birds and tree-dependent wildlife would occur as a result of habitat loss and modification where trees are removed. Trees to be removed are a combination of primarily cottonwood, Douglas fir, and mixed hardwoods, including Oregon white oak woodland. Most of the potential danger trees are located in scattered areas lining agricultural fields, although some line the edges of woodlands adjacent to the right-of-way. The majority of trees (about 605) would be removed from Salem-Albany No. 1; the remaining (about 154) trees would be removed from Salem-Albany No. 2 (BPA 2014a). Removal of trees in oak woodlands would incrementally decrease the availability of this priority habitat, which supports a high diversity of species (see Section 3.3). Most habitats in the affected area are fragmented, and while tree removal would affect site-specific habitat condition, it would primarily occur at the edge of the transmission line, and the adjacent woodlands would remain as available habitat to any displaced wildlife. Because the remaining canopy, understory trees, shrubs, and crown sprouts would continue to provide canopy cover and maintain existing habitat, and since tree removal would occur along a linear path rather than in large areas, the effects of habitat loss on wildlife due to removal of trees are anticipated to be **low**. Some of the danger trees that would be removed are in riparian areas. Long-term impacts would include the loss of large riparian trees along the Willamette, Santiam, and Calapooia rivers, which can provide prime nesting, foraging, and roosting habitat for raptors such as osprey and bald eagles. Approximately 38 trees have been identified as potential danger trees along the transmission lines within 1 mile of the Willamette River; 9 trees within 1 mile of the Santiam River, and 1 tree within 1 mile of the Calapooia River (BPA 2014a). However, because numerous riparian trees would remain in adjacent areas in the riparian zones of these rivers, and since danger tree removal would take place outside of the nesting season, impacts to nesting habitat for raptors and other wildlife would be **low-to-moderate**.

Transmission lines associated with the existing structures are horizontally oriented. Under the Proposed Action, the majority of the structures would maintain this orientation; however, lines associated with the 77 steel monopoles would be converted to a vertical orientation. The 77 single-pole, vertical structures could increase the probability of bird collisions due to an increase in height of the collision zone; however, current literature lacks evidence to support or refute line configuration as an indicator of collision risk (APLIC 2012). Additionally, from structures SA2:10/8 to 12/4 and SA2:12/10 to 13/4, where the Proposed Action crosses or is adjacent to Ankeny NWR, bird flight diverters would be installed on the conductors to reduce the probability of avian collision. Since the transmission lines and guy wires would be in the same general location as the existing lines and bird diverts would be installed on conductors over large wetland

areas, rivers, and other areas that could be major flyways for waterfowl and waterbirds, **low-to-moderate** impacts to birds are expected from the upgrade to a vertical steel monopole.

Incidental mortality from construction vehicles and tree removal would be avoided for most wildlife species because animals are typically mobile and would flee when startled by construction equipment. However, animals with young, small mammals, invertebrates, amphibians, and reptiles that are less mobile or take refuge in nests or dens underground or in trees could be harmed or killed by equipment during construction. Species that could be harmed in this way include birds, moles, chipmunks, snakes, other ground-dwelling mammals and reptiles, and semi-aquatic species such as newts. Overall, while some incidental mortality of small common animals could occur as a result of the Proposed Action, impacts would occur at the scale of individuals and would likely not have an impact on regional populations. In addition, danger tree removal would be completed outside of the bird breeding season. Because incidental mortality would not occur for most wildlife species and the remainder that would be affected are common and there would likely not be population level impacts, incidental mortality impacts to wildlife would be **low-to-moderate**.

Wildlife would also be temporarily subjected to increased stress due to the noise and human intrusion associated with construction activities. These disturbances could reduce the foraging effectiveness of adults, disrupt breeding and other activities, and cause adults to leave nest or den sites, which could endanger their young. For instance, raptors nesting in trees or on structures close to the lines could be startled from their nests at the onset of activities. Stringing the line with a helicopter would create the most intensive noise disturbance, and birds nesting close to the line would experience the greatest effects. The helicopter would make three passes over each structure, each time hovering for about 10 to 15 minutes before moving on to the next structure approximately 500 or more feet away. However, because the majority of the affected area occurs in farmland where the use of loud machinery—including aircraft for spraying pesticides (i.e., crop dusters)—occurs frequently during the breeding season, birds and other wildlife are habituated to these types of noise disturbances, so would be less likely to abandon their nests (or dens) for long periods of time, reducing the risk of mortality of young or nest failure. In addition, raptor nests currently found on existing structures would be removed outside of the breeding season prior to construction. Overall, while incidental mortality of birds and wildlife could occur as a result of noise and human disturbance, the impacts would occur at the scale of individuals and would likely not have an impact on regional populations. Additionally, over the long term, the transition from H-frame wood structures to steel monopoles and updated wood structures would reduce the need for inspection and repairs, thereby reducing the frequency of wildlife displacement due to noise, trucks, and human presence. Because the risk of mortality or nest failure would be low, and since the increased stress associated with construction disturbance would be temporary, impacts to birds and other wildlife from helicopter and other construction noise would be **low-to-moderate**.

SPECIAL-STATUS SPECIES

The following section describes potential impacts to special-status species that have potential to occur in the affected area, including, migratory birds, bald eagle, streaked horned lark, purple martin, Oregon vesper sparrow, long-eared myotis, long-legged myotis, western pond turtle, and western painted turtle.

Bald Eagle

Based on over 30 years of comprehensive state-wide surveys, the closest bald eagle nest to the affected area is about 0.7 miles or 3,600 feet away from either transmission line. The recommended buffer for helicopters use near bald eagle nests is 1,000 feet (USFWS 2007); therefore, evidence indicates that bald eagle breeding habitat would not be affected. Since it is possible that bald eagles could be found foraging along the Willamette River, impacts would be **low** since they would likely be limited to infrequent and temporary construction disturbance to roosting and foraging bald eagles.

Streaked Horned Lark

Streaked horned lark are known to occupy the critical habitat unit on the Ankeny NWR east of the Salem-Albany No.1 transmission line and have been observed in at least three other sites in the vicinity of the affected area (USFWS 2013a and b; Selvaggio Pers. Comm. 2014; USFWS Pers. Comm. 2014). Additionally, the managed agriculture fields and wetlands adjacent to the Proposed Action and the disturbed rights-of-way provide habitat for this species. Potential impacts would be similar to those described for general wildlife, including temporary increased stress during construction and incidental mortality. Noise and physical disturbance associated with construction activities could lead to nest abandonment or destruction. In addition, vehicles could present a hazard to juveniles and adults foraging on the ground. It would be considered a high impact if streaked horned larks were killed or nests were abandoned during construction, however, the period until young have fledged is relatively short (12 days of incubation, then 9 days until fledging), and seasonal restrictions would likely be used to avoid impacts. Reduced speed limits could also be used to reduce the risk of juvenile and adult mortality. BPA will prepare a Biological Assessment to further assess potential impacts and work with USFWS to determine potential avoidance or mitigation measures that would be employed to minimize impacts.

On the Ankeny NWR, habitat for streaked horned lark could be altered from a managed prairie habitat to graveled habitat under access road Options 2 and 3; conversely, lark habitat could increase due to the construction of a new graveled access road under access road Option 1. Upon completion of the Proposed Action, these new roads would not be used on a regular basis and only traveled for infrequent ongoing inspection and repair (see Chapter 2); although the new use of these areas as roads would have the potential to disrupt larks if they were present, road use would help maintain low-growing vegetation lark habitat.

Surveys are scheduled for spring and summer of 2014 and the results will be included in the final EA. If breeding pairs are found within the affected area, BPA will prepare a Biological Assessment to further assess potential impacts and work with USFWS to determine potential mitigation measures that would be employed to reduce impacts. With mitigation measures, impacts would be expected to be **moderate**.

Purple Martin

The right-of-way would not provide appropriate nesting habitat for purple martins, as it is maintained and tree snags are removed; however, they may forage in the affected area. Noise and physical disturbance associated with construction activities could affect behavior and/or reproductive success of purple martins present in the affected area. Since purple martins would be unlikely to nest along the right-of-way, effects would be limited to behavioral changes which could include area avoidance or interference with communication (Lackey 2010). Since disturbances would be temporary, foraging habitat would likely be available nearby, and effects would not likely contribute to the need for federal listing given the species'

status, but since reproductive success in any nearby nesting sites could be affected, impacts to purple martin, if present, would be **low-to-moderate**.

Oregon Vesper Sparrow

Although the affected area is in the range of the Oregon vesper sparrow, the only sighting (via birdsong) recorded in the affected area was in 1996, and it is unlikely that this species would occur. Nearly all detections of Oregon vesper sparrows are in young Christmas tree farms with extensive grass and weed cover, or in lightly grazed pastures with scattered shrubs and grass heights of less than 1 to 2 feet (WDFW 2012). While this habitat type does occur in the affected area, it is unlikely that it would be utilized by this species as it has not been detected in over 10 years and the species exhibits high site fidelity, therefore there would likely be **low** impacts to the Oregon vesper sparrow. If the species were to be present in the affected area, noise and physical disturbance associated with construction activities could affect their behavior and/or reproductive success. The potential for these effects to occur is low and therefore not further discussed.

Long-Eared Myotis and Long-Legged Myotis

The long-eared and long-legged myotis have the potential to occur within the affected area due to their ability to utilize a variety of habitat types, but it is unlikely to roost or hibernate within the affected area because the right-of-way is maintained and would not provide appropriate roosting snags. Nevertheless, the species may forage in the affected area. Bats have been found to avoid foraging in areas with high noise emissions if a more silent environment is available (Schaub et al. 2008). Construction activities would increase noise in the affected area during working hours, which may have some, but not much, overlap with the hours bats are foraging. Short-term impacts from loss of foraging habitat due to construction disturbance are expected to be **low** as the species would likely avoid the affected area and forage in surrounding non-affected areas during construction.

Fender's Blue Butterfly

Fender's blue butterflies are unlikely to occur in the affected area; however, there is a possibility that an unknown population could exist on remnant prairie habitat on private property in the affected area. Since no known populations occur in the affected area, potential impacts from the Proposed Action would be restricted to the crushing of adults feeding on nectar plants within the project corridor if construction occurs during the months of May and June. The probability of adults utilizing the affected area is unlikely since at least 12 acres of high quality nectar habitat is required to support a Fender's blue butterfly population and vegetation surveys completed to date indicate a lack of upland prairie habitat containing Kincaid's lupine or nectar species (USFWS 2010c; BPA 2010c). Therefore, the Proposed Action would likely have a **low** impact on Fender's blue butterfly. (Rare plant surveys, including Kincaid's lupine, are planned for summer 2014; the results will be included in the Final EA).

Western Pond Turtle and Western Painted Turtle

Western pond turtles have the potential to occur in the affected area. Effects to the pond turtles' aquatic lifestage would be limited to a new culvert installation in an unnamed tributary of Soap Creek near structures SA2:20/8 to 21/1. Pond turtles, if present, could be displaced during construction due to increased activity in the affected area. Effects to the pond turtles' terrestrial lifestage could result from the use of a pulling-tensioning site adjacent to Thornton Lake, and roadwork and construction activities in the

vicinity of pond turtle habitat. Depending on the time of year, these activities could result in nest and hatchling mortality or mortality of adults in overwintering (terrestrial) habitat. These impacts would be offset by mitigation, to be determined in consultation with ODFW. Therefore, disturbances associated with construction activities could have a **moderate** impact on the western pond turtle by reducing year class recruitment or resulting in adult mortality.

In Oregon, native painted turtles are distributed in north-central and north-eastern Oregon, and in the northern portion of the Willamette Basin, north of Salem (Gervais et al. 2009). Therefore it is unlikely that this species would occur in the affected area, the nearest known occurrence of the western painted turtle was recorded pre-1984 in the Ankeny NWR, east of Salem-Albany No. 1 (ORBIC 2013). Since this species would be unlikely to occur in the affected area, **no** impacts are anticipated to western painted turtles.

3.4.3 MITIGATION – PROPOSED ACTION

The following mitigation measures have been identified to reduce or eliminate impacts to fish and wildlife species.

- Complete in-water construction below the ordinary high water mark (OHWM) work by the ODFW recommended work period between July 1 and September 15, the period below ordinary high water, except for west bank tributaries of the Willamette River (Luckiamute River), which is July 1 to October 15.
- Isolate work areas and remove and relocate fish prior to commencing in-water work activities in known streams with ESA-listed fish and critical habitat (Luckiamute River, list streams) in accordance with NMFS guidelines (NMFS 2011).
- Design stream crossings (culverts) to comply with fish passage design requirements and recommendations from ODFW and USFWS, to be determined in ongoing consultation and reported in the Final EA.
- Treat water generated during construction activities prior to its discharge to prevent the release of contaminated or sediment-laden water into the streams.
- Adhere to NMFS and ODFW requirements for utilizing the four fords planned for the project. At all other locations, prevent equipment from fording the stream sections during construction.
- Implement pollution and erosion control measures prior to construction and maintain them throughout the duration of the Proposed Action.
- Reseed disturbed areas during the appropriate season and in coordination with the underlying land owner using a seed mix that matches the surrounding habitat as closely as possible in order to restore preconstruction conditions.
- Minimize removal of mature trees adjacent to streams.
- Continue to coordinate with the Ankeny NWR USFWS to reduce potential construction impacts to Ankeny NWR during sensitive periods for waterfowl, water birds, and shorebirds and during raptor and migratory bird nesting periods.
- Schedule tree removal between August 31 and March 1 to minimize impacts to migratory birds. If active nests are found, do not remove trees until the young have fledged.
- Remove raptor nests on structures starting in January or prior to the nesting season, and continue to remove biweekly or provide alternate nesting structures. If eggs are present in nests, do not remove nests until the young have fledged.

- Install bird diverters on conductors in high bird-conductor collision risk areas (established flight corridors along and within river and creek drainages that are likely to be frequented by large numbers of birds).
- Utilize fire prevention and control training and equipment to protect habitats.
- Abide by any terms and conditions or mitigation measures agreed to with NOAA Fisheries during ESA consultation for steelhead and Chinook salmon.
- Abide by any terms and conditions or mitigation measures agreed to with USFWS during ESA consultation for streaked horned larks. These could include avoiding seasonal restrictions on construction until the young have fledged and reduced speed limits in the vicinity of documented larks.

Additional mitigation measures applicable to fish and wildlife are described in Section 3.5.3 of Water Resources.

3.4.4 UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION

FISH

Even with the implementation of mitigation measures, stream turbidity from construction adjacent to streams and in-water work could disrupt fish; fish would also be handled when isolating in-water work areas.

WILDLIFE

Unavoidable impacts to wildlife would include removal of existing habitat due to the development of new or widened roads and removal of trees; potential slight increased risk of bird-conductor collisions in high use areas due to changes to transmission line conductor configuration; injury or incidental mortality of less mobile wildlife species due to construction equipment, vegetation removal, and soil excavation; and stress or temporary displacement of more mobile wildlife due to construction noise and human disturbance during construction.

3.5 WATER RESOURCES

This section describes the waterways, groundwater, and any known areas of water quality concern found within the affected environment, as well as potential impacts of the Proposed Actions on these resources. The No Action Alternative is discussed at the end of Chapter 3.

3.5.1 AFFECTED ENVIRONMENT

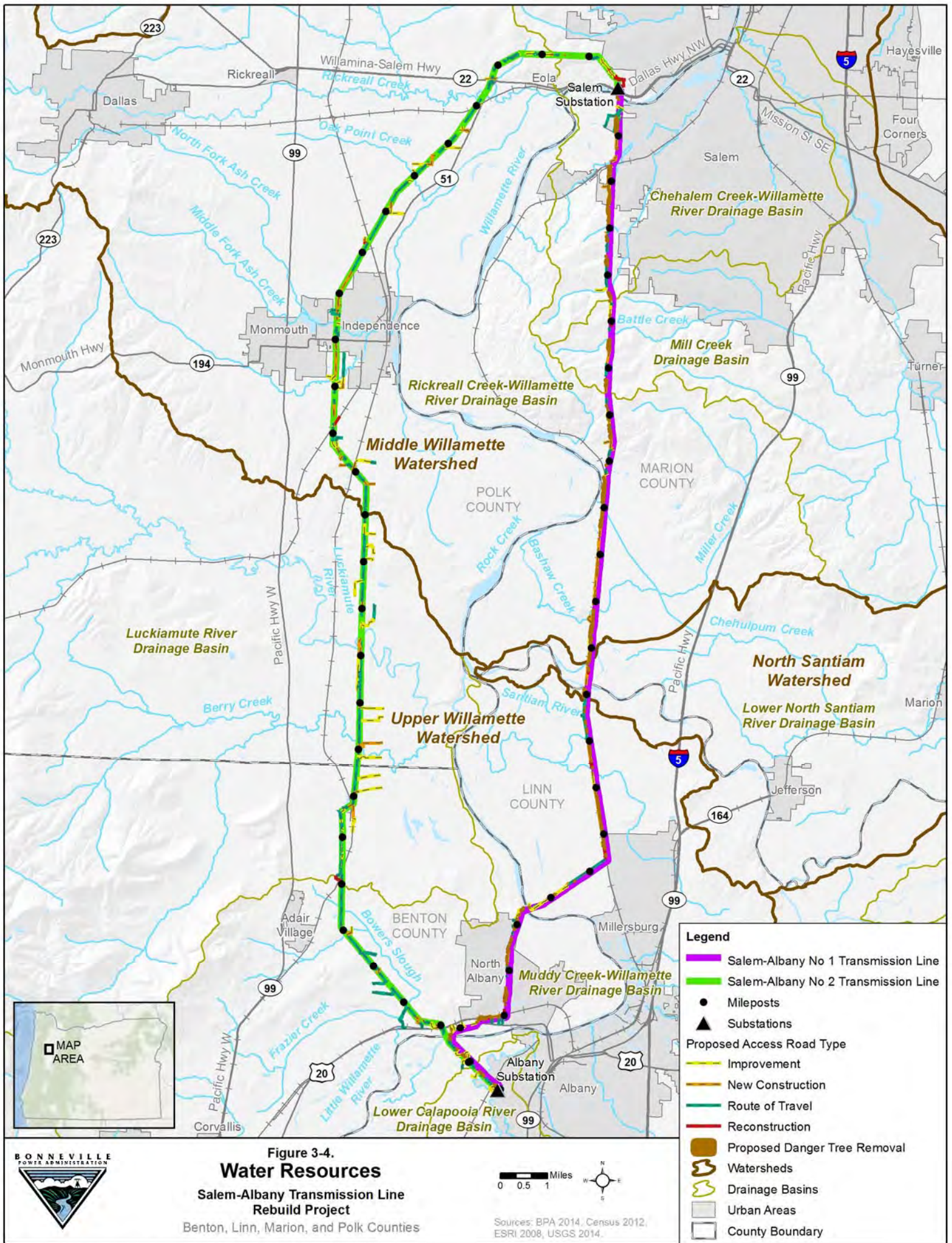
The affected environment includes all streams crossed or adjacent to the transmission line rights-of-way and access roads.

HYDROLOGY

The Proposed Action falls entirely within USGS designated Willamette River Basin (including seven of its watersheds (Table 3-11), which drains to the Columbia River and ultimately to the Pacific Ocean. It crosses or spans 58 streams or rivers, 28 of which are perennial and 30 intermittent or ditches (Appendix B). Perennial waterbodies crossed by the transmission lines or access roads include the Willamette River (which is crossed four times), as well as Ash Creek, Bradshaw Creek, Battle Creek, Bowers Slough, Calapooia River, Calloway Creek, Croisan Creek, Laurel Creek, Luckiamute River, McNary Creek, Oak Point Creek, Pettijohn Creek, Rickreall Creek, Santiam River, Soap Creek, South Fork Ash Creek, and Thornton Lake (Figure 3-4).

Table 3-11. Watersheds and Drainage Basins Crossed by Salem-Albany No. 1 and No. 2

Watershed	Portion of Rights-of-Way
<i>Salem-Albany No. 1</i>	
Chehalem Creek-Willamette River	Salem Substation to SA1:6/4
Mill Creek	SA1:6/4 to 8/2
Lower North Santiam River	SA1:8/2 to 13/10
Luckiamute River	SA1:13/10 to 14/7
Muddy Creek-Willamette River	SA1:14/7 to 24/6
<i>Salem-Albany No. 2</i>	
Chehalem Creek-Willamette River	Salem Substation to SA2:2/7
Rickreall Creek-Willamette River	SA2:2/7 to 14/9
Luckiamute River	SA2:14/9 to 22/14
Muddy Creek-Willamette River	SA2:22/14 to 28/2
Lower Calapooia River	SA2:28/2 to the Albany Substation



The Oregon Department of Environmental Quality (ODEQ) periodically prepares a list of all surface waters in the state that are water quality limited because they do not meet water quality standards under Section 303(d) or 305(b) of the Clean Water Act (CWA; 33 USC 1251 *et seq.*). These streams include those for which a Total Maximum Daily Load (TMDL) has been developed, streams that need a TMDL, as well as streams for which water quality is limited but a TMDL is not needed. Streams crossed by the Proposed Action that are considered water quality limited by the State of Oregon include the following (ODEQ 2010):

- Where it is crossed by the Proposed Action, the **Willamette River** has TMDLs for mercury, temperature, e. coli, and dioxin, and is included on the 303(d) list (meaning a TMDL is needed) for iron, biological criteria, dissolved oxygen, and manganese. The river is also considered water quality limited for flow modification. It is spanned by the Proposed Action four times, at SA1:1/1 to 1/2, SA1:19/9 to 20/1, SA1:23/8 to 23/9, SA2:27/2 to 27/3, and SA1:24/9 to 24/10 (co-located with SA2:28/5 to 28/6).
- **Crosain Creek** is spanned by the Proposed Action at SA1:5/10 to 6/1, where it has a TMDL for E. coli and is water quality limited for dissolved oxygen and habitat modification.
- **Battle Creek** is spanned by the Proposed Action at SA1:7/9 to 8/1, where it has a TMDL for E. coli and is water quality limited for dissolved oxygen and habitat modification.
- **Bradshaw Creek** is spanned by the Proposed Action at SA1:12/7 to 12/8, where it has a TMDL for E. coli.
- The **Santiam River** is spanned by the Proposed Action at SA1:14/5 to 14/6, where it has a TMDL for temperature and is water quality limited for dissolved oxygen.
- **Calapooia River** is spanned by the Proposed Action at SA1:24/9 to 24/10 (co-located with SA2:28/5 to 28/6) where it has a TMDL for temperature and e. coli and is water quality limited for dissolved oxygen, iron, manganese, and flow modification.
- **Rickreall Creek** is spanned by the Proposed Action at SA2:4/9 to 4/10, where it has a TMDL for temperature and is water quality limited for flow modification
- The **Luckiamute River** is spanned by the Proposed Action at SA2:17/5 to 17/7, where it has a TMDL for temperature.
- **Soap Creek** is spanned by the Proposed Action at SA2:19/9 to 19/10, where it has a TMDL for temperature and is water quality limited for dissolved oxygen.

GROUNDWATER RESOURCES

The Willamette Basin includes a major river system and significant groundwater aquifers. Groundwater for the Willamette Basin is an important natural resource. The Willamette Basin has over 11,000 recorded groundwater rights for uses, including campgrounds, fish culture, fish and wildlife, irrigation, manufacturing, municipal, and stock (ODEQ 2004). The basin also has over 1,700 groundwater-based public water supply systems. These systems use either groundwater exclusively, or a combination of groundwater and surface water, to supply various public uses, including municipal drinking water (ODEQ 2004). Another 100,000 domestic water wells in the basin provide drinking water to rural residences and areas with no public water supply systems (ODEQ 2004).

Groundwater quality studies in the Willamette Basin have shown impacts from several pollutants, including nitrate, pesticides, and volatile organic compounds (VOCs). Nitrate is a common contaminant of shallow groundwater in areas with well-drained soils and is derived from fertilizers, septic systems, and animal manure. Although some level of nitrate may be naturally occurring, levels exceeding 3 milligrams per liter (mg/L) indicate anthropogenic causes. Elevated levels of nitrate occur in the southern Willamette Valley, south of Albany and in localized areas near north Salem, Albany, and Canby. Nitrate in groundwater from 9 percent of sampled domestic drinking wells of the Willamette Basin exceeded the EPA drinking water standard of 10 parts per million (ppm, ODEQ 2004).

Bacteria contamination detections may indicate contamination from non-point sources such as on-site septic systems, or point sources, such as facilities handling or disposing of manure. Bacteria contamination of groundwater has previously been detected in North Albany (ODEQ 2004).

3.5.2 ENVIRONMENTAL CONSEQUENCES — PROPOSED ACTION

The following sections analyze how the Proposed Action could impact streams and ground water. A detailed table describing the approximately 90 surface waters that occur in the affected environment and the activities that could potentially impact them is provided in Appendix B.

STRUCTURE AND TRANSMISSION LINE REPLACEMENT

Impacts to surface or groundwater from structure replacement include soil disturbance and erosion or compaction leading to increased turbidity, possible contamination from accidental spills of fuels or oils during construction or from leaching of pentachlorophenol (PCP) from installation of treated wood poles, and potential inadvertent herbicide run-off contamination during noxious weed control.

SOIL DISTURBANCE

Structure replacements would occur within 100 feet of perennial or intermittent streams or ditches at about 23 locations. Soil exposure from structure replacement could increase soil erosion rates, resulting in sediment deposition and increased turbidity in nearby streams, rivers, and ponds. Soil erosion into these surface waters would be more likely to occur where disturbance areas are immediately adjacent to streams (see Section 3.4.2 for a discussion of the impacts of increased turbidity on fish). Potential impacts to water quality at structure replacement locations would be influenced by the timing of construction, weather conditions, local topography, and the erosion potential of soils. BMPs would be implemented during construction to adjust to local conditions and minimize soil erosion and stormwater runoff.

BMPs to reduce erosion during the construction of new structures would be implemented to minimize impacts to surface water quality. Further, erosion rates would likely return to their current levels once vegetation is reestablished. Any impacts to surface water from structure replacement would be temporary and would be **low** because most structures would be replaced in the same locations and very little soil would be exposed from widening existing structure holes. Therefore, erosion levels would be near normal during and following construction.

HEAVY MACHINERY

Accidental spills of fuel, oil, or chemicals during construction could expose surface water resources and groundwater to hazardous materials. Petroleum spills could infiltrate to the groundwater aquifer, but such an event is unlikely. Any chemical spills from vehicles or machinery used during construction would likely be

small in volume that could easily be contained and cleaned. In addition, Spill Prevention and Response Plans and Procedures would be developed, and spill prevention and response equipment would be present at all construction sites. Any impacts to groundwater quality would be localized, short-term, and likely would not exceed federal or state water quality criteria. With these mitigation measures in place to prevent the occurrence of spills and to reduce the risks of spills reaching groundwater, impacts to surface and groundwater likely would be **low**.

PENTACHLOROPHENOL (PCP)

Once constructed, the new structures could impact groundwater or surface water by leaching PCP, a general biocide that is commonly used as a wood preservative treatment for utility poles, as discussed in Section 3.2.2, Geology and Soils. Because of the demonstrated tendency for PCP to adsorb to soils, the moderately rapid degradation of the compound in the environment, and the localized nature of the compound, it is unlikely that surface or groundwater contamination would result from installation of the new wood poles. In addition, concentrations of PCP released during replacement of structures are not expected to exceed EPA levels of concern for human health. In wetlands, wooden structures would be placed inside corrugated culverts, which would contain PCPs and prevent them from leaching into surrounding soils. Therefore, the impact of PCP associated with new structures installed for the Proposed Action on surface or groundwater quality and any associated drinking water is expected to be **low**.

HERBICIDES

Herbicides would be used for noxious weed control prior to and following construction, if appropriate. Herbicides would be applied to buffer widths, as specified in BPA's *Transmission System Vegetation Management Program Final Environmental Impact Statement and Record of Decision* (BPA 2000). Impacts to surface waters and groundwater could occur if herbicide residues on vegetation and soil are transported when it rains or, in the event of overspray, if herbicides are inadvertently applied directly to surface waters. However, BPA has specific restrictions regarding the distance from water that herbicides can be used, as well as which toxicity class of herbicides can be used near water (BPA 2000). The impact of herbicide use when following appropriate application rates and adhering to BPA's restrictions is expected to be **low**.

ROAD WORK

Impacts to surface water quality from access road work would be similar to those from structure replacement, although there would be a greater amount of soil exposure along roadsides, increasing the risk for soil erosion and resulting in **low** temporary impacts to surface water quality. Construction and improvement of access roads would occur within 100 feet of perennial or intermittent streams at about 30 (Appendix B).

Seventeen new culverts would be installed along Salem-Albany No. 1, three culverts would be replaced, and three culverts would be cleaned. Thirty-six new culverts would be installed along Salem-Albany No. 2, seven culverts would be replaced, improvements would be made to one culvert, and one culvert would be cleaned. The installation of new culverts and the improvement of old culverts would enhance stream crossings over the long-term, particularly at the crossing of the unnamed tributary to the Luckiamute River, discussed in Section 3.4.2, Fish). Where culverts would be repaired, replaced, or cleaned, there would be temporary sedimentation and disturbance impacts to water resources due to in stream work, however the long-term impacts would be an improvement to water resources due to improved stormwater conveyance

as the culverts would be properly sized and functional. New culverts would also cause similar temporary sedimentation and disturbance impacts due to installation; however, streambanks would be stabilized after installation, and the properly sized and installed culverts would not impact water resources long term.

At four locations, fords would be used to cross streams during construction; one along Salem-Albany No. 1 and three on Salem-Albany No. 2. Equipment moving across streams at these locations could disturb the substrate and release sediments or result in compaction. Because effects on water quality during construction would be temporary and mitigation measures would be implemented to reduce these effects, impacts to water quality would be **low** in the long term and **low-to-moderate** in the short term.

The amount of sediment introduced to streams during road work would be similar to natural erosion processes during the dry season because there would be little or no flowing water on road surfaces. Traffic on gravel roads during the wet season has the largest potential to deliver sediment to stream channels. However, structure replacement projects such as this usually involve about eight vehicle trips per day (four vehicles to and from the transmission line) so the amount of rock fines running off into streams and increasing sedimentation would be low, and the BMPs described in Section 3.5.3 would help to minimize turbidity and sediment runoff into streams from construction activities. Further, there would be a long-term reduction of soil erosion due to project design, gravel placement, seeding, erosion control, such that resurfacing, widening, and new construction of roads would result in **low** impacts to surface waters from access road and slope stabilization activities.

TREE REMOVAL

Trees removal would occur within 100 feet of about 16 perennial and 12 intermittent streams. The number of trees proposed for removal near streams will be confirmed during field work conducted summer 2014. Tree removal has the potential to impact streams by temporarily increasing erosion and sedimentation by exposing soils. However, since stumps and low-growing vegetation would be left in place, the risk of erosion and increased sedimentation is low. Tree removal near streams can also expose flowing water to increased solar radiation, which can increase water temperatures. The trees cleared near streams would be a small percentage of the total trees in the area, stumps would remain, and the remaining tree canopy, understory trees, shrubs, and crown sprouts would continue to provide shading and hold soils in place. This limits the potential for increased water temperatures and erosion; therefore, impacts to water quality from tree removal are expected to be **low**.

3.5.3 MITIGATION MEASURES

The following mitigation measures have been identified to reduce or eliminate impacts to water resources:

- Monitor site restoration following ground disturbance activities; implement contingency measures if site restoration should fail and soil erosion occurs.
- Construct, widen, and resurface access roads during the dry season when stream flow, rainfall, and runoff are low.
- Replace culverts during the dry season when stream flow, rainfall, and runoff are low or if flows are present at fish bearing streams, temporarily divert streams around the construction site.
- Minimize ground disturbances near waterbodies during construction, particularly in areas prone to erosion.
- Retain vegetative buffers, where possible, to prevent runoff into waterbodies.

- Prepare and implement a Stormwater Pollution Prevention Plan.
- Install sediment barriers and other suitable erosion- and runoff-control devices, prior to ground-disturbing activities at construction sites to minimize offsite sediment movement.
- Complete work below the ordinary high water mark during the ODFW recommended in-water work period between July 1 and September 15.
- Properly space and size culverts.
- Stabilize approaches to streams and stream crossings with clean rock or steel plates during construction to minimize erosion and sedimentation.
- Prepare and implement a Spill Prevention and Response Plan and Procedures to prevent, contain, and report accidental spills.
- Inspect and maintain tanks and equipment containing oil, fuel, or chemicals for drips or leaks to prevent spills onto the ground or into waterbodies.
- Maintain and repair all equipment and vehicles on impervious surfaces away from all sources of surface water.
- Park construction vehicles or equipment at least 50 feet from any stream or wetland unless authorized by a permit or on an existing roadway.
- Place sorbent materials or other impervious materials underneath individual wood poles at pole storage and staging areas to contain leaching of preservative materials.
- Soil excavated in proximity (within approximately 12 inches) to existing wood poles may contain wood preservatives. Any potentially-contaminated excess soil, beyond the needs of backfill, would be removed, handled, transported and disposed of according to all applicable regulations.
- Use herbicides in accordance with BPA's *Transmission System Vegetation Management Program Final EIS and Record of Decision* (BPA 2000).

3.5.4 UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION

Unavoidable impacts would include temporary increased turbidity from the in-water work at the 68 culvert installation or improvement sites, and at locations of the four stream fords, as well as erosion from upland construction activities including road construction and improvement and other ground-disturbing activities. Increased solar radiation of stream channels would occur where streamside trees would be removed.

3.6 WETLANDS AND FLOODPLAINS

This section describes the existing wetlands and floodplains found within the affected environment, as well as potential impacts of the Proposed Action on these resources. The No Action Alternative is discussed at the end of Chapter 3.

3.6.1 AFFECTED ENVIRONMENT

The affected environment for wetlands and floodplains includes all wetlands and 100-year floodplains crossed by or adjacent to the e transmission line and project access roads, as well as any additional project features, such as tensioning sites extending outside of the rights-of-way.

WETLANDS

Wetlands are defined as those areas where surface water or groundwater saturates the soils for sufficient durations during the growing season, and at a frequency to support vegetation adapted to saturated soil conditions (Clean Water Act, 40 Code of Federal Regulations [CFR] 230.3[t]). Wetlands perform a number of functions that are considered valuable to society, including water storage, water filtration, and biological productivity. Wetlands can support complex food chains that provide valuable sources of nutrients to plants and animals. Wetlands also provide general and specialized habitats for a wide variety of aquatic and terrestrial species. Rivers and streams are discussed in Section 3.5, Water Resources.

Based on the results of the field investigations, wetland scientists identified approximately 91 acres of jurisdictional wetlands within the affected area (BPA 2014c). All delineated wetlands discussed in this section are assumed to be subject to federal jurisdiction under Section 404 of the Clean Water Act. Assessments of wetland functions were conducted in the field using best professional judgment and on representative wetlands from each of the drainage basins using the Oregon Rapid Wetland Assessment Protocol (ORWAP).

Wetlands and waters along the rights-of-way are associated with topographic depressions, flat valley bottoms, riparian areas, hill slopes, ravines, and drainage swales. Many of the wetlands within the rights-of-way have been disturbed through development (such as those adjacent to the railroad) or are in agricultural use. Dominant hydrologic sources to wetlands and waters include direct precipitation and surface and shallow subsurface flows. The wetlands in the Willamette River Valley often have a seasonally perched water table because of heavy clay soils, which can cause ponding in the winter months. This seasonal ponding may be more prevalent due to soil compaction from heavy grazing or farm vehicle traffic. Outside of the major river valleys, most of the wetlands observed were wetlands located on slopes (also referred to as slope wetlands).

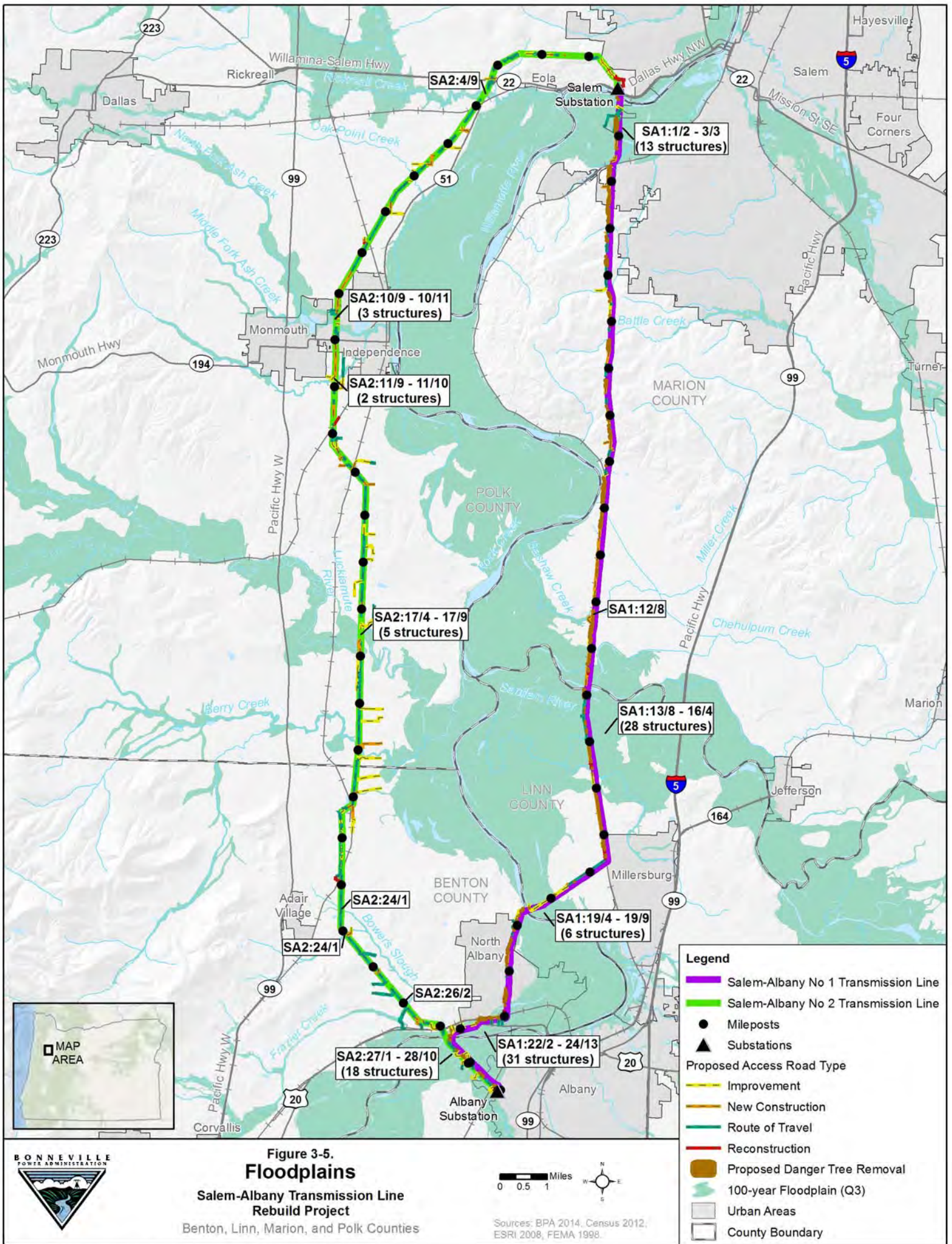
Wetlands within the affected area fall into the category of palustrine wetlands, which are non-tidal wetlands that are not associated with lake shores or rivers. They are then further characterized by the dominant vegetation type that they support. The vast majority of these wetlands (90 of the 91 acres) are classified as palustrine emergent. Emergent wetland vegetation communities—those with erect, non-woody plants that are mostly above the water—are dominant in these wetlands. Palustrine emergent wetland vegetation communities in the affected area are typically characterized by a dominance of invasive reed canarygrass. However, other species were also observed, including one-sided sedge, barnyard grass (*Echinochloa crus-gali*), blunt spikerush (*Eleocharis obtusa*), creeping spikerush (*Eleocharis palustris*), cursed

buttercup (*Ranunculus sceleratus*), slough sedge, soft rush, dense sedge, beggar's tick (*Bidens cernua*), leafy beggar's tick (*B. frondosa*), awned flat-sedge (*Cyperus squarrosus*), needle-leaf pincushion plant (*Navarretia intertexta*), rough cocklebur (*Xanthium strumarium*), and Chilean tarweed (*Madia satvia*).

Approximately 1 acre of delineated wetlands is classified as palustrine scrub-shrub. Thirty percent of the vegetative canopy cover in these areas consisted of shrubs or trees less than 20 feet tall. Typical shrub species that these wetlands support included Sitka willow, Oregon ash, red-osier dogwood, and ninebark (*Physiocarpus capitatus*); an herbaceous layer that contains similar species to the palustrine emergent wetlands also occurs within the scrub-shrub wetlands.

