United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Spokane District
Wenatchee Field Office
915 Walla Walla Avenue
Wenatchee, Washington 98801

IN REPLY REFER TO:
2850 (ORW020)
WAOR 65753

January 2, 2015

Dear Reader:

Enclosed for your review is the Supplemental Draft Environmental Impact Statement (SDEIS) for the Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project (Project). On January 4, 2013, the U.S. Department of the Interior, Bureau of Land Management (BLM) released a Draft Environmental Impact Statement (DEIS) for public review and comment. As a result of the comments received at public meetings and submitted in writing during the DEIS comment period, the BLM, Pacific Power and the U.S. Department of the Army Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) met and identified a New Northern Route (NNR) that is located largely on JBLM YTC land. Through this process, the BLM determined that an SDEIS was required. As was done with alternative routes analyzed in the DEIS, the NNR was developed into an alternative and evaluated for potential impacts in the SDEIS. The SDEIS fully describes the NNR Alternative and identifies direct, indirect, and cumulative impacts as well as mitigation measures that could avoid, minimize, or reduce potential impacts. The SDEIS focuses the analysis on the NNR Alternative as well as any significant new circumstances or information that has become available since the January 2013 publication of the DEIS. The BLM remains the lead federal agency and, along with the Cooperating Agencies, is responsible for analyzing the effects of granting, granting with conditions, or denying Pacific Power's (the Applicant) right-of-way applications to construct, operate and maintain a 230 kV transmission line, associated access roads, and other ancillary facilities. The JBLM YTC, U.S. Bureau of Reclamation (Reclamation), Bonneville Power Administration (BPA), Federal Highway Administration (FHWA), U.S. Fish and Wildlife Service (USFWS), Washington Department of Natural Resources (DNR), Washington Department of Transportation (WSDOT), and Kittitas and Yakima Counties are Cooperating Agencies and assisted with the preparation of the SDEIS.

The Project area is situated in south-central Washington State, extending from BPA's Vantage Substation, just east of Wanapum Dam in Grant County, to Pacific Power's Pomona-Heights Substation near Selah, Washington. Three alternatives are compared in the SDEIS: No Action, NNR Alternative, and DEIS Agency Preferred Alternative. The NNR Alternative analyzed in the SDEIS is approximately 41 miles in length. The NNR Alternative also includes one potential sub-route section and two locations with underground and overhead design options. The NNR Alternative crosses federal land managed by the BLM, the JBLM YTC, Reclamation, and state land managed by WSDOT and DNR. The NNR Alternative crosses private lands in Yakima, Kittitas, and Grant counties.

The SDEIS is not a decision document. Instead, its purpose is to inform the public and interested parties of impacts associated with implementing the Applicant's proposal as associated with granting rights-of-way to construct, operate, maintain, and decommission transmission facilities across federal lands. This

SDEIS also provides information to other regulatory agencies for use in their decision making process for other permits required for implementation of the project.

The SDEIS is available for review online at: http://www.blm.gov/or/districts/spokane/plans/vph230.php and also at the following locations during regular business hours:

- Mattawa Community Library, 101 Manson Lane, Mattawa, Washington, (509) 932-5507.
- Terrace Heights Library, 4011 Commonwealth Rd, Yakima, Washington, (509) 457-5319.
- Yakima County Public Services Dept., Planning Division; 128 North Second St., Fourth Floor, Courthouse, Yakima Washington, (509) 574-2300.
- WSDOT South Central Region Office, 2809 Rudkin Road, Union Gap, Washington, (509) 577-1600.
- Bureau of Land Management, Wenatchee Field Office, 915 Walla Walla Ave, Wenatchee, Washington, (509) 665-2100.
- Bureau of Land Management, Spokane District Office, 1103 N. Fancher Rd., Spokane Valley, Washington, (509) 536-1200.

The BLM is soliciting written comments on the SDEIS. The forty-five (45) day public comment period for the SDEIS will begin on January 2, 2015 and end on February 17, 2015. The SDEIS is available for review online at: http://www.blm.gov/or/districts/spokane/plans/vph230.php. A CD containing the SDEIS is available upon request. Please contact the BLM Wenatchee Field Office to request a CD.

The BLM will host public meetings in Selah and Desert Aire, Washington during the comment period. The meetings will provide an overview of the Project and take public comments on the proposed Project and SDEIS. The public meetings will be announced by the BLM at least 15 days in advance through the BLM website, public notices, local media news release, and/or mailings.