FLOODPLAINS

The Federal Emergency Management Agency (FEMA) maps 100-year floodplains on its National Flood Insurance Program (NFIP) Rate Maps, and defines 100-year floodplains as areas that have a 1 percent chance of being flooded in a given year. The Salem-Albany No. 1 right-of-way crosses the 100-year floodplains of a number of waterbodies (Figure 3-5), including the Willamette River, Bradshaw Creek, Santiam River, and Crooks Creek. In the right-of-way, 79 of the 240 existing structures (33 percent) lie within or on the boundaries of these floodplains. The Salem-Albany No. 2 right-of-way crosses the 100-year floodplains of Rickreall Creek, Ash Creek, South Fork Ash Creek, Luckiamute River, Calloway Creek, Bowers Slough, and the Willamette River (Figure 3-6). In the right-of-way, 31 of the 301 existing structures (10 percent) lie within or on the boundaries of these floodplains. A total of 12 miles of Proposed Action roads and routes of travel would be located in 100-year floodplains. On Salem-Albany No. 1, this includes 2 miles of new roads, 1 mile of improved roads, 1 mile of reconstructed roads, and 3 miles of routes of travel. On Salem-Albany No. 2, this includes 1 mile of new construction, 2 miles of improved roads, and 2 miles of routes of travel.



3.6.2 ENVIRONMENTAL CONSEQUENCES — PROPOSED ACTION

BPA analyzed how the Proposed Action could alter or damage wetlands or floodplains in the affected environment.

WETLANDS

Most (99 percent) of the impacts to wetlands from the Proposed Action would be to palustrine emergent type wetlands (Table 3-12). Replacement of structures within wetlands would primarily result in temporary disturbances of wetland soils and vegetation, as most poles would be replaced in the same hole from which the old ones were removed. To prepare for installation in wetlands, each existing hole would be cleaned out and re-augured so that it is approximately 5 feet in diameter and 10 to 12 feet deep. A 4-foot diameter corrugated metal pipe would be installed upright in the hole and extend to the soil surface for all H-frame wood poles installed in wetlands (See Figure 3-6; structures SA1:2/2 to 2/5 and SA1:23/11 to 24/11). (The metal piping would not be needed for steel monopole structures.) The new wood poles would be placed within the vertical pipe and would be back-filled with crushed rock. The use of corrugated metal pipes surrounding the poles would improve the stability of the poles in soft wetland soils, increase the longevity of the wood structures, and help prevent any leaching of PCP into surrounding areas.

Table 3-12. Wetland Impacts

Project Activity	Impacts (Acres)	
	Permanent	Temporary
<i>Palustrine Emergent Wetlands</i>		
Road Construction	7.7	0.0
Road Improvement or Reconstruction	1.0	0.0
Culverts, riprap, etc.	To be included in the Final EA	To be included in the Final EA
Replacement of Structures (Including relocations)	<0.1	10.4
Tensioning Sites	0.0	3.6
Overland Travel Routes	0.0	4.0
<i>Palustrine Scrub-Shrub Wetlands</i>		
Road Improvement or Reconstruction	<0.1	0.0
Replacement of Structures (including relocations)	0.0	0.1
Temporary Access	0.0	<0.1
Total	8.8	18.1

Source: BPA 2014c

Note: Temporary disturbance areas do not include areas that are permanently impacted.
Totals are rounded to the nearest tenth.

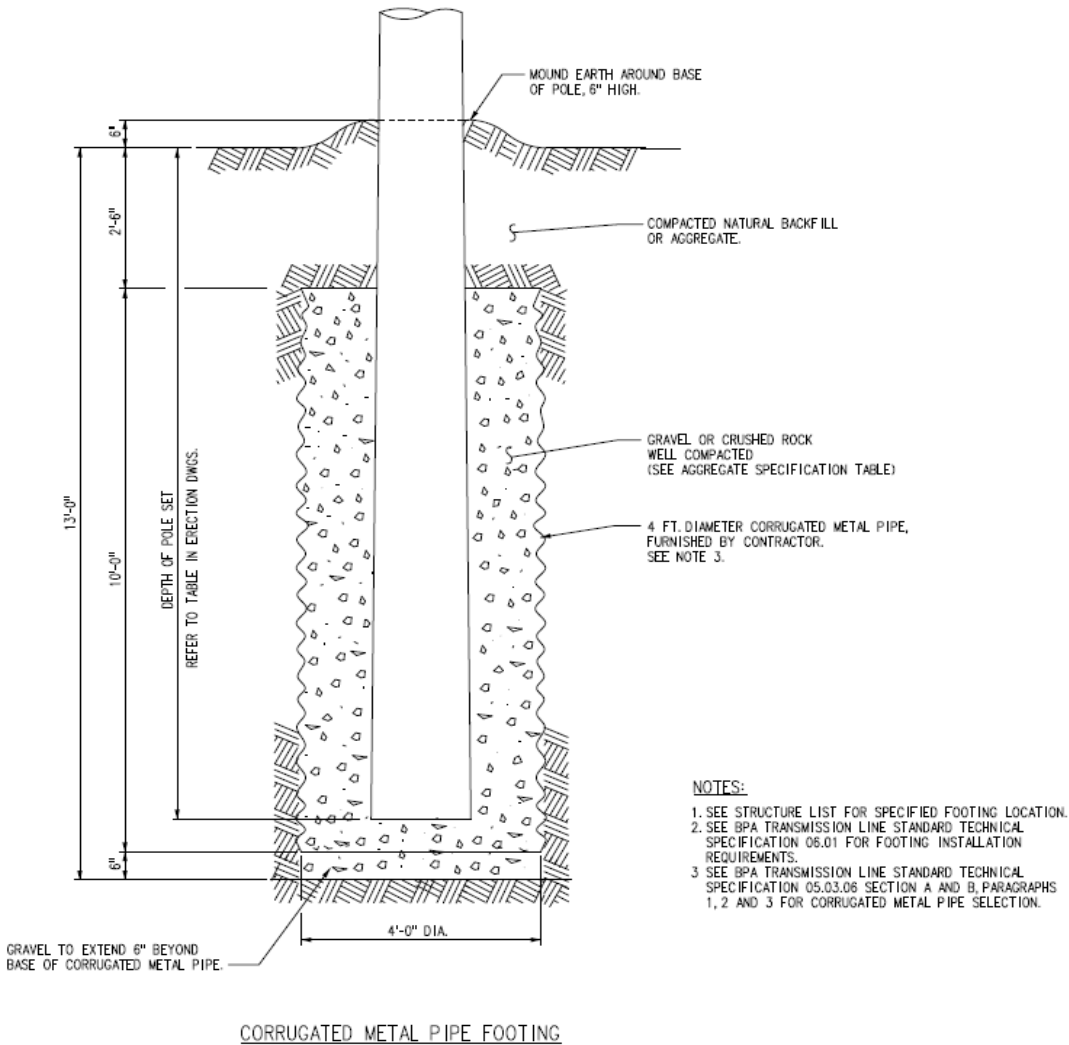


Figure 3-6. Corrugated Metal Pipe Footing for Structures in Wetlands

Temporary impacts associated with structure replacement would consist of construction access by heavy equipment within a 25-foot radius of the structure, construction of temporary roads, and the installation of heavy guy wire anchors and grounding wires at some structures. Impacts to wetlands would occur as wetland vegetation is crushed and soil is compacted or exposed by construction equipment. Temporary impacts from structure replacement would be restricted to 0.06 acre per structure in wetlands, for a total of approximately 18.1 acres of temporary wetland impacts for all project activities.

Since many of the wetlands are only seasonally wet, construction equipment would be able to gain access to sections of the transmission line rights-of-way by driving over the wetland areas in the dry season using overland travel routes—primarily in agricultural fields—and thereby minimizing impacts. In places where wet areas persist during the construction season, crane mats or temporary roads constructed of geotextile fabric and rock would be used to cross wet areas and minimize wetland impacts. These mats or temporary roads would be removed following construction. Temporary use of tensioning sites would also have the potential to temporarily impact 3.6 acres of wetlands, depending on the time of the year that the work is

completed. If tensioning sites are used during the wet season, temporary fill (e.g., crane mats) could be used to stabilize machinery and enable access.

Most of the wetland vegetation that would be disturbed during construction would consist of grasses and forbs within the maintained rights-of-way. All disturbed areas would be reseeded with an appropriate seed mix based on existing conditions and inspected to verify establishment. If vegetation does not reestablish, contingency measures would be implemented as needed. The gravel layer associated with new permanent access road fords would be covered with existing wetland soils, which would allow the wetland vegetation, typically reed canarygrass, to reestablish. Although the Proposed Action would be temporarily disruptive, the wetland function would likely return to pre-construction conditions after mitigation and restoration are completed (see Section 3.6.3).

Removal of danger trees would be conducted in some wetlands adjacent to the transmission line rights-of-way. Tree removal in wetlands would likely occur adjacent to the rights-of-way at about 20 locations along Salem-Albany No. 1 and 5 locations along Salem-Albany No. 2.

In areas where danger trees are removed in wetlands, the tree would be cut above the ground with stumps left in place; work would not disturb the root structure in order to avoid wetland impacts.

Construction and improvement of new access roads would permanently fill a total of 7.7 acres of wetlands. These impacts would be dispersed throughout the project area. The largest of these permanent impacts would be to build new roads to structures that currently do not have established access, as follows:

- In the area adjacent to the railroad right-of-way to the east and Ankeny NWR, access to structures SA1:12/5 to SA1:11/6 would require a 0.9 mile road impacting 1.6 acres either temporarily or permanently, depending on the Option selected. Options 1 and 2 include construction of a permanent road in a wetland; Option 3 includes construction of a temporary road in a wetland. Vegetation in this wetland is dominated by reed canarygrass.
- 1.5 acres to reconstruct an existing access road to provide improved access to 11 structures from SA1:16/10 to 17/9.
- 1.4 acres to build roads to provide access to structures SA2:8/9 to 10/3.
- The additional 1.1 acres of wetland impacts are dispersed throughout the affected environment.

The widths of new roads that would be constructed in wetlands would be reduced to a finished 12-foot road bed with 2-foot shoulders (compared to the typical preferred road width of a 14-foot road bed with 3-foot shoulders). Wetland mitigation credits would be purchased from an approved mitigation bank for the approximately 8.8 acres of wetlands that would be permanently impacted due to access roads and structure placement. With this mitigation, remaining impacts to wetlands would be **low**.

FLOODPLAINS

A total of 12 miles of proposed action roads and routes of travel would be located in 100-year floodplains. On Salem-Albany No. 1, this includes 2 miles of new roads, 1 mile of improved roads, 1 mile of reconstructed roads, and 3 miles of routes of travel. On Salem-Albany No. 2, this includes 1 mile of new construction, 2 miles of improved roads, and 2 miles of routes of travel. Construction, improvement, and reconstruction of roads would convert about 7 acres of vegetated land within the floodplain to compacted gravel surfaces that would lessen water permeability. Soil compaction and removal of vegetation could contribute to erosion within the floodplain until new vegetation is established, lessen dissipation of water

energy during floods, and impede water permeability. However, roads would be level with existing grades so they would not restrict or change water flow and the proportion of each floodplain potentially cleared or compacted would be small relative to the size of the floodplain. Therefore, the effects of floodplain fill from construction of the Proposed Action would be *low*.

3.6.3 MITIGATION – PROPOSED ACTION

The following mitigation measures have been identified to reduce or eliminate impacts to wetlands and floodplains:

- Design construction activities to minimize impacts to wetlands, and obtain the appropriate permits.
- Implement all mitigation measures—which may include the purchase of wetland mitigation bank credits—required under Section 404 permitting through USACE and Oregon Removal-Fill permitting with DSL.
- Place materials storage and staging areas outside of waterways and wetlands.
- Flag wetland boundaries in the vicinity of construction areas to ensure these areas are avoided during construction: do not exceed a 0.06-acre disturbance area around structures located in wetlands.
- Park construction vehicles and equipment at least 50 feet from any wetland, unless they are being used to conduct a permitted activity (e.g., road construction or structure replacement in a wetland).
- Store fuel and refuel machinery at least 150 feet from wetlands and waterways, and inspect regularly for leaks.
- Place geotextile fabric around work areas at stream crossings with associated wetlands within 25 feet of wetlands to avoid depositing excavated material into the wetlands.
- Require a BPA environmental specialist to meet with contractors in the field, and visit wetlands near or within construction areas to review mitigation measures and any permit requirements.
- Install sediment barriers along with other suitable erosion- and runoff-control BMPs, where needed, prior to ground-disturbing activities at construction sites to minimize off-site sediment movement near wetlands and floodplains.
- Revegetate disturbed wetland and adjacent vegetation with appropriate species based on existing conditions following specific revegetation guidelines in any applicable permits.
- Deposit and stabilize all excavated material not reused in an upland area outside of wetlands and floodplains.
- Soil excavated in proximity to wood poles would not be used as backfill or overburden in wetland areas, and would be removed, handled, transported and disposed of according to all applicable regulations. Only clean fill would be used in wetland areas, and only in accordance with all permit conditions.
- In areas where danger trees are removed in wetlands, the tree would be cut above the ground, with stumps left in place, and work would not disturb the root structure in order to avoid wetland impacts.

3.6.4 **UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION**

Temporary wetland disturbance would occur to approximately 18.1 acres of mostly palustrine emergent wetlands and about 8.8 acres of wetlands that would be permanently filled would be replaced through the purchase of credits from an approved wetland mitigation bank.

A total of approximately 7 acres of floodplain would be compacted and layered with gravel to improve, reconstruct, or establish permanent access roads.

3.7 VISUAL QUALITY

This section describes the visual quality of the affected environment, as well as potential impacts of the Proposed Action on this resource. The No Action Alternative is discussed at the end of Chapter 3.

3.7.1 AFFECTED ENVIRONMENT

The affected environment for visual quality includes the existing transmission line rights-of-way, access roads, and surrounding lands from which the rights-of-way and access roads can be seen. The transmission lines are located in the Willamette Valley in between Oregon's Coast and Cascade Mountains.

Approximately 33 miles of the Proposed Action is located within agricultural fields or orchards, with the remainder passing through a mixture of urban and suburban areas that have been substantially modified by human activities.

SALEM-ALBANY No. 1

As it heads south from the Salem Substation, Salem-Albany No. 1 consists primarily of two-pole H-frame wood structures. In the Salem vicinity, the transmission line passes through areas characterized by small scale agricultural operations and light industrial development. The topography varies between rolling hills covered with evergreen trees and flat open areas with low vegetation. In many areas, dense stands of trees limit the views of the transmission line.

Near structures SA1:4/3 to 4/10, the viewshed consists primarily of suburban residential developments (Figure 3-7). The area has been substantially modified by the clearing of trees to create spaces for houses and other structures. There are large residences separated by stands of trees and open fields. The relatively large lots with limited vegetation afford clear views of the right-of-way from the road and houses, but the rolling topography limits the views of the transmission line beyond adjacent properties. The transmission line is clearly visible from the roads, which are used primarily by local residents.



Figure 3-7. Structure SA1:4/7, Looking North

At structure SA1:5/4, the landscape changes to largely agricultural interspersed with a mixture of small industrial buildings and residences. The rolling topography and wooded areas often limits views of the transmission line at structure SA1:6/8 (Figure 3-8). As the transmission line continues south it passes over private lands and is only visible by the adjacent landowner or when it intersects a road. The transmission line crosses several local roads but it does not parallel any major roads.



Figure 3-8. Transmission Line at Tree Farm, Looking at Structure SA1:6/8

In the vicinity of structures SA1:9/7 to 10/11 the transmission line parallels the Willamette River. The nearby land is largely agricultural with views limited to areas where roads cross or briefly parallel the transmission line at structure SA1:11/3 (Figure 3-9).

Between structures SA1:10/6 to 13/6, the transmission line passes through or adjacent to the Ankeny National Wildlife Refuge (see Figure 3-9 for Viewpoint 3, below). Here the transmission line is clearly visible as the topography is much flatter and it parallels the road and the railroad. The transmission line also substantially parallels a railroad line from structures SA1:9/8 to 17/13. In these segments the transmission line is a noticeable linear feature.

Near structure SA1:20/1, the transmission line enters the city of Albany and the right-of-way passes through moderately dense suburban areas that have been altered by the construction of houses and adjacent landscaping. In several areas the transmission line passes through residential areas where the lots back up directly onto the right-of-way (Figure 3-10). The transmission line is also visible when it passes through or near community resources such as the Riverview Heights Park (Albany, OR) near structure SA1:12/5 (Figure 3-11).



Figure 3-9. Structure SA1:11/3 as Line Passes Agricultural Land



Figure 3-10. Looking South to Structure SA1:20/9



Figure 3-11. Structure SA1:12/5 in Riverview Heights Park, Looking North

SALEM-ALBANY NO. 2

Like Salem-Albany No. 1, Salem-Albany No. 2 passes through a variety of landscapes and viewsheds as it travels south from Salem to Albany. The transmission line passes west from the Salem Substation. Near the substation, the line travels through largely residential areas on the hillsides above the city (Figure 3-12). In areas where the line is adjacent to roadways, it is a visible linear feature; but there are many areas where the hills and trees obscure or limit the view to the areas immediately adjacent to the transmission line.



Figure 3-12. Salem-Albany No. 2, Facing Structure SA2:2/6 in a Residential Area of Salem

Near structure SA2:4/5, the transmission line enters a more agricultural area until it reaches the city of Monmouth. Here the transmission line passes through the more urban area in between the cities of Independence and Monmouth. This portion of the affected area is characterized by a gridded street system filled with commercial, civic, and residential properties, and a school near structure SA2:10/12 (Figure 3-13).



Figure 3-13. Structure SA2:10/12 at the Monmouth High School Parking Lot, Looking North

South of Monmouth, the land again becomes largely agricultural. The topography is a mixture of open, largely flat fields interspersed with rolling hills (Figures 3-14 and 3-15). For example, flat fields comprise the Oregon Department of Fish and Wildlife's E.E. Wilson Wildlife Area, which is traversed by structures SA2:21/7 to 22/11. The transmission line right-of-way then largely avoids the developed residential areas of the city of Albany before it reaches the Albany Substation.



Figure 3-14. Structure SA2:17/5, Looking North



Figure 3-15. Structure SA2:24/2, Looking North

VIEWERS AND VISUALLY SENSITIVE LOCATIONS

The majority of the transmission line rights-of-way pass through the moderately populated areas between Salem and Albany. The primary viewers of the transmission line rights-of-way are local residents, recreationists, and motorists.

A viewer's activity often influences their sensitivity to the visual environment. Residents or visitors to parks or recreational areas typically are more stationary and have longer viewing times. The surrounding scenery

is often an important aspect of their activities. The most sensitive view points for recreationists and residents include the residential areas in Salem and Albany and public spaces in the affected environment, including the Ankeny National Wildlife Refuge, the E.E. Wilson Wildlife Area, the Minto-Brown Island Park, and Riverview Heights Park. The Willamette Valley Bikeway (Bikeway) also crosses or is near the Salem-Albany No. 1 transmission line near structures SA1:3/4 to 3/5 (near Minto-Brown Island Park), structures SA1:9/3 to 10/8 (near Ankeny NWR), and structures SA1:13/6 to 13/8. While the observation times would be shorter than for many types of recreation, such as bird watching, users of the Bikeway program are sensitive to the environment, particularly if they are stopping to rest. Alternatively, motorists typically experience a particular view only for a short period of time and are engaged in other activities. Their sensitivity is generally lower unless they are travelling on roads known for their visual quality, such as scenic byways.

3.7.2 ENVIRONMENTAL CONSEQUENCES — PROPOSED ACTION

The Proposed Action was analyzed to determine how it could alter or diminish the visual quality of the affected environment. The impacts to residents, recreationists, and motorists are discussed in the following sections. The Bureau of Land Management's (BLM) Visual Resources Management (VRM) methodology, which analyzes the scenic quality of the existing areas and compares level of contrast between the existing conditions and the proposed activity, was used to evaluate the level of alteration of visual resources from the existing environment. Scenic quality ratings are established for an area or viewshed based the eight key factors listed in the BLM "Scenic Quality Rating Form" (BLM 1986) The factors include landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. With this methodology, the Proposed Action would be assigned a low level of impact where a weak-to-moderate level of contrast occurs in a low-to-medium scenic quality area, while a moderate-to-high level of impact would be assigned where the Proposed Action would have a strong level of contrast in a minimally altered or highly scenic area. In addition to analyzing the impacts to the broader region for specific viewer types from all of the Proposed Action activities, simulations were prepared to portray what the steel monopoles would look like in selected areas where they would replace existing wood structures with implementation of the Proposed Action. Table 3-13 identifies the viewpoint number, structure number, predominant viewer type, and the scenic quality rating assigned to the area depicted in each viewpoint.

Temporary impacts would occur from construction activities—vehicles, equipment, soil disturbance, dust, vegetation debris, and storing construction materials (see Figures 2-10 through 2-14). Viewers who are sensitive to visual change, particularly local residents and recreational users, could be affected temporarily by the construction work. Vegetation clearing and soil disturbance would be visible within the rights-of-way and along access roads until the reestablishment of vegetation.

RESIDENTS

Short-term impacts from construction activities would temporarily modify the visual landscape for residents. Other than a few portions of Salem and Albany, there are relatively few residences in the affected area and the impacts are expected to be temporary and localized. The majority of the land, approximately 76 percent, is zoned as agricultural where residential development is sparse. In total, 242 residences are located within 200 feet of either side of both transmission lines. Implementation of mitigation measures identified in Section 3.7.3, such as avoiding the storage of construction equipment and supplies on residential streets, would lessen potential impacts to residents. Although residential viewers

are sensitive to changes in their visual environment, the existing transmission lines are a familiar element in the visual landscape for residents in the affected area. The rebuilt transmission lines would continue to be located in the existing rights-of-way and in the majority of areas have a similar appearance.

In the majority of the residential areas, the existing level of alteration to the environment is moderate-to-high, with other buildings, utility lines, and the project transmission lines already visible. Although some areas have scenic views of farmland and distant mountains, the scenic quality of the overall affected area is low-to-medium due to alterations to the viewshed from the introduction of agriculture, construction of housing, and the presence of existing transmission and utility lines.

Table 3-13. Viewpoints

Viewpoint	Structure Number and Location	Viewer Type	Scenic Quality Rating
Viewpoint 1	Structure SA1:21/2 in a residential area of Albany	Residential	Low
Viewpoint 2	Structure SA1:21/4 in a residential area of Albany	Residential	Low
Viewpoint 3	Structures SA1:12/3 to 12/2 near the Ankeny NWR	Recreationists	Medium
Viewpoint 4	Structure SA1:21/5 at Riverview Heights Park in Albany	Recreationists	Low
Viewpoint 5	Structure SA1:21/8 Northwest Gibson Hill Road in Albany	Motorist	Low

Danger trees would be removed outside of the transmission line rights-of-way and a limited number of smaller landscape trees would be removed in residential areas within the rights-of-way to assure that accidental electric arcing does not occur during operation. With the trees removed, less of the transmission line would be screened but the visual impact would be offset as additional views would be opened up in the rights-of-way. The resulting long-term impact to area residents from fewer trees but a broader viewing area would likely be **low**. Additionally, if the trees were not removed and a fire occurred within the rights-of-way caused by arcing there would be substantial visual impacts to the residents.

The new structures generally would be taller, and the new wood 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.

Viewpoints 1 and 2 (Figures 3-16 and 3-17) portray how the new steel monopoles would appear to residents in the affected area. In both viewpoints, as in many of the residential portions of the affected area, the adjacent landscape is characterized by low rolling hills. The surrounding scenery consists of residential buildings and wooded areas. The colors are generally muted greens and browns and can be seen throughout the area. The view is dominated by housing types that are commonly found in the area. The existing Salem-Albany No. 1 is a noticeable but not dominant element of the landscape as the existing wood

structures blend in with the stand of trees and residential fencing (Figures 3-18 and 3-19). As shown in Figures 3-18 and 3-20, in areas with the steel monopoles, the new structures would occupy less space, there would be no cross arm, and the conductors would be aligned vertically. Therefore, the introduction of the steel monopoles would result in simpler lines that would be less distracting to residents. In some portions of the affected area the lighter color of the poles would also create less contrast against the existing residential buildings and vegetation. The resulting visual contrast in most of the residential areas of the Proposed Action would be weak and the impacts to residents would be low.



Figure 3-16. Viewpoint 1 - Existing View of Structure SA1:21/2, Looking South



Figure 3-17. Viewpoint 1 - Proposed View of Structure SA1:21/2, Looking South



Figure 3-18. Viewpoint 2 - Existing View of Structure SA1:21/4, Looking West



Figure 3-19. Viewpoint 2 - Proposed View of Structure SA1:21/4, Looking West

RECREATIONISTS

The primary formal recreation in the affected area occurs at Riverview Heights Park, E.E. Wilson Wildlife Area, Minto-Brown State Park, and at the Ankeny National Wildlife Refuge. Users of the Willamette Valley Bikeway system would also observe the Salem-Albany No. 1 transmission line at several points. Although there are views of both Salem-Albany No. 1 and No. 2 from Bower's Rock State Park, there is limited public

access and the impacts to recreational users would be minimal. Additional informal recreation occurs throughout the affected area in the form of walking and biking. Recreationists would observe changes during construction but the impacts would be temporary and would only occur in limited portions of the affected area.

Although the quality of the views is an important part of a recreational experience, the existing transmission lines are already a familiar element of the landscape. The portions of the affected area used by recreationists have already been altered through the construction of residences, park facilities, the railroad, and agricultural resources. The contrast created by installing taller poles and more reflective conductors would be weak so visual impacts for recreationists are expected to be *low*.

Viewpoints 3 and 4 (Figures 3-20 through 3-23) portray recreation areas in the affected area before and after the construction of the steel monopoles. As shown in Figures 3-21 and 3-23, the new structures would occupy less space, there would be no cross arm, and the conductors would be aligned vertically. Therefore, the change to monopoles would result in simpler lines that would be less distracting to recreationists. In wooded areas such as the Riverview Heights Park (see Figure 3-23), the existing wood pole structures blend in well with the dark colors and rough textures of the evergreen trees. However, in portions of the affected area with light colored vegetation, such as the Ankeny NWR, the lighter gray monopoles would create less contrast against the pale cream colors of the existing vegetation (Figures 3-21 and 3-23). The light gray color of the poles would also create less contrast against the sky than the dark wood poles. Overall, the resulting visual contrast in most of the recreational areas of the project would be weak and long-term impacts to recreationists would be *low*.



Figure 3-20. Viewpoint 3 - Existing View of Structures SA1:12/3 to 12/2, Looking North



Figure 3-21. Viewpoint 3 - Proposed View of Structures SA1:12/3 to 12/2, with Bird Diverters, Looking North



Figure 3-22. Viewpoint 4 - Current View of Structure SA1:21/5, Looking North, Riverview Heights Park



Figure 3-23. Viewpoint 4 - Proposed View of Structure SA1:21/5, Looking North

MOTORISTS

Construction activities could detract from views in the affected area for motorists but the impacts from these activities would be of limited duration and in limited areas of the affected area. In general, Salem-Albany No. 1 is only visible to motorists when the transmission line crosses local roads. However, it does cross State Route (SR) 22 as it leaves the Salem Substation and SR 20 near structure SA1:23/1. Salem-Albany No. 2 is also visible primarily from local roads but it does cross SR 22 near structure SA2:4/5. Salem-Albany No. 2 is also visible from SR 51 for a short period of time near the intersection with SR 22 (near structures SA2:4/5 to 4/11) and as it heads west in between Independence and Monmouth near structure SA2:11/1. It is also visible from SR 20 near structure SA2:27/1. Traffic speeds in these areas are relatively high, which would limit the time that any particular structure or segment of the line would be visible. In these areas, the surrounding viewshed is also developed with buildings and other features that would distract from the view of the transmission line.

Viewpoint 5 portrays the view seen by motorists on Northwest Gibson Hill Road before and after the installation of the steel monopoles (Figures 3-24 and 3-25). The new structure would occupy less space, there would be no cross arm, and the conductors would be aligned vertically. Therefore, the change to monopoles would result in simpler lines that would be less distracting to motorists. Although the existing wood poles are similar to the evergreen trees found throughout the area, the steel monopoles resemble the types of street lamps that are familiar features to motorists. As the level of contrast from the existing conditions in the majority of the affected area would be weak, the overall impacts to motorists would be **low**.

The visual impacts of typical line and road maintenance activities would not change with the Proposed Action.



Figure 3-24. Viewpoint 5 - Current View of Structure SA1:21/8, Looking South



Figure 3-25. Viewpoint 5 - Proposed View of Structure SA1:21/8, Looking South

3.7.3 MITIGATION – PROPOSED ACTION

The following mitigation measures have been identified to reduce or eliminate impacts to visual resources:

- Schedule construction work during daylight hours to reduce the need for nighttime illumination of work areas.
- 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 seed mix appropriate to site conditions, or a seed mix agreed upon with landowners.
- Locate construction staging areas away from sensitive viewers as much as possible.
- Require the contractor to maintain clean construction sites to minimize the visual impacts of the temporary use of these areas.

3.7.4 UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION

Unavoidable impacts from the Proposed Action to visual resources for residents, recreationists, and motorists include temporary visual changes from construction activities, as well as permanent element changes from the development of new access roads and installation of steel monopole structures.

3.8 AIR QUALITY AND GREENHOUSE GASES

This section describes the air quality and greenhouse gas emissions within the affected environment, as well as potential impacts of the Proposed Action on them. The No Action Alternative is discussed at the end of Chapter 3.

3.8.1 AFFECTED ENVIRONMENT

The affected environment for air quality and greenhouse gasses includes the airsheds within Marion, Polk, Benton, and Linn counties (the project area).

AIR QUALITY

The agencies with primary air quality jurisdiction in these counties are the EPA and the Oregon Department of Environmental Quality (ODEQ) Air Quality Division. 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 with a diameter of 10 micrometers or less (PM₁₀), lead, sulfur dioxide, and nitrogen dioxide. ODEQ has adopted the standards set by the EPA. For each of the six criteria pollutants, the NAAQS represent a maximum concentration above which adverse effects on human health may occur. When an area's air quality exceeds these standards, it is designated a nonattainment area. If a nonattainment area meets the EPA promulgated standards for the criteria pollutant in question, then the area is designated a "maintenance area" after a maintenance plan has been established to keep the area within the standards approved by the EPA. The Salem-Keizer Area Transportation Study (SKATS) air quality area, intersected by both Salem-Albany No. 1 and Salem-Albany No. 2, was designated nonattainment for both ozone and carbon monoxide (CO) in 1978 under the 1977 Clean Air Act Amendments. The SKATS is subject to the Salem-Keizer Area Ozone Maintenance Plan and the Salem-Keizer Area Carbon Monoxide Limited Maintenance Plan (ODEQ 2007a; ODEQ 2007b). The Salem-Keizer Area Ozone Maintenance Plan contains emission standards for existing industrial sources of volatile organic compounds (VOCs), which are ozone precursors. The SKATS achieves attainment with the NAAQS for CO through adherence to federal control measures, particularly the Federal Motor Vehicle Emissions Control Program and Major New Source Review with Best Available Control Technology.

Given the predominantly rural-to-low density urban setting of the project area, the three criteria pollutants of potential interest are CO, ozone, and PM₁₀. The remaining three criteria pollutants (lead, sulfur dioxide, and nitrogen dioxide) are not discussed further in this section.

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. Vehicles traveling along U.S. Highway 20, State Route 22, State Route 51, and various county and community roads are the primary sources of CO in the vicinity of the Proposed Action. ODEQ does not monitor CO in 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 VOCs and nitrogen oxides (NO_x). Small amounts of ozone may be produced by the existing transmission line as a result of corona (i.e., the breakdown of air at the surface of conductors). The NAAQS 8-hour average standard for ozone is

0.075 parts per million (ppm). Within the project area, ODEQ only monitors ozone in Marion County. Data from the monitoring station show that Marion County did not exceed the NAAQS in 2013 (EPA 2013a).

PM is generated by industrial emissions, residential wood combustion, motor vehicle engines, and dust from roadways and unpaved surfaces. Two forms of PM are regulated by EPA: PM less than 10 micrometers in size (PM₁₀) and PM less than 2.5 micrometers in size (PM_{2.5}). PM_{2.5} has a greater health effect than PM₁₀ at locations far from the emitting source because it remains suspended in the atmosphere longer and travels farther. The NAAQS 24-hour standards for PM are as follows: 150 micrograms per cubic meter (µg/m³) for PM₁₀ and 35 µg/m³ for PM_{2.5}. ODEQ monitors PM_{2.5} concentrations in Benton, Linn, and Marion counties. Data from the monitoring stations show that these counties did not exceed the NAAQS 24-hour limit for PM_{2.5} in 2013 (EPA 2013b, c, and d).

Class I areas are specific areas of national or regional natural, recreational, scenic, or historic value where air quality is to be preserved, protected, and enhanced under Section 160 of the Clean Air Act (42 USC 7470[2]). No Class I areas are located within the project area (EPA 2012). The closest Class I area to the project area is the Mount Jefferson Wilderness, which is about 60 miles from the affected area.

GREENHOUSE GASES

Greenhouse gases are chemical compounds found in the earth's atmosphere that absorb and trap infrared radiation, or heat, re-radiated from the surface of the earth. The trapping and build-up of heat in the atmosphere increases the earth's temperature, warming the planet and creating a greenhouse-like effect (U.S. Energy Information Administration [EIA] 2009). Anthropogenic activities are increasing atmospheric concentrations to levels that could increase the earth's temperature up to 7.2 degrees Fahrenheit (degrees F) by the end of the twenty-first century (EPA 2013e).

The principal greenhouse gases emitted into the atmosphere through human activities are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases (EPA 2013e). Of these four gases, carbon dioxide is the major greenhouse gas emitted (EPA 2013e; Woods Hole Research Center 2014). For example, CO₂ emissions from the combustion of coal, oil, and gas constitute 81 percent of all U.S. greenhouse gas emissions (EIA 2011). Carbon dioxide enters the atmosphere primarily through the burning of fossil fuels such as coal, natural gas and oil, and wood products; as a result of land use changes; and the manufacturing of cement. Prior to the industrial revolution, concentrations were roughly stable at 280 parts per million (ppm), but have increased 36 percent to 379 ppm in 2005, all of which is attributed to human activities (Intergovernmental Panel on Climate Change [IPCC] 2007).

Of the remaining three principal greenhouse gases, methane is emitted during the production and transport of fossil fuels, through intensive animal farming, and by the decay of organic waste in landfills. Methane concentrations have increased 148 percent above pre-industrial levels (EPA 2013e). Nitrous oxide is emitted during agricultural and industrial activities, and during the combustion of fossil fuels and solid waste. Nitrous oxide atmospheric levels have increased 18 percent since the beginning of industrial activities (EPA 2013e). Fluorinated gases, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) are synthetic compounds emitted through industrial processes and now are being used to replace ozone-depleting compounds such as chlorofluorocarbons in insulating foams, refrigeration, and air conditioning. Although they are emitted in small quantities, these gases have the ability to trap more heat than carbon dioxide and are considered high global-warming potential gases. Atmospheric concentrations of fluorinated gases have been increasing over the last two decades and are expected to continue to increase (EPA 2013e).

The Clean Air Act is a federal law that establishes regulations to control emissions from large generation sources such as power plants. The EPA has issued a Final Mandatory Reporting of Greenhouse Gases Rule (40 CFR 98) that requires reporting of greenhouse gas emissions from large sources. Under the rule, suppliers of fossil fuels or industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of greenhouse gases, are required to submit annual reports to the EPA (EPA 2013f). For federal agencies such as BPA, Executive Orders 13423 and 13514 require agencies to measure, manage, and reduce greenhouse gas emissions by agency-defined target amounts and dates.

In Oregon, House Bill 3543 from 2007 (codified at Oregon Revised Statutes 468A.205), directs state and local governments, businesses, nonprofit organizations and individual residents to reduce greenhouse gas emissions. This statute sets several reduction targets: 1) by 2010, arrest growth of greenhouse gas emissions; 2) by 2020 begin to reduce greenhouse gas levels to 10 percent below 1990 levels; and 3) by 2050 achieve greenhouse gas levels at least 75 percent below 1990 levels (Oregon Global Warming Commission 2014).

Global atmospheric greenhouse gas concentrations are a product of emissions and removal over time. Soils store carbon in the form of decomposing plant materials and constitute the largest carbon reservoir on land. Through the process of photosynthesis, atmospheric carbon is also captured and stored as biomass in vegetation, especially forests. Vegetation removal can impact the carbon cycle. The carbon cycle consists of two phases: gaseous carbon (carbon dioxide) and solid carbon (sugars). Photosynthesis is the process plants such as trees use to sequester carbon dioxide from the air and subsequently manufacture solid, organic mass. Consequently, as trees grow and increase in mass, carbon is removed from the atmosphere. Inversely, as trees decay or are burned, carbon is emitted into the atmosphere.

Based on the carbon cycle, trees act as temporary carbon reservoirs. In a natural environment, a tree seed would grow (sequester carbon), the tree would die and decay (release gaseous carbon), and subsequently a new tree would presumably grow in its place. Essentially, the quantity of carbon stored in solid, organic mass is dependent on the current phase of the carbon cycle. Peak solid carbon storage occurs when a tree is fully mature, and minimum solid carbon storage occurs immediately after the tree has decomposed or burned. Alternatively, minimum solid carbon storage may occur when a forested area is permanently converted to a non-forested area, such as grasslands.

Stored carbon can be released back into the atmosphere when biomass is burned (EPA, 2008). In addition, carbon dioxide, nitrous oxide, and methane emissions increase in areas where soil disturbance occurs (Kessavalou et al. 1998). Models predict atmospheric concentrations of all greenhouse gases would increase over the next century, but the extent and rate of change is difficult to predict, especially on a global scale.

3.8.2 ENVIRONMENTAL CONSEQUENCES — PROPOSED ACTION

The following sections describe the potential impacts of the Proposed Action on air quality and greenhouse gases.

CONSTRUCTION

AIR QUALITY

Air quality effects from the Proposed Action would occur during construction, which would take approximately 8 months in 2015 to complete for Salem-Albany No. 2 and the same amount of time in 2016 for Salem-Albany No. 1. Construction activities have the potential to temporarily increase PM, CO, NO_x, and VOC levels within a localized area. PM would be generated by construction activities, including dust created in localized areas for short durations, during soil-disrupting operations.

In addition, increases in CO, NO_x, and VOC levels could occur due to the operation of heavy equipment and vehicles during construction. However, these emissions would also be short-term and localized. In addition, vehicle and equipment emissions would be relatively small, and comparable to current conditions found in agricultural and developed areas.

Overall, air quality impacts resulting from construction would likely be **low** as these impacts would occur near the construction site, would be temporary in nature, and would not result in permanent regional impacts to air quality or a change in air quality that would likely create any risk to human health.

GREENHOUSE GASES

Implementation of the Proposed Action would contribute to greenhouse gas concentrations in several ways. Carbon dioxide, methane, and nitrous oxide emission levels would incrementally increase as vegetation and soils are removed or disturbed during construction of the transmission lines and through the use of construction vehicles. Emissions from vehicles, which would be fueled by gasoline and diesel combustion motors would incrementally contribute to atmospheric greenhouse gas concentrations.

The total amount of greenhouse gas emissions from the Proposed Action would be about 17,530 metric tons of carbon dioxide equivalents--this equates to less than 0.01 percent of the 167,470,000 metric tons of carbon dioxide emitted annually in BPA's four-state service territory and is below EPA's 25,000 metric tons reporting threshold (EPA, 2011; EPA 2013f). The individual components of the total greenhouse gas emissions are described below.

Greenhouse gas emissions were estimated for the Proposed Action based on the approximate number of vehicles to be used during project construction and the approximate distance those vehicles would travel during the construction period. For the Proposed Action, an estimated eight vehicle round trips per day would occur during the peak construction periods for each transmission line. Construction would take about 480 days, with peak construction activity likely occurring between July and October of 2015 and 2016.

To provide a conservative analysis and ensure that the Proposed Action's potential contribution to greenhouse gas concentrations are adequately considered, greenhouse gas emissions were calculated for the entire project duration. A round trip for the Proposed Action was considered to be from Salem to the midpoint of the transmission line between the Salem and Albany Substations for both transmission lines (about 13 miles).

As shown in Table 3-14, construction vehicle emissions would result in an estimated 836 metric tons of total carbon dioxide equivalent for the entire 2-year construction period. The Proposed Action's estimated carbon dioxide equivalent emissions translate roughly to the annual carbon dioxide emissions of 147 passenger vehicles.

Table 3-14. Estimated Construction Vehicle Greenhouse Gas Emissions from the Proposed Action

Total CO ₂ Emissions in metric tons	Total CH ₄ Emissions (CO ₂ equivalent emissions) in metric tons	Total N ₂ O Emissions (CO ₂ equivalent emissions) in metric tons	Total CO ₂ equivalent emissions in metric tons
159	2	5	836

Measuring emissions from soil disturbances is difficult because these emissions are short-lived and return to background levels within several hours (Kessavalou et al. 1998). Based on the conservative methodology used to estimate construction vehicle emissions, the emissions related to soil disruption and annual vegetation decay are accounted for in the overall construction emission rates. Carbon that would be stored in removed vegetation would be offset in time by the growth and accumulation of carbon in soils and new vegetation.

The approximately 774 trees identified as danger trees or for access roads would result in a permanent loss of that carbon storage source if they were removed. The greenhouse gas emissions from tree removal are broken down further into three segments: 1) carbon that has the potential to be released from the existing trees; 2) loss of future carbon sequestration that would have occurred if each tree continued to grow to full maturity; and 3) energy consumed while removing the trees from the soil.

For the tree removal carbon estimation, BPA used the following assumptions:

- All of the trees are mixed hardwoods (although the suite of species is a mix of hardwoods and softwoods, a larger proportion of hardwoods is carbon than softwoods, so this provides a higher estimate).
- The average moisture content of a green tree is assumed to be 30 percent.
- About 50 percent of a tree’s dry-mass is comprised of carbon.
- All of the carbon would eventually be oxidized into carbon dioxide and emitted into the atmosphere.
- The aboveground biomass of the tree increases with increasing size expressed as a measurement of the tree’s diameter at breast height (dbh).
- Each tree would reach 40 inches in dbh at full maturity.

Tree growth and future carbon sequestration rates are highly variable and depend on several factors including the species of tree, age of the tree, climate, forest density, and soil conditions. As an alternative to estimating tree growth rates, mass balance may be estimated. The existing biomass of trees along the transmission lines vary considerably. Most of the trees along the transmission line rights-of-way are less than 40 inches dbh, but BPA based calculations on the assumption that each tree would reach 40 inches in dbh at full maturity. This is a conservative estimate because some trees may not reach full maturity due to natural attrition. Using the same assumptions listed above, each remaining tree that reaches 40 inches in dbh would have a mass of 8,074 kilograms and would sequester approximately 6 metric tons of carbon dioxide equivalents. The estimated approximately 774 trees, if not removed, would have sequestered approximately 4,644 metric tons of carbon dioxide equivalents at full maturity. Removal and disposal of these trees could further result in the release of approximately 319 metric tons of carbon dioxide equivalent, for a total of 4,963 metric tons of carbon dioxide equivalent. This equates to less than

0.01 percent of the 167,470,000 metric tons of carbon dioxide emitted annually in BPA's four-state service territory and is below Environmental Protection Agency's (EPA) 25,000 metric tons reporting threshold. Therefore, the overall impact on greenhouse gases from tree removal would be *low*.

3.8.3 MITIGATION – PROPOSED ACTION

The following mitigation measures have been identified to reduce or eliminate impacts to air quality and GHG:

- Use water trucks to control dust from construction.
- Keep all vehicles in good operating condition to minimize exhaust emissions.
- Turn off construction equipment during prolonged periods of non-use.
- Drive vehicles at low speeds (less than 5 mph) on unpaved access roads and the BPA rights-of-way to minimize dust.
- Encourage use of carpooling and shuttle vans among construction workers to minimize construction-related traffic and associated emissions.
- Reduce electricity usage in the construction office by using compact fluorescent bulbs and turning off computers and other electronic equipment every night.
- Recycle or salvage non-hazardous construction and demolition debris where practicable.
- Locate staging areas as close to construction sites as practicable to minimize driving distances between staging areas and construction sites.
- Locate staging areas in previously disturbed or graveled areas to minimize soil and vegetation disturbance where practicable.
- Encourage use of the proper size of equipment for the job to maximize energy efficiency.
- Use local rock sources for road construction where practicable.

3.8.4 UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION

Unavoidable impacts would include short-term increases in some air pollutants during construction and slight increases in GHG releases and decreases in GHG storage capacity.

3.9 SOCIOECONOMICS, PUBLIC SERVICES, AND ENVIRONMENTAL JUSTICE

This section describes the existing socioeconomics (e.g., population, area economy, and employment and income), environmental justice populations (i.e., minority and low-income populations), property taxes, and public services in the affected area, and their potential impacts from the Proposed Action. The No Action Alternative is discussed at the end of Chapter 3.

3.9.1 AFFECTED ENVIRONMENT

The socioeconomics, environmental justice, property taxes, and public services affected area includes Benton, Linn, Marion, and Polk counties, as well as the towns/cities of Adair Village, Albany, Independence, Millersburg, Monmouth, and Salem.

POPULATION

The 2000 and 2010 populations of the counties and municipalities that comprise the affected area are provided in Table 3-15. The population density for the affected area varies from 4,257 people per square mile for the town of Monmouth to 51 for rural Linn County. The four subject counties average 136 persons per square mile, and the six municipalities average 2,879, which is greater than the state average of 39 persons per square mile (www.usa.com 2014). Overall, average population of the affected area increased by approximately 65,000 people or 12 percent from 2000 to 2010. This is similar to the state average population growth rate of 12 percent.

The cities of Salem and Albany represent the two economic centers in the affected area where concentrations of residential, industrial, and commercial activity are located. The origin and terminus of both transmission lines are located on the outskirts of these cities. The Salem Substation is located in a rural setting near State Route 22, while the Albany Substation is located near residences. The transmission lines traverse primarily agricultural and rural lands, but Salem-Albany No. 2 does pass through the residential municipalities of Monmouth and Independence.

Table 3-15. Population Estimates, Rate of Growth, and Density (2000 and 2010)

Area	Year 2000 Population (number of people)	Year 2010 Population (number of people)	Population Growth Rate 2000 to 2010	Year 2010 Population per Square Mile (number of people)
<i>Counties</i>				
Benton County	78,153	85,579	10%	126
Linn County	103,069	116,672	13%	51
Marion County	284,834	315,335	11%	264
Polk County	62,380	75,403	21%	101

Table 3-15. Population Estimates, Rate of Growth, and Density (2000 and 2010)

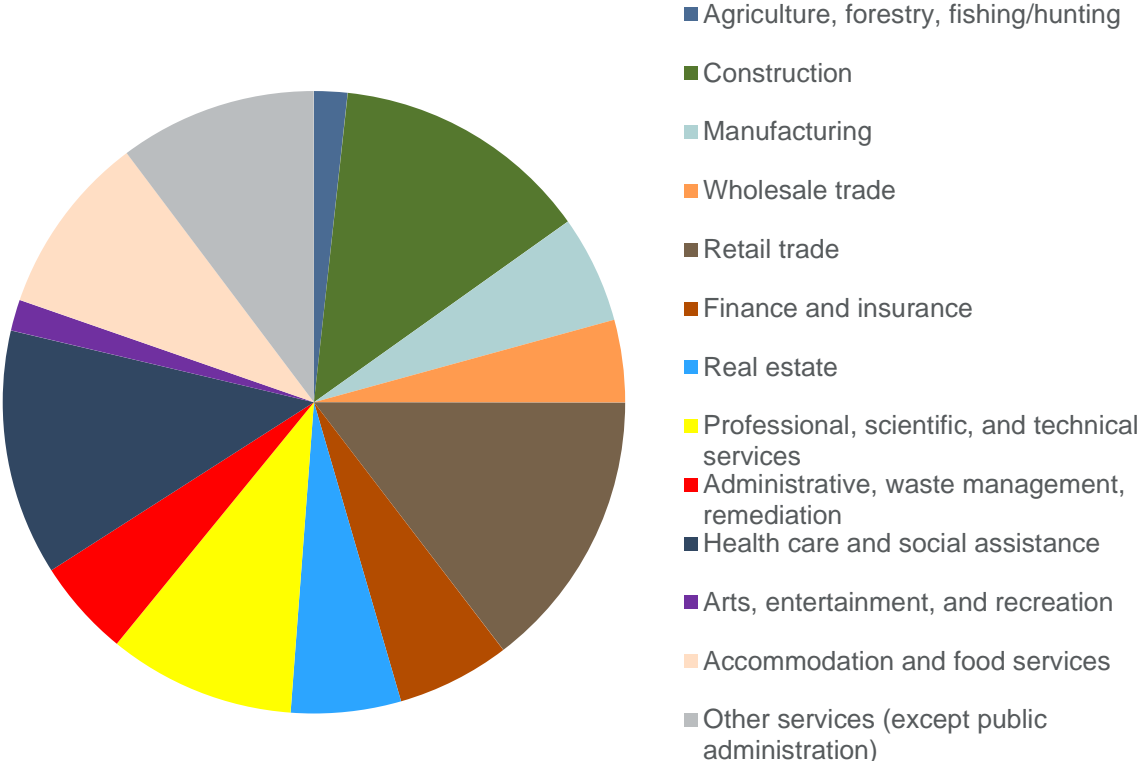
Area	Year 2000 Population (number of people)	Year 2010 Population (number of people)	Population Growth Rate 2000 to 2010	Year 2010 Population per Square Mile (number of people)
<i>County Total</i>	528,436	592,989	12%	107
<i>Cities and Towns</i>				
Adair Village	536	840	57%	3,669
Albany	40,852	50,158	23%	2,826
Independence	6,035	8,590	42%	3,044
Millersburg	651	1,329	104%	285
Monmouth	7,741	9,534	23%	4,257
Salem	136,924	154,637	13%	3,192
<i>Cities and Towns Total</i>	192,739	225,088	17%	2,500

Source: U.S. Census Bureau 2010

AREA ECONOMY

Over 50 percent of the affected area economy is comprised of businesses in the retail, construction, health care, and social assistance sectors. While the transmission lines traverse mostly agricultural lands, the city centers of Salem and Albany provide a diverse economic composition. Figure 3-26 provides a breakdown of the economic sectors that comprise the economy of the affected area.

The cities of Salem and Albany introduce a large retail, healthcare/social assistance, and construction contingent to the affected area economy; these three sectors represent approximately half of the affected area's total revenues. However, the primary land use that the transmission lines cross is agricultural. A total of 219 farms in the affected area generated approximately \$1.2 billion in agricultural sales in 2012, with Marion County generating the most agricultural revenue of any county in Oregon at \$639 million (NASS USDA 2012).



Source: U.S. Census Bureau 2010

Figure 3-26. Affected Area Economic Composition by Number of Establishments (County-Level)

EMPLOYMENT AND INCOME

There were approximately 163,387 paid employees in the affected area in 2011 (U.S. Census Bureau 2013b). Figure 3-27 provides a breakdown of employment in the affected area. Retail, healthcare, real estate, and accommodation/food services represent the primary employers in the affected area. The affected area had an average seasonally unadjusted unemployment rate in December 2013 of 6.7 percent; Benton County’s unemployment rate was the lowest with 4.7 percent and Linn County’s was the highest with 8.4 percent (OLMS 2013a). The state of Oregon’s unemployment rate is slightly higher than the affected area’s at 6.9 percent.

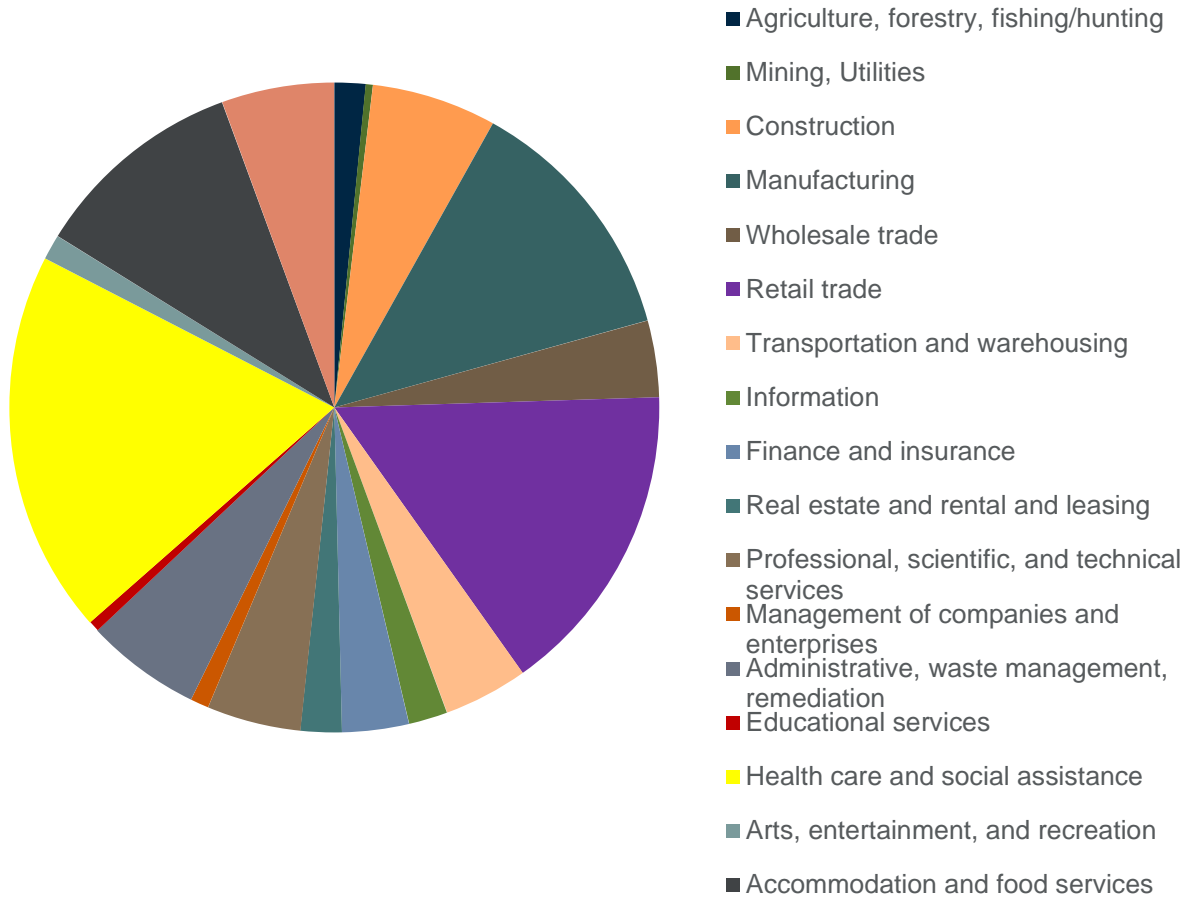


Figure 3-27. Employment by Sector (County-Level)

Table 3-16 provides a profile of income in the affected area. The average per capita income in the affected area in 2010 was \$23,992, approximately \$2,700 less than the statewide figure of \$26,702. Mean and median household incomes in the affected area are also significantly less than the statewide averages of \$77,630 and \$61,438, respectively (U.S. Census Bureau 2013b). As shown in Table 3-16, the share of the population living below the poverty level in the affected area is 17.7 percent, which is higher than the statewide average of 15.5 percent (U.S. Census Bureau 2013b).

Table 3-16. Income Profile of Project Area Counties

County	Mean Household Income (\$2010)	Median Household Income (\$2010)	Per Capita Income (\$2010)	Percentage (%) of People Living Below Poverty Level (2012)
Benton County	67,308	48,635	27,210	21.6%
Linn County	55,984	47,129	21,911	16.7%
Marion County	59,880	46,654	22,182	18.0%
Polk County	64,855	52,365	24,663	14.6%

Table 3-16. Income Profile of Project Area Counties

County	Mean Household Income (\$2010)	Median Household Income (\$2010)	Per Capita Income (\$2010)	Percentage (%) of People Living Below Poverty Level (2012)
Affected Area Average	62,007	48,696	23,992	17.7%

Source: U.S. Census Bureau, 2008-2012 American Community Survey 5-Year Estimates

PROPERTY TAXES AND PUBLIC FINANCE

Oregon does not have a sales tax and relies heavily on income, business, and property taxes for public finance. State and local property taxes help support the activities of local taxing districts, such as schools and local government services, and are paid by private landowners unless in a tax-exempt status. All federal, state, and local government real property is exempt from paying property taxes. When BPA acquires an easement across private property, the landowner continues to pay property taxes, but often at a lesser value, based on any limitation of use created by the encumbrance. Any property purchased by BPA would be exempt from state and local property taxes.

If BPA acquires easements on private land, landowners are offered fair market value for the land, as established through the appraisal process. The appraisal accounts for all factors affecting property values, including the impact the transmission line easements or access roads would have on the remaining portion of the property. Each property is appraised individually using neighborhood-specific data to determine fair market value. Existing easements typically accommodate additional transmission facilities, relocations, and access roads.

The statewide average effective property tax rate is \$11.82 per \$1,000 of real market value. The average effective property tax rate for the affected area is \$12.45, ranging from \$11.87 in Benton County to \$12.82 per \$1,000 of real market value in Marion County (ODOR FY2012). County governments rely almost exclusively on property taxes to finance governmental management and services. Income taxes are paid directly to the state of Oregon, which then distributes part of that funding to county governments.

PUBLIC SERVICES

The primary providers of electricity and natural gas services in the affected area are Northwest Natural, Pacific Power, Portland General Electric, and Salem Electric. Public water in the affected area is provided by municipal systems and water divisions per county. There are two primary landfills that service the affected area: the Brown’s Island Demolition Landfill in Marion County that primarily disposes of construction and building materials, and the Coffin Butte Landfill operated by Republic Services located in Corvallis, Benton County. There are numerous transfer stations located throughout the affected area that deliver refuse to the two landfills. Marion County also operates a waste-to-energy and incineration facility. The energy recovered in the process is sold to Portland General Electric.

Fire protection in the affected area is provided by either the municipal fire departments in Salem and Albany (for the portion of the transmission lines located within city boundaries) or the respective county

fire districts (for the remaining parts of the affected area). Emergency response services are also provided by these fire departments and districts. Police protection in the affected area is provided by the cities of Albany's and Salem's Police Departments, the Polk County Sheriff's Department, the Marion County Sheriff's Department, Linn County's Sheriff's Department, Benton County Sheriff's Department, and the Oregon State Police. For emergency medical services, there are five hospitals in the area: two in Salem, one in west Albany, one in Monmouth, and one in north Corvallis.

The transmission lines would traverse both populated and rural areas. Major transportation routes include I-5, SR 51 (Monmouth Street), Old Salem Road Northeast, Woods Road Northeast, Rogers Street, Clow Corner Road, SR 22 (Willamena-Salem Highway), numerous community roads north of Albany, and numerous county roads through area farmlands.

The four-county affected area contains 25 school districts, all providing kindergarten through twelfth grade education. Students are transported to schools by an extensive system of school bus routes that traverse most county roads. Western Oregon University is located in Monmouth, Willamette University and Corban University are located in Salem, and Oregon State University is located in Corvallis.

ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, states that each federal agency shall identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

In accordance with Council on Environmental Quality (CEQ) Guidance, minority populations should be identified if the minority population in the Project area "exceeds 50 percent" or if the percentage of minority population in the Project Area is meaningfully greater than the "minority population percentage in the general population or other appropriate unit of geographic analysis" (Council on Environmental Quality 1997).

The affected area for environmental justice was assessed for the four subject counties and the six towns/cities either traversed or in close proximity of the transmission lines. For this analysis, the proportions of disadvantaged populations within affected area counties were compared to statewide proportions to identify disadvantaged populations. Similarly, the concentration of minority and low-income populations within the affected area communities were compared to the proportion of minority and low-income populations at the county level.

As provided in Table 3-17, the poverty rate within affected area counties ranged between 14.6 percent in Polk County to 21.6 percent in Benton County, while the State of Oregon exhibited a poverty rate of 15.5 percent in 2012. In general, poverty rates for affected area communities are similar to the counties in which they are located. The only communities with poverty rates that are notably higher than the county in which they are located are Independence (26.6 percent) and Monmouth (25.8 percent), which exceeds the Polk County poverty rate (14.6 percent) by 12.0 and 11.2 percentage points.

Table 3-17. White and Minority Population Percentages and Percent of Total Population Below Poverty (2012)

Counties/Cities	White	Black or African American	American Indian and Alaska Native	Asian or Pacific Islander	Other Race	Two or More Races	Hispanic or Latino	Below Poverty
<u>Benton County</u>	88.2%	1.0%	0.7%	6.1%	1.2%	3.0%	6.4%	21.6%
Adair Village	93.4%	1.5%	0.0%	0.5%	0.0%	4.6%	1.68%	11.7%
<u>Linn County</u>	91.5%	0.5%	2.0%	1.2%	2.5%	2.3%	7.8%	16.7%
Albany	87.4%	0.5%	2.1%	2.1%	4.7%	3.2%	12.1%	18.4%
Millersburg	90.4%	0.0%	0.5%	1.7%	5.4%	2.0%	9.0%	14.0%
<u>Marion County</u>	80.4%	1.0%	1.6%	2.6%	10.7%	3.7%	24.2%	18.0%
Salem	81.7%	1.4%	1.5%	4.0%	7.7%	3.9%	19.7%	18.2%
<u>Polk County</u>	87.7%	0.4%	1.7%	2.8%	3.4%	4.2%	12.1%	14.6%
Independence	79.8%	0.4%	1.8%	2.4%	9.8%	5.9%	38.3%	26.6%
Monmouth	85.0%	0.7%	0.7%	3.0%	5.0%	5.6%	14.0%	25.8%
Salem	81.7%	1.4%	1.5%	4.0%	7.7%	3.9%	19.7%	18.2%
Oregon	85.3%	1.8%	1.4%	4.3%	3.8%	3.7%	11.7%	15.5%

Source: U.S. Census Bureau 2012 ACS 5-year Estimates

The concentrations of minority populations for those counties located within affected area are similar to the statewide concentration of minority populations, with exception of Marion County. Hispanics/Latinos comprise 24.2 percent of Marion County’s population, while comprising only 11.7 percent of Oregon’s population. Furthermore, 10.7 percent of Marion County’s population is identified as Other Race, while statewide 3.8 percent of the population is Other Race. Despite the differences between Marion County and the State of Oregon, the Marion County community of Salem has lower concentrations of Hispanic/Latino populations (19.7 percent) than that of Marion County (24.2 percent).

Other affected area communities have similar concentration of minority population as their respective counties, with exception of Independence, which has a Hispanic/Latino population (38.3 percent) comprising a larger proportion of the city’s total population than that of Polk County (12.1 percent). The proportion of residents classified as Other Race is also higher in Independence (9.8 percent) than in Polk County (3.4 percent).

3.9.2 ENVIRONMENTAL CONSEQUENCES — PROPOSED ACTION

The following sections describe the potential impacts on socioeconomics, environmental justice, and public services from implementing the Proposed Action and No Action Alternative.

POPULATION

Four to six work crews would be working along both transmission lines on any given day. Each crew would consist of 6 to 8 contractor employees, for a total of up to 48 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. Crews would be working up to 10 hours per day, 6 days per week, for approximately 5 months during the peak construction period. The construction for Salem-Albany No. 2 is anticipated to last 8 months, from May to December 2015. Work on Salem-Albany No. 1 would occur a year later and last 8 months from May through December 2016. Because the workforce would be small, would likely come from the project vicinity or temporarily reside in the area, and the work be done in a two year period, **low** impacts would occur to area population levels.

The Proposed Action would result in **no** long-term disruptions to community character, traditions, or travel patterns because there would be no displacement of residences, businesses, or other community facilities.

AREA ECONOMY, EMPLOYMENT, AND INCOME

The Proposed Action would have a **low**, positive impact on the regional economy, employment, and income levels during construction (a total of approximately 16 months) through the provision of local jobs and income, and 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 likely 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 affected area would likely have **low**, but positive, impacts on local businesses.

BPA would work with the local energy suppliers to ensure there would be no break in service during the potential outage of the Salem-Albany No. 2 line in 2015 and the Salem-Albany No. 1 line in 2016. This would ensure against losses in income for the utility as well as disruptions in electricity to the service area.

The total project cost to rebuild of both lines and upgrade the access roads is estimated to be about \$30.8M. The Proposed Action would require up to 48 construction workers, each working an average of 60 hours per week for approximately 16 months. The total labor construction payroll, including per diem payments and other allowances, is expected to be over approximately \$11,000,000. Estimated local project-related expenditures, employment, and construction-related earnings would be temporary and small relative to the total area economic activity, employment, and income in the four affected area counties, and thus would have a **low** but beneficial impact on the local economy.

Approximately 6 acres of agricultural field crops would be removed for permanent access roads. Although the landowner would no longer be able to use this land to grow crops, most of the roads would be along field edges, and landowners would be compensated for any new road easements.

PROPERTY TAXES AND PUBLIC FINANCE

The Proposed Action generally involves replacing existing transmission lines in the same locations and would have no appreciable impacts on property values over the long term where property acquisitions would not be needed.

The Proposed Action would not decrease or generate additional revenue for the State, because states cannot tax direct purchases by the federal government and there is no sales tax in Oregon.

BPA would acquire easements across private property for the transmission lines and access roads. The underlying land ownership would not change and the landowners would continue to pay property taxes on these parcels, but potentially at a lesser value, based on the limitation of use created by the new BPA encumbrance. However, because the purchase of these easements would negligibly reduce the short-term and long-term county property tax revenues, compared to the total annual county property tax revenues, these impacts would be **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 3.3, Vegetation) would require the use of washing stations and water trucks. A sufficient water supply would likely be provided by the local water providers with **no** impacts on the local water supplies. Construction waste would be recycled or taken to local landfills/transfer stations, with **no** anticipated impacts to the operation of these waste facilities. In addition, BPA would work with the local energy suppliers to ensure there would be no break in service during the outage of the Salem-Albany No. 2 line in 2015 and the Salem-Albany No. 1 line in 2016.

Increased truck traffic associated with the Proposed Action would result in minimal localized delays (as described in Section 3.1). These delays would be brief enough to not disrupt the ability of emergency service personnel to respond to emergencies so there would be **no** impact. Construction plans would incorporate fire prevention measures to limit the potential effects of the Proposed Action on fire departments to a **low** impact. Medical facilities are located within the affected area, and would likely be able to treat any injuries that occur during construction, without interfering with the ability to serve the larger community; thus, having **no** impact. Project construction would take place from May through December both years and **no** impacts on schools or school transportation services would be expected.

The Proposed Action would not result in a long-term increase in the local population that would require changes to public services. The Proposed Action would not displace or otherwise negatively affect any agencies or organizations that provide public services to communities near the rights-of-way; therefore **no** long-term impacts would occur to social services. The Proposed Action would have a **low** positive impact on public services, as well as the communities they serve, because rebuilding the transmission lines would improve the reliability of the electrical system and avoid potential disruptions that could occur if the structures were to fail.

ENVIRONMENTAL JUSTICE

As described above, construction of the Proposed Action would have a **low** but positive temporary impact on the economy in the affected area. Additionally, all persons, regardless of race or income, would

experience the same low impacts associated with construction within the transmission line right-of-way. Thus, construction of the Proposed Action would likely have *no* adverse or disproportionate impacts on minority or low-income populations.

3.9.3 MITIGATION – PROPOSED ACTION

The following mitigation measures have been identified to reduce or eliminate impacts on socioeconomic resources and public services:

- Distribute a schedule of construction activities to all potentially affected landowners and businesses.
- Coordinate with local farmers and landowners to minimize potential construction-related disruptions.
- Coordinate with public service providers to determine exact locations of utilities and minimize service disruptions in the transmission line easements within the railroad right-of-way.
- Compensate landowners for the value of commercial crops damaged or destroyed by construction activities as required in easement documents or other applicable land use agreements.
- Coordinate the routing and scheduling of construction traffic with Oregon State Department of Transportation (ODOT) and county roads staff.

3.9.4 UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION

There would be an unavoidable negligible reduction in county property taxes paid by landowners who provide new easements to BPA.

3.10 CULTURAL RESOURCES

This section describes the presence of cultural resources in the affected environment, as well as potential impacts of the Proposed Action on these resources. The No Action Alternative is discussed at the end of Chapter 3.

3.10.1 AFFECTED ENVIRONMENT

Cultural resources are nonrenewable resources associated with human occupation or activity related to history, architecture, archaeology, engineering and culture. A cultural resource may be a tangible entity or a cultural practice. Tangible cultural resources are categorized as districts, sites, buildings, structures, and as archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources (National Park Service 1998).

Under Section 106 of the National Historic Preservation Act of 1966 (NHPA), federal agencies must take into account the effects their projects may have on cultural resources that listed on or are eligible for listing in the National Register of Historic Places (NRHP). Cultural resources are evaluated for eligibility for listing in the NRHP using four criteria commonly known as Criterion A, B, C, and D as identified in 36 CFR 60.4 (a–d). These criteria include an examination of the cultural resource’s age, integrity, and significance in American culture, among other things. A cultural resource must meet at least one criterion to be eligible for listing.

The study area for cultural resources includes all those resources within a 100- to 150-foot right -of-way centered on the transmission line and a 20-foot wide right-of-way centered on project roads, as well as any additional project features, such as pulling-tensioning sites, extending outside of the right-of-way.

BACKGROUND

The earliest radiocarbon ages indicate that Native Americans were in the Willamette Valley by 9,800 before present (BP) (O’Neill et al. 2004). During the early portion of this period, the people of the region lived in small groups that were very mobile. Most of their habitation sites were likely situated near stable and predictable food resources. Artifacts that represent this early period consist primarily of stone tools, associated debris from the manufacture of those tools, and diffuse midden materials (i.e., plant remains and organic remains such as shell and bone). By 5,000 BP, the number and variety of site settings indicate an increasing population and regular use of a wide range of resources (Toepel 1985). Ground stone tools are more common and reflect the increased importance of plant resources to regional subsistence. Hundreds of camas roasting ovens dating to this period have been documented in the southern and central valley (Connolly et al. 1998; O’Neill et al. 2004). By 2,000 BP, settlement and subsistence practices were similar to those recorded at European contact. A broad range of plant resources, dominated by camas, was exploited, with hunting as an important ancillary pursuit. Clusters of camas processing and occupation sites suggest long-term cyclical use of specific locations, possibly by family-based groups (Bowden 1997). Shell ornaments and other artifacts, found at sites such as the Fuller and Fanning mounds on the South Yamhill River, denote increasing trade and exchange with the Oregon coast and Columbia River regions.

The study area was historically inhabited by the Kalapuya, who occupied basins of Willamette River tributaries, with each basin offering a range of riverine, valley, and foothill habitats and resources (Toepel and Beckham 1981:59-60). The study area falls within the territories of three Kalapuya bands including the Santiam, the Luckiamute, and the Marys River bands. Each band occupied the river basin for which they are

named. Camas was a primary staple of the Kalapuya diet, with contributions from other vegetal resources such as hazelnuts, tarweed, lupine, cattail, and various berries. Wapato was an important crop in the northern valley, but was less common in the southern valley. Most Kalapuya groups pursued some fishing and hunted a variety of birds and mammals. Kalapuya families were generally mobile between April and November each year, moving as needed to acquire and process foods and other resources both for immediate consumption as well as for storage. Most camps during this part of the year were small and transitory, but permanent villages were returned to each winter. These winter villages had large, rectangular, semi-subterranean multi-family lodges. Each village was politically autonomous, with authority vested in a chief, who adjudicated disputes among village members and assisted them in times of need (Zenk 1990). Kalapuya groups were part of the regional trade networks, exchanging a variety of goods and foodstuffs with other Kalapuya bands, as well as Chinookans, the Molala, the Klamath, and some coastal groups. Bands in the southern Willamette Valley were sometimes victimized by slave raids from some of these same groups. Inter-marriage among the Kalapuya bands, and with their trading partners, occurred with some frequency (Zenk 1990).

Direct contact between Oregon Native Americans and Euro-Americans began in 1792, when American Robert Gray located the mouth of the Columbia River. The Lewis and Clark expedition descended the Columbia River to the Pacific Ocean in 1805. Trapping expeditions soon entered the Willamette Valley. Trading posts were first established in 1812–1813. Oregon Native Americans had been devastated by successive waves of introduced epidemic diseases. A Willamette Valley epidemic in the early 1830s, thought to be malaria, resulted in mortality rates as high as 90 percent (Boyd 1990). In 1855, the Kalapuya bands signed the Dayton Treaty. They ceded their lands to the United States for specified annuities and were removed to the Grand Ronde Reservation in the foothills west of the Willamette Valley.

The Methodist Mission was founded in 1834. By 1844, the missionaries had been recalled and the mission closed, but the locale continued as a settlement. A town site was laid out and named Salem. The town prospered through the 1840s and became territorial capital in 1851 (McArthur 1974). With statehood in 1859, Salem became the state capitol. The city has grown primarily as a political and commercial center. American emigrants first ventured south of Salem in 1845. In 1848, a town site was platted near the confluence of the Calapooia with the Willamette River and named Albany. The town developed quickly as a local commercial hub for surrounding farms and was designated the county seat for Linn County in 1851. Lands in the central Willamette Valley continued to be relatively rural and agricultural through the mid-twentieth century although with areas of increased urban and suburban development facilitated by improved transportation networks. The Oregon Central Railroad connected Portland to Salem in 1870 and Albany in 1871 and became further tied to the growing Portland metropolitan area with the spread of interurban railroad lines in the early twentieth century (Thompson 2008).

Camp Adair, a World War II U.S. Army training facility, was constructed in 1942 north of Corvallis. Training operations ceased in 1944, but a portion of the camp served as a Prisoner-of-War (POW) camp from 1944 to 1946, and the U.S. Navy continued use of the base hospital until June 1946. Most barracks and other camp structures were removed in the late 1940s.

BPA was created in 1937 to generate and distribute hydroelectric power from dams on the Columbia River to underserved areas and to support the development of industry in the Pacific Northwest. The Salem-Albany transmission lines No. 1 and No. 2 that are the subject of the current project were constructed in 1946 as part of the construction and operation of the BPA transmission system in the Pacific Northwest beginning in 1938 (Kramer 2010a, 2010b).

ARCHAEOLOGICAL RESOURCES

A review of Oregon State Historic Preservation Office (SHPO) files in Salem revealed that 70 archaeological studies have been conducted within 1 mile of the Proposed Action study area. Of the 70 previous studies, 24 overlap with the study area.

A total of 69 archaeological sites have been previously recorded within 1 mile of the Proposed Action study area. Of those, nine are within or adjacent to the study area. One additional archaeological site (35LIN804) was identified during an investigation for the Proposed Action. The 10 sites within the study area are listed in Table 3-18. In addition, 44 previously recorded archaeological isolates (nine artifacts or less) were identified within one mile of the study area. Of those, three were identified within the study area. Two additional isolated finds were identified during an investigation for the Proposed Action.

Table 3-18. Archaeological Sites Within or Adjacent to the Study Area

Site ID	Description
35LIN804	A low density dispersed artifact scatter in an agricultural field near the Willamette River on undulating terrain. The scatter consisted of three tools (an obsidian used flake, ground stone fragment, and possible hammerstone) and 26 pieces of debitage.
35BE139	A prehistoric lithic scatter (debitage, a projectile point, a flaked tool, cobble tools, and fire-cracked rock). The site has been revisited for limited testing twice since the initial recording.
35MA212	Early twentieth-century Sydney Mill complex; the site was originally recorded in 1994, and a 2005 revisit indicated that many of the buildings and associated features have deteriorated significantly.
35MA278	The Van Dreische Hearth site, a Middle Archaic (6,000 to 2,000 BP) camp containing debitage, points, flaked tools, and fire-cracked rock located at a private residence; excavations at the site yielded over 100 artifacts and exposed a hearth.
35PO26	A prehistoric lithic scatter containing debitage and projectile points.
35PO27	A light prehistoric lithic scatter containing debitage, a scraper, and projectile points.
35PO28	A prehistoric lithic scatter containing debitage, projectile points, a stone knife, and a biface.
35PO31	A possible prehistoric base camp with a scatter of debitage, a worked lithic fragment, a possible hammerstone, and fire-cracked rock (a neighbor reportedly has collected ground stone artifacts from the site as well).
35PO83	A Late Archaic (2,000 to 200 BP) camp containing debitage, tools, faunal remains, and fire-cracked rock; 187 artifacts were encountered in shovel probes during the initial survey, and subsequent testing has increased the size of the collection and extended the site boundary.
35PO86	A prehistoric camp containing debitage, tools, and fire-cracked rock; ten artifacts were encountered in shovel tests during the initial visit (no surface evidence), and monitoring during construction-related activities that destroyed the site yielded only one additional artifact and one piece of fire-cracked rock.

HISTORIC/ARCHITECTURAL RESOURCES

Potentially significant historical structures were identified within the Proposed Action study area by a review of the Oregon SHPO built resources database, review of historical quadrangle maps, and field reconnaissance. Twelve historical built resources were identified within the study area (Table 3-19). Five of

the resources are considered eligible for or are listed in the NRHP; one resource is considered not eligible for listing in the NRHP.

Table 3-19. Historical Built Resources Within or Adjacent to the Study Area

Year(s)	Description
1940-48	Salem-Albany No. 1 Transmission Line
1942	Salem Substation
1954	Albany Substation
1940-48	Salem-Albany No. 2 Transmission Line
1954	Monmouth Substation
1900	Barn
1900	Early 19 th Century Residence
1900	Southern Pacific Railroad
1900	Burlington Northern Railroad
1890	Farmhouse
1860	Farmhouse (Brunk House)
1912-17	Valley and Siletz Railroad (removed)

3.10.2 ENVIRONMENTAL CONSEQUENCES — PROPOSED ACTION

Cultural resources are part of the “human environment” analyzed under NEPA. The significance of effects on cultural resources is determined by considering two variables: context and intensity. Context is the geographic, biophysical, and social context in which the effects will occur. Intensity is the severity of the impact within the context. Under NEPA, impacts may include adverse effects to historic properties as outlined under NHPA, or to cultural resources that may not be eligible for listing in the NRHP.

ARCHAEOLOGICAL RESOURCES

Adverse effects to cultural resources from the Proposed Action could result from physical ground disturbances caused by material and equipment staging, replacement of structures, construction of access roads, access road upgrades, and vehicle and heavy equipment access to and from work areas. None of the archaeological sites identified for the Proposed Action have been evaluated for the NRHP. Five of the sites on (35BE139, 35MA212, 35MA278, 35PO28, and 35PO86) would not be disturbed by the Proposed Action. Construction activities would result in ground disturbance at Sites 35LIN804 in the vicinity of Salem-Albany No. 1, and Sites 35PO26, 35PO27, 35PO31, and 35PO83 in the vicinity of Salem-Albany No. 2. Based on the proximity of previous finds, undiscovered artifacts could still be in the ground in these areas and could be moved or physically damaged by construction vehicles and access road construction or improvements. New structures generally would not have an impact since they would be placed in the hole from which the existing structures would be removed, to the extent possible, and only a small amount of auguring would

be required. BPA would coordinate with the SHPO and tribes if any previously undiscovered cultural resources are discovered during construction. In addition, given the potential extent of Sites 35PO26 and 35PO27, ground disturbance at these locations would be avoided until the boundaries of these sites have been confirmed through archaeological test excavations, and consultation with SHPO is complete. BPA would work with SHPO to determine the appropriate mitigation and avoidance measures needed. Adverse impacts to known resources would be minimized with the mitigation measures identified in Section 3.10.3, resulting in **no-to-low** impacts, depending on the level and amount of disturbance.

The likelihood for impact on cultural resources due to danger tree removal would be expected to be **no-to-low** because there would be no tree removal in areas of known sites and only surface disturbance (no soil disturbance) would occur from workers on foot and felling and removal of trees. However, these activities could disturb undiscovered cultural resources, if any exist.

HISTORIC/ARCHITECTURAL RESOURCES

The Salem-Albany No. 1 transmission line, Salem-Albany No. 2 transmission line, Salem Substation, Monmouth Substation, and Albany Substation are all integral components of the BPA transmission system and are considered eligible for listing in the NRHP. The Proposed Action would not alter the original design character or essential function of the transmission lines, except for the change from wood to steel pole structures in specific areas of the Proposed Action. The Proposed Action would not alter the integrity of design or workmanship of the transmission lines and would likely have **no-to-low** adverse effect on the resources. No alterations are anticipated at the Salem, Monmouth, or Albany Substations; therefore, the Proposed Action would likely have **no** impact on these historic structures.