Comments related to the Vantage to Pomona Heights 230 kV Transmission Line Project SDEIS may be submitted by any of the following methods:

- Online at: http://www.blm.gov/or/districts/spokane/plans/vph230.php.
- By email to: blm_or_vantage_pomona@blm.gov (please specify Vantage to Pomona Heights SDEIS in the Subject line).
- By mail to: Spokane District, Records Manager, 1103 North Fancher Road, Spokane, Washington, 99212, Attn: Vantage to Pomona Heights SDEIS.
- By fax: (509) 536-1275, Attn: Vantage to Pomona Heights SDEIS Project Manager.
- Written comments may also be hand delivered to the BLM Wenatchee Field Office 915 Walla Walla Avenue, Wenatchee, Washington 98801-1521 between 8:00 a.m. and 4:00 p.m. Monday through Friday, but excluding federal holidays.

Comments on the SDEIS should be as specific as possible. It would be helpful if comments referred to chapters and/or sections of the SDEIS. Comments may address the adequacy of specific analyses in the SDEIS and the merits of the alternatives formulated and discussed in the document (refer to Council on Environmental Quality regulations at 40 Code of Federal Regulations (CFR) Part 1503.3).

For all comments submitted, please identify whether you are submitting them as an individual or as the designated spokesperson on behalf of an organization. All comment submittals must include the commenter's name and address. However, before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal information, may be made publically available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

For further information, contact the Vantage to Pomona Heights SDEIS Project Manager: telephone (509) 665-2100 or email: blm_or_vantage_pomona@blm.gov.

We appreciate your interest in public land management and look forward to receiving your comments on the SDEIS.

Sincerely,

Linda Coates-Markle

Linda Coates-Markle
Field Manager

Enclosure

Supplemental Draft Environmental Impact Statement for the Vantage to Pomona Heights 230 kV Transmission Line Project

DOI-BLM-OR-134-2013-0002-EIS

BLM

WENATCHEE FIELD OFFICE

JANUARY 2015

U.S. Department of the Interior
Bureau of Land Management

Supplemental Draft Environmental Impact Statement for the Vantage to Pomona Heights 230 kV Transmission Line Project

DOI-BLM-OR-134-2013-0002-EIS
Case File: WAOR 65753

Spokane District
Wenatchee Field Office
915 Walla Walla Avenue
Wenatchee, WA 98801

Cooperating Agencies
U.S. Army Joint Base Lewis-McChord Yakima Training Center
Bureau of Reclamation
Bonneville Power Administration
Federal Highway Administration
U.S. Fish and Wildlife Service
Washington State Department of Transportation
Washington State Department of Natural Resources
Kittitas County
Yakima County

January 2, 2015

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SPOKANE DISTRICT

EIS #:	DOI-BLM-OR-134-2013-0002-EIS
Project Name:	Vantage to Pomona Heights 230 kV Transmission Line Project Supplemental Draft Environmental Impact Statement
Lead Agency:	U. S. Department of the Interior Bureau of Land Management Spokane District, Wenatchee Field Office, Washington
Cooperating Agencies:	U.S. Army Joint Base Lewis-McChord Yakima Training Center Bureau of Reclamation Bonneville Power Administration Federal Highway Administration U.S. Fish and Wildlife Service Washington State Department of Transportation Washington State Department of Natural Resources Kittitas County Yakima County
Project Location:	Benton, Grant, Kittitas and Yakima Counties, Washington
BLM Contact Person:	Roberta Estes BLM Prineville-Oregon State Office 3050 NE Third Street Prineville, OR 97754 (541) 416-6728 restes@blm.gov
Applicant:	Pacific Power c/o John Aniello; Project Manager 825 NE Multnomah, Suite 1700 Portland, Oregon 97232 (503) 813-6030 john.aniello@pacificorp.com

Abstract:

This Supplemental Draft Environmental Impact Statement (EIS) considers the Proposed Action of authorizing a right-of-way across lands administered by the Bureau of Land Management (BLM), U.S. Army Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), and the Bureau of Reclamation (Reclamation) for the construction and operation of a transmission line and access roads associated with the Vantage-Pomona Heights 230 kV Transmission Line Project. Based on public comments received on the January 2013 Vantage-Pomona Heights 230 kV Transmission Line Project Draft EIS alternatives and on electrical regulating authority's revised transmission line separation distance requirements, a new alternative is being considered that crosses the northern portion of JBLM YTC. This Supplemental Draft EIS considers one additional alternative with one subroute variation to supplement the nine alternatives considered in the Draft EIS: the New Northern Route (NNR) Alternative and Manastash Ridge Subroute. The following issues were identified for analysis in the Supplemental Draft EIS based on public scoping and cooperating agency concerns: potential impacts on sage-grouse populations and habitat, and special status wildlife species and protected birds; avian collision potential; effects on vegetation; sagebrush and native grassland communities disturbance types and levels; endangered and threatened plant species effects; introduction, spread and control of noxious weeds; impacts on cultural resources, prehistoric and historic sites; electric and magnetic field health effects; impacts on residential areas and planned development; effects on productive or revenue generating state lands; affect on recreational areas and opportunities; impact on Native American Tribal cultural properties; financial impacts to farming and agricultural operations; effect on property values; effects on low-income and minority populations or communities; potential for increased public access on access roads; private property aesthetic impacts; effects on BLM Visual Resource Management objectives and Washington State Department of Transportation established visual quality; affects on fire management/suppression activities and risk of wild fire; and impacts on JBLM YTC training operations.