Four additional historic structures were located within the Proposed Action study area. Three of the structures were determined to be potentially eligible for listing in the NRHP. One structure (Brunk House) is listed on the NRHP. These structures would not be directly altered in any way, and regardless of their eligibility to the NRHP, the Proposed Action would not alter any of the aspects of integrity that would qualify the resource for eligibility (i.e., materials, design, workmanship, feeling, association, setting, or location). Therefore the Proposed Action would likely have **no** impact on these historic structures.

The alignment of the Southern Pacific Railroad and the Burlington Northern Santa Fe Railroad rights-of-way may be eligible for listing on the NRHP; however, evaluation of the resources was outside the scope of this study. The alignment of the Valley and Siletz Railroad was previously determined to be not eligible for listing in the NRHP. The railroads would not be directly altered in any way, and regardless of their eligibility to the NRHP, the Proposed Action would not alter any of the aspects of integrity that would qualify the resource for eligibility (i.e., materials, design, workmanship, feeling, association, setting, or location). Therefore the Proposed Action would likely have **no** impact on these railroads.

3.10.3 MITIGATION – PROPOSED ACTION

Where ground disturbance cannot be avoided at the locations listed above, further evaluation would be required to determine eligibility of the sites for inclusion in the NRHP.

The following mitigation measures would be implemented under the Proposed Action to avoid and minimize impacts on cultural resources:

- Site transmission structures and access roads to avoid known cultural resource sites and limit ground disturbance.
- Provide cultural resource monitors, as necessary, to observe ground-disturbing activities in areas of previously documented cultural sites.
- In the event of an inadvertent discovery, stop work immediately and notify, appropriate BPA personnel, the Oregon SHPO, and the interested tribes. Develop an Inadvertent Discovery Plan that details crew member responsibilities for reporting in the event of a discovery during construction.
- Stop construction in the area immediately should human remains or burials be encountered. Secure the area, placing it off limits for anyone but authorized personnel, and immediately notify proper law enforcement, the BPA archaeologist, the Oregon SHPO, and the tribes.
- Implement any additional mitigation measures for cultural resources identified through the Section 106 consultation process.

3.10.4 UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION

With the implementation of the recommended mitigation measures, ground disturbance could still inadvertently move or damage any undiscovered artifacts in the ground.

3.11 NOISE, PUBLIC HEALTH AND SAFETY, AND EMF

This section describes the existing noise, public health and safety, and electromagnetic field (EMF) within the affected environment, as well as their potential impacts from the Proposed Action. The No Action Alternative is discussed at the end of Chapter 3.

3.11.1 AFFECTED ENVIRONMENT

The affected environment for noise, public health and safety, and EMF includes land uses within 1,000 feet of the Salem-Albany No. 1 and No. 2 transmission line rights-of-ways, existing and proposed access roads, and the proposed bridge and culvert replacement locations.

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.

Oregon counties have the authority to establish a noise control ordinance pursuant to Oregon Revised Statute 467.100. Linn, Benton, and Polk counties do not have noise regulations that would pertain to the Proposed Action. Marion County's Environmental Quality & Natural Resources Code states that all developments that are noise sources shall comply with applicable ODEQ standards. ODEQ's noise standards apply to existing and new commercial and industrial noise sources but do not specify noise limits for construction of these sources.

The city of Salem exempts the noises produced by a public utility from its noise controls (Salem Revised Codes, Section 8, Title VIII, Chapter 93). The city of Albany (City of Albany Municipal Code Chapter 7.08) prohibits construction noise that generates sounds audible at any residentially-zoned property for 30 minutes or more in any 3-hour period between the hours of 6:00 p.m. and 7:00 a.m.

Land uses most sensitive to noise within the affected area include occupied buildings (e.g., residences, schools, places of worship, and businesses), natural areas used for recreation (e.g., Eola Bend, Minto-Brown Island Park, Willamette River Greenway Sidney Access Point, Ankeny National Wildlife Refuge, Riverview Heights Park, Hazelwood Park, Eola Heights Park, E.E. Wilson Wildlife Area, and Bower's Rock State Park), and other areas where noise can interfere with peoples' use or enjoyment of the environment.

From structures SA1:1/1 to 5/5 within and on the west edge of Salem, Eola Bend and Minto-Brown Island Park are crossed by the transmission line, and approximately 118 residences and one business are within the affected area. Beginning on the southwest corner of Salem at structure SA1:5/10 south to Willamette R. Greenway Sydney at structure SA1:10/7, there are approximately 134 dispersed residences. From structures SA1:10/7 to 14/2 there are approximately 71 concentrated residences and from structures SA1:14/7 to 16/7 approximately 16 dispersed residences, both surrounded by agricultural lands. Within and just to the west of Millersburg from structures SA1:17/8 to 17/10 there are approximately 15 residences and Riverview Heights Park, and from structures SA1:18/10 to 19/3 there are approximately five dispersed residences. Beginning just to the north of Albany at structure SA1:20/3 south to Bowers Rock State Park at structure SA1:20/7, there are approximately 727 concentrated residences. South of Bowers Rock State Park, where the transmission lines are parallel from structures SA1:24/3 to 23/7 and SA2:27/8 to 23/7,

there are approximately 203 concentrated residences leading to the terminus in Albany on the south edge of Hazelwood Park.

Heading northwest from Salem, there are approximately 165 residences, one place of worship, and Eola Heights Park within the affected area from structures SA2:1/3 to 2/7. From structures SA2:2/8 to 5/2, there are approximately 80 residences and one place of worship, and from structures SA2:5/7 to 6/1 there are approximately 15 residences and one business. From structures SA2:6/8 to 8/2, there are approximately 34 residences and from structures SA2:8/6 to 8/8 there are approximately seven residences along agricultural fields. In and surrounding Independence and Monmouth from structures SA2:10/2 to 11/10, there are approximately 756 residences, 15 businesses, Ash Creek Elementary School, Central High School, Talmadge Middle School, three places of worship, and John Pfaff Park in the affected area (City of Independence 2014). From structures SA2:12/2 to 13/1, there are approximately 10 residences and from structures SA2:13/6 to 17/9 there are approximately 42 residences along agricultural fields. From structures SA2:19/3 to 20/4, there are approximately 11 residences and three businesses, and from structures SA2:21/11 to 22/1 there are approximately two residences and one business along agricultural fields. From structures SA2:23/10 to 25/11, there are approximately 15 residences and one business, and from structures SA2:26/8 to 27/2 there are approximately 21 residences and Hyak Park up to the north end of Bowers Rock State Park where the transmission lines meet (Benton County 2014).

Within the affected area, ambient noise levels vary with the proximity of the transmission line rights-of-way to highways and other noise-generating activities. The majority of the transmission line rights-of-way are located in rural, undeveloped areas where noise levels are generally low. In these areas, the predominant sources of noise are agricultural equipment operation and some vehicular traffic. In particular, vehicles traveling along U.S. Hwy 20, State Route 22, State Route 51, numerous community roads north of Albany, and county roads through farmlands in the affected area generate noise in proximity to the Proposed Action rights-of-way. Other sources of noise include maintenance activities along the Proposed Action rights-of-way. In the cities of Salem, Albany, and Independence and in the communities of Millersburg and Monmouth (all located within 1,000 feet of the rights-of-way for either the Salem-Albany No. 1 or No. 2 transmission lines), traffic and noise associated with human activity are major contributors to background noise. Noise from the existing Salem-Albany No. 1 and No. 2 transmission lines contributes to the noise setting, but is overshadowed by other noise sources in the urbanized areas.

Sources of audible noise associated with electrical transmission systems include construction and maintenance equipment, transmission line corona (see below), and the hum of electrical transformers. Audible noise from high-voltage transmission lines (generally 345-kV and above) occurs as a result of conductor corona activity (i.e., the electrical breakdown of air molecules in the vicinity of high-voltage conductors). This corona activity produces a hissing, crackling, popping sound, particularly during wet conditions such as rain or fog. Generally, audible noise from 115-kV transmission lines is so low as to not be noticeable (due to the low amount of corona activity generated at this voltage level) and is usually well below other ambient noise levels in the area. BPA designed the existing 115-kV Salem-Albany No. 1 and No. 2 transmission lines to meet applicable state and federal noise regulations. Historically, public complaints or inquiries about transmission line audible noise at this voltage level are extremely rare.

PUBLIC HEALTH AND SAFETY

In Marion, Polk, Benton, and Linn counties, as in the state of Oregon overall, the leading causes of fatal, unintentional injury in 2012 were motor vehicle collisions, falls, and poisoning (Oregon Health

Authority 2012). Sources of motor vehicle traffic in the affected area that could interact with traffic associated with the Proposed Action include vehicles traveling along U.S. Hwy 20, State Route 22, State Route 51, numerous community roads north of Albany, and county roads through farmlands in the affected area. Agricultural equipment is also operated in the affected area and may cross the Proposed Action access roads and rights-of-way of Salem-Albany No. 1 and No. 2.

Natural and manmade hazards of particular concern to the affected area include drought, extreme heat, hazardous materials, volcanic eruption, earthquakes, wildfire, flooding, windstorms, severe winter storms, and landslides (Linn County 2005; City of Salem 2012; Benton County 2011; Polk County undated; Marion County 2011). The deteriorated condition of the Salem-Albany No. 1 and No. 2 transmission lines leaves the communities served by the electrical transmission and distribution system vulnerable to loss of electrical service in the event of high winds, a severe winter storm, or other natural hazard. Additional safety hazards are associated with the existing Salem-Albany No. 1 transmission line and include the conductor and fiber optic line swinging outside of the right-of-way or too close to structures along the right-of-way during high winds.

ELECTRIC AND MAGNETIC FIELDS

Transmission lines, like all electric devices and equipment, produce electric and magnetic fields (EMFs). Voltage, the force that drives the current, is the source of the electric field. Current, the flow of an electric charge in a wire, produces the magnetic field. The strength of the EMF depends on the design of the line and the distance from the line; field strength decreases rapidly with distance.

EMFs are found around any electrical wiring, including household wiring and electrical appliances and equipment. Electric fields are measured in units of volts per meter (V/m) or thousands of volts per meter (kV/m). Magnetic fields are measured in units of gauss (G) or milligauss (mG), which are thousandths of a gauss. Throughout a home, the electric field strength from wiring and appliances is usually less than 0.01 kV/m. However, fields of 0.1 kV/m and higher can be found very close to electrical appliances.

There are no national guidelines or standards for electric fields from transmission lines. For siting transmission lines under its jurisdiction, the state of Oregon, through the Oregon Energy Facility Siting Council, requires that a proposed transmission line be designed and operated so that its electric fields do not exceed 9 kV/m at roughly 3 feet above ground surface in areas accessible to the public (Oregon Administrative Rule 345-024-0090). BPA designs transmission lines to meet the electric-field guideline of 9 kV/m maximum on the transmission line right-of-way and 5 kV/m maximum at the edge of the transmission line right-of-way.

Average magnetic field strength in most homes (away from electrical appliances and home wiring, etc.) is typically less than 2 mG. Fields of tens or hundreds mG are present very close to appliances carrying high current. Unlike electric fields, magnetic fields from outside power lines are not reduced in strength by trees and building material. 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. Oregon does not have a limit for magnetic fields from transmission lines. BPA does not have a guideline for magnetic field exposures. The guidelines that do exist for public and occupational magnetic-field exposures are intended for measuring short-term magnetic field exposures and are not applicable to determining the effects of long-term exposures.

3.11.2 ENVIRONMENTAL CONSEQUENCES — PROPOSED ACTION

The Proposed Action was analyzed to determine whether there could be an increase or decrease in noise, or change in public and worker health or safety in the affected area.

NOISE

Construction activities would result in short-term and intermittent noise impacts as construction progresses along the transmission line rights-of-way. Noise would result from construction equipment and vehicles used for road work, bridge and culvert replacement, vegetation removal, and structure removal and replacement. Helicopters could be used to string a sock line through the structures. Table 3-20 contains examples of common construction vehicles and equipment and the maximum noise levels, in dBA, that they might generate.

Table 3-20. Typical Construction Vehicle and Equipment 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

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. Noise-sensitive properties within 800 feet of construction sites could be exposed to daytime noise levels of 65 dBA. Noise levels would be further attenuated due to the areas of open space within the transmission line rights-of-way. Using a terrain coefficient (a number expressing the ratio of actual ground displacement by elastic waves to that which the same waves would produce in rock, which has a terrain coefficient of 1) of 0.005 dBA/m, noise-sensitive receptors beyond 1,000 feet from the transmission line rights-of-way would not experience non-helicopter construction noise levels above 60 dBA (Rogers 2006).

If helicopters are used for conductor stringing, their presence would result in noise levels that may exceed 100 dBA for a brief time. Helicopter noise levels are about 106 dBA when operating at 50 feet above ground surface. 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 three hours.

Other construction activities at any given location are also expected to be relatively short in duration (approximately one to two days). In addition, implementation of the mitigation measures described in Section 3.11.3, such as having sound-control devices on construction equipment with gasoline or diesel engines and limiting construction noise to daylight hours (7:00 a.m. to 5:00 p.m.), would reduce noise 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.

Noise impacts from construction of the Proposed Action would be **low** for the rural portions of the rights-of-way because these areas are located away from noise-sensitive uses and regularly include machinery noise from agricultural practices, so it is unlikely that there would be a perceived change in overall noise levels. The portion of the Proposed Action that would be constructed adjacent to the noise-sensitive land uses described in Section 3.11.1 would have **moderate** impacts because residents and recreational users are present in these areas and noise levels during construction would exceed ambient noise levels.

Table 3-21 provides the calculated corona noise levels for the transmission lines under existing conditions and after implementation of the Proposed Action. Under the Proposed Action, corona noise from the transmission lines would have **no** or reduced impacts from current levels and noise that could be generated during maintenance activities would not change. The transmission lines would remain compliant with applicable state of Oregon noise regulations.

Table 3-21. Transmission Line Rights-of-Way Audible Noise (dBA, wet conditions)

Right-of-way (ROW) Section Description	Proposed Action Effects	West or North of Right-of-Way Edge (dBA)	Maximum on Right-of-Way (dBA)	East or South of Right-of-Way Edge (dBA)
<u>Section A:</u> 100-foot ROW with 1 Line: Salem-Albany No. 1 115-kV	Existing Conditions	18.2	20.8	18.2
	Proposed Conditions	17.0	19.6	17.0
<u>Section B:</u> 262.5-foot ROW with 2 Lines: Salem-Albany No. 1 115-kV Santiam-Toledo No. 1 230-kV	Existing Conditions	42.7	45.9	37.4
	Proposed Conditions	42.7	45.9	37.4
<u>Section C:</u> 100-foot ROW with 1 Line: Salem-Albany No. 2 115-kV	Existing Conditions	18.2	20.8	18.2
	Proposed Conditions	17.0	19.6	17.0

<i>Section D:</i> 200-foot ROW with 3 Lines:	Existing Conditions	26.7	28.3	23.4
Salem-Albany No. 1 115-kV Salem-Albany No. 2 115-kV Albany-Burnt Woods No. 1 115-kV	Proposed Conditions	26.3	28.2	22.8

PUBLIC HEALTH AND SAFETY

Potential public health and safety impacts would be associated with the use of construction and heavy equipment; potential exposure to hazardous materials, such as fuels and lubricants during construction; construction traffic entering and traveling across the project corridor; potential aircraft hazards; and worker proximity to high-voltage power lines. Standard construction safety procedures would be employed. Additional information about BPA’s public safety measures can be found in two brochures: “Landowner’s Guide to BPA Projects: Before & during Construction” and “Living and Working Safely around High-Voltage Power” (<http://www.bpa.gov/PublicInvolvement/LandsCommunity/Pages/default.aspx>). Implementation of the mitigation measures described in Section 3.11.3 would reduce these potential impacts. These potential impacts are, therefore, expected to be **low**.

The soil surrounding existing wood structures are not known to be contaminated, although creosote was used to treat wood poles throughout the lines. Government environmental databases that record the handling, storage, and release of hazardous materials to the environment were reviewed to document existing conditions in the transmission line rights-of-way. No areas of hazardous material contamination within the transmission line rights-of-way or access road system were identified during the database review. No areas of obvious hazardous material contamination were observed during a site visit or reviews of recent, high-resolution aerial photos of the transmission line right-of-way.

BPA would dispose of creosote-treated wood poles in accordance with federal and state laws, so impacts would be **low**. If unknown hazardous materials located along the right-of-way were disturbed during construction of the Proposed Action, there could be an unexpected release to the environment and potential temporary impact to public health and safety of nearby residents. Construction activities associated with the Proposed Action could involve the use of small amounts of solvents, pesticides, paint products, motor and lubricating oils, and cleaners, which could be released into the environment. If any of these materials are spilled, BPA would immediately contain and clean up the spill and dispose of all regulated materials in accordance with federal and state laws. Impacts resulting from a hazardous materials release to soil or groundwater during construction would likely be **low** because of the implementation of mitigation measures discussed in Section 3.11.3.

Implementation of the Proposed Action would have an overall **low** positive impact on public safety by replacing the wood-pole structures with steel monopoles, and thus allowing the line to be moved further from the edge of the rights-of-way, and by moving some wood-pole structures closer to the center of the rights-of-way. These design features would keep the conductors within the rights-of-way and within safety limits when high winds make the conductors swing between structures.

The Proposed Action, by improving the condition of the Salem-Albany No.1 and No. 2 transmission lines, would reduce the vulnerability of the electrical system to natural hazards common to the affected area (such as severe winter storms and windstorms) and would help to prevent the loss of electrical service to

residential, commercial, industrial, and municipal customers, thus having a **low** positive impact. In addition, the design changes proposed for portions of Salem-Albany No. 1 (see Section 2.1.1) would be safer for adjacent landowners and would protect the integrity of the line. The heights of the new wood-pole structures would average 10 feet taller than existing structures, ranging from 50 to 100 feet above ground for the two-pole wood structures and 50 to 95 feet above ground for the three-pole or dead-end structures. The 75 steel monopole structures would range from 85 to 115 feet above ground. While the presence of the taller structures could pose a hazard to any low-flying aircraft, given that the height of the new structures would remain relatively low, the risk associated with this potential hazard would be considered low. Furthermore, the new structures would replace existing structures within the Salem-Albany No. 1 and No. 2 transmission lines, which aircraft likely currently avoid.

ELECTRIC AND MAGNETIC FIELDS

During construction, each transmission line would be de-energized, thus temporarily eliminating the EMF levels within the rights-of-way. However, construction workers would continue to be subjected to EMF levels for any work occurring in or near the Salem and Albany substations, and would follow all protocols and take appropriate standard safety measures. There would be **no** additional impacts from these activities, since ongoing activities already occur in the substations.

The primary parameters that affect the EMF levels produced by a power line are line voltage, current loading, line configuration, and line routing. Because the Proposed Action would not appreciably change any of these parameters, EMF levels in the vicinity of the transmission lines would not change except in a few isolated cases where structure heights would be raised slightly to increase the conductor-to-ground clearances. In these areas, ground-level EMF would decrease slightly within the transmission line rights-of-way. No changes would occur beyond the rights-of-way of the transmission lines. BPA would continue to meet the state of Oregon's electric field regulations for transmission lines. The state of Oregon has no regulations regarding transmission line magnetic fields.

EMF levels for the Proposed Action are shown in Tables 3-22 and 3-23. The data illustrate that the Proposed Action would have **no** impact, either on the electric or magnetic field environment on the rights-of-way.

Table 3-22. Transmission Line Rights-of-Way Electric Field Values (kV/m)

ROW Section Description	Proposed Action Effects	West or North of Right-of-Way Edge (kV/m)	Maximum on Right-of-Way (kV/m)	East or South of Right-of-Way Edge (kV/m)
ROW Section A: 100-foot ROW with 1 Line: Salem-Albany No. 1 115-kV	Existing Conditions	0.4	1.5	0.4
	Proposed Conditions	0.4	1.5	0.4
ROW Section B: 262.5-foot ROW with 2 Lines: Salem-Albany No. 1 115-kV Santiam-Toledo No. 1 230-kV	Existing Conditions	0.9	3.6	0.2
	Proposed Conditions	0.9	3.6	0.2
ROW Section C: 100-foot ROW with 1 Line: Salem-Albany No. 2 115-kV	Existing Conditions	0.4	1.5	0.4
	Proposed Conditions	0.4	1.5	0.4
ROW Section D: 200-foot ROW with 3 Lines: Salem-Albany No. 1 115-kV Salem-Albany No. 2 115-kV Albany-Burnt Woods No. 1 115-kV	Existing Conditions	0.8	1.6	0.5
	Proposed Conditions	0.5	1.6	0.5

Table 3-23. Representative Transmission Line Rights-of-Way Magnetic Field Values (milligauss, based on annual 2013-2014 line load statistics)*

ROW Section Description	Proposed Action Effects	West or North of Right-of-Way Edge (milligauss)		Maximum on Right-of-Way (milligauss)		East or South of Right-of-Way Edge (milligauss)	
		Annual Average	Annual Peak	Annual Average	Annual Peak	Annual Average	Annual Peak
ROW Section A: 100-foot ROW with 1 Line: Salem-Albany No. 1 115-kV	Existing Conditions	1.5	3.9	3.7	18.9	1.5	3.9
	Proposed Conditions	1.5	3.9	3.7	18.9	1.5	3.9
ROW Section B: 262.5-foot ROW with 2 Lines: Salem-Albany No. 1 115-kV Santiam-Toledo No. 1 230-kV	Existing Conditions	11.2	18.7	33.1	83.8	1.8	3.0
	Proposed Conditions	11.3	18.8	33.0	83.7	2.1	3.7
ROW Section C: 100-foot ROW with 1 Line: Salem-Albany No. 2 115-kV	Existing Conditions	1.5	3.9	3.7	18.9	1.5	3.9
	Proposed Conditions	1.5	3.9	3.7	18.9	1.5	3.9
ROW Section D: 200-foot ROW with 3 Lines: Salem-Albany No. 1 115-kV Salem-Albany No. 2 115-kV Albany-Burnt Woods No. 1 115-kV	Existing Conditions	1.2	2.5	5.1	21.4	2.1	5.1
	Proposed Conditions	1.2	2.5	5.1	21.4	2.1	5.1

Note: Calculation of annual average and annual peak magnetic field levels reported in Table 3-22 were based on historical 2013 and 2014 annual line loading statistical data obtained from BPA's SCADA system.

Radio and television interference from high-voltage power lines can be produced from two general sources: conductor corona activity and spark-discharge activity on connecting hardware. Conductor corona activity is primarily a function of the operating line voltage, while spark-discharge activity on connecting hardware is usually associated with the aging condition of hardware (e.g., over time, hardware connections can become loose and corroded causing small spark-gaps). However, BPA rarely receives public complaints of radio and television interference from BPA transmission lines operating at this voltage and there would be **no** impact on radio and television reception from corona and spark-discharges.

The operating voltage of the Proposed Action would be the same as the operating voltage of the existing transmission lines. Additionally, the Proposed Action would add new, properly-installed connecting hardware that would reduce any risk associated with aging hardware spark-discharge activity. Thus, the Proposed Action would have **no** impact because it would either not change or would possibly reduce the potential for radio and television interference along the transmission lines. Nevertheless, any 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 action to eliminate the interference.

3.11.3 MITIGATION – PROPOSED ACTION

The following mitigation measures have been identified to reduce or eliminate noise impacts:

- 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 (mufflers) 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.
- Provide a construction schedule to all potentially affected landowners.
- Limit construction noise to daylight hours (7:00 a.m. to 5:00 p.m.).
- Turn off construction equipment during prolonged periods of use.
- Post a construction schedule in affected recreational areas.

The mitigation measures described in Section 3.1.3, Land Use would reduce the risk of collisions between construction traffic and motor vehicles traveling in the affected area. The following additional mitigation measures would minimize potential public health and safety risks if the Proposed Action is implemented:

- Prepare and maintain a Spill Prevention and Response Plan that would detail how to manage hazardous materials such as fuel, and how to respond to emergency situations. This plan, prepared prior to the start of construction, would be kept on site at all times.
- Conduct crew safety meetings at the start of each workday to review potential safety issues and concerns. spill
- Conduct monthly meetings between BPA and the contractor(s) 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 Oregon and prepare a Fire Prevention and Suppression Plan to meet BPA, local authority, and land manager requirements.
- Construct and operate the new transmission lines 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.
- Ground fences and other metal structures on and near the transmission line rights-of-way during construction to limit the potential for shocks.

3.11.4 UNAVOIDABLE IMPACTS REMAINING AFTER MITIGATION

Unavoidable noise impacts would include noise that would be experienced by people in the area, such as residents and recreational users, during construction activities, which would be short-term and cease upon the completion of construction activities.

Potential unavoidable public health and safety risks would include increased risks of electrical shocks, accidental release of fuels or oils, accidental injury to construction workers, and possible collisions between construction vehicles and vehicles driven by the public while construction is ongoing.

3.12 CUMULATIVE IMPACTS

Cumulative impacts are the impacts on the environment which results from the incremental impact of the 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. (40 CFR 1508.7). Sections 3.1 through 3.11 of this chapter present information about present environmental conditions and the environmental and socioeconomic consequences of implementing the Proposed Action. This Section addresses the cumulative impacts of the Salem-Albany Rebuild when combined with other past, present, and reasonably foreseeable future actions.

Because the Proposed Action would rebuild the existing transmission line in its current location, with minor siting changes and similar structures and conductors, it would likely have low cumulative impacts on the cities and counties surrounding the Proposed Action.

3.12.1 IDENTIFICATION OF PRESENT AND REASONABLY FORESEEABLE FUTURE ACTIONS

Potentially relevant projects, plans and programs that could occur during the same time as construction of the Proposed Action were identified by contacting the counties and cities within the Cumulative Effect Analysis area and requesting information on current and proposed development. A summary of potential projects obtained from these sources are provided below:

- Benton County – No current or potential developments identified.
- Linn County/City of Millersburg
 - Potential residential development in Millersburg city limits and outlying areas.
- Marion County - No current or potential developments identified.
- Polk County/City of Independence
 - Potential future residential development outside of Independence city limits near Hoffman Road to the north and South Falcon Loop to the south.
 - The Trust for Public Lands holds an option to purchase Hayden Island, a 270-acre gravel mine located along the Willamette River south of Eola. If this land is purchased, the intent is to create a protected greenway that would offer recreation opportunities and environmental education facilities.
- City of Albany - No current or potential developments identified.
- City of Salem
 - Development of the Eagle’s View residential subdivision began in 2001 near Eagle Street NW as a proposed 394 lot, 93 acre site. The original plan was amended in 2007 and to date only part of the development has been constructed with the approval extending until 2015. Development and construction of the subdivision has begun.
 - The City of Salem is pursuing acquisition of approximately 310 acres of the northern portion of Minto-Brown Island for recreation and habitat restoration. The purchase would expand

the existing parks acreage and allow for the expansion of the existing bicycle and pedestrian trail system.

- Reasonable foreseeable future BPA activities in the project area would include ongoing maintenance of the Salem-Albany transmission line.

3.12.2 LAND USE, RECREATION, HABITAT CONSERVATION, AND TRANSPORTATION

Land use, recreation, habitat conservation, and transportation in the corridor have experienced incremental changes due to past and present development, and this trend is expected to continue. Potential residential and parkland development have been identified in the surrounding area and are described above in Section 3.12.1. These new developments would result in increased traffic in the surrounding area; however, increased traffic associated with the Proposed Action would be limited to the construction period. The Proposed Action would be expected to have a low cumulative impact on transportation. Land use and recreation in the surrounding area could be impacted by present and reasonably foreseeable future actions, described in Section 3.12.1, however, since the land uses, conservation lands, and recreation lands affected by the Proposed Action would small, and the project would have low impacts on recreational and conservation activities, the Proposed Action is expected to have a low cumulative impact on land use, conservation and recreation.

3.12.3 GEOLOGY AND SOILS

Potential residential and parkland development as well as BPA vegetation management activities have been identified in the surrounding area and are described above in Section 3.12.1. Past and ongoing land use activities along the Proposed Action include agriculture and residential development. The amount of soil that would be affected by the Proposed Action is small compared to the area affected by other past, present and reasonably foreseeable future actions in the area. Therefore, the Proposed Action would have a *low* cumulative impact on geology and soils.

3.12.4 VEGETATION

Agriculture, vegetation control along roads and utility corridors, and commercial and residential development are responsible for most of the past and present vegetation impacts in the affected area. Agriculture has altered the vegetation in the region by replacing native plant communities with crops, introducing non-native weeds, and impacting herbaceous plant communities through livestock grazing. Vegetation control routinely occurs along local highways, county roads, residential roads, and utility corridors in the project and surrounding area, including the existing Salem-Albany transmission line. Vegetation control activities generally include herbicide applications and mechanical cutting of vegetation using mowers and chainsaws. Commercial and residential development has resulted in further reductions in native plant communities.

Potential residential and parkland development have been identified in the surrounding area and are described above in Section 3.12.1. Other reasonably foreseeable future actions that could occur in the project area and contribute to vegetation impacts include ongoing maintenance of the Salem-Albany transmission line, other utility ROWs, and other local roads. Contributions to cumulative impacts from the Proposed Action on vegetation would include the permanent removal of approximately 759 danger trees,

770 instances of high brush, and 78 acres of low-growing vegetation; and additional temporary disturbance of 180 acres. Through the implementation of mitigation measures discussed in Section 3.3.3, vegetation losses and damage would be minimized; thus, when combined with other past, present, and reasonably foreseeable future actions the Proposed Action would have a **low** cumulative impact on vegetation.

3.12.5 FISH AND WILDLIFE

Cumulative impacts for fish and wildlife are described below.

FISH

Stream crossings for roads (such as with culverts), along with agriculture, removal of riparian vegetation adjacent to roads and in utility corridors, and commercial and residential development are responsible for most of the past and ongoing impacts to fish communities and associated riverine habitat in the project area. These effects include blocking of fish passage, loss of riparian vegetation, livestock use of streams, herbicide run-off, and soil erosion. Potential residential and parkland development have been identified in the surrounding area and are described above in Section 3.12.1. Other reasonably foreseeable future actions that could occur in the project area include ongoing maintenance of the Salem-Albany transmission line, other utility rights-of-way, and other local roads. These ongoing activities could lead to sedimentation from runoff due to road and land use, potential spills from vehicle access and construction of the Salem-Albany transmission lines, and blockage of fish passage, all of which could combine to cumulatively impact fish and fish habitat.

The Proposed Action would have some adverse impacts on fish and fish habitat (described above Section 3.4.2), but the impacts would be temporary and small, no other projects affecting fish or fish habitat are expected to occur in the surrounding area at the same time. Furthermore, the Proposed Action would replace, clean or improve 15 existing culverts, which would improve fish passage in these locations. Therefore the Proposed Action would be expected to have a **low** cumulative impact on fish and fish habitat

WILDLIFE

Agriculture, vegetation control along roads and utility corridors, and commercial and residential development are responsible for most of the past and present impacts to wildlife and wildlife habitat in the project area. Potential residential and parkland development have been identified in the surrounding area and are described above in Section 3.12.1. Other reasonably foreseeable future actions that could occur in the project area include ongoing maintenance of the Salem-Albany transmission lines, other utility rights-of-way, and other local roads. Agricultural activities and commercial and residential development have removed forest habitats and replaced them with habitats that generally support different wildlife than previously existed in the forests. These ongoing activities, including the rebuild and maintenance of the Salem-Albany transmission lines, cumulatively impact wildlife and wildlife habitat. The Proposed Action would be expected to have a **low** cumulative impact on wildlife and wildlife habitat since it would remove forest habitat in small amounts along the project corridor.

3.12.6 WATER RESOURCES

Potential residential and parkland development have been identified in the surrounding area and are described above in Section 3.12.1. Reasonable foreseeable BPA activities in the project area would include ongoing maintenance of the Salem-Albany transmission line. Past and ongoing land use activities in the

surrounding area include agriculture and residential. These activities could impact water quality in the Proposed Action watersheds due to nonpoint source pollution such as erosion and street runoff. The footprint of the Proposed Action is relatively small in relation to the size of the watershed, and project design features and mitigation measures would reduce the potential for impacts to water resources. Therefore, the Proposed Action would have a **low** cumulative impact on waterways and water quality.

3.12.7 WETLANDS AND FLOODPLAINS

Wetland and floodplain cumulative impacts could result if past, present and reasonably foreseeable future actions were to affect wetland and floodplain functions (i.e., water quality, hydrology, and wildlife habitat). Reasonably foreseeable future actions in the surrounding area that could have wetland and floodplain impacts include agricultural activities, vegetation control along roads and utility corridors, and commercial and residential development (described in Section 3.12.1). These activities are also likely responsible for most of the past and present project area wetland impacts and loss. The wetland impacts of the Proposed Action would be mitigated by implementing the mitigation measures described in Section 3.6.3 as well as any other mitigation measures required as part of the permitting process. These measures would likely ensure that the cumulative impact of the Proposed Action when combined with impacts of other past, present, and reasonably foreseeable future actions on wetlands and floodplains would be low.

3.12.8 VISUAL QUALITY

The visual quality of the transmission line right-of-way has changed due to past and present development, and this trend is expected to continue. The impact to visual quality and views resulting from the Proposed Action would be expected to be a **low** long-term impact on the rural, pastoral, and forested visual environment because the rebuilt transmission line would be similar in character to the existing line. Danger tree removal would result in a **moderate** long-term impact on visual quality in rural areas where the transmission line would be more visually dominant as a result of tree removal and **low-to-moderate** in urban areas given the urban development already present. Trees would not be replanted or allowed to regrow in the project corridor, resulting in a long-term change to visual quality. Thus, when combined with the present and reasonably foreseeable future actions impacting visual quality, the Proposed Action would have a **low-to-moderate** cumulative impact.

3.12.9 AIR QUALITY AND GREENHOUSE GASES

Cumulative impacts for air quality and greenhouse gases are described in the following sections.

AIR QUALITY

Ongoing vehicular use, agricultural activities, and commercial and residential facilities in the cumulative effects analysis area all contribute to ambient air pollutant emissions. These sources of pollutants would continue to occur. Potential residential and parkland development have been identified in areas along the transmission line rights-of-way and are described above in Section 3.12.1. While the Proposed Action would contribute a small amount to pollutant levels, when combined with present and reasonably foreseeable future actions in the affected area, these actions are not expected to violate NAAQS and, therefore, cumulative impacts on air quality would be **low**.

GREENHOUSE GASES

Vehicular traffic, agricultural activities, and commercial and residential facilities in the cumulative effects analysis area all contributed to GHG emissions. These sources of GHG emissions would continue to occur. In terms of cumulative impacts to the atmospheric levels of greenhouse gases, any addition, when considered globally, could contribute to long-term impacts to climate change. However, the concentrations estimated for the Proposed Action (approximately 16,953 metric tons of carbon dioxide equivalent), when compared to the regional (less than 0.002 percent), national, and global rates, are low. In addition, the potential ability of the Proposed Action to assist in the transmission and distribution of renewable (non-fossil fuel burning) energy, such as wind power, would help offset the Proposed Action's contribution to cumulative greenhouse gas impacts. As of October 2011, wind, solar, and hydro accounted for 90 percent of the generation capacity transmitted by BPA (BPA 2013).

3.12.10 SOCIOECONOMICS, PUBLIC SERVICES, AND ENVIRONMENTAL JUSTICE

The small influx of revenue associated with the temporary increased spending and lodging in the surrounding area would combine with the spending associated with workers employed in existing industries and result in a low positive cumulative impact on the economy within the surrounding area. The Proposed Action could affect public services by briefly disrupting access to properties, causing localized increases in noise and dust, and causing small traffic slow-downs, although it would have a low cumulative impact since there are no other known projects that would be occurring during the same period. Also, the Proposed Action is not anticipated to disproportionately affect environmental justice populations. Therefore, the Proposed Action would have **low** cumulative impacts on socioeconomics and public services and **no** cumulative impacts on environmental justice populations.

3.12.11 CULTURAL RESOURCES

Cultural resources in the project area have likely been cumulatively affected by past, present, and current development activities. Most impacts have likely occurred as a result of inadvertent disturbance or destruction from ground-disturbing activities such as road work, urban development, and agriculture. Like the Proposed Action, other reasonably foreseeable future projects in the vicinity of the project area—including agricultural, residential, commercial, and utility line maintenance activities—have the potential to disturb previously undiscovered cultural resources. The Proposed Action would likely have **low** cumulative effects on historic properties because road construction activities could affect potential historic properties in the form of a number of archaeological resources. Implementation of the mitigation measures described in Section 3.10.3 would reduce the potential for construction activities to contribute incrementally to the cumulative impacts on unknown cultural resources in the area of potential effect (APE). In the event that previously undiscovered cultural resources are encountered, potential impacts would be **low-to-moderate**, depending on the level and amount of disturbance, and the eligibility of the resource for listing in the NRHP.

3.12.12 NOISE, PUBLIC HEALTH AND SAFETY, AND EMF

The following sections describe the potential cumulative noise and public health and safety impacts from construction of the Proposed Action.

NOISE

Within the surrounding area, the predominant sources of noise are agricultural equipment operation and vehicular traffic. These sources of noise would continue to occur. Additionally, BPA conducts routine helicopter inspection patrols of the federal transmission system in the Pacific Northwest, including the transmission lines in the surrounding area. As part of these routine patrols, BPA would continue to use helicopters to fly the Salem-Albany transmission lines to identify any problems or repair needs. These patrols typically occur two or three times per year, generally in March, July, and October. Any noise experienced during these flyovers would be infrequent and limited in duration (i.e., only for the few seconds it would take for the helicopter to pass). Reasonable foreseeable future activities in the cumulative effects analysis area that could increase noise levels include a proposed residential development in Polk County and ongoing maintenance of the Salem-Albany transmission lines. Cumulative noise impacts occur when there is noise from more than one noise source at approximately the same time. The noise impacts associated with construction of the Proposed Action would be mitigated using the measures described in Section 3.11.3 while noise associated with ongoing maintenance would be limited in duration and would have a minimal contribution to noise in the cumulative effects analysis area. Therefore, the Proposed Action would be expected to have a ***low*** cumulative impact on noise.

PUBLIC HEALTH AND SAFETY

Past and ongoing activities along the transmission line right-of-way include timber harvest, agriculture, and some residential and industrial development and these activities all have the potential for risks to public health and safety from operating heavy machinery and exposure to hazardous materials. Since the effects of the Proposed Action would be mitigated through safety and mitigation measures aimed at reducing the risks from operating heavy equipment and vehicles and exposure to hazardous materials, the cumulative impacts on public health and safety would be expected to be ***low***.

EMF

Since the proposed action would have no impact on the electric or magnetic fields environment within the transmission line rights-of-way, there would be no cumulative impact on EMF.

3.13 NO ACTION ALTERNATIVE

Under the No Action Alternative, BPA would not rebuild the transmission lines, upgrade or build access roads, or replace culverts as a single coordinated project over a two-year period. However, the reliability and safety issues that prompted the need for the Proposed Action would remain. As the line continues to deteriorate and fail intermittently, BPA's ability to provide reliable electric service to its customers in the area would be reduced. BPA would also continue to have inadequate access in the case of an emergency outage or line failure, particularly during the rainy season or inclement weather.

BPA would continue to operate and maintain the existing transmission lines in their current condition, replacing aging and rotting structures as they deteriorate, maintaining access roads to allow access to structures on an as-needed basis, and managing vegetation for safe operation. In addition, the safety concerns dealing with the proximity of the line to adjacent structures would persist. Given the current poor condition of the transmission lines, the No Action Alternative would likely result in more frequent and more disruptive repair activities within the corridors as time progresses and the aging line and structures continue to deteriorate. It might be possible to plan some repairs, but many would likely occur on an emergency basis as various parts of the transmission lines continue to deteriorate. In addition, danger trees would still need to be identified and cut, limbed, or topped where they pose a threat to the line—this would occur in the near future since comprehensive danger tree work has not been conducted along these lines in the last 10 years. Danger tree identification under the No Action Alternative along the Salem-Albany No. 1 line would be somewhat different than that of the Proposed Action because the line would not be moved to the center of the right-of-way, which would change the distance of trees from the conductor. The effects of the No Action Alternative are discussed below by resource.

3.13.1 LAND USE, RECREATION, HABITAT CONSERVATION, AND TRANSPORTATION

Under the No Action Alternative, there would be no change in land use because there would be no tower relocation or new road footprints on existing land uses. However, disruption type impacts to land use, transportation, recreation, and conservation would still occur as repairs to the lines are required. Land use disruptions would increase over typical disruption associated with on-going maintenance and operation activities, because repairs would be done on an as-needed basis. For example, workers could need to replace a deteriorated structure in the fall, and then need to come out again to the same property to replace an adjacent structure threatening to fall over that winter. Because repairs to the line would increase or be needed on an emergency basis, interference with access to individual properties and noise and dust impacts could occur more often. Likely emergency repairs could reduce the ability to coordinate with landowners and would potentially increase conflicts with agricultural (driving across productive rather than fallow fields), interfere with driveway or road traffic, or be visible or disruptive to recreation or habitat conservation lands during high use or sensitive seasons.

The disruption and landscape impacts from danger tree removal would be similar under the No Action Alternative as with the Proposed Action, although different trees would be identified in areas where the Proposed Action would center the right-of-way or use steel poles.

3.13.2 GEOLOGY AND SOILS

Because new roads to provide adequate access to the transmission line structures would not be built under the No Action Alternative, increasing repair work, especially on an emergency basis, could cause soil compaction and rutting. Vehicles accessing structure locations for repair work could drive over a larger area as workers follow the most accessible routes to the line during different seasons and from year to year, particularly during wet weather when access is more difficult and soils are more susceptible to compaction.

3.13.3 VEGETATION

Under the No Action Alternative, the temporary disturbance and permanent loss of vegetation habitats (180 acres and 78 acres, respectively) would not occur since no new access roads would be built or widened and structures would not be relocated. A similar number of danger trees would likely be identified as potentially hazardous and cut, limbed, or topped with the No Action as with the Proposed Action; however the location of the trees may be different along the Salem-Albany No. 1 line where the Proposed Action calls for centering the line or using steel poles.

In the absence of adequate access roads, damage to vegetation from maintenance vehicles needed for repairs could occur over a larger area as drivers follow the most accessible routes to the line during different seasons and from year to year, particularly during wet weather when access is more difficult.

Soil compaction and exposure from driving heavy maintenance vehicles in the absence of adequate access roads could result in long-term impacts by facilitating the influx of invasive and noxious weeds and degrading the vegetative community.

3.13.4 FISH AND WILDLIFE

FISH

Under the No Action Alternative, the existing access roads would not be improved and would continue to provide some soil runoff to streams, most notably the currently-failing culvert on the tributary to the Luckiamute River, and fish habitat would experience increasing turbidity due to large-scale streambank erosion caused by the existing failing culvert. Culverts on fish-bearing streams would not be installed or replaced, thereby continuing to potentially limit fish passage.

Culvert replacements or road repairs near stream crossings would be more likely to be completed on an emergency basis, which could occur during higher flow conditions or periods when ESA-listed fish species are present. This could result in fish mortality and larger habitat impacts than these activities would cause if they were done on a non-emergency schedule during the appropriate in-water work window.

Danger tree removal would still occur, which would reduce habitat for birds and other tree dependent wildlife, and potentially affect fish habitat through reduced shading of streams.

WILDLIFE

Under the No Action Alternative, the temporary disturbance and permanent loss of habitats (180 acres and 78 acres, respectively) would not occur since no new access roads would be built or widened and structures would not be relocated. An estimated 759 danger trees and 770 instances of high brush would likely still be

removed, (although locations and numbers would be somewhat different) resulting in a small reduction in tree or woodland and understory habitat.

Construction disturbance and incidental mortality of wildlife from repair activities would still occur, but would be isolated to smaller areas where intermittent repairs are needed and would occur on a more regular basis from year to year as the line components continue to age and deteriorate. Helicopter disturbance from restringing the line would not occur unless sections of the line should fail over time. Timing of emergency repairs might not be able to accommodate seasonal restrictions to reduce impacts for specific wildlife species.

If a downed line, resulting from structure failure, were to create an electrocution risk or cause a fire, wildlife could be harmed or habitat degraded through vegetation loss, soil erosion, and weed establishment.

3.13.5 WATER RESOURCES

Because line failures tend to occur during inclement weather when soils are more prone to erosion, emergency repair activities, that would likely occur under the No Action Alternative, would involve heavy vehicles and equipment and without good-quality access roads and would be more likely to damage riparian vegetation and cause soil erosion, resulting in stormwater runoff and increased turbidity in streams.

Because roads would be used as-is, stormwater runoff to streams would increase, especially in areas of failing culverts (i.e., on the tributary to the Luckiamute River).

Emergency repair activities caused by inclement weather would correspondingly also take place during higher flow conditions and when ESA-listed fish species are present. Road and culvert repair needed to quickly reach downed or damaged structures or lines could consequently result in greater fish mortality and larger habitat impacts than these activities would cause if they were done on a non-emergency schedule during the in-water work window.

3.13.6 WETLANDS AND FLOODPLAINS

The No Action Alternative would avoid needing to permanently fill 8.8 acres of wetlands and temporarily impact 18.1 acres of wetlands from access road work, new structure locations, tensioning sites, and removal and reinstallation of structures. Similarly, 34 acres of permanent conversion of vegetated land within the floodplain to compacted gravel surface would also be avoided.

However, because line failures tend to occur during inclement weather when soils are more prone to erosion, emergency repair activities with heavy vehicles and equipment would be more likely to damage wetlands by causing soil compaction, rutting, and erosion, which could result in changes in hydrology and facilitate the establishment of invasive weeds.

3.13.7 VISUAL QUALITY

Under the No Action Alternative, there would be no changes in the viewscape along the rights-of-way since the two transmission lines would retain the same structure types and locations.

Disruptions to the viewscape for repair work would increase compared to existing on-going maintenance activities as different components of the transmission line will require repair or replacement from year to year.

3.13.8 AIR QUALITY AND GREENHOUSE GASES

Under the No Action Alternative, many of the actions that would create air quality or greenhouse gas emissions would be as similar to the proposed action (repairs would be required, vehicles and equipment used, trees cut, and dust generated). The inefficiency of repairing the entire deteriorating line on an as-needed basis could increase the total air quality or greenhouse gas emissions, but emissions would be spread out over time.

3.13.9 SOCIOECONOMICS, PUBLIC SERVICES, AND ENVIRONMENTAL JUSTICE

Under the No Action Alternative, there would be no positive impacts associated with construction crew spending or material acquisition in the area. If the line were to fail because the aging structures collapsed or the conductor broke, electrical outages could occur in the area and could affect public services, industrial production, as well as business.

3.13.10 CULTURAL RESOURCES

Under the No Action Alternative, there would be no immediate impacts to cultural resources. Over time as repairs were conducted, potential impacts could occur and emergency repair activities could increase the risk of damaging cultural resources since there might not be time to implement the appropriate mitigation measures to protect these resources.

Inadvertent discoveries of cultural resources resulting from repairs would require the same mitigation measures as the Proposed Action.

3.13.11 NOISE, PUBLIC HEALTH AND SAFETY, AND EMF

Under the No Action Alternative, noise associated with construction activities would be limited to as-needed repairs spread over time and location. Helicopter noise from restringing the line would not occur unless sections of the line should fail over time. Corona noise along the line would not change.

Public safety could potentially be compromised as the conductors in some areas along Salem-Albany No. 1 line would continue to be located too close to buildings adjacent to the edge of the right-of-way, allowing the conductor to swing outside of the rights-of-way in some locations on warm windy days. BPA would not relocate the off-center structures toward the center of the right-of-way, including 83 structures from structures SA1:2/1 to 9/9, to keep the conductor swing within the right-of-way. These areas would continue to be a safety issue for adjacent landowners and would present integrity issues for the transmission line.

Without new or improved access roads, BPA would not be able to ensure transmission system reliability, particularly in hilly and wetland areas. Additionally, work in these areas could be precarious during inclement weather, which would present a safety hazard to workers.

Danger trees and high brush would still be removed to reduce the risk of fire, outages, and electrocution.

The aging transmission lines would continue to deteriorate under the No Action Alternative, increasing their vulnerability to natural hazards, such as inclement weather, which would create risks to the safety of the public and maintenance crews. Any downed lines resulting from structure failures would have a high potential for causing fires in the vicinity of the downed line or electrocution as a result of accidental or inadvertent contact with an energized, downed line.

Chapter 4 ENVIRONMENTAL CONSULTATION, REVIEW, AND PERMIT REQUIREMENTS

4.1 NATIONAL ENVIRONMENTAL POLICY ACT

This EA was prepared by BPA pursuant to regulations implementing NEPA (42 U.S.C. 4321 *et seq.*), which require federal agencies to assess the impacts that their actions may have on the environment. NEPA requires preparation of an EIS for major federal actions significantly affecting the quality of the human environment. BPA 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 Finding of No Significant Impact (FONSI).

4.2 VEGETATION, WILDLIFE, AND FISH

4.2.1 ENDANGERED SPECIES ACT

The ESA of 1973 (16 USC 1531 *et seq.*), as amended in 1988, 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 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 endangered or threatened species or 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. Five federally listed plant species have potential habitat in the affected area, including Bradshaw's lomatium, Kincaid's lupine, Nelson's checkermallow, water howellia, Willamette Valley daisy. Due to the high level of disturbance and habitat fragmentation in the affected area, and the rareness of these species, their likelihood of occurrence is low. However, if any of these species are found during surveys to be carried out during the appropriate season in 2014, BPA would work with USFWS to determine the appropriate mitigation and avoidance measures to minimize impacts. Two fish species, Chinook salmon and steelhead occur in the affected area; and two wildlife species, including streaked horned lark and Fender's blue butterfly have potential habitat in the affected area. BPA is working with NMFS, ODFW, and USFWS, as appropriate, to identify necessary mitigation and avoidance measures to minimize impacts to Chinook salmon and steelhead, and to streaked horned lark and Fender's blue butterfly should either species be found during field surveys in the spring and summer of 2014. Potential impacts to ESA-listed species are discussed in Chapter 3.6 Fish and Wildlife, and the results of the field surveys will be included in the Final EA.

4.2.2 FISH AND WILDLIFE CONSERVATION ACT AND FISH AND WILDLIFE COORDINATION ACT

The Fish and Wildlife Conservation Act of 1980 (16 U.S.C. 2901 *et seq.*) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife and their habitats. In addition, the Fish and Wildlife Coordination Act (16 U.S.C 661 *et seq.*) requires federal agencies with projects affecting water resources to consult with USFWS and the state agency responsible for fish and wildlife resources. Fish and wildlife impacts are discussed in Section 3.4. The USFWS and ODFW have been notified of the project and will be sent copies of the Draft and Final EA. BPA has also held a meeting and two site visits with ODFW, and has corresponded with ODFW biologists on survey protocols for streaked horned lark, fish presence in streams crossed by the Proposed Action, and impacts to Oregon white oak woodland habitat. Similarly, BPA has communicated frequently with USFWS Ankeny NWR personnel on the Proposed Action as it could affect the Ankeny NWR, including a meeting, numerous e-mails and phone calls, and several site visits. BPA has also worked with USFWS on developing streaked horned lark survey protocols and the use of bird diverters in migratory bird flyways.

4.2.3 NATIONAL WILDLIFE REFUGE SYSTEM ADMINISTRATION ACT

The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), which amended National Wildlife Refuge System Administration Act of 1966 (NWRSA; 16 USC 668dd-668ee), requires that any activity on a refuge be determined to be compatible with the Refuge System mission and refuge purpose(s). The NWRSA provides the USFWS with the authority for establishing policies and regulations governing Refuge uses, including the authority to prohibit certain harmful activities. The refuge manager must discern if a proposed use is appropriate before undertaking a compatibility review of the use and prepare a compatibility determination. If an existing use is not appropriate, the refuge manager will eliminate or modify the use as expeditiously as practicable. If a proposed use is not appropriate, the refuge manager will deny the use without determining compatibility. Compatibility of the Proposed Action with the management goals of Ankeny NWR is further discussed in Appendix C of this document.

4.2.4 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

NMFS is responsible for ensuring compliance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (Magnuson-Stevens Act) (16 USC 1801 *et seq.*). The Magnuson-Stevens Act established requirements for including Essential Fish Habitat (EFH) descriptions in Federal fishery management plans, and requires Federal agencies to consult with NMFS on activities that may adversely affect EFH (Pub. L. No. 104-297). EFH can include all streams, lakes, ponds, wetlands, and other viable waterbodies, and most of the habitat historically accessible to salmon necessary for spawning, breeding, feeding or growth to maturity. Activities above impassible barriers are subject to consultation provisions of the Magnuson-Stevens Act.

Pacific salmon EFH is administered under the amended Magnuson-Stevens Act; EFH for coho and Chinook are found within all Project watersheds. Compliance with the Magnuson-Stevens Act would be satisfied by incorporating an impact analysis of the EFH into the BA prepared for this project (ESA consultation).

4.2.5 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 U.S. Department of Energy [DOE]) and USFWS have a memorandum of understanding (MOU) to address migratory bird conservation in accordance with Executive Order 13186 (Responsibilities to Federal Agencies to Protect Migratory Birds), which directs each federal agency that is taking actions possibly negatively affecting migratory bird populations to work with the USFWS to develop an agreement to conserve those birds (DOE and USFWS, 2013). The MOU addresses how both agencies can work cooperatively to address migratory bird conservation and includes specific measures to consider implementing during project planning and implementation. Construction of the Proposed Action would result in a similar level of impact on migratory birds as it would on other birds and wildlife described in Section 3.4.2. Measures to lessen potential impacts to birds would include scheduling tree cutting outside of active nesting periods and installing bird strike diverters on conductor spans where a high risk of bird strikes might exist (e.g., river or wetland crossings) and where technically feasible.

4.2.6 BALD 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 only covers international acts of acts in “wanton disregard” of the safety of bald or golden eagles.

There are no suitable habitats or documented occurrences of golden eagle in the affected area. Potential occurrences of bald eagles in the project vicinity are discussed in Section 3.4 (Fish and Wildlife) of this EA. Compliance with the Bald and Golden Eagle Protection Act would be required to address potential impacts to bald eagles since they have been known to nest within 1 miles of the corridor (nest recorded in 2006 near the Salem substation) and there is suitable bald eagle habitat throughout the project vicinity. Mitigation measures to avoid and minimize impacts to bald eagles are the same as for other migratory birds (see Section 4.2.5).

4.2.7 OREGON FISH PASSAGE LAW

Since August 2001, the owner or operator of an artificial obstruction located in waters in which native migratory fish are currently or were historically present must address fish passage requirements prior to certain trigger events, such as the construction, installation, replacement, extension, or repair of culverts, roads, or any other hydraulic facilities. Laws regarding fish passage are found in Oregon Revised Statutes 509.580 through 509.910 and in Oregon Administrative Rules 635, Division 412. A fish passage plan would be prepared for the culvert that would be placed in the fish-bearing tributary of the Luckiamute (discussed in Section 3.4 Fish and Wildlife), and would be submitted to ODFW. Any other fish passage plans would be determined in coordination with ODFW. As a federal agency, BPA is not required to comply with state and

local stream habitat approvals or permits; however, BPA strives to meet or exceed these substantive standards and policies of state and local plans and programs to the maximum extent possible. BPA intends to meet the requirements of these regulations as part of this project, although it would not obtain the written approval that the Proposed Action complies with fish passage laws.

4.3 WATER RESOURCES

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 of the Clean Water Act requires that states certify compliance of federal permits and licenses with state water quality standards. A federal permit to conduct an activity that results in discharges into waters of the U.S., including wetlands, 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 USACE are required to obtain a Section 401 water quality certification from the Oregon Department of Environmental Quality (ODEQ). BPA is consulting with ODEQ and USACE to determine the need for permitting.

Section 402 of the Clean Water Act authorizes discharges of pollutants, such as stormwater from point sources into waters of the U.S. through the National Pollutant Discharge Elimination System (NPDES) permitting program. The U.S. EPA and delegated states administer the NPDES permitting program. As part of this program, General NPDES permits would be issued to BPA to regulate stormwater discharges associated with construction activities. Under the Stormwater Phase II Final Rule, all construction activities that disturb one or more acres of land are being regulated. "Disturbance" refers to exposed soil resulting from activities such as clearing, grading, and excavation. Construction activities can include road building and demolition.

For federal facilities in the State of Oregon, EPA has delegated enforcement and permitting authority to the ODEQ. ODEQ regulates stormwater runoff from construction sites through a series of general individual permits. As a federal agency, BPA has obtained and maintains an agency NPDES General Storm Water 1200-CA Permit from ODEQ (File No.: 111769; EPA No.: ORR10-4145). The General NPDES Permit requires permittees to notify the issuing agency of proposed construction activities, prepare and implement Stormwater Pollution Prevention Plans to control stormwater pollution associated with construction activities, and to notify the issuing agency once construction ceases and the site has been stabilized.

Section 404 of the Clean Water Act established a program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. This includes excavation activities that result in the discharge of dredged material that could destroy or degrade waters of the U.S. Dredge and fill activities are controlled by a Section 404 permit process that is administered by the Corps in conjunction with state agencies that have been delegated this authority over discharges or dredged or fill materials into waters of the state. Through its Removal-Fill Law, Oregon Department of State Lands (DSL) requires a permit for removal, fill or alteration involving 50 cubic yards or more of material in any water of the state, including wetlands. Impacts on wetlands are described in Section 3.6 (Wetlands and Floodplains) and other regulations pertinent to wetlands and floodplains are described in Section 4.4 below. Project wetlands were delineated in 2014.

As discussed in Section 3.6, proposed replacement of structures, construction and improvement of roads, and operation and maintenance of the project would impact waters of the U.S., including wetlands. Mitigation measures have been identified in Section 3.6.3 of this EA to avoid or minimize any impacts to

streams and rivers, and BPA is coordinating with USACE and DSL to determine necessary permits and required authorizations under Section 404.

4.4 FLOODPLAINS AND WETLANDS PROTECTION

DOE mandates that impacts on floodplains and wetlands be assessed and alternatives for protection of these resources be evaluated in accordance with Compliance with Floodplain/Wetlands Environmental Review Requirements (10 C.F.R. 1022.12) and Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands). Potential impacts to floodplains and wetlands from the Proposed Action are discussed in detail in Section 3.6 (Wetlands and Floodplains). Direct impacts to wetlands from the Proposed Action total 8.8 acres; mitigation for these impacts is discussed in Section 3.6. Wetland management, regulation, and protection are addressed in several sections of the Clean Water Act, including Sections 401, 402, and 404 (see Section 4.3). Wetlands are also addressed in a combination of other state and federal laws, including the Coastal Zone Management Act, the ESA, NHPA, Rivers and Harbors Act, and Wild and Scenic Rivers Act.

4.5 CULTURAL AND 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 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 when their aboriginal territory falls within a Proposed Action area. 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 (NAGPRA) (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).

In compliance with the NHPA, BPA identified and documented cultural resources in the project area and evaluated them for eligibility for listing in the NRHP. Section 106 of the NHPA requires federal agencies to consider the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Historic properties are properties that are included in or that meet the criteria for listing in 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 to make an assessment of adverse effects on identified historic properties. BPA's compliance with these regulations is discussed in Section 3.10 (Cultural Resources).

If, during construction, previously unidentified cultural resources that would be adversely affected by the Proposed Action are found, BPA would follow the procedures set out in Section 3.10.3.

4.6 FARMLAND PROTECTION POLICY ACT

The Farmland Protection Policy Act (7 U.S.C. 4201 *et seq.*) directs Federal agencies to identify and quantify adverse impacts of Federal programs on farmlands. The Act's purpose is to minimize the number of Federal programs that contribute to the unnecessary and irreversible conversion of agricultural land to non-agricultural uses.

Large portions of the transmission lines are located in or adjacent to agricultural land. The Proposed Action would occur almost entirely along the existing transmission lines rights-of-way and within existing structure areas or access road rights-of-way. Evaluation of the project according to the criteria set forth in the Act indicates the Proposed Action would comply with the Act and would have little long-term impact on area farmlands. As described in section 3.1, Land Use, approximately 107 acres of agricultural land would be temporarily impacted, primarily for temporary access roads. Of the affected acreage, about 3 acres are designated as Prime Farmlands and about 104 acres are designated as Farmlands of Statewide Importance. In addition, approximately 45 acres of land (primarily agricultural) would be permanently converted from existing land uses to new or widened access roads.

4.7 STATE AND LOCAL PLAN AND PROGRAM CONSISTENCY

As a Federal agency, BPA is not required to comply with state and local land-use approvals or permits; however, BPA strives to meet or exceed these substantive standards and policies of state and local plans and programs to the maximum extent practical. As the project is an existing line, and the Proposed Action will be completed within the existing right-of-way to the extent practicable, only minor impacts to land use would result, and the project would be consistent with the area's land use plans.

The relevant land management plans governing land use planning in the vicinity of Salem-Albany No. 1 include the following:

- Polk County Comprehensive Plan (Polk County 2012)
- Marion County Comprehensive Land Use Plan (Marion County 1981)
- Benton County Comprehensive Plan (Benton County 2007)
- Linn County Comprehensive Plan (Linn County 2003)
- Salem Comprehensive Policies Plan (City of Salem 2013)
- Albany Comprehensive Plan (City of Albany 2012a)

The same land management plans govern land use planning in the vicinity of Salem-Albany No. 2, with the addition of the City of Independence Comprehensive Plan (City of Independence, undated) and the exception of the Marion County Comprehensive Land Use Plan.

For both Salem-Albany lines, the majority of land crossed by the transmission lines is zoned for agricultural use. Land zoned for single-family residential use is the second most common type of zoning along the lines—primarily within Polk and Marion counties and within the city of Albany.

4.8 ENVIRONMENTAL JUSTICE

In February 1994, EO 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 3.9).

4.9 PUBLIC HEALTH AND SAFETY

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

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 may 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 EIS and Record of Decision* (BPA 2000). Herbicides are used on transmission line ROWs 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 may 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 may 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 will coordinate with the appropriate BPA personnel. In addition, the contractor will not be allowed to disturb such conditions until the technical representative has given the notice to proceed.

4.9.4 SAFE DRINKING WATER ACT

The Safe Drinking Water Act (42 U.S.C. Section 300f *et seq.*) is designed to protect the quality of public drinking water and its sources. BPA would comply with state and local public drinking water regulations and apply BMPs for protecting water resources (see Section 3.5.3). The Proposed Action would not affect any sole source aquifers or other critical aquifers, or adversely affect any surface water supplies.

4.10 NOISE

The Noise Control Act of 1972, as amended (42 U.S.C. 4901 *et seq.*), sets forth a broad goal of protecting all people from noise that jeopardizes their health or welfare. The Act further states that federal agencies are authorized and directed, to the fullest extent consistent with their authority under federal laws administered by them, to carry out the programs within their control in such a manner as to further this policy. Noise effects of the Proposed Project are discussed in Section 3.11 (Noise, Public Health and Safety, and EMF).

Oregon counties have the authority to establish a noise control ordinance pursuant to Oregon Revised Statute 467.100. Linn County, Benton County, and Polk County do not have noise regulations that would pertain to the Proposed Action. Marion County's Environmental Quality & Natural Resources Code states that all developments that are noise sources shall comply with applicable ODEQ standards. ODEQ's noise standards apply to existing and new commercial and industrial noise sources but do not specify noise limits for construction of these sources.

The City of Salem exempts the noises produced by a public utility from its noise controls (Salem Revised Codes, Section 8, Title VIII, Chapter 93). The City of Albany (City of Albany Municipal Code Chapter 7.08) prohibits construction noise that generates sounds audible at any residentially-zoned property for 30 minutes or more in any three-hour period between the hours of 6:00 pm and 7:00 am. As described in Section 3.11 (Noise, Public Health and Safety and EMF) of this EA, the Proposed Action would have primarily temporary and low noise impacts, and mitigation measures are identified to further reduce noise impacts.

4.11 AIR QUALITY

The Clean Air Act, as amended (42 USC 7401 *et seq.*), requires the EPA and individual states to carry out a wide range of regulatory programs intended to ensure attainment of the NAAQS. Air quality impacts of the Proposed Action would be low, localized, and temporary, as discussed in Section 3.8 (Air Quality and Greenhouse Gasses) in this EA.

4.12 FEDERAL COMMUNICATIONS COMMISSION

Federal Communications Commission (FCC) regulations require that transmission lines be operated so that radio and television reception are not seriously degraded or repeatedly interrupted. Further, the FCC

regulations require that the operators of these devices mitigate such interference. There would likely be no interference with radio, television, or other reception as a result of the Proposed Action (see Section 3.11.2, Electric and Magnetic Fields). BPA would comply with FCC requirements relating to radio and television interference from the Proposed Action if any such interference occurs.

4.13 FEDERAL AVIATION ADMINISTRATION

As part of transmission line design, BPA seeks to comply with Federal Aviation Administration (FAA) procedures. The FAA requires BPA to submit its designs for FAA approval if a proposed structure is taller than 200 feet from the ground, if a conductor is 200 feet above the ground, or if any part of the proposed transmission line or its structure is within the approach path of an airport. Placement of the conductor above the Willamette River would be less than 200 feet above the river and surrounding ground surface. Final locations of structures, structure heights, and conductor heights would be submitted to the FAA for approval if appropriate.

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Chapter 5 PERSONS, TRIBES, AND AGENCIES CONSULTED

The project mailing list contains over 700 potentially interested or affected landowners, as well as government agencies, tribes, public officials, local utilities, and interest groups that may have an interest in the Proposed Action. They have been given instructions on how to receive project information, and will have an opportunity to review and comment on the Draft EA.

5.1 FEDERAL AGENCIES AND OFFICIALS

- National Oceanic and Atmospheric Administration, National Marine Fisheries Service
- U.S. Army Corp of Engineers—Portland District
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Department of Agriculture, Natural Resource Conservation Service
- U.S. Department of Energy
- U.S. Senate
- U.S. House of Representatives (Districts 4 and 5 of Oregon)

5.2 TRIBES AND TRIBAL GROUPS

- The Confederated Tribes of Grand Ronde
- The Confederated Tribes of Siletz
- The Confederated Tribes of the Warm Springs Reservation of Oregon
- Coquille Indian Tribe
- Cow Creek Band of Umpqua Tribe of Indians

5.3 STATE AGENCIES AND OFFICIALS

- Oregon State Senate (Districts 8, 10, and 12)
- Oregon State House of Representatives (Districts 15, 19, 20, and 23)
- Oregon Department of Agriculture
- Oregon Department of Energy Division
- Oregon Department of Environmental Quality
- Oregon Department of Fish and Wildlife
- Oregon Department of State Lands

- Oregon Department of Transportation
- Oregon Parks and Recreation Department

5.4 LOCAL GOVERNMENTS

- Benton County
- City of Albany
- City of Independence
- City of Millersburg
- City of Monmouth
- City of Salem
- Linn County
- Marion County
- Polk County
- Mid-Willamette Cooperative Weed Management Area
- Upper-Willamette Cooperative Weed Management Area

5.5 LOCAL UTILITIES

- Blachly Lane Electric Cooperatives
- Monmouth Power & Light
- Oregon Municipal Electric Utilities
- Portland General Electric
- Salem Electric Cooperative

5.6 INTEREST GROUPS

- Benton County Historical Society
- Calapooia Watershed Council
- Coast Range Natural Resources Educational Association
- Friends of the Willamette Valley National Wildlife Refuge Complex
- Institute for Applied Ecology
- Linn County Historical Society
- Luckiamute Watershed Council
- Marion County Historical Society

- Marys River Watershed Council
- Native Plant Society of Oregon—Corvallis Chapter
- Native Plant Society of Oregon—Willamette Valley Chapter
- North Santiam Watershed Council
- Oregon Oak Communities Working Group
- Polk County Historical Society
- Pringle Creek Watershed Council
- Salem Audubon Society
- Salem Parks Foundation
- Sierra Club - Oregon Chapter
- The Greenbelt Land Trust
- The Nature Conservancy of Oregon
- The Xerces Society
- Wetlands Conservancy
- Willamette River Initiative
- Willamette Riverkeeper
- Workers for a Livable Oregon

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Chapter 6 GLOSSARY

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

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

Alluvial - deposited by a stream or running water.

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

Anadromous – fish species that breed in fresh water but live their adult life in the sea such as Chinook, coho, and sockeye salmon and steelhead trout.

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

Anthropogenic – caused or produced by humans.

Aquifer – underground bed or layer of permeable rock, sediment, or soil that contains groundwater.

Archaeological isolates – Nine artifacts or less in one location.

Area of Potential Effect - the area around a project where the character or use of historic resources may be impacted as a result of the project.

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.

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

Biface – A stone tool flaked on both sides.

Biological criteria – the descriptive qualities that must be present to support a desired condition in a waterbody, such as the presence, condition, and numbers of types of fish, insects algae, plants, and other organisms, and serve as the standard against which assessment results are compared.

Candidate - Plants and animals for which the U.S. Fish and Wildlife Service has 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.

Centerline – the center line of the transmission corridor, which divides the corridor into halves of equal width.

Circuit – the pathway for an electrical current.

Compaction – the compression of soils by heavy equipment, which degrades soil structure and increases the risk of erosion.

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

Conifer – any of numerous, chiefly evergreen trees or shrubs including pine, fir, spruces, and other cone-bearing trees and shrubs.

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.

Critical Habitat - Habitat essential to the conservation of an endangered or threatened species that has been designated as critical by the US Fish and Wildlife Service or the National Marine Fisheries Service.

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 right-of-way 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.

Debitage – all waste material produced during lithic reduction and the production of chipped stone tools.

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

Dissolved oxygen – the amount of oxygen dissolved in a body of water as an indication of the degree of health of the water and its ability to support a balanced aquatic ecosystem.

Distinct Population Segment – a vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The federal Endangered Species Act provides for listing species, subspecies, or distinct population segments of vertebrate species.

Drain dip – mounds of crushed rock that create a high point directing water from the road to a nearby drain system (i.e., along the side of or off of a road, not diagonally across the road like a water bar).

Ecoregion – A unit of land and/or water containing a geographically distinct assemblage of species, natural communities, and environmental conditions.

Ecoregion – The transition area between two biomes. Where two communities meet and integrate.

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

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 populations – low-income and minority populations protected under Executive Order 12898 from disproportionate adverse effects of federal projects.

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

Essential fish habitat – the environmental conditions that are necessary for the spawning, breeding, growth, and nurture of specific fish species.

Ethnographic - relating to specific human cultures.

Evapotranspiration – the process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants.

Extirpate – locally extinct.

Federal Species of Concern – **Species not legally protected under the Endangered Species Act but recognized by USFWS as declining or appearing to be in need of conservation.**

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).

Geomorphic – relating to the surface features of the Earth.

Global warming potential – a relative measure of how much heat a greenhouse gas traps in the atmosphere that compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide.

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

Ground stone fragment – **A stone tool formed by grinding.**

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 structure – structures designed to prevent ground wire, conductors, or other equipment from falling on an obstacle (e.g., railroads, existing powerlines, and other structures).

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

Hammerstone – **A stone tool used as a hammer for chipping stone or processing food.**

Hibernacula – location an animal uses for hibernation.

High brush – Saplings or low-hanging branches over eight feet tall under or directly adjacent to a transmission line that could be a hazard due to the potential for electrical arcing.

Historic isolate – an archaeological site with less than nine artifacts.

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.

Intermittent stream – a stream or waterway that only flows for part of the year.

Iteroparous - fish do not die after spawning and can subsequently return and spawn in later years.

Kilovolt – one thousand volts of electrical power.

Landslide – a rapid movement of a large mass of earth and rocks down a hill or a mountainside.

Lattice-steel structure – a square or triangular transmission tower constructed steel poles.

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

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

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.

100-year floodplain – areas that have a 1% chance of being flooded in a given year, as designated by the Federal Emergency Management Agency.

Old Growth – forest growth consisting of mature or overmature trees.

Ordinary High Water Mark – refers to the highest level reached by a body of water that has been maintained for a sufficient period of time to leave evidence on the landscape, including vegetation and soils.

Oregon State Sensitive Species – Naturally-reproducing fish and wildlife species, subspecies, or populations that are facing one or more threats to their populations and/or habitats in Oregon. Implementation of appropriate conservation measures to address the threats may prevent them from declining to the point of qualifying for threatened or endangered status.

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

Outlet Ditch – drainage outlet to ensure positive flow away from roadway.

Overstory – the uppermost layer of foliage in a forest, forming the canopy.

Palustrine wetlands – non-tidal wetlands that are substantially covered with emergent vegetation. Palustrine emergent wetlands are wetlands dominated by non-woody, soft-stemmed plants while palustrine scrub-shrub wetlands are dominated by woody vegetation, such as young trees and shrubs.

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

Perennial – refers to streams or waterways with continuous, year-round water flow.

Perched - unpressurized water held above the water table by impermeable rock or sediment.

Permeability – the rate at which a substance passes through a porous medium, such as dirt or rock.

Physiographic – the science of physical geography.

Primary Constituent Elements – specific physical or biological features that provide for a species life-history process and are essential for conservation of the species.

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

Propagule – a plant part that becomes detached from the rest of the plant and grows into a new plant.

Proposed special-status species – a species proposed for listing as having special-status by the U.S. Fish and Wildlife Service or National Marine Fisheries Service under the provisions of the Endangered Species Act.

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.

Riprap – crushed rock used to armor streambeds, culvert inlets and outlets, bridge abutments, pilings, and other structures against scour, water, or ice erosion.

Road bed – The surface of a road that is driven and walked upon, excluding any related ditches or curbs.

Rock Fill – crushed rock added in areas where landslide or slope stabilization is required.

Salmonid – member of the family of soft-finned fish that includes salmon and trout. Most are anadromous: they spawn in fresh water, but spend their life in the marine environment.

Scarify - the act of breaking up soil that has been compacted.

Sensitive Species – a species that can only survive within a narrow range of environmental conditions and whose disappearance from an area is an index of pollution or other environmental change.

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

Sole Source Aquifer – defined by the EPA as an underground water source that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer.

Spark-discharge – A sudden flow of electricity between two electrically charged objects caused by contact, an electrical short, or dielectric breakdown.

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

Species of Concern – species about which either federal or state agencies have concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA.

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.

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

Subsistence – the means of supporting life; a living or livelihood.

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

Substrate – the substance or layer that underlies something, or on which some process occurs.

Successional – replacement of one kind of community by another kind; the progressive changes in vegetation and animal life that may culminate in the climax.

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

Take – under the ESA, take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering..

Tensioning – the process of installing and tightening new conductors.

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.

Total Maximum Daily Load – the maximum amount of a pollutant that can be introduced to a water body while still being compliant with water quality standards.

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).

Turbidity – the amount of particulate matter, such as suspended sediment, per unit volume of water.

Unconsolidated sediments – sediments such as soil, sand, or organic matter that are not bound together and are susceptible to wind and water erosion.

Unincorporated land – land that is not part of or governed by a municipality.

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

Viewshed – An area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point.

Vulnerable Species – a species categorized as likely to become endangered unless the circumstances threatening its survival and reproduction improve.

Water Bar – a channel across the road surface that diverts surface water that would otherwise flow down the whole length of the road, used to prevent erosion on sloping roads, cleared paths through woodland, or other access ways by reducing flow length.

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.

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APPENDIX A

STRUCTURE REPLACEMENT TYPE AND LOCATION AND PROJECT LOCATION MAPS

Appendix A Structure Replacement Type And Location And Project Location Maps

Table A-1. Structure Replacement Types and Locations for Salem-Albany No. 1 and No. 2 Transmission Lines

Structure Number or Range	Existing Structure Type	Action
SA1:1/1 to 1/2	Lattice-steel	No change
SA:2/1	Wood	Change from a 2-pole to a 3-pole structure
SA1:2/2 to 3/1	Wood	Replace
SA1:3/3	Wood	Change from a 2-pole to a 3-pole structure and would be moved 185 feet forward
SA1:3/4	Wood	Remove
SA1:3/5	Wood	Change from a 2-pole to a 3-pole structure
SA1:3/6 to 5/3	Wood	Replace
SA1:5/4	Wood	Change from a 2-pole to a 3-pole structure
SA1:5/5 to 5/8	Wood	Replace
SA1:5/9	Wood	Change from a 2-pole to a 3-pole structure
SA1:5/10 to 6/10	Wood	Replace
SA1:7/1	Wood	Change from a 2-pole to a 3-pole structure
SA1:7/2 to 8/1	Wood	Replace
SA1:8/2	Wood	Move about 135 feet back on line

Table A-1. Structure Replacement Types and Locations for Salem-Albany No. 1 and No. 2 Transmission Lines

Structure Number or Range	Existing Structure Type	Action
SA1:8/3	Wood	Move about 80 feet ahead on line
SA1:8/4	Wood	Move about 20 feet back on line
SA1:8/5 to 9/5	Wood	Replace
SA1:9/6	Wood	Move about 85 feet back on line
SA1:9/7 to 9/7	Wood	Replace
SA1:9/8	Wood	Move about 100 feet back on line
SA1:9/9	Wood	Change from a 2-pole to a 3-pole structure
SA1:10/1 to 10/7	Wood	Replace with steel monopoles with conductors strung on the east side of the poles (toward the railroad)
SA1:10/8	Wood	Remove
SA1:10/9 to 13/1	Wood	Replace with steel monopoles with conductors strung on the east side of the poles (toward the railroad)
SA1:13/2 to 13/9	Wood	Replace
SA1:13/10 to 14/3	Wood	Replace with steel monopoles
SA1:14/4 to 14/5	Wood	Replace
SA1:14/6 to 14/7	Lattice-steel	No change
SA1:14/8 to 15/1	Wood	Replace
SA1:15/1 to 16/5	Wood	Replace with steel monopoles with conductors strung on the east side of the poles (towards the railroad)

Table A-1. Structure Replacement Types and Locations for Salem-Albany No. 1 and No. 2 Transmission Lines

Structure Number or Range	Existing Structure Type	Action
SA1:16/6 to 16/10	Wood	SA1:16/6 would be changed from a 2-pole to a 3-pole structure SA:16/7 to 16/10 would be replaced
SA1:16/11 to 17/10	Wood	Replace with steel monopoles
SA1:17/11 to 20/9	Wood	Replace SA1:18/1 would also be moved about 50 feet west
SA1:21/1 to 21/12	Wood	Replace with steel monopoles, moved toward center of the right-of-way in a congested neighborhood area
SA1:21/13 to 22/1	Wood	Change from a 2-pole to a 3-pole structure
SA1:22/2	Wood	Move about 110 feet ahead on line
SA1:22/3	Wood	Change from a 2-pole to a 3-pole structure
SA1:22/4 to 24/10	Wood	Replace
SA1:24/11	Wood	Change from a 3-pole to a 2-pole structure
SA1:24/12 to 24/14	Wood	Replace
SA1:24/14A	Wood	New structure
SA2:1/1 to 21/4	Wood	Replace
SA2: 21/5	Wood	New Structure
SA2:21/6 to 28/10	Wood	Replace

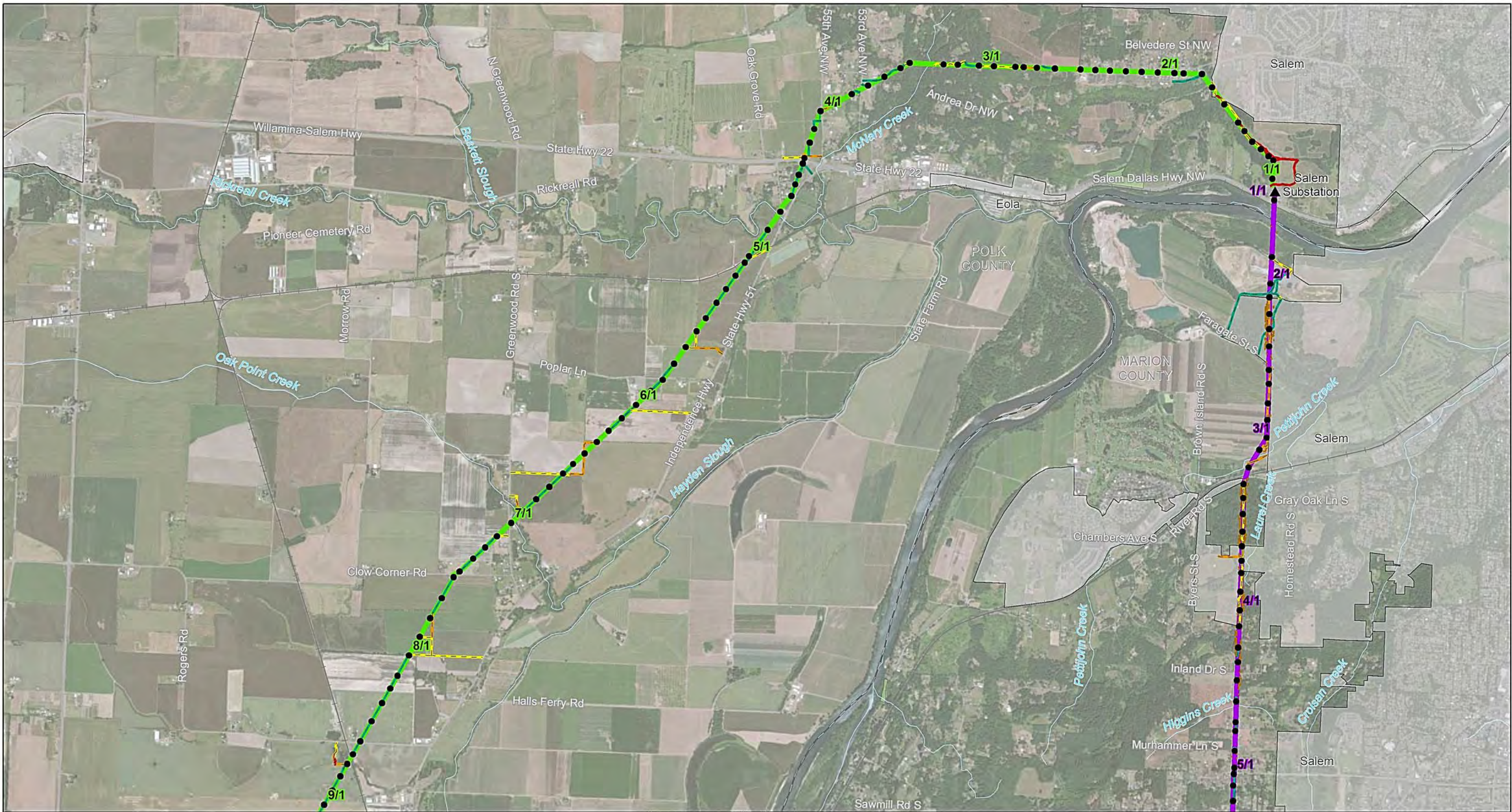
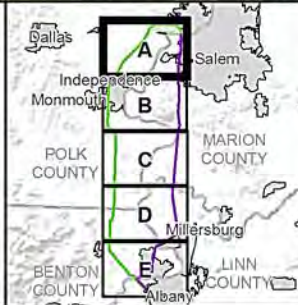
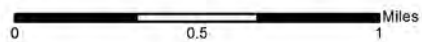


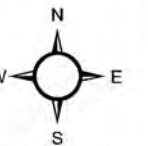
Figure A-1. Project Location Map A

Salem-Albany Transmission Line Rebuild Project
Benton, Linn, Marion, and Polk Counties



Legend

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| Salem-Albany No 1 Transmission Line | Proposed Access Road Type: New Construction | Oregon Parks and Recreation Department |
| Salem-Albany No 2 Transmission Line | Reconstruction | State Lands |
| Structures | Improvement | US Fish & Wildlife |
| Substations | Route of Travel | |
| Urban Areas | Proposed Danger Tree Removal | |
| County Boundary | | |

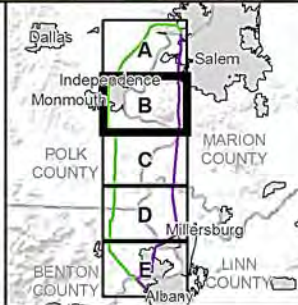
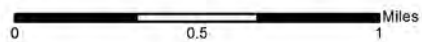


Sources: BPA 2014, Census 2012, ESRI 2008, OSSC 1993.



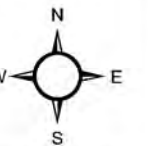
Figure A-2. Project Location Map B

Salem-Albany Transmission Line Rebuild Project
Benton, Linn, Marion, and Polk Counties



Legend

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| Salem-Albany No 1 Transmission Line | Proposed Access Road Type | Oregon Parks and Recreation Department |
| Salem-Albany No 2 Transmission Line | New Construction | State Lands |
| Structures | Reconstruction | US Fish & Wildlife |
| Substations | Improvement | |
| Urban Areas | Route of Travel | |
| County Boundary | Proposed Danger Tree Removal | |

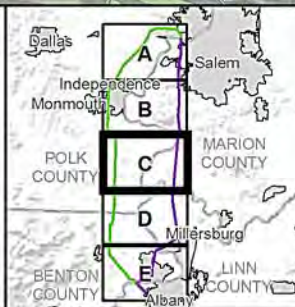
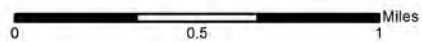


Sources: BPA 2014, Census 2012, ESRI 2008, OSSC 1993.



Figure A-3. Project Location Map C

Salem-Albany Transmission Line Rebuild Project
Benton, Linn, Marion, and Polk Counties



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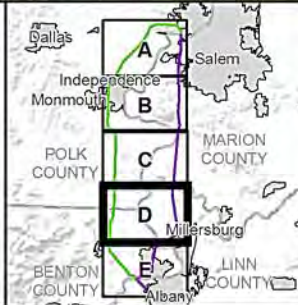
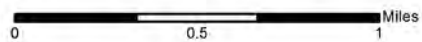
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| Salem-Albany No 1 Transmission Line | Proposed Access Road Type | Oregon Parks and Recreation Department |
| Salem-Albany No 2 Transmission Line | New Construction | State Lands |
| Structures | Reconstruction | US Fish & Wildlife |
| Substations | Improvement | |
| Urban Areas | Route of Travel | |
| County Boundary | Proposed Danger Tree Removal | |



Sources: BPA 2014, Census 2012, ESRI 2008, OSSC 1993.

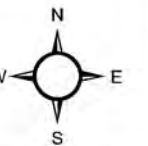


Figure A-4. Project Location Map D
Salem-Albany Transmission Line Rebuild Project
 Benton, Linn, Marion, and Polk Counties



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| <ul style="list-style-type: none"> — Salem-Albany No 1 Transmission Line — Salem-Albany No 2 Transmission Line ● Structures ▲ Substations ▭ Urban Areas ▭ County Boundary | <p>Proposed Access Road Type</p> <ul style="list-style-type: none"> — New Construction — Reconstruction — Improvement — Route of Travel — Proposed Danger Tree Removal | <ul style="list-style-type: none"> ▭ Oregon Parks and Recreation Department ▭ State Lands ▭ US Fish & Wildlife |
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Sources: BPA 2014, Census 2012, ESRI 2008, OSSC 1993.

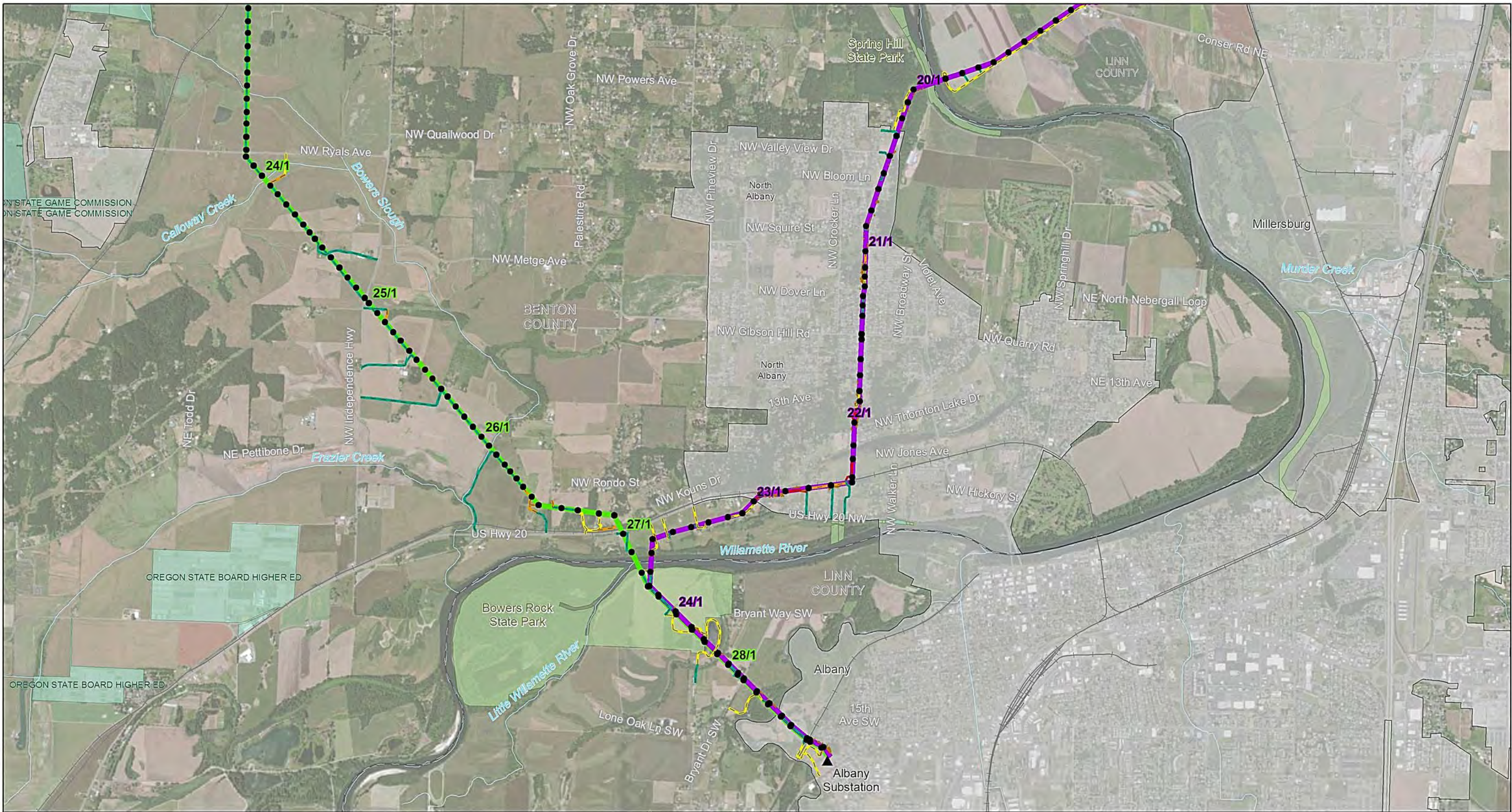
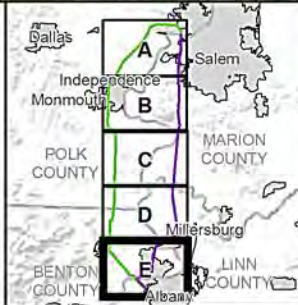
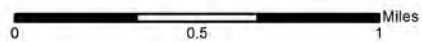


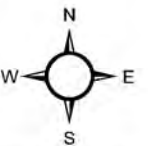
Figure A-5. Project Location Map E

Salem-Albany Transmission Line Rebuild Project
Benton, Linn, Marion, and Polk Counties



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| Salem-Albany No 1 Transmission Line | Proposed Access Road Type | Oregon Parks and Recreation Department |
| Salem-Albany No 2 Transmission Line | New Construction | State Lands |
| Structures | Reconstruction | US Fish & Wildlife |
| Substations | Improvement | |
| Urban Areas | Route of Travel | |
| County Boundary | Proposed Danger Tree Removal | |



Sources: BPA 2014, Census 2012, ESRI 2008, OSSC 1993.

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APPENDIX B

STREAM AND RIVER CROSSINGS

Appendix B Stream and River Crossings

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA1:1/1 to 1/2	Willamette River	Perennial	Fish bearing; Pacific lamprey, coho, steelhead, chinook, white sturgeon occurrence; chinook and steelhead critical habitat	Yes	No	No	No
SA1:2/5 to 2/6	Unnamed Tributary to Willamette River	Perennial	Fish possible	Yes	No	No	Bridge (Existing)
SA1:3/2 to 3/3	Pettijohn Creek	Perennial	Present	No	0.45 acre (access road construction - 003015A); 0.05 acre (pulling/tensioning sites)	0.2 acre (access road construction - 003015A)	Culvert (New Install)
SA1:3/9 to 3/11	Laurel Creek	Perennial	None	No	0.12 acre (access road improvement - 003055B)	0.05 acre (access road improvement - 003055B)	No

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA1:4/6 to 4/7	Higgins Creek	Intermittent	Fish possible	No	No	No	No
SA1:5/3 to 5/4	Unnamed Tributary to Croisan Creek	Perennial	Fish possible	Yes	No	No	No
SA1:5/10 to 6/1	Croisan Creek	Perennial	Fish possible	No	0.09 acre (access road improvement - 005055B)	0.04 acre (access road improvement - 005055B)	Bridge
SA1:6/6 to 6/7	Unnamed Tributary to Battle Creek	Intermittent	Fish possible	No	0.01 acre (SA1:6/6, single-pole wood structure); 0.18 acre (access road improvement - 006020A)	0.01 acre (SA1:6/6 single-pole wood structure); 0.01 acre (access road improvement - 006020A)	No
SA1:6/10 to 7/1	Battle Creek	Perennial	Fish possible	Yes	No	No	No
SA1:7/8 to 8/1	Unnamed Tributary to Battle Creek	Intermittent	Fish possible	No	No	No	No

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA1:8/5 to 8/6	Unnamed Tributary to Wilkerson Creek	Intermittent	Fish possible	Yes	No	No	No
SA1:9/4 to 9/5	Unnamed Tributary to Willamette River	Intermittent	Fish possible	No	0.07 acre (access road construction - 009030A)	0.03 acre (access road construction - 009030A)	Culvert (New Install)
SA1:9/6 to 9/7	Unnamed Tributary to Willamette River	Perennial	Fish possible	Yes	No	No	No
SA1:10/1 to 10/4	Willamette River	Perennial	Fish possible	Yes	No	No	No
SA1:10/7 to 10/8	Sidney Power Ditch	Ditch	*Note that ORBIC data says that ODFW classifies as salmon rearing. ODFW communication says no.	Yes	0.11 acre (SA1:10/8, steel monopole)	No	No
SA1:10/12	Unnamed Tributary to Willamette River	Perennial	Present	Yes	0.21 acre (SA1:10/10 to 10/12, steel monopole)	No	No

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA1:12/7 to 12/10	Bashaw Creek	Perennial	Fish possible	No	0.20 acre (SA1:12/8, steel monopole); 0.33 acre (access road construction - 013010A)	0.33 acre (access road construction - 013010A)	No
SA1:13/11 to 14/1	Porter Slough	Intermittent	Fish possible	Yes	0.57 acre (access road construction - 014010A); 0.15 acre (access road improvement - 014010A)	0.29 acre (access road construction - 014010A); 0.06 acre (access road improvement - 014010A)	No
SA1:14/5 to 14/6	Santiam River	Perennial	Fish bearing; Chinook, steelhead, coho; Chinook and steelhead critical habitat	No	0.20 acre (SA1:14/5, steel monopole); 0.002 acre (access road construction - 014010A)	0.01 acre (access road construction - 014010A)	No
SA1:15/2 to 15/3	Unnamed Tributary to Cole Slough	Intermittent	Fish possible	No	0.09 acre (SA1:15/2, steel monopole); 0.16 acre (SA1:15/3, steel monopole)	No	No
SA1:16/3 to 16/4	Crooks Creek	Intermittent	Fish possible	No	0.08 acre (SA1:16/3, steel monopole); 0.01 acre (SA1:16/4, steel monopole)	0.006 acre (access road reconstruction - 015020A)	No

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA1:18/5 to 18/6	Unnamed Tributary to McCarthy Slough	Intermittent	Fish possible	No	0.01 acre (SA1:18/5, single-pole wood structure)	No	No
SA1:19/3 to 19/4	Unnamed Tributary to McCarthy Slough	Intermittent	Fish possible	Yes	0.25 acre (access road improvement - 019015A)	0.10 acre (access road improvement - 019015A)	No
SA1:19/6 to 19/7	Unnamed Tributary to McCarthy Slough	Intermittent	Fish possible	No	0.01 acre (SA1:19/6, single-pole wood structure); 0.20 acre (access road improvement - 019015A)	0.08 acre (access road improvement - 019015A)	No
SA1:19/9 to 20/1	Willamette River	Perennial	Fish bearing; western brook lamprey, white sturgeon, coho, steelhead, Chinook, steelhead, Pacific lamprey; Chinook and steelhead critical habitat	No	No	No	No
SA1:20/9 to 21/1	Unnamed Tributary to Willamette River	Intermittent	Fish possible	Yes	No	No	No

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA1:22/2 to 22/3	Thornton Lake	Perennial	Fish possible	No	No	No	Culvert (New Install)
SA1:22/7 to 22/8	Unnamed Tributary to Willamette River	Intermittent	Present	Yes	0.0001 acre (SA1:22/7, single-pole wood structure); 0.003 acre (access road construction - 022045A)	No	Culvert (New Install)
SA1:23/8 to 23/9 SA2:27/2 to 27/3	Willamette River	Perennial	Fish bearing	Yes	No	No	No
SA1:24/4 to 24/5 SA2:27/9 to 28/1	Unnamed Tributary to Willamette River	Intermittent	Fish bearing	Yes	0.01 acre (SA1:24/4, single-pole wood structure); 0.01 acre (SA1:27/9, single-pole wood structure); 0.05 acre (access road improvement - 027-080)	0.02 acre (access road improvement - 027-080)	No
SA1:24/9 to 24/13 SA2:28/5 to 28/9	Calapooia River	Perennial	Fish bearing; Chinook, steelhead; Chinook and steelhead critical habitat	Yes	0.04 acre (access road improvement - 028-070)	0.01 acre (access road improvement - 028-070)	No

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA2:3/3 to 3/4	McNary Creek	Perennial	Fish Possible	Yes	No	No	No
SA2:3/8 to 3/9	Unnamed Tributary to McNary Creek	Intermittent	Fish possible	No	No	No	No
SA2:4/3 to 4/4	Unnamed Tributary to McNary Creek	Perennial	Fish possible	No	0.01 acre (SA2:4/4, single-pole wood structure); 0.35 acre (access road construction - 004-030); 0.02 acre (access road improvement - 004-030)	0.17 acre (access road construction - 004-030); 0.01 acre (access road improvement - 004-030)	Culvert (New Install)
SA2:4/9 to 4/11	Rickreall Creek	Perennial	Fish bearing; Steelhead, Chinook, coho	Yes	0.001 acre (SA2:4/9, single-pole wood structure)	No	No
SA2:6/8 to 6/9	Unnamed Tributary to Oak Point Creek	Intermittent	Fish possible	No	No	No	No

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA2:6/10 to 7/1	Oak Point Creek	Perennial	Fish Possible	No	0.01 acre (SA2:7/1, single-pole wood structure); 0.08 acre (access road construction - 006-101); 0.23 acre (access road construction - 006-100)	0.04 acre (access road construction - 006-101); 0.11 acre (access road construction - 006-100)	Culvert (Replace)
SA2:8/2 to 8/3	Unnamed Tributary to Oak Point Creek	Intermittent	Fish possible	No	No	No	No
SA2:8/7 to 8/8	Unnamed Tributary to Hayden Slough	Intermittent	Fish possible	No	0.01 acre (SA2:8/8, single-pole wood structure); 0.32 acre (access road construction - 008-080); 0.03 acre (access road construction - 008-082); 0.01 acre (access road reconstruction - 008-081); 0.16 acre (access road reconstruction - 008-082)	0.15 acre (access road construction - 008-080); 0.01 acre (access road construction - 008-082); 0.01 acre (access road reconstruction - 008-081); 0.06 acre (access road reconstruction - 008-082)	Culvert (New Install)

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA2:10/10 to 10/11	Ash Creek	Perennial	Fish bearing; Chinook, steelhead	Yes	No	No	No
SA2:11/2 to 11/3	Unnamed Tributary to South Fork Ash Creek	Intermittent	Fish possible	No	0.34 acre (access road construction - 011-020)	0.17 acre (access road construction - 011-020)	No
SA2:11/8 to 11/10	South Fork Ash Creek	Perennial	Fish bearing	No	0.01 acre (SA2:11/10, single-pole wood structure); 0.03 acre (access road improvement - 011-070); 0.45 acre (access road improvement - 011-100)	0.01 acre (access road improvement - 011-070); 0.17 acre (access road improvement - 011-100)	Culvert (Replace) Bridge
SA2:13/8 to 14/1	Unnamed Tributary to Willamette River	Intermittent	Fish possible	No	0.16 acre (access road construction - 013-100); 0.26 acre (access road improvement - 013-101)	0.08 acre (access road construction - 013-100); 0.10 acre (access road improvement - 013-101)	Culvert (New Install) Culvert (2)
SA2:14/7 to 14/8	Unnamed Tributary to Duck Slough	Intermittent	Fish possible	No	0.01 acre (SA2:14/7, single-pole wood structure)	No	No

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA2:15/3 to 15/4	Unnamed Tributary to Luckiamute River	Intermittent	Fish possible	No	0.27 acre (access road improvement - NA)	0.11 acre (access road improvement - NA)	Culvert
SA2:15/6 to 15/7	Unnamed Tributary to Luckiamute River	Intermittent	Fish possible	No	0.72 acre (access road improvement - 015-060)	0.29 acre (access road improvement - 015-060)	Culvert (New Install)
SA2:16/4 to 16/5	Unnamed Tributary to Luckiamute River	Intermittent	Fish possible	No	1.01 acre (access road improvement - 016-040)	0.40 acre (access road improvement - 016-040)	Culvert
SA2:16/7 to 16/10	Unnamed Tributary to Luckiamute River	Intermittent	Fish possible	No	0.01 acre (SA2:16/10, single-pole wood structure); 0.22 acre (access road construction - 016-081); 0.19 acre (access road improvement - 016-040)	0.11 acre (access road construction - 016-081); 0.08 acre (access road improvement - 016-040)	No
SA2:17/3 to 17/4	Unnamed Tributary to Luckiamute River	Perennial	Fish bearing; Coho, steelhead, Chinook, Steelhead,; Chinook Critical Habitat	No	0.06 acre (SA2:17/4, steel monopole); 0.20 acre (access road improvement - 017-030)	0.08 acre (access road improvement - 017-030)	Culvert (Replace)

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA2:17/5 to 17/6	Luckiamute River	Perennial	Fish bearing; coho, steelhead, steelhead Critical Habitat	No	0.00001 acre (SA2:17/5, steel monopole)	No	No
SA2:19/4 to 19/6	Unnamed Tributary to Soap Creek	Intermittent	Fish possible	No	0.21 acre (access road improvement - 019-040)	0.08 acre (access road improvement - 019-040)	No
SA2:19/9 to 19/10	Soap Creek	Perennial	Fish bearing; Coho, steelhead, Chinook, steelhead; Chinook Critical Habitat	No	No	No	No
SA2:20/1 to 20/2	Unnamed Tributary to Soap Creek	Intermittent	Fish possible	Yes	0.55 acre (access road improvement - 020-010); 0.16 acre (access road improvement - 020-011)	0.22 acre (access road improvement - 020-010); 0.07 acre (access road improvement - 020-011)	Bridge
SA2:20/8 to 21/1	Unnamed Tributary to Soap Creek	Perennial	Fish bearing	No	0.01 acre (SA2:20/8, single-pole wood structure); 0.22 acre (access road construction - 020-080)	0.11 acre (access road construction - 020-080)	Culvert (New Install)
SA2:23/7 to 23/8	Bowers Slough	Perennial	Fish bearing	No	No	No	Culvert (New Install)

Appendix B. Stream and River Crossings

Nearest Structure Span	Waterbody Name	Stream Classification	Fish Status	Danger Tree Removal within 100 Feet of Crossing	Temporary Disturbance Area within 100 Feet of Crossing	Permanent Disturbance Area within 100 Feet of Crossing	Other Features (e.g., Culvert, Bridge)
SA2:24/1 to 24/2	Calloway Creek	Perennial	Fish bearing	No	0.22 acre (access road improvement - 024-011)	0.09 acre (access road improvement - 024-011)	Culvert (Clean)
SA2:25/2 to 25/3	Unnamed Tributary to Bowers Slough	Intermittent	Fish possible	No	0.01 acre (SA2:25/3, single-pole wood structure); 0.29 acre (access road construction - 025-020)	0.14 acre (access road construction - 025-020)	Culvert (New Install)
SA2:26/2 to 26/3	Bowers Slough	Perennial	Fish bearing; Chinook	No	0.01 acre (SA2:26/2, single-pole wood structure); 0.03 acre (access road improvement - 026010B)	0.01 acre (access road improvement - 026010B)	No

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APPENDIX C

U.S. FISH AND WILDLIFE ANKENY NATIONAL WILDLIFE REFUGE APPENDIX

Appendix C U.S. Fish and Wildlife Ankeny National Wildlife Refuge Appendix

C.1 Overview

The Salem-Albany No. 1 line is located adjacent to the USFWS Ankeny National Wildlife Refuge (Ankeny NWR or Refuge). This appendix was prepared to provide a summary of activities and potential impacts that would occur on or adjacent to the Ankeny NWR with implementation of the Salem-Albany Transmission Line Rebuild Project (Proposed Action). It is intended to help develop a more thorough understanding of how the Proposed Action and the access road options could impact the Ankeny NWR, and help determine if activities on Ankeny NWR property would be consistent with the Refuge's mission and purposes and contribute to their NEPA review or other federal compliance requirements.

The Ankeny NWR is located approximately 7 miles south of Salem and 0.5 mile west of I-5. It can be accessed via several county/local roads, including County Road No. 906, Buena Vista Road South, Wintel Road South, Marlatt Road South, and Talbot Road South. An active railroad line—the BNSF Railroad—is located adjacent to and through various portions of the Refuge. The railroad owns a 100-foot-wide right-of-way, which encompasses BPA's easement for the existing Salem-Albany No. 1 transmission line in the Ankeny NWR: the Salem-Albany No. 1 right-of-way is not located on Ankeny NWR property.

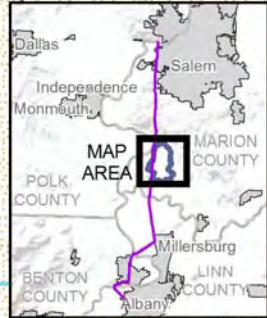
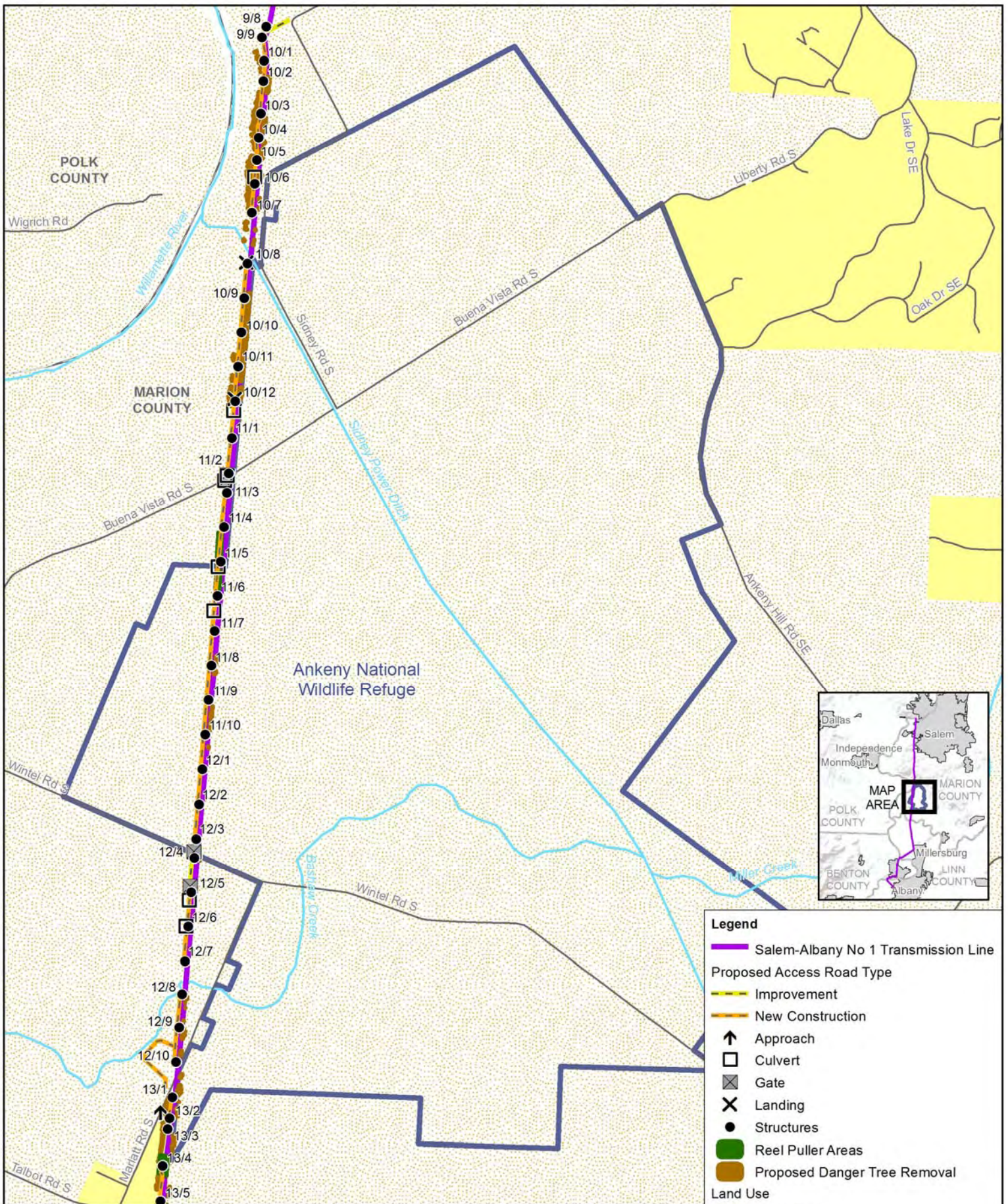
The Ankeny NWR was established in 1965, 25 years after the Salem-Albany No. 1 line was built in 1940 (USFWS 2012a). It contains 2,796 acres, consisting of approximately 1,765 acres of grass crops, 600 acres of riparian forests, and 597 acres of shallow water seasonal wetlands (USFWS 2012a). These habitats support wintering waterfowl, wading birds, and shorebirds, along with a large number of other wildlife and plant species. Historically, the Willamette Valley was a mix of wildlife habitats containing wetlands, woodland, oak savanna, riparian and bottomland hardwoods, and native prairie grasslands (Campbell 2004). Today, the Willamette Valley is a mix of farmland and urban areas with few remaining habitats for wildlife (USFWS 2012a). In response to this loss of habitat, Ankeny NWR was established in 1965 under the Migratory Bird Conservation Act to preserve historic waterfowl habitat in the Willamette Valley and offset the excessive hunting pressure on geese. Correspondingly, the primary management directive of the Ankeny NWR is the protection of high-quality wintering habitat for geese—primarily dusky Canada geese (*Branta canadensis*)—and other migratory waterfowl (USFWS 2011). Other management objectives include providing habitat for other wildlife and recreational opportunities for visitors to the Refuge. In addition, the federally endangered streaked horned lark is known to occur at the Ankeny NWR, and critical habitat was designated in the Refuge in 2013.

C.2 Details of the Proposed Action adjacent to the Ankeny NWR

Details of the complete Proposed Action are provided in Chapter 2 of the Draft EA. Specific details regarding construction activities and design adjacent to the Ankeny NWR are provided below.

The Proposed Action is adjacent to Ankeny NWR for approximately 3 miles, from Salem-Albany No.1 structure 10/6 (SA1:10/6) to SA1:13/4 (see Figure 1 in this appendix). For about 0.9 of these miles, the Proposed Action bisects Ankeny NWR in BPA's existing right-of-way on railroad property from structures SA1:11/5 to 12/4, such that Ankeny NWR property is on either side of the right-of-way. The railroad is

situated on a high grade just east of the right-of-way, and is bounded to the east by a high dike that impounds ponded and emergent wetlands interspersed with upland areas. The field west of the right-

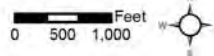


- Legend**
- Salem-Albany No 1 Transmission Line
 - Proposed Access Road Type**
 - Improvement
 - New Construction
 - ↑ Approach
 - Culvert
 - Gate
 - X Landing
 - Structures
 - Reel Puller Areas
 - Proposed Danger Tree Removal
 - Land Use**
 - Agriculture
 - Single Family Residential
 - Ankeny National Wildlife Refuge
 - Urban Areas
 - County Boundary



Figure 1.
Salem-Albany Transmission Line Rebuild Project

Marion County



Sources: BPA 2014, Census 2012, ESRI 2008, Marion County 2014

of-way is Ankeny NWR Field 5, which is managed for agriculture in the west and northern portions of the field and vernal pool habitat in the southeast corner (see Figure 6). The wetlands east of the right-of-way include Pintail Marsh, Mohoff Pond, Egret Marsh, and Mallard Marsh. Field 6 lies to the east of this wetland area, and Field 4 is located to the north.

The location of the right-of-way relative to the Ankeny NWR is as follows (Figure 2):

- SA1:10/6 to 11/5 = Ankeny NWR is east of the right-of-way and BNSF Railroad
- SA1:11/5 to 12/4 = Ankeny NWR is east and west of the right-of-way and BNSF Railroad
- SA1:12/4 to 13/4 = Ankeny NWR is east of the right-of-way and BNSF Railroad

In this area, the Proposed Action would involve replacing all components of the existing line, improving access to all of the transmission line structures, and removing danger trees (an existing fiber optic cable would be reinstalled).



Figure 2. Structure SA1:12/3 and Looking North: the Ankeny NWR is Located Left (West) of the Transmission Line and Right (East) of the Railroad Tracks in this Section

C.2.1 Replacement of the Existing Line

A total of 31 H-frame wood-pole structures adjacent to the Ankeny NWR would be replaced. Twenty-eight of these would be replaced with steel monopoles to address safety issues arising from the risk of conductor swing outside of the narrow right-of-way (see Chapter 2 for a detailed description). The steel monopoles would be placed in the more easterly pole position of the existing two-pole structures (nearest the railroad) (Figures 3a and 3b). The three new conductors and existing fiber optic line would change from a horizontal configuration to a vertical configuration, with 12 feet between lines (Figures 3a and 3b). The remaining three structures (SA1:13/2 to 13/4) would be replaced with similar H-frame wood-pole structures.



Figure 3a. View of Existing Two-Pole Wood Structures at SA1:12/3, Looking North



Figure 3b. Simulation of Proposed Steel Monopole Structures at SA1:12/3, with Bird Diverters and Conductors , Looking North

C.2.2 Access Roads

Currently, there are no access roads to structures SA1:10/6 to 12/3 and 12/5 to 13/4. BPA would need a road surface that can support heavy construction equipment to implement the Proposed Action. In addition, BPA needs to have safe and reliable access to the transmission lines in the future to ensure transmission system reliability as well as public and worker safety. To better meet these needs, BPA has proposed to improve access to these structures (Figure 4). For SA1:11/6 to 12/4, three access road options have been analyzed and vetted with Ankeny NWR. Currently, the preferred option for both BPA and Ankeny NWR is Option 1. (Ankeny NWR would also include Option 3 as a preference if wetland mats could be used: BPA would need to determine if wetland mats would be feasible given the distance that would be crossed). The options include the following:

- **Option 1:** New construction of about 1 mile of gravel access road in the BPA right-of-way, adjacent to Ankeny NWR, with an approach in the county road easement for Wintel Road and BPA right-of-way (see Figure 4). (Road construction would be as described in Section 2.1.3 of the main body of the Draft EA).
- **Option 2:** New construction of about 1 mile of gravel access road on the Ankeny NWR adjacent to the existing BPA right-of-way, with an approach in the county road easement for Wintel Road. This would require BPA purchase of about 6 acres of Ankeny NWR property.
- **Option 3:** Establishment of a route-of-travel across Ankeny NWR. For the line rebuild work, this route-of-travel would require installation of a temporary road (using geotextile fabric and gravel or wetland mats) across the wetlands present. The road would be removed following construction. For future access needs, this option would require development of a Memorandum of Understanding with USFWS to allow for annual line inspections, periodic maintenance, and potential emergency repairs.

Under all three options, road construction could occur in stages, with a rudimentary road initially established by leveling the ground and contouring the road bed to allow construction vehicles into work areas, and with subgrade and surface gravel laid later when the work area is clear. In addition, since much of the affected area in and adjacent to Ankeny NWR is located in a wetland, the road width for each of these options would be reduced from BPA's standard 20-foot width to a 16-foot width, which includes a finished 12-foot road bed with 2-foot shoulders. A total of three culverts would be installed for Options 1 and 2 to provide movement of stormwater and groundwater, and a gate would be installed at Wintel Road and Buena Vista Road to prevent unauthorized access.

Permanent access roads under Options 1 and 2 would be expected to remain in place at least for the life of the rebuilt transmission line, which would be estimated at 50 years. Therefore, access roads are considered "permanent," although converting land to an access road would not necessarily be an irreversible change because if the roads should be deemed unnecessary at some point and removed, the underlying soil and vegetation could be restored.

Under Option 3, a temporary access road would be built between structures SA1:11/6 and 12/4, since the existing ground might not support construction vehicles, particularly when wet. Wooden wetland mats or a temporary road bed using geotextile fabric and gravel would be laid down during construction.

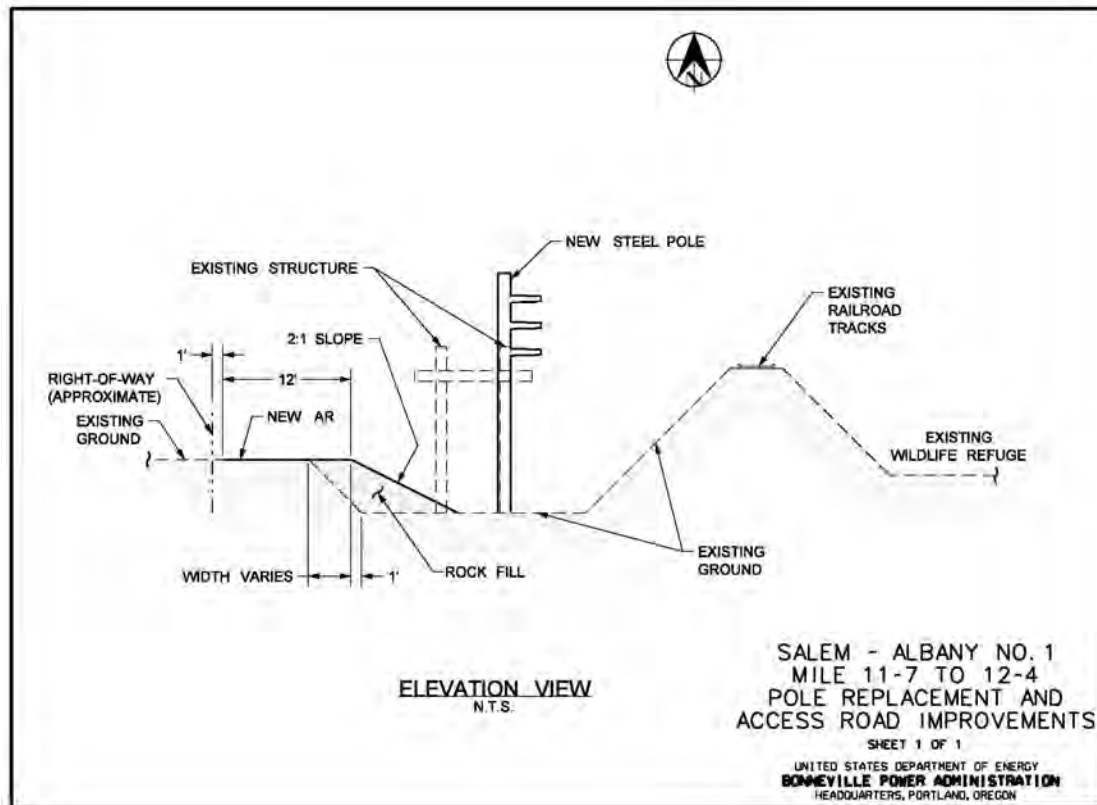


Figure 4. Elevation View of Access Road Option 1 (AR = Access Road)

After construction is completed, either the mats would be taken out or the fabric and rock would be removed with an excavator or similar equipment, depending on which road surface was used. Following removal of the road bed, the disturbed ground would be restored, which could require reseeding for wetland mats or recontouring the ground and reseeding for fabric and gravel. During routine inspection, maintenance, and emergency repairs, BPA would access these structures according to terms outlined in a Memorandum of Agreement that would be established with the USFWS. Temporary wetland mats or road beds would be installed infrequently and as needed for repair vehicles and equipment. Most of the time, smaller inspection or maintenance vehicles would be able to drive across the field without a road to reach structures, unless visits occur when the ground is muddy and impassable.

In addition to the roadwork discussed in the options above, approximately 1.7 miles of new permanent access roads would be constructed for all options to provide access to structures SA:10/6 to 11/5 and SA1:12/5 to 13/4. These new roads would be separated from the Ankeny NWR by the high grade of the railroad. They would also be constructed to the reduced 16-foot width where they would occur in wetlands: in non-wetland areas, they would be 20 feet wide. Construction of these roads would include installation of six culverts. In addition, one-tenth of a mile of improvements to existing roads would be completed between structures SA1:12/4 and 12/5.

C.2.3 Danger Trees

Danger tree survey and removal are typically done every 4 to 10 years along BPA transmission line rights-of-way. It has been at least 10 years since a comprehensive danger tree survey and removal project has been done for the Salem-Albany No. 1 line, and an estimated 51 danger trees have grown into the safety buffer of the transmission line in this 3-mile area (this includes trees both inside and outside of the right-of-way). An example of potential danger trees is visible in Figure 5. The species identified as danger trees include 33 cottonwoods, 9 Douglas-fir, and 9 Oregon ash. Many of these trees are leaning toward the line, while some are old and declining or simply too close to the transmission line. To ensure safety and the reliability of the line, danger trees need to be cut down, limbed, or topped so they no longer present a hazard. Felled trees and branches could be left in place, used for stream restoration on the Refuge, or removed depending on requests by either the BNSF railroad (if trees are located on BNSF property) or Ankeny NWR (if trees are located on Refuge property).



Figure 5. Potential Danger Trees East of the Railroad Bed Adjacent to Ankeny NWR Field 6

Because the danger trees in this area are located in the swale between the railroad and a dike along the west side of Field 6 in the Refuge, access to the trees would be difficult. A Refuge road located on the dike would be used by crews to approach the trees in pick-up trucks; however, this road would be unlikely to support heavier vehicles that might be needed to remove felled trees and limbs (Selvaggio Pers. Comm. 2014). Alternative access could be possible using the railroad. BPA would work with the

Refuge and BNSF Railroad to determine the best method for access. Danger tree removal would entail workers on foot using chainsaws along with other equipment to remove the downed trees.

Estimates are based on LiDAR data and field surveys conducted in May and June 2014. Further analysis will be done to determine which trees could be limbed or topped, and which are located on Ankeny NWR property versus the BPA right-of-way (on railroad property).

With construction of access roads, the line replacement, and danger tree removal, work in and adjacent to Ankeny NWR would be expected to take at least 30 days, with work broken up into different periods of time.

C.3 Potential Impacts to the Refuge from the Proposed Action

Potential environmental impacts to the Ankeny NWR as a result of the Proposed Action include many of those discussed in Chapter 3 of the main body of the EA. There are a number of potentially affected resources of concern that have been identified during conversations and site visits with Ankeny NWR personnel at the Ankeny NWR that will be discussed in more detail below. They include Land Use, Vegetation, Wildlife, and Wetlands and Floodplains.

C.3.4 Land Use

Affected Environment in and adjacent to Ankeny NWR

Marion County has zoned Ankeny NWR and most of the surrounding area as agricultural lands (see Figure 1). Single-family zoning also occurs outside of the northeastern and southwestern boundaries of Ankeny NWR. The Refuge is managed under the Comprehensive Conservation Plan for Ankeny, Basket Slough, and W.L. Finley National Wildlife Refuges (Conservation Plan; USFWS 2012b). The primary management directive of the Ankeny NWR is the protection of wintering areas for geese and other migratory waterfowl (USFWS 2011). Land uses on the Refuge include a variety of wildlife habitat (e.g., wetlands, riparian areas, cultivated grass fields, waterways, and wet prairies) (Figure 6). A total of 1,765 acres of the Refuge is in agricultural use and 597 acres are managed as wetlands. The primary agricultural crops grown on the Refuge are grass seed (e.g., annual ryegrass, perennial ryegrass, and fescue), which provide winter forage for Canada geese and hay for the lessee.

The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), which amended National Wildlife Refuge System Administration Act of 1966 (NWRSA; 16 USC 668dd-668ee), requires that any activity on Refuge property be determined to be compatible with the Refuge System mission and Refuge purpose(s) using the USFWS Compatibility Determination and Appropriate Uses Determination (USFWS pers. comm. 2014). The NWRSA provides the USFWS with the authority for establishing policies and regulations governing Refuge uses, including the authority to prohibit certain harmful activities. The Refuge manager must discern if a proposed use is appropriate before undertaking a compatibility review of the use and prepare a compatibility determination. If an existing use is not appropriate, the Refuge manager will eliminate or modify the use as expeditiously as practicable. If a proposed use is not appropriate, the Refuge manager will deny the use without determining compatibility.

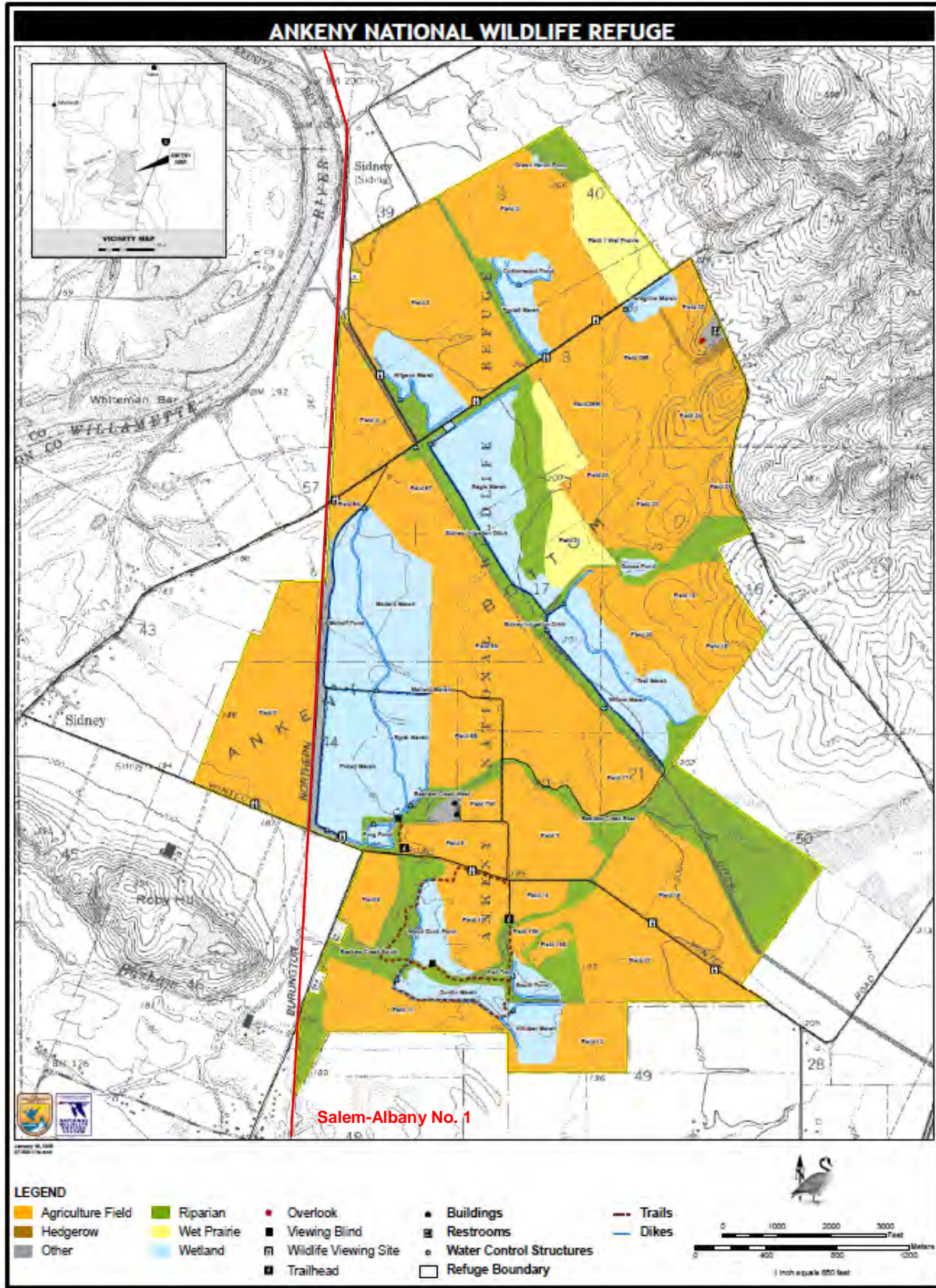


Figure 6. Land Use in the Ankeny National Wildlife Refuge

The compatibility policy (Chapter 2; 603 FW 2) describes when a Refuge manager should deny a proposed use without determining compatibility. By screening out proposed uses not appropriate to the Refuge, the Refuge manager avoids unnecessary compatibility reviews. Although a Refuge use may be both appropriate and compatible, the Refuge manager retains the authority to not allow the use or to modify the use.

In addition to refuge-specific goals, Ankeny NWR is managed using the Oregon Conservation Strategy (ODFW 2006), which is an overarching strategy for conserving fish and wildlife species within the state of Oregon. The Oregon Conservation Strategy identifies specific Conservation Opportunity Areas where high-priority species and habitat can be addressed. The Ankeny NWR contains two Oregon Conservation Strategy Habitat Areas east of the railroad and provides extensive restored shallow-water seasonal wetlands that are heavily used by migrating and wintering waterfowl and shorebirds (ODFW 2006; ODFW 2014d). High priority fish and wildlife species identified in the Oregon Conservation Strategy with suitable habitat in the Ankeny NWR include six birds (bald eagle, streaked horned lark, purple martin, Oregon vesper sparrow, western wood-pewee, and tree swallow); two amphibians (western painted turtle and northern red-legged frog); and one fish (Oregon chub) (see Section 3.4.1 of the main body of the Draft EA).

Leased agricultural fields on the Refuge—including Field 5, located to the west of the Salem-Albany No.1 transmission line from structures SA1:11/5 to 12/4—support different types of grass crops that provide winter browse for waterfowl and hay for the lessee. The western and northern portions of Field 5 were planted with ryegrass during field surveys in the winter of 2014. According to the Conservation Plan, Field 5 will continue to be managed for agriculture, with the southeast corner of the field managed as a vernal pool, with mowing in the summer to maintain early successional prairie attributes (USFWS Pers. Comm. 2014). Vernal pools are relatively rare in Oregon, and the vernal pool habitat is also used by streaked horned lark on the Refuge (USFWS Pers. Comm. 2014). To the east of BPA's right-of-way between structures SA1:11/5 and 12/4, Ankeny NWR lands are Pintail, Mallard, and Egret Marsh, which are managed as permanent and seasonal wetlands. Areas on Ankeny NWR to the east of structures SA1:12/5 to 13/4 are managed for riparian habitat and agriculture.

Major public use and recreational activities within Ankeny NWR include hiking, environmental education and interpretation, photography, and wildlife/wildlands observation, resulting in about 61,185 visitors per year (USFWS 2012c). Typically, the highest number of waterfowl on Ankeny NWR can be seen east of the affected area at Eagle Marsh Overlook. Recreational resources available within Ankeny NWR include year-round and seasonal trails, parking and viewing areas, and restrooms.

Environmental Consequences in and adjacent to Ankeny NWR

Implementation of the Proposed Action would have both temporary and long-term impacts to the mission of the Ankeny NWR to protecting habitat for wintering waterfowl and other wildlife (wildlife conservation), supporting agriculture, and managing for vernal pool and streaked horned lark habitat in the Ankeny NWR, and short-term impacts to providing recreational activities on the Refuge.

Temporary impacts from rebuilding the transmission line and road work would include intermittent noise and visual disturbance to wildlife, wildlife habitat, and visitors to the Refuge during the proposed May through December 2016 construction period; and potential injury or mortality to wildlife from construction vehicles and equipment. Temporary ground disturbance to remnant wet prairie and

shrubby hedgerows (wetland) habitat from structure replacements and tensioning sites would total 2.6 acres. Because these activities would be limited to the area along the right-of-way (and the access road under Options 2 and 3), would be intermittent and temporary, would not prevent use of the Ankeny NWR by either wildlife or visitors, and because wildlife injury or mortality would not likely cause population-level effects, impacts to wildlife conservation and visitor recreation on the Refuge would be **low-to-moderate**.

Danger tree removal would likely involve the Refuge road along the dike west of Field 6. Because of soft soils and the steep slopes of the dike, it could be damaged by vehicles if using the road during the rainy season; therefore, Ankeny NWR might not allow access along this route in the winter (Selvaggio Pers. Comm. 2014). BPA would restrict danger tree removal to outside of the rainy season, minimizing impacts to this Refuge road and associated Refuge personnel management activities.

Long-term impacts to wildlife conservation at the Ankeny NWR could be caused by the change from a horizontal to a vertical line configuration, which could harm waterfowl and other birds through a potential increased risk of collision, and from danger tree removal, which would affect wildlife habitat (see Section 1.3.3 in this Appendix). Potentially, the addition of bright yellow bird diverters on the transmission line could alter bird behavior and flight patterns. Presumably, birds would adjust to the change over time. Impacts to wildlife conservation at Ankeny NWR would be **low** since impacts would be limited to the area along the right-of-way, and wildlife injury or mortality in this area would not likely cause population-level effects.

Access road construction would also result in long-term impacts. The Proposed Action would have a small long-term indirect impact on Refuge wildlife by converting habitat directly outside the Refuge to new gravel access roads and reducing the amount of available habitat in the surrounding area: approximately 4.15 acres of remnant wet prairie and shrubby hedgerow (wetland) habitat and 0.7 acre of waterfowl foraging habitat would be affected from structures SA1:10/6 to 11/5 and 12/5 to 13/4. Because the amount of affected habitat is small relative to the habitat available in the Refuge and surrounding area, impacts to wildlife conservation at the Refuge would be **low**. Additionally, impacts to land use that would result from the three road options for structures SA1:11/6 to 12/4 are discussed below.

Access Road Options

Option 1: Construction of a new permanent 14-foot-wide access road and approaches within the railroad right-of-way and BPA's Salem-Albany No. 1 easement would not directly impact land use on Ankeny NWR. Converting 1.75 acres of remnant wet prairie and shrubby hedgerow (wetland) habitat on land cutting through the Refuge to new access road would have a small long-term indirect impact on wildlife conservation by reducing the amount of available habitat in the general area (see Section 1.3.3 in this Appendix). In addition, a new permanent access road could increase access to visitors to the Ankeny NWR in a part of the Refuge that is not open to visitors, although installing gates and signs would limit access. Although a road would result in a change of access to the right-of-way, it would be an allowed use under county zoning and would be consistent with existing land uses in the area. Because there would be no habitat loss within the Ankeny NWR, and since habitat loss adjacent to the Refuge would be small relative to the surrounding area (e.g., about 1 percent of the available wetland

habitat in the Refuge), long-term impacts to wildlife conservation from a permanent access road under Option 1 would be *low*.

Option 2: Under Option 2, 6 acres of Refuge property adjacent to the railroad/BPA right-of-way would be purchased by BPA. Approximately 2.14 acres would be converted from land currently managed for hay and waterfowl forage or vernal pool habitat to a permanent graveled access road, which does not support Ankeny NWR's mission to protect waterfowl wintering habitat and support other wildlife conservation. This option could also result in the removal of up to 3.86 additional acres of potential forage by removing it from cultivation and vernal pool habitat, depending on the land use agreement between BPA and USFWS upon the transfer of the property. However, assuming the additional acreage would stay in production, the location of the road along the edge of the right-of-way would not bisect the field and hinder cultivation.

The USFWS would need to evaluate the appropriateness and compatibility of the transmission line access road with the policies and procedures in Part 603 National Wildlife Refuge System Uses, as well as rights-of-way-specific regulations and policies found in 50 CFR 25.21, 29.21, and 29.22; 340 FW 3; and 603 FW 2; and Specialized Uses policy found at 5 RM 17. The USFWS regulations address opening Refuges and allowing uses (50 CFR 25.21) and rights-of-way crossing Refuges, including application procedures; nature of interest granted; terms and conditions; disposal, transfer, or termination of interest; payments; and appeals (50 CFR 29.21 and 29.22). The USFWS policy states that, "It is the policy of the Service to discourage the types of uses embodied in right-of-way requests" (340 FW 3.3). All new and reauthorized Refuge uses, for periods longer than 10 years, must include terms and conditions that allow for future modifications to those terms and conditions to ensure compatibility (603 FW 2.11 H. (3)). The USFWS specialized uses policy (5 RM 17) defines a ROW as a, "Use that will encumber real property by granting a right to use that may alter the landscape due to construction of a facility."

The USFWS appropriate use policy applies to all proposed and existing uses in the National Wildlife Refuge System (Refuge System) only when the Refuge System has jurisdiction over the use. The appropriate use procedure (Chapter 1; 603 FW 1) describes the initial decision process the Refuge manager follows when first considering whether or not to allow a proposed use on a Refuge. The Refuge manager will decide if a new or existing use is an appropriate Refuge use.

Because the potential reduction of up to 6 acres of waterfowl foraging habitat and vernal pool habitat supporting streaked horned lark would not support Ankeny NWR's management objectives, but since the loss of 6 acres represents about a 0.3 percent reduction in forage habitat provided by grass fields, Option 2 would have a *moderate* impact on wildlife conservation in the Ankeny NWR.

Option 3: Under Option 3, a temporary access road would be constructed across Ankeny NWR for use during the construction period, impacting a total of 2.14 acres of hay and waterfowl forage. This access would cause a temporary disruption to the land uses of waterfowl forage and agriculture or vernal pool habitat during one construction season. Impacts to wildlife habitat would be less if wetland mats could be used (also see Sections 1.3.2 and 1.3.3 in this Appendix).

Future line inspection and repair activities would require driving across the field, resulting in additional temporary damage to vegetation. Impacts to waterfowl foraging habitat and vernal pool/streaked horned lark habitat would be variable depending on the time of year access would be needed and soil conditions (see Section 1.3.2 in this Appendix).

As with Option 2, the USFWS will evaluate the appropriateness and compatibility of the transmission line access road with the policies and procedures in Part 603 National Wildlife Refuge System Uses, as well as rights-of-way-specific regulations and policies found in 50 CFR 25.21, 29.21, and 29.22; 340 FW 3; and 603 FW 2; and Specialized Uses policy found at 5 RM 17. A memorandum of understanding between BPA and USFWS would detail the parameters under which the temporary road would be removed and become an overland travel route for future inspection and maintenance.

Because approximately 0.1 percent of the total foraging habitat in the Ankeny NWR would be unavailable for just one construction season, but since streaked horned lark habitat would be affected, and additional impacts could occur over the same ground from year to year from inspection and maintenance activities, with potentially greater impacts for emergency repair, impacts to wildlife conservation from a temporary road under Option 3 with wetland mats would be **low-to-moderate**. With geotextile fabric and gravel, impacts could be **moderate** since habitat recovery could take longer and potentially be less successful if weeds should become established and the habitat degraded.

Mitigation Measures

Mitigation measures would be the same as those listed in Section 3.1.3 of the main body of the EA. Additional mitigation measures to avoid or minimize impacts to land use at Ankeny NWR would include the following:

- Work with the USFWS to develop appropriate mitigation under Option 2 for converting 6 acres of Refuge property from foraging habitat and agricultural use to transmission line access road and right-of-way.
- Work with the USFWS under Option 3 to ensure the temporary road is restored to preconstruction conditions.
- Work with the Refuge to determine construction seasonal and daily timing restrictions to minimize impacts to waterfowl activities and movement.
- Set up wash stations for vehicles before entering the Refuge to reduce the risk of spreading invasive weeds.
- Communicate the proposed schedule of construction activities to Ankeny NWR personnel and post a notice at the Refuge, if requested by Ankeny NWR personnel, so landowners and visitors would know when they can expect to experience construction-related disruptions.
- Restrict danger tree removal to outside of the rainy season to avoid damage to the Ankeny NWR dike road.

C.3.5 Vegetation

Affected Environment in and adjacent to Ankeny NWR

Common Vegetation

Vegetative communities in the affected area in and adjacent to Ankeny NWR typically reflect disturbed conditions resulting from past disturbance from railroad development within the right-of-way and cultivation in Field 5 west of the right-of-way. Vegetation within the right-of-way is predominantly remnant wet prairie and shrubby hedgerows, some of which has been delineated as palustrine

emergent wetlands and palustrine scrub shrub wetlands, respectively (see Section 1.3.4 in this Appendix). Most of the remnant wet prairie in the right-of-way is dominated by reed canarygrass (*Phalaris arundinacea*), while the shrubby hedgerow is dominated by clustered wild rose (*Rosa pisocarpa*) and Himalayan blackberry (*Rubus armeniacus*). Other herbaceous species in the right-of-way include several Willamette valley natives such as wooly sedge (*Carex pellita*), tufted hairgrass (*Deschampsia cespitosa*), native selfheal (*Prunella vulgaris* var. *lanceolata*) and narrow-leaf mule's ear (*Wyethia angustifolia*). The easternmost portion of the transmission line right-of-way contains the rocked subgrade of the Willamette Pacific Railway, and as such is sparsely vegetated by weeds that include velvet grass, Queen Anne's lace (*Daucus carota*) and prickly lettuce (*Lactuca serriola*). Mature cottonwood (*Populus trichocarpa*) and willow (*Salix* spp.) occur to the east of the railroad grade. Other native species present in the affected area include tricolored monkey-flower (*Mimulus tricolor*) and meadow checkermallow (meadow checkermallow (*Sidalcea campestris*). Field 5 is cultivated land that was planted with annual ryegrass (*Lolium multiflorum*), with the southeastern portion of the field managed for vernal pool habitat, which contains the native fragrant popcornflower (*Plagiobothrys figuratus*).

Other vegetation types in the affected area include isolated trees and woodlands, including a cottonwood stand to the west of the right-of-way and a narrow band of forested vegetation east of the right-of-way near SA1: 10/6 to 10/8 between the railroad and the Refuge. Near SA1:13/1 to 13/4, there is a woodland consisting of mixed oak, maple, and Douglas fir, and intermixed with managed residential vegetation.

Special-Status Plants

The vegetative community in the greater Ankeny NWR includes at least 163 plant species, including wetland and upland herbaceous plants and trees and shrubs typical of the Willamette Valley (Selvaggio Pers. Comm. 2014a). Special-status plants, as defined in this document, 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 Oregon Department of Agriculture (ODA 2014). Additionally, rare plants, those which do not have state or federal protective management but are noted to be rare by the Oregon Biodiversity Information Center (ORBIC) were also considered in the areas adjacent to Ankeny NWR. A total of 21 rare plant species may occur within Marion County, of which 13 could have suitable habitat within the affected area between structures SA1:10/6 and 13/4 based on the availability of suitable habitat (see Section 3.3 in the main body of the Draft EA for a discussion of species and habitat requirements). None of the plants included on Ankeny NWR's plant list are included on the rare plant list for Marion County. A special-status plant survey will be conducted during spring and summer 2014 in suitable habitat in the affected area, including the rights-of-way and access roads, but excluding cultivated areas.

Noxious Weeds

Noxious weeds reported on Ankeny NWR's plant list are Himalayan blackberry, St. Johnswort, Canada thistle, and bull thistle. According to Ankeny NWR's *Comprehensive Conservation Plan*, seventeen invasive species have been identified by Refuge staff as those posing serious threats to the various habitats within Ankeny NWR Complex, including Armenian (Himalayan) blackberry, black locust (*Robinia pseudoacacia*), Canada thistle, English ivy (*Hedera helix*), false brome (*Brachypodium sylvaticum*),

Fuller's/Common Teasel, harding grass, Italian prune (*Prunus cocomilia*), Japanese knotweed (*Fallopia japonica*), meadow knapweed (*Centaurea pratensis*), milk thistle (*Silybum marianum*), periwinkle (*Vinca minor*), purple loosestrife (*Lythrum salicaria*), reed canarygrass, Scotch broom (*Sarothamnus scoparius*), tansy ragwort, and yellow flag iris (*Iris pseudacorus*) (USFWS 2011). None of the plants found during the vegetation reconnaissance survey conducted in winter 2014 near structure SA1:11/6 are included on the state noxious weed list. Further noxious weed surveys for the affected area will be conducted in the spring and summer 2014.

Environmental Consequences in and adjacent to Ankeny NWR

Common Vegetation

Structure and conductor replacement would have no direct impacts to vegetation on the Ankeny NWR. Construction disturbance would temporarily compact and expose soils and crush or remove 2.6 acres of disturbed remnant wet prairie and shrubby hedgerow (wetland) vegetation in BPA's right-of-way. In the long-term, there could be a small increase in vegetative cover (less than 0.1 acre) where 2-pole wood structures would be replaced by steel monopoles between SA1:11/6 to 12/4 under access road Options 2 and 3 (see discussion of access road options below).

These activities could have indirect impacts on Refuge vegetative communities, since disturbed soils could be more susceptible to weed spread and establishment, which could, in turn, spread to the adjacent Refuge and have indirect long-term effects. The vegetation community in and along the edge of the right-of-way contains a high number of invasive weeds, such as reed canarygrass and Himalayan blackberry. In addition, construction vehicles, machinery, and supplies could transport weed seeds or propagules from infested areas outside of the Refuge into new locations in the construction areas. Preconstruction noxious weed surveys would be completed to identify where state-listed noxious weed infestations exist. Infestation would be treated prior to construction, and surveys would help identify where vehicle wash stations would be useful in reducing the risk of spreading seeds and propagules of noxious weeds to uninfested locations (a wash station would be used prior to entry to the Refuge to protect adjacent Refuge habitat regardless of the noxious weed survey). In addition, post-construction noxious weed surveys would be completed to determine whether construction activities resulted in new infestations in the affected area, which would be treated. Treatment of noxious weeds and reseeding disturbed areas to facilitate the restoration of preconstruction conditions, as needed, would reduce potential long-term impacts to the adjacent Refuge vegetation community to low.

Although many of the estimated 51 danger trees in this area are likely inside the right-of-way, danger tree removal could include some cottonwoods and other trees in Ankeny NWR on the east side of the railroad (these numbers will be determined and reported in the Final EA). Because these trees represent a small proportion of the approximately 500 acres of woodlands on the Refuge (see Section 1.3.1 in this Appendix), but because trees are relatively rare this part of the Refuge (Fields 5 and 6), impacts to Ankeny NWR woodlands would be ***low-to-moderate***.

The construction of permanent access roads between SA1:10/6 to 11/5 and 12/5 to 13/4 would remove 4.15 acres of remnant wet prairie and shrubby hedgerow (wetland) habitat and 0.7 acre of waterfowl foraging habitat in BPA's right-of-way, but would have no direct impacts on the vegetation in Ankeny NWR. In addition, it would not present a risk of weed infestation on the Refuge since it would be

separated from project roads by the steep railroad grade. However, road construction between SA1:11/6 to 12/4 could affect Refuge vegetation, as discussed below.

Access Road Options

Option 1: The permanent access road constructed inside BPA's right-of-way would have **no** direct impacts to vegetation on Ankeny NWR. Construction of the road would cause the loss of 1.75 acres of remnant wet prairie and shrubby hedgerow (wetland) vegetation in BPA's right-of-way bisecting the Refuge, including the areas currently disturbed by the westerly pole of the 2-pole structures.

The new road would have the same potential indirect **low** impacts from potential weed spread to the vegetative community on Ankeny NWR as replacement of structures and conductors (see above), since the road edges and graveled road bed could provide opportunities for weed infestations.

Option 2: The permanent access road constructed on land transferred to BPA from Ankeny NWR would have direct impacts to vegetation currently on Ankeny NWR. It would remove 2.14 acres of grass cultivated for hay and waterfowl forage or vernal pool vegetation for the road bed and edges. Potentially, the vegetation in the remaining 3.86 acres would remain unchanged, depending on the land use agreement between BPA and USFWS. Because the amount of grass crop lost would be at most about 0.3 percent of the total cultivated grass fields on Ankeny NWR, but since vernal pool habitat is rare in the state of Oregon, impacts to vegetative communities on the Refuge would be **moderate**.

Option 3: Under Option 3, the temporary access road would directly affect vegetation on Ankeny NWR. The road, made of wetland mats or geotextile fabric and gravel, would compact soils and crush 2.14 acres of grass cultivated for hay and waterfowl forage or vernal pool vegetation. A temporary road with geotextile fabric and gravel could create a wider and deeper disturbance area since these materials would need to be removed with an excavator or similar equipment that would remove or expose additional soil and vegetation. Effective restoration of the area would likely require recontouring, reseeding, and possibly weed control. With wetland mats, existing vegetation would be more likely to regrow since it would be crushed or flattened, there would be little soil exposure, and there would be a lower risk of weed establishment.

Future line inspection and repair activities would require driving across the field, resulting in additional temporary damage to vegetation. When soils are dry, recovery would be expected to occur quickly, but should an emergency repair be necessary when soils are saturated, damage to soils could be greater and vegetation recovery slower, which could also facilitate weed establishment and spread. In these cases, mitigation measures to facilitate vegetative recovery would be implemented. Since the temporary access road and future overland travel would only affect about 0.1 percent of the grass fields on the Refuge, since damage to vegetation would be expected to recover through cultivation or mitigation, and since overland travel over wet soils would not be expected to occur frequently in the future, impacts to vegetation from a temporary access road using wetland mats and future access using overland travel would be **low**. With geotextile fabric and gravel, impacts would be **low-to-moderate** since vegetation recovery could take longer and potentially be less successful if weeds should become established.

Special-Status Plants

The risk of finding threatened or endangered rare plant species within the affected area appears to be **no-to-low** for most species based on their habitat requirements and their likelihood of occurrence in the

affected area in and adjacent to Ankeny NWR. For Nelson's checkermallow, which occurs in open prairie remnants along the margins of streams, sloughs, ditches, roadsides, fence rows, and drainage swales, has been observed in the Refuge about 0.75 mile to the east of the affected area (USFWS Pers. Comm. 2014), and is more tolerant of disturbance, there is a **moderate** likelihood of occurrence and therefore impacts to these species. However, for all species, habitat is fragmented with a dense cover of reed canarygrass, and the affected environment is not likely to support large populations.

Surveys for state and federally designated special-status plants as well as rare plants of concern to Ankeny NWR will be conducted during the appropriate season in 2014 in suitable habitat in and adjacent to Ankeny NWR. The results of these surveys will be reported in the final EA. If rare plants are found, mitigation measures could include avoidance by adjusting impact areas if possible, marking off populations to avoid during construction, or others as determined in consultation with ODFW and USFWS (if federally listed plants are affected). If federally protected plants are identified, a biological assessment will be prepared, and BPA will work with USFWS to mitigate impacts. If Nelson's checkermallow is present, replacement of structures would have a **low** impact, because avoidance would likely be more possible if plants are found in the right-of-way. New access roads would likely have **low-to-moderate** impacts given the larger and continuous area affected.

Mitigation Measures

Mitigation measures for vegetation would be the same as those listed in Section 3.3.3 in the main body of the EA. Additional mitigation measures would be implemented for activities adjacent to and in Ankeny NWR as follows:

- Clean vehicles and other equipment that have been in weed infested areas at a portable wash stations upon leaving the infested areas and prior to entering Ankeny NWR to prevent spreading weeds to uninfested areas during construction.
- Reseed all disturbed areas with an appropriate seed mix as determined in coordination with Ankeny NWR.
- Abide by any terms and conditions or mitigation measures agreed to with USFWS during ESA consultation if Nelson's checkermallow or other listed plant species are found. These could include avoidance, flagging of populations, and other measures.

C.3.6 Wildlife

Affected Environment in and adjacent to Ankeny NWR

General

General wildlife species present in the affected area include birds, mammals, amphibians, reptiles, and invertebrates that are typical in wetland and riparian habitats in the Willamette Valley (see Section 3.4 in the main body of the Draft EA). The largest known population of Oregon chub is found at Oregon NWR east of the affected area (USFWS Pers. Comm. 2014). The wetlands in the affected area do not support fish; therefore, this and other fish species are not discussed further.

The habitats in the Ankeny NWR provide foraging and nesting opportunities for many species of migratory birds as well as perching and nesting opportunities for raptors such as peregrine falcons. The wetlands, agricultural grass fields, and riparian habitat in the affected area provide suitable wintering and/or breeding habitat for waterfowl and other birds. At least 190 bird species have been sighted at

the Ankeny NWR, the greatest number of species including swans, geese, and ducks, but also including herons, raptors, plovers, sandpipers, owls, finches, sparrows, and woodpeckers, among others (USFWS 2009; ORBIC 2013b3; Selvaggio Pers. Comm. 2014). Cottonwoods and other trees provide perching and nesting opportunities for raptors, song birds, and some waterfowl.

Ankeny NWR also provides hunting, nesting, denning, and foraging habitat to a variety of mammalian species. Typical species that could occur in the affected area include beaver (*Castor canadensis*), Columbian black-tailed deer (*Odocoileus columbianus*), grey-tailed vole (*Microtus canicaudus*), red fox (*Vulpes vulpes*), and coyote (*Canis latrans*).

The streams, wetlands, and woodlands in the affected area provide habitat for many species of amphibians and reptiles. Typical amphibians and reptiles that would be expected to occur in the affected area include the rough-skinned newt (*Taricha granulosa*), common garter snake (*Thamnophis sp.*), northern red-legged frog (*Rana aurora*), and Pacific tree frog (*Pseudacris regilla*). Common invertebrate species include common spiders, bugs, beetles, and butterflies. No OCS species are known to occur in Ankeny NWR.

Special-Status Wildlife Species

In this document, special-status wildlife include federally and state-listed species, as well as state sensitive species and federal species of concern. Species with potential to occur in the affected area of the Proposed Action based on suitable habitat and documented occurrences are in Section 3.4 of the main body of the Draft EA, along with their potential distribution based on required habitat features. They include six species: bald eagle, streaked horned lark, purple martin, tree swallow, western painted turtle, and western pond turtle. Three of these, bald eagle, streaked horned lark, purple martin, and tree swallow are known to occur in the affected area in and adjacent to the Ankeny NWR. The western pond turtle and western painted turtle are unlikely to occur in this area based on a lack of oak savanna and upland prairie habitat for the western pond turtle, and current distribution of known populations for the western painted turtle, which does not extend south of Salem in the vicinity of the Refuge (see Section 3.4.1 in the main body of the Draft EA).

Bald Eagle

Given the proximity to the Willamette River, trees at Ankeny NWR could provide perching and possibly nesting opportunities for bald eagle. Bald eagle sightings at Ankeny NWR are common, although the closest documented eagle nest is about 2 miles away along the Willamette River (ORBIC 2013a; USFWS Pers. Comm. 2014). Documented occurrences for bald eagle are based on 30 years of a comprehensive state survey from 1971 to 2007, with no nests documented over this period within the Ankeny NWR (Isaacs and Anthony 2011). Therefore, while bald eagles commonly use the affected area in and adjacent to the Ankeny NWR to hunt and roost, the evidence indicates they are unlikely to use the area for nesting habitat.

Streaked Horned Lark

Critical habitat for streaked horned lark has been designated at Ankeny NWR, in Field 6, about 0.3 mile east of the Salem-Albany No.1 transmission line, with sightings of individuals and pairs by Ankeny NWR personnel in Fields 5 and 6 (Selvaggio, Pers. Comm. 2014b). The area of streaked horned lark critical

habitat is currently occupied and is consistently utilized by streaked horned larks, as is the vernal pool area directly adjacent to BPA's right-of-way in the southeast corner of Field 5 (USFWS 2013).

This species exhibits a strong natal fidelity to nesting sites (return each year to location they were born) (USFWS 2013). Therefore, the critical habitat on Ankeny NWR would be expected to remain in use by this species, and the Refuge grass field adjacent to the right-of-way could be utilized by the species for nesting and foraging habitat early in the growing season before vegetation gets too tall and dense.

Purple Martin

Refuge personnel have observed purple martin several times as close as Pintail Marsh, just east of the right-of-way (USFWS Pers. Comm. 2014). Since it is a summer resident of Oregon, it could be present during project construction. Nesting habitat is limited to tree snag cavities at least 20 feet from large live trees, no tree snags have been observed along the right-of-way, although they could be present further east in Pintail and Egret marshes.

Tree Swallow

Tree swallows are considered abundant at Ankeny NWR (USFWS, Pers. Comm. 2014). Both nesting and foraging habitat are available in the Refuge. Since it is a summer resident of Oregon, it could be present during project construction. Nesting habitat includes tree snag cavities; no tree snags have been observed along the right-of-way, although they could be present further east in Pintail and Egret marshes.

Environmental Consequences in and adjacent to Ankeny NWR

General

Impacts to wildlife from the Proposed Action could include temporary impacts through injury and incidental mortality, noise and visual disturbance, and temporary displacement; and long-term impacts through habitat conversion, changes to line configuration, and danger tree removal.

Temporary impacts associated with construction activities would occur under all three options and would be related to increased noise (including helicopters) and human intrusion in the affected area. A temporary increase in noise associated with construction activities could disrupt foraging and breeding activities or cause adults to abandon nest or den sites, endangering their young. Nesting raptors, should they occur in the affected area, are easily disturbed by construction noises and human presence. However, wildlife in the affected area are likely accustomed to periodic noise disturbance from trains and agricultural equipment, so are habituated to these types of loud disturbance and would be less likely to experience high levels of stress and abandon their nests (or dens) for long periods of time, reducing the risk of mortality of young or nest failure. The temporary small loss of remnant wet prairie and shrubby hedgerow (wetland) habitat within the right-of-way (2.6 acres) would be offset by the large amount of available habitat in the adjacent Refuge.

Injury or mortality resulting from direct contact with construction vehicles and equipment would be avoided for most wildlife species because animals are typically mobile and would flee when startled by construction equipment. However, small mammals, invertebrates, amphibians, and reptiles that are less mobile or that take Refuge underground could be harmed or killed by equipment during construction.

Species that could be harmed in this way include moles, chipmunks, snakes, other ground-dwelling mammals and reptiles, and semi-aquatic species such as newts.

Overall, because construction disturbance would be intermittent and temporary and limited to the area along the right-of-way (and the access road under Options 2 and 3), wildlife could access available habitat nearby, and wildlife injury or mortality would occur at the scale of individuals and not likely cause population-level effects, impacts to wildlife would be **low-to-moderate**.

The right-of-way is in an active flyway for waterfowl, such as dusky geese, cackling geese, and ducks; and waterbirds such as sandpipers, which regularly fly back and forth between the wetlands and ponds east of the right-of-way to Field 5 west of the right-of-way. The change from a horizontal to a vertical transmission line configuration in the affected area in and adjacent to the Ankeny NWR could increase the risk of avian collision due to an increase in the height of the collision zone, although current literature lacks evidence to support or refute line orientation as an indicator of collision risk (APLIC 2012). To minimize the potential risk of an increase in collisions and potential bird injury and mortality, swan flight bird diverters would be installed in 50-foot intervals on the conductors and fiber within the three-mile corridor where the Proposed Action crosses or is adjacent to Ankeny NWR (see Figure 3b). In addition, birds would likely become habituated to the new line configuration, and effects would likely lessen over time. Since the transmission line would be in the same general location as the existing line, and with bird diverters and reduced effects over time, the change to a vertical orientation would not likely have population-level effects to birds, including dusky Canada geese, and would therefore have a **low** impact.

An estimated 51 cottonwoods and other trees (approximately 0.4 acre) would be removed between 10/8 and 13/4, resulting in both temporary and long-term impacts to wildlife and wildlife habitat both in the Ankeny NWR and on the right-of-way adjacent to the Refuge. Temporary impacts include disturbance from tree felling, which could cause injury or mortality to wildlife—particularly nesting birds and wildlife such as squirrels. However, impacts to wildlife resulting from danger tree removal would be **low** since danger tree removal would be done outside of the nesting season to reduce the chance of injury or mortality. Long-term impacts to birds and tree-dependent wildlife, including bald eagle and other raptors, would occur as a result of tree habitat loss and modification. The remaining trees, shrubs, and crown sprouts would continue to provide canopy cover, with some tree removal occurring at the edges of woodlands. In addition, trees and riparian woodlands in other areas of the Ankeny NWR cover approximately 600 acres—about 20 percent of all available habitat on the Refuge—and would continue to provide habitat. Although the proportion of trees removed from the affected area is small relative to the total amount of woodland in the Refuge, the effects of habitat loss to nesting birds and wildlife due to removal of danger trees would be **moderate** since the trees along the right-of-way providing the primary tree habitat in the vicinity of Fields 5 and 6, and are known to support at least two raptor nests. Danger tree removal would be minimized where safety standards could be met by topping or limbing trees.

Removal and replacement of structures would be the same under all three access road options and would have no long-term adverse impacts on wildlife habitat. For the 28 structures that are changing from a two-pole to a monopole structure, the permanently impacted area would be reduced and available habitat within the right-of-way would be slightly increased, unless this area is converted to a permanent access road under Option 1 (see discussion of options below).

Access road construction would also result in long-term impacts to wildlife habitat. The Proposed Action would have a small long-term indirect impact on Refuge wildlife by converting habitat directly outside the Refuge to new permanent access roads and thereby reducing the amount of available habitat in the surrounding area: approximately 4.15 acres of remnant wet prairie and shrubby hedgerow (wetland) habitat and 0.7 acre of waterfowl foraging habitat from structures SA1:10/6 to 11/5 and 12/5 to 13/4. Because the amount of affected habitat is small—about 1 percent of similar habitat available in the Refuge—impacts to wildlife conservation at the Refuge would be **low**. Additionally, impacts to wildlife habitat that would result from the three road options for structures SA1:11/6 to 12/4 are discussed below.

Access Road Options

Option 1: Construction and improvement of a permanent access road under Option 1 would not directly affect the Ankeny NWR, but would indirectly affect wildlife dependent on the Refuge by permanently altering 1.75 acres of remnant wet prairie and shrubby hedgerow (wetland) habitat in the right-of-way bisecting the Refuge. This habitat loss would adversely affect wildlife such as invertebrates, amphibians, reptiles, and foraging birds. However, the proposed road would be located in low-quality habitat dominated by weedy species, including dense cover by reed canarygrass (See Section 1.3.2 in this Appendix). In addition, it would only take up a portion of the entire right-of-way, leaving some habitat intact.

Therefore, while this habitat offers some structural diversity to wetland species, the effects of habitat loss on wildlife dependent on Ankeny NWR under Option 1 would be **low** since no habitat on the Ankeny NWR would be directly affected, a proportion of habitat would remain in the right-of-way, and the amount of habitat lost would be a relatively small proportion of the size (about 1 percent) of similar and higher-quality wetland habitat in the adjacent Refuge.

Under Options 1 and 2, the presence of a new road would result in some road maintenance activities. Since the topography is flat and the surface rock is large and unlikely to be washed away in an area with no to low flow, the most likely road maintenance would involve infrequent vegetation removal within the road bed to maintain visibility of the road: grading and resurfacing would unlikely be necessary. Impacts to wildlife from road maintenance would be **low** since it would primarily result in a temporary, slight, and infrequent noise disturbance.

Option 2: Construction of a permanent access road under Option 2 would permanently alter 2.14 acres of waterfowl foraging habitat or vernal pool habitat in the grass field of Field 5 on property transferred to BPA from the Ankeny NWR. An additional 3.86 acres could be removed from foraging habitat or vernal pool habitat depending on the land use agreement between BPA and Ankeny NWR. The amount of lost foraging habitat would be small relative to the total area of Field 5 and the total amount of this habitat type in the Ankeny NWR (about 0.3 percent). Vernal pool habitat, however, is rare and currently supports streaked horned lark on Refuge property; therefore, permanent impacts to wildlife and wildlife habitat on the Ankeny NWR would be **moderate** (also, see below for impacts specific to streaked horned lark).

Impacts for road maintenance over time would be **low**, as for Option 1.

Option 3: Construction of a temporary access road under Option 3 would remove 2.14 acres of waterfowl foraging habitat or vernal pool habitat in the grass field of Field 5 for one construction season. After construction is completed, the temporary access road would be removed and the area would be restored, as described in Section 2.1.2. Since the temporary road would be removed at the end of the construction season, the impact on wintering geese would be less, assuming vegetation could recover in time for winter, which would be more likely if wetland mats could be used (see Section 1.3.2 in this Appendix).

Future access across the field with no road in place could damage forage grass and disturb soils, although in most cases this habitat would recover quickly under cultivation. During periods of wet weather, impacts to soils and vegetation could be greater, in which case mitigation measures to help recover the affected area could be required.

Although this option would impact vernal pool habitat, since wildlife dependent on Ankeny NWR would experience only a temporary loss of habitat, vegetation would be expected to recover with mitigation, and since the affected habitat would be only about 0.1 percent of the available foraging habitat on the Refuge, Option 3 with wetland mats would have a **low** impact on waterfowl foraging habitat and a **low-to-moderate** impact to vernal pool habitat (see impacts for streaked horned lark below). With geotextile fabric and gravel, impacts would be **low-to-moderate** since habitat recovery could take longer and potentially be less successful if weeds should become established and the habitat degraded.

Special-Status Wildlife Species

Bald Eagle

Roosting and foraging bald eagles are common at the Ankeny Refuge. However, since they are not known to nest within 2 miles of the Refuge, impacts would be **low** since they would likely be limited to infrequent and temporary construction disturbance to roosting and foraging bald eagles.

Streaked Horned Lark

Since streaked horned larks are known to forage and nest at the Ankeny NWR, the Proposed Action could have both positive and negative impacts on the species. Noise and physical disturbance associated with construction activities could lead to nest abandonment or destruction. In addition, vehicles could present a hazard to juveniles and adults foraging along the ground. Mortality or failed nests would be a **high** impact on the streaked horned lark due to the federally threatened status of the species. However, the period until young have fledged is relatively short (12 days of incubation, then 9 days until fledging), and seasonal restrictions for construction would likely be employed to avoid impacts. Reduced speed limits could also be used to reduce the risk of juvenile and adult mortality. BPA will prepare a Biological Assessment to further assess potential impacts and work with USFWS to determine potential avoidance or mitigation measures that would be employed to minimize impacts.

Construction of a permanent access road under Options 2 and 3 could alter lark nesting habitat from a high quality vernal pool/prairie habitat to a lower quality gravel habitat, which would have a negative impact on the species. Conversely, Option 1 could create potential additional nesting (gravel) habitat with the new permanent road in the swale of the right-of-way, which could be a slightly positive impact. However, the 3-inch-long gravel proposed for the road surface may not be suitable or preferred habitat. Upon completion of the Proposed Action, these roads would not be used on a regular basis and only

traveled once or twice a year for annual inspections and infrequent maintenance of the road or line. These activities would have the potential to disrupt larks present in the area but would also help maintain their habitat (i.e., vegetation clearing). Since annual inspections and repair activities would be limited in occurrence and duration and would aid in maintaining habitat, the anticipated impact level of a new access road to streaked horned lark would be **moderate**.

Purple Martin

Noise and physical disturbance associated with construction activities could affect behavior and/or reproductive success of purple martins present in the affected area, and construction activities could remove right-of-way vegetation and foraging habitat adjacent to the Refuge. Since disturbances would be temporary, foraging habitat is available nearby, and effects would not likely contribute to the need for federal listing given the species' status, but since reproductive success in any nearby nesting sites could be affected, impacts to purple martin on the Refuge would be **low-to-moderate**.

Tree Swallow

Impacts to tree swallow on the Refuge would be the same as for purple martin. However, because the population status is secure, impacts would be **low**.

Mitigation Measures

Mitigation measures for wildlife and wildlife habitat would be the same as those listed in Section 3.4.3 of the main body of the EA. Additional mitigation measures would be implemented for activities adjacent to and in Ankeny NWR as follows:

- Design the Proposed Action to minimize impacts to sensitive natural resources in the affected area.
- Abide by any terms and conditions or mitigation measures agreed to with USFWS during ESA consultation for streaked horned larks. These could include avoiding seasonal restrictions on construction until the young have fledged and reduced speed limits in the vicinity of documented larks.
- Utilize fire prevention and control training and equipment to protect habitats.
- Coordinate construction activities with the Ankeny NWR to reduce impacts during sensitive periods for waterfowl and other birds.
- Schedule danger tree removal between August and November outside of the bird nesting season to minimize impacts to migratory birds and the Refuge dike road (see Mitigation Measure in Land Use section of this Appendix). If a nest is found it must be deemed inactive prior to removal of the tree.
- Limb trees wherever possible, or top or girdle trees to create snags, which can be used as wildlife habitat.
- Facilitate the planting of trees to replace any danger trees on Ankeny NWR property that are removed as a result of the Proposed Action.
- Install yellow swan bird flight diverters every 50 feet on conductors and fiber to reduce the potential for collision (AFWA 2010). This includes all spans discussed in this Appendix.

C.3.7 **Wetlands and Floodplains**

Affected Environment in and adjacent to Ankeny NWR

Wetlands

Based on the results of field investigations, wetland scientists identified jurisdictional wetlands within the right-of-way and proposed access roads adjacent to and on Ankeny NWR. Ankeny NWR has a total of about 597 acres of wetlands (USFWS 2012a). Wetlands and waters in this area are associated with flat valley bottoms and the drainage swale that runs adjacent to the existing railroad grade. The wetlands found at Ankeny NWR have a seasonally perched water table because of heavy clay soils, which can cause ponding in the winter months. Dominant hydrologic sources primarily include groundwater and direct precipitation due to the relatively flat topography.

The vast majority (99 percent) of affected area wetlands in or adjacent to Ankeny NWR were classified as palustrine emergent (including the remnant wet prairie, grass fields, and vernal pool discussed in the Vegetation section) (see Figures 7a through 7d below). Wetlands in the right-of-way were typically found to be characterized by a dominance of invasive reed canarygrass. However, other species were also found, including one-sided sedge (*Carex unilateralis*), barnyard grass (*Echinochloa crus-gali*), ovoid spikerush (*Eleocharis obtusa*), creeping spikerush (*Eleocharis palustris*), cursed buttercup (*Ranunculus sceleratus*), slough sedge (*Carex obnupta*), soft rush (*Juncus effesus*), dense sedge (*Carex densa*), beggar's tick (*Bidens cernua*), leafy beggar's tick (*B. frondosa*), awned flat-sedge (*Cyperus squarrosa*), needle-leaf pincushion plant (*Navarretia intertexta*), rough cocklebur (*Xanthium strumarium*), and Chilean tarweed (*Madia satvia*). In addition, the grass field, which is also classified as palustrine emergent wetland, has been planted to rye grass, and the vernal pool supports fragrant popcornflower.

Approximately 1 percent of delineated wetlands in the affected area were classified as palustrine scrub shrub (referred to as shrubby hedgerows in Section 1.3, Vegetation). Thirty percent of the vegetative canopy cover in these areas consisted of shrubs or trees less than 20 feet tall. Typical shrub species that these wetlands support are dominated by clustered wild rose and Himalayan blackberry, but also include Sitka willow (*Salix sitchensis*), Oregon ash (*Fraxinus latifolia*), red-osier dogwood (*Cornus sericea*), and ninebark (*Physiocarpus* sp.): an herbaceous layer that contains similar species to the palustrine emergent wetlands is also present.

Floodplains

The Federal Emergency Management Agency (FEMA) maps 100-year floodplains on its National Flood Insurance Program (NFIP) Rate Maps, and defines floodplains as areas that have a 1 percent chance of being inundated by floodwaters in a given year. A proposed new access road crosses the 100-year floodplain of Bradshaw Creek near structure SA1:12/10, and structure SA1:12/8 is located in the floodplain. Both of these locations occur west of the Ankeny NWR. No proposed activities occur in floodplains within the Ankeny NWR.

Environmental Consequences in and adjacent to Ankeny NWR

Rebuilding the line would not directly affect wetlands on Ankeny NWR property. Temporary impacts to wetlands adjacent to Ankeny NWR would include ground disturbance from vehicles and equipment around structures and tensioning site, which would affect approximately 2.6 acres of primarily palustrine emergent wetlands and some scrub-shrub wetlands in the right-of-way. If tensioning sites are used during the wet season, temporary fill could also be used to stabilize machinery and enable access,

although this would not likely be necessary under Option 1. Long-term effects of rebuilding the line would have a positive impact on wetlands as a result of structure replacement: replacing two-pole structures with monopoles (of the same diameter) would result in the reduction of wetland fill in the right-of-way.

Because all wetland fill and temporary disturbance would be within BPA's right-of-way, there would be **no** impacts to wetland on Ankeny NWR.

Removal of danger trees would be conducted in some wetlands outside of the transmission line right-of-way. Danger tree removal could occur in wetlands near structures SA1:10/6 to 10/12, 11/8 to 11/10, 12/4 to 12/5, and 13/3. In areas where danger trees are removed in wetlands, the tree would be cut off aboveground, and work would not disturb the root structure to avoid wetland impacts.

Construction of access roads could impact wetlands both adjacent to and on Ankeny NWR. Between structures SA1:10/6 to 11/5 and 12/5 to 13/4 new permanent access roads would impact 5.85 acres of primarily palustrine emergent wetlands with some scrub-shrub wetlands on property outside of Ankeny NWR; therefore, new access road would have no impact on wetlands in Ankeny NWR. Additionally, wetland impacts under the three access road options for structures SA1:11/6 to 12/4 are discussed below.

Access Road Options

Option 1: Construction of a new access road under Option 1 would have **no** direct impacts to Ankeny NWR wetlands, since all impacts would be within the existing right-of-way. The new access road in the right-of-way would result in the permanent fill of approximately 1.75 acres of primarily palustrine emergent wetlands with some scrub-shrub wetlands.

Because of the fill that would occur in the swale along the railroad grade, there was a question of whether a permanent road in this location would indirectly impact adjacent wetland habitat in Field 5 of Ankeny NWR by altering the hydrology. To address this question, a hydrologic analysis was conducted in early spring 2014. To estimate surface water flow patterns, the drainage area of the Proposed Action in this area was mapped using the USGS program Streamstats (Figure 8). The mapped drainage area is small (less than 1.5 square miles), flat (less than 1 degree slope), and lacking significant drainage features either entering or leaving the affected area. The lack of drainage features is not surprising given that the property is surrounded by the relatively high berms that constitute the BNSF Railroad embankment to the east, the Wintel Road embankment to the south, and the Buena Vista Road embankment to the north and west. Given the topographic context, surface water elevations within the affected area can be expected to be controlled by direct precipitation to the area, infiltration, evapotranspiration, and groundwater saturation: water flow velocities can be expected to be very low.

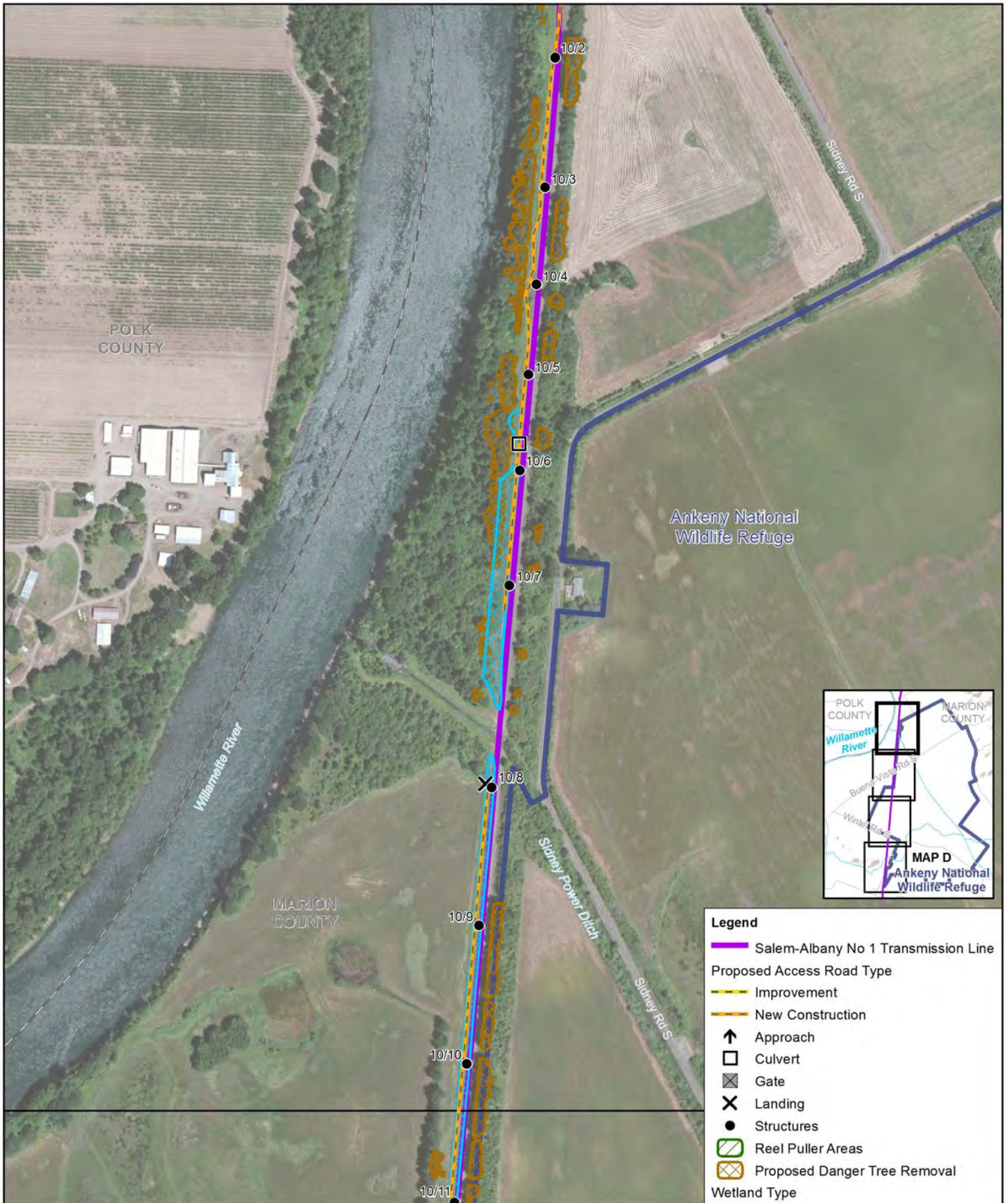
To calibrate the desktop analysis described above, a hydraulic engineer and ecologist accompanied BPA staff on a site visit on February 27, 2014. The existing transmission line right-of-way occupies a shallow swale between the Ankeny NWR agricultural fields (Figure 9) and the berm supporting the BNSF

Railroad line. The shallow swale had standing water approximately 12 inches deep from the crossing with Wintel Road and extending about 2,000 feet north. North of that area there was no standing water in the right-of-way. The standing water is due to high seasonal groundwater elevations, and was not

flowing in either direction. There were large areas of standing water in Field 5, but there was no direct flowing connection observed between water in the swale and water in the field (Figure 9).

In one location, 20 feet south of structure SA1:12/2, there is evidence of an intermittent, seasonal ditch that may be periodically opened by farming operations, which could temporarily provide connection to another shallow swale in Field 5. There was no flow observed either way during the site visit. However, Refuge personnel did note that flow was observed in this location at a later date (Selvaggio, Pers. Comm. 2014b).

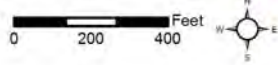
The new road prism would extend from the western edge of the right-of-way to slightly past the center of the swale, and would be level with or slightly lower than the adjacent Field 5 (Figure 4). The proposed access road design also includes large angular riprap in the subgrade course to improve water permeability. The relatively large interstitial space of the riprap would provide high hydraulic conductivity (greater than 12 inches/hour) and allow groundwater seepage to occur with minimal impedance. This hydraulic conductivity is likely to be higher than that of the native soils, which the USDA maps as Dayton silt loam (Da). These soils are reported to consist of alluvial silts and clays with a shallow groundwater table, frequent ponding, and very low capacity to transmit water (0 to 0.06 inch/hour). The ability of the road prism riprap to transmit water is substantially higher. Therefore, the proposed design would not impede the movement of water on or off Field 5. The displacement of water by the large angular riprap would occur but would not result in a measurable amount of increased surface water in Field 5, given the small size of the area affected relative to the size of the field and the additional capacity of the remaining swale between the road and the railroad grade to hold any excess water. Even if the interstitial spaces should fill with sediment over time, the additional affected volume would likely have no substantial effect on water levels in Field 5. Therefore, because of the ability of the proposed road to transmit water, the relatively small area affected, and the capacity of the non-road portion of the swale to contain water, there would be no-to-low impact on water surface elevations and duration and area of inundation, and no impact on water conveyance in Field 5 of the Ankeny NWR due to access road construction.



Legend

- Salem-Albany No 1 Transmission Line
- Proposed Access Road Type**
- Improvement
- New Construction
- ↑ Approach
- Culvert
- ⊗ Gate
- ⊗ Landing
- Structures
- ◻ Reel Puller Areas
- ◻ Proposed Danger Tree Removal
- Wetland Type**
- ◻ PEM
- ◻ PSS
- ◻ Ankeny National Wildlife Refuge
- ◻ County Boundary
- ◻ Map Sheets

Figure 7a.
Salem-Albany Transmission Line Rebuild Project
 Marion County



Sources: BPA 2014, Census 2012, ESRI 2008



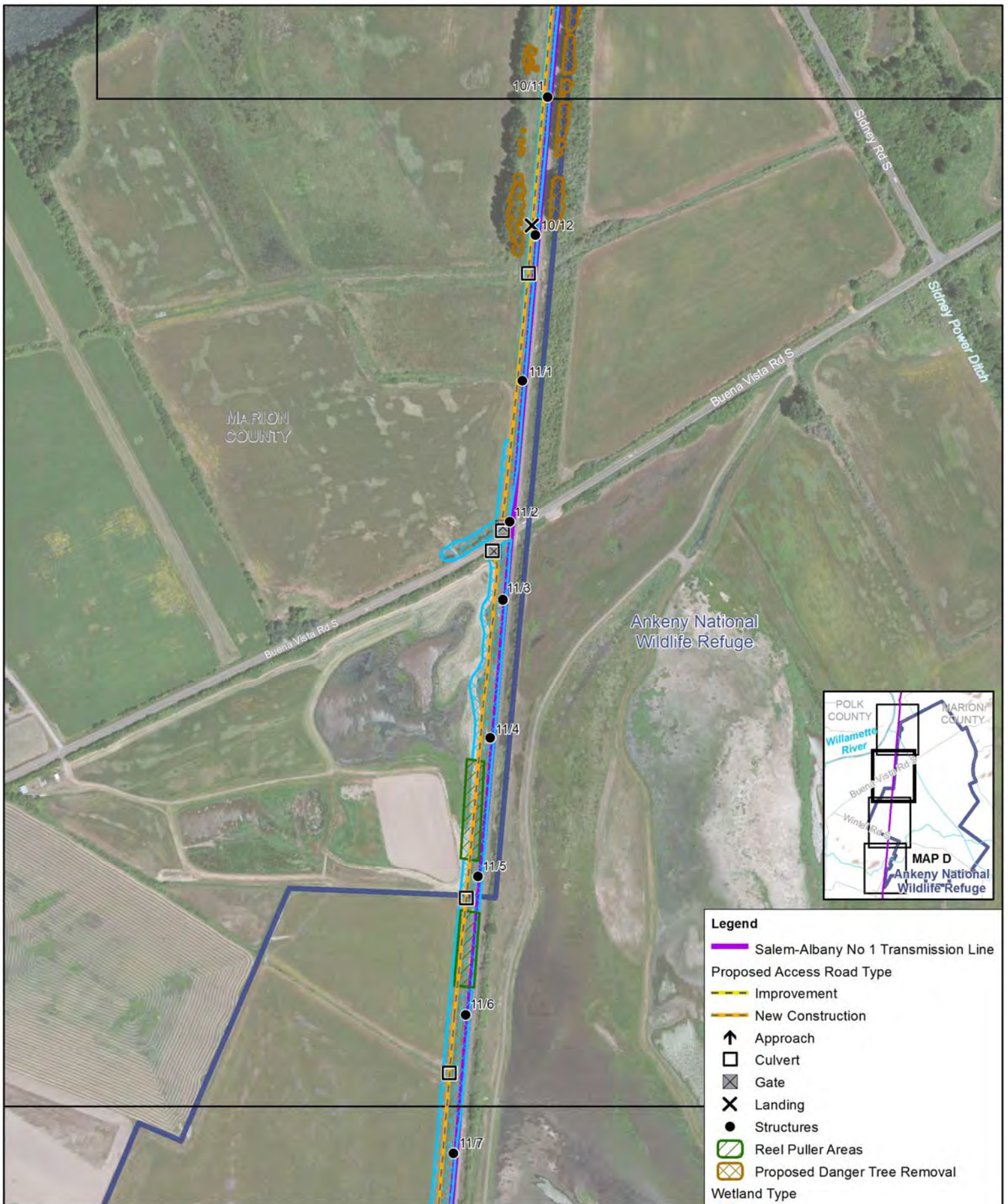
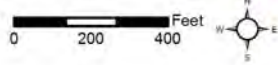


Figure 7b.
Salem-Albany Transmission Line Rebuild Project

Marion County



Sources: BPA 2014, Census 2012, ESRI 2008

- Legend**
- Salem-Albany No 1 Transmission Line
 - Proposed Access Road Type**
 - Improvement
 - New Construction
 - ↑ Approach
 - Culvert
 - ⊠ Gate
 - ✕ Landing
 - Structures
 - ▭ Reel Puller Areas
 - ⊠ Proposed Danger Tree Removal
 - Wetland Type**
 - ⊠ PEM
 - ⊠ PSS
 - ⊠ Ankeny National Wildlife Refuge
 - ⊠ County Boundary
 - ⊠ Map Sheets



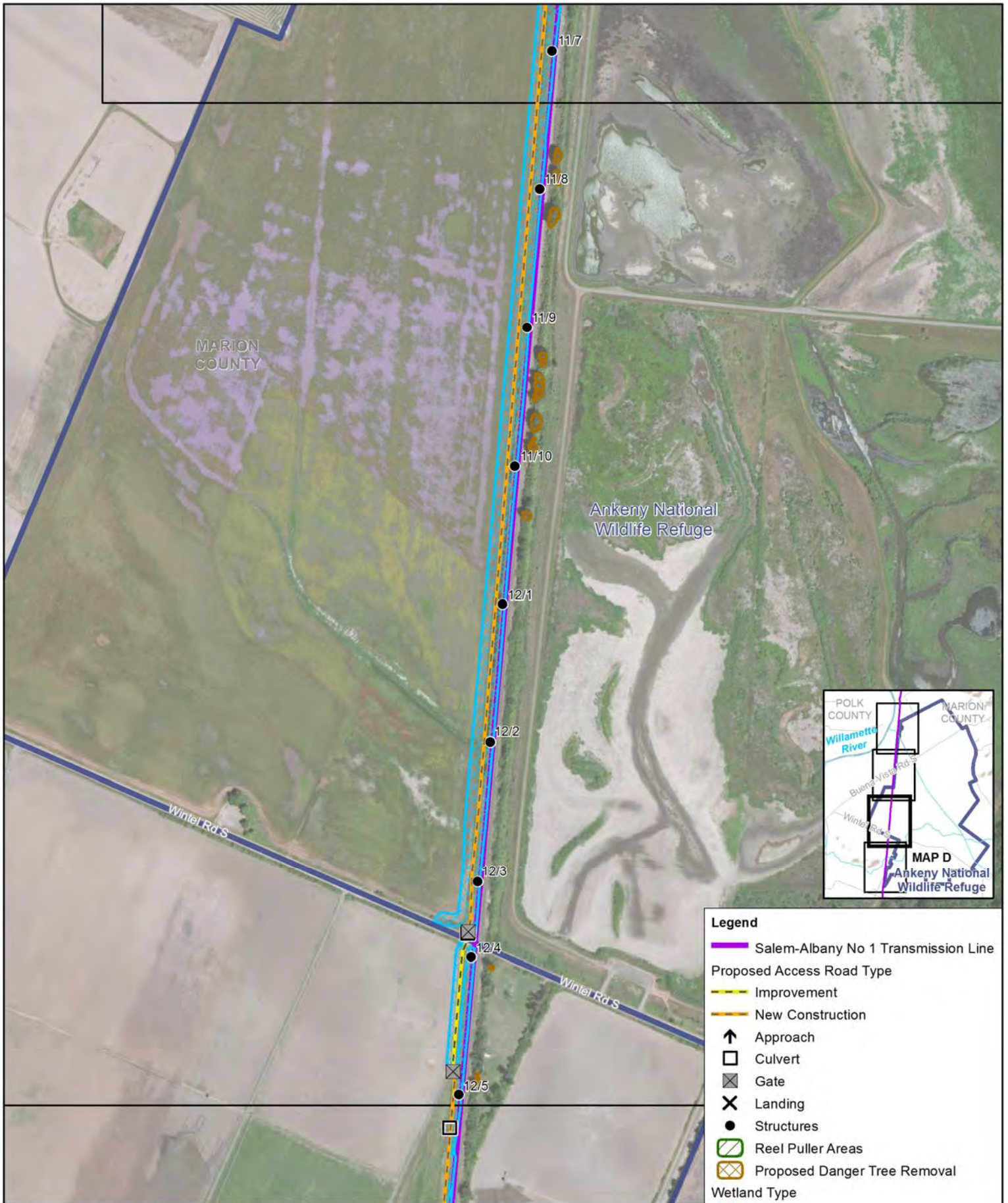
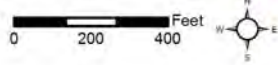


Figure 7c.
**Salem-Albany Transmission Line
 Rebuild Project**

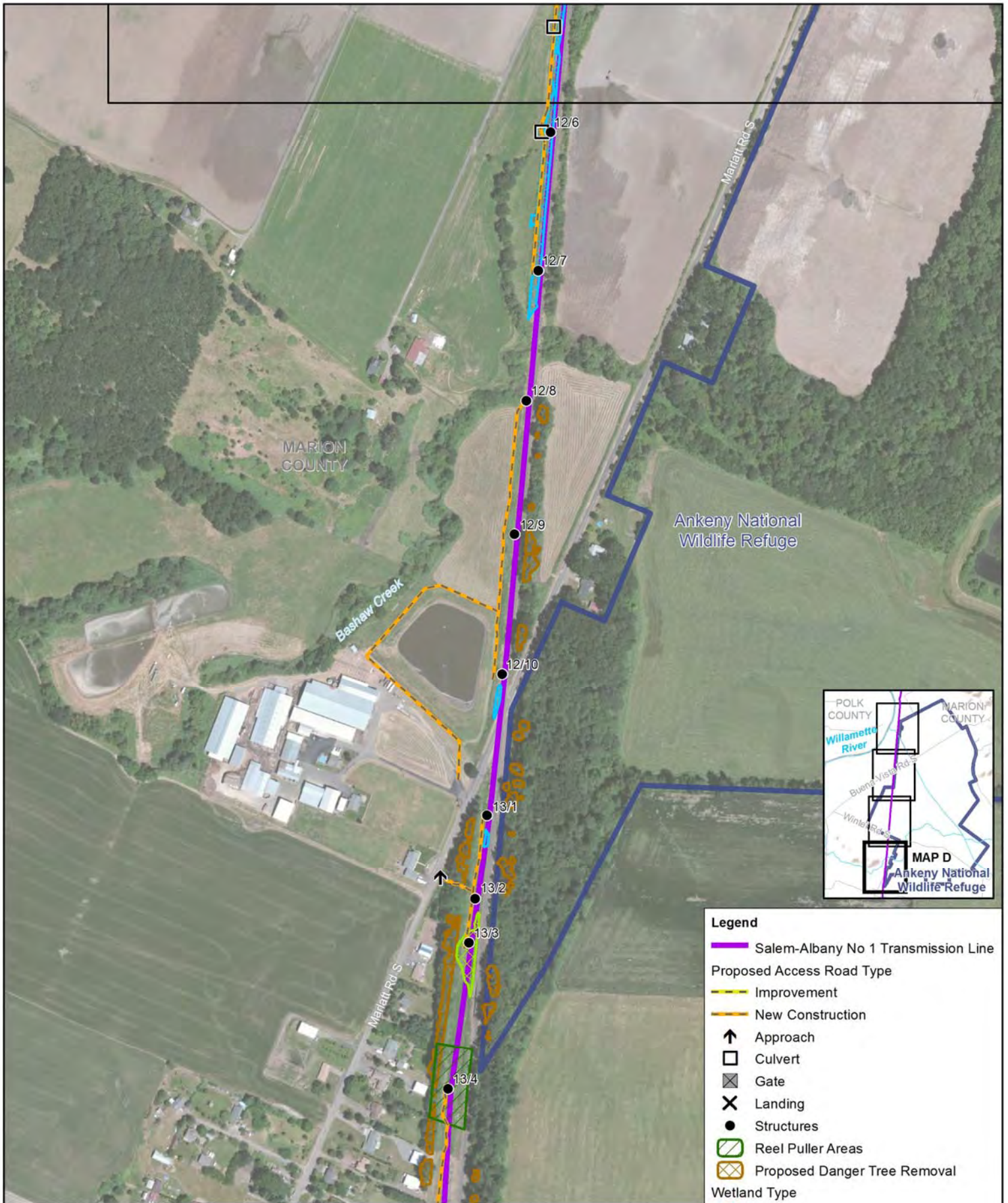
Marion County



Sources: BPA 2014, Census 2012, ESRI 2008

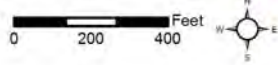
- Legend**
- Salem-Albany No 1 Transmission Line
 - Proposed Access Road Type**
 - Improvement
 - New Construction
 - ↑ Approach
 - Culvert
 - ⊠ Gate
 - ⊗ Landing
 - Structures
 - ◻ Reel Puller Areas
 - ⊠ Proposed Danger Tree Removal
 - Wetland Type**
 - ◻ PEM
 - ◻ PSS
 - ◻ Ankeny National Wildlife Refuge
 - ◻ County Boundary
 - ◻ Map Sheets





- Legend**
- Salem-Albany No 1 Transmission Line
 - Proposed Access Road Type**
 - - - Improvement
 - - - New Construction
 - ↑ Approach
 - Culvert
 - ⊠ Gate
 - ✕ Landing
 - Structures
 - ◻ Reel Puller Areas
 - ◻ Proposed Danger Tree Removal
 - Wetland Type**
 - ◻ PEM
 - ◻ PSS
 - ◻ Ankeny National Wildlife Refuge
 - ◻ County Boundary
 - ◻ Map Sheets

Figure 7d.
Salem-Albany Transmission Line Rebuild Project
 Marion County



Sources: BPA 2014, Census 2012, ESRI 2008



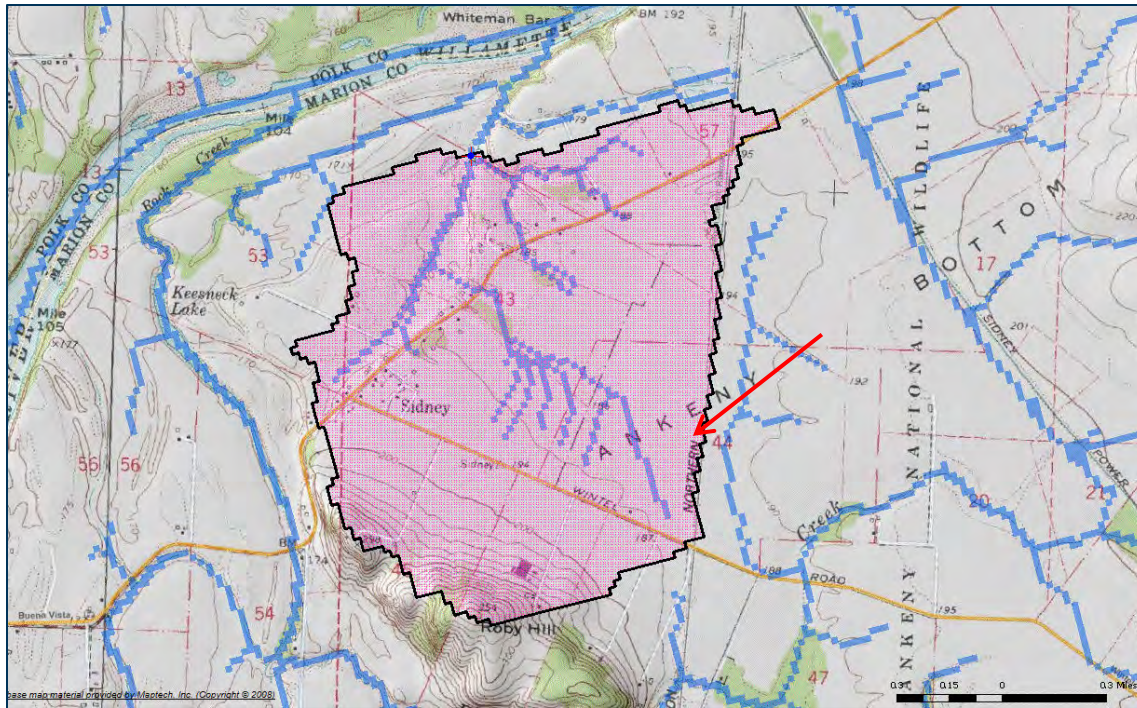


Figure 8. Approximate Surface Water Drainage Area Encompassing the Affected Area in and adjacent to Ankeny NWR (USGS 2014)



Figure 9. Area of Proposed Road Construction Adjacent to Field 5 of the Ankeny NWR

Option 2: The new access road under Option 2 would permanently fill approximately 2.14 acres of palustrine emergent wetlands (currently planted to grass or managed as a vernal pool wetland). Since

much of the affected wetland has been previously disturbed by field cultivation, it makes up only about 1 percent of the available wetland habitat on Ankeny NWR, and impacts would be mitigated through the purchase of wetland credits, but since vernal pools are a rare type of wetland, a new access road across Field 5 would have a **moderate** impact to wetlands on Ankeny NWR.

Option 3: Under Option 3, construction of a temporary access road across Field 5 would result in 2.14 acres of temporary impacts to palustrine emergent wetlands (currently planted to grass or managed as a vernal pool wetland). Quick recovery of the underlying vegetation and soil would be more likely if wetland mats could be used (see Section 1.3.2 in this Appendix).

Since many of the wetlands are only seasonally wet, construction equipment would be able to gain access to sections of the transmission line right-of-way by driving over the wetland areas in the dry season using overland travel routes and thereby minimizing impacts. In places where wet areas persist during the construction season, crane mats or temporary roads constructed of geotextile fabric and rock would be used to cross wet areas and minimize wetland impacts. These mats or temporary roads would be removed following construction. Since much of the affected wetland has been previously disturbed by field cultivation, it makes up only about 1 percent of the available wetland habitat on Ankeny NWR, and soils and vegetation would be restored by BPA, but since vernal pools are a rare type of wetland, impacts to wetlands on Ankeny NWR from a temporary road using wetland mats would be **low-to-moderate**. With geotextile fabric and gravel, impacts would be **moderate** since vegetation recovery could take longer and potentially be less successful if weeds should become established.

Future use of the access easement would involve overland travel by inspection and maintenance vehicles, which would occur annually. When this would occur when fields are dry, there would be little wetland soil disturbance. However, if fields are wet, or if emergency repairs are needed quickly during the rainy season, impacts to the wetland could be more substantial due to increased soil disturbance and potential weed introduction through exposed soils (see Section 1.3.2 in this Appendix). Mitigation measures would be implemented to restore the soils, and so impacts would be expected to be **low-to-moderate**.

Mitigation Measures

Mitigation measures for wetlands on or adjacent to Ankeny NWR are the same as those listed in Section 3.6.3 in the main body of the EA.

C.3.8 Cultural Resources

Affected Environment in and adjacent to Ankeny NWR

The area now encompassed by the Ankeny NWR was most likely occupied by the Pudding River (Anhancuyuk) band of the Kalapuya, although there may have been some Santiam bands in the area as well (Kindred 1980). The Pudding River band utilized the area from French Prairie, south to the Santiam River, and east to the foothills (Berreman 1937). According to Collins (1951), “nothing of the culture of the Pudding River Indians can be located in the literature.” Native Americans used plant resources from what is now the Refuge that included cattails for mat-making, camas for food, willow for fiber to make twine, acorns of Oregon oak, berries for food and pigment, and tarweed for their edible seeds. Wilkes (1852) refers to the tarweed as “sunflower” which forms a large portion of their food. Tarweed seeds were collected after the prairies had been fired.

A review of Oregon State Historic Preservation Office (SHPO) files in Salem revealed that eight archaeological studies have been conducted within 1 mile of the affected area in or adjacent to Ankeny NWR. A total of eight archaeological sites have been previously recorded in this same area. None of the eight sites were located in or adjacent to the affected area. No historic or architectural resources were identified during the SHPO review. There are no known paleontological resources on Ankeny NWR (USFWS 2011), and an investigation conducted for the Proposed Action did not reveal any additional archaeological sites.

Environmental Consequences in and adjacent to Ankeny NWR

No archaeological or architectural resources were identified during the current investigation for the Proposed Action within Ankeny NWR. **No** impacts to cultural resources within Ankeny NWR are anticipated for the Proposed Action, all options included. Due to a determination of **no** impact, impacts to cultural resources are not discussed further in this Appendix.

Mitigation Measures

Mitigation measures for inadvertent discoveries of cultural resources should they occur on or adjacent to Ankeny NWR are the same as those listed in Section 3.10.3 of the main body of the EA.

C.3.9 References

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