EXECUTIVE SUMMARY

This Executive Summary provides a synopsis of the Vantage to Pomona Heights 230 kV Transmission Line Project Supplemental Draft Environmental Impact Statement (SDEIS). On January 4, 2013, the Bureau of Land Management (BLM) released a Draft Environmental Impact Statement (DEIS) for public review and comment, identifying an Agency Preferred Route Alternative paralleling an existing transmission line in Benton, Grant and Yakima Counties. As a result of the public comments received on the DEIS during the comment period, the BLM, Pacific Power and the U.S. Department of the Army (Army) Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) met and identified a new route that is located largely on JBLM YTC land. This new route is similar to a northern JBLM YTC route that was considered and eliminated in the DEIS. This previously eliminated route was re-considered because of revised electrical regulatory requirements (i.e., reduction in transmission line separation). The revised separation requirements would also eliminate JBLM YTC aerial operating conflicts that had previously eliminated the alternative from consideration in the DEIS.

This SDEIS builds on the work done in the January 2013 DEIS and, where appropriate, relies on the data presented and analyses done in the DEIS. This SDEIS describes the New Northern Route (NNR) Alternative, with two Design Options, and the Manastash Ridge (MR) Subroute variation on the NNR Alternative. The Overhead Design Option and the Underground Design Option for the NNR Alternative, and the MR Subroute, are compared with the DEIS Agency Preferred Alternative (Alternative D) and the No Action Alternative in this SDEIS. The analysis discusses their potential effects on the human and natural environment. The SDEIS has been distributed to interested persons in hard copy and compact disk (CD) formats; hard copies are available for review at the BLM Spokane District Office and Wenatchee Field Office, Yakima County Public Services Department, Washington State Department of Transportation (WSDOT) South Central Region Office, and local libraries, and online at: http://www.blm.gov/or/districts/spokane/plans/vph230.php.

INTRODUCTION

The proposed Vantage to Pomona Heights 230 kV Transmission Line Project (Project) would extend from the existing Bonneville Power Administration (BPA) Vantage Substation located east of the Wanapum Dam in Grant County, Washington to Pacific Power's existing Pomona Heights Substation located east of Selah in Yakima County, Washington. Pacific Power, a regulated utility serving 730,000 customers in Oregon, Washington, and northern California, filed separate right-of-way (ROW) applications (SF-299) in October 2008 with the BLM Spokane District Office and the JBLM YTC to request grants of ROW across federal lands for the transmission project. A revised SF-299 was submitted to the BLM and JBLM YTC in October 2010 to reflect a change in routes under consideration since the submittal of the original SF-299 in 2008. An updated SF-299 was submitted to JBLM YTC in November 2013 for the NNR Alternative. In April 2011, Pacific Power filed a ROW application with Bureau of Reclamation (Reclamation) to request a grant of ROW across Reclamation lands. In addition, Pacific Power has submitted an interconnection request to BPA to interconnect the proposed new transmission line to BPA's Vantage Substation and will submit an application to use I-82 land owned by WSDOT to the Federal Highway Administration (FHWA).

The proposed Project would: eliminate the potential for redistributed loads and the overloading of the adjacent transmission system; would ensure continued reliable and efficient service to the Yakima Valley; and would address future reliability issues within the Mid-Columbia transmission system. . As a result of studies conducted by Mid-Columbia utilities including BPA, Grant County Public Utility District (PUD), Chelan County PUD, PacifiCorp, and Puget Sound Energy joined with the Northwest Power Pool (NWPP) - Northwest Transmission Assessment Committee (NTAC) to perform a detailed screening of the transmission system's exposure to overloading. System reinforcement projects or upgrades were identified to address system conditions and overloading. The proposed Vantage to Pomona Heights 230 kV Transmission Line Project was one of the reinforcement projects that were identified for Grant, Benton, and Yakima counties to ensure reliability of the transmission network in the Mid-Columbia area.

The BLM is serving as the federal lead agency, with the JBLM YTC, the BPA, Reclamation, WSDOT, the FHWA, the Washington State Department of Natural Resources (DNR), Yakima County, and Kittitas County serving as Cooperating Agencies. Because the development of the Vantage to Pomona Heights 230 kV Transmission Line Project is dependent upon federal approval of a ROW grant for the transmission line across federal lands, the BLM will decide whether to grant, grant with conditions or modifications, or deny the application for a new ROW on BLM-administered lands. Pursuant to 43 Code of Federal Regulations (CFR) Part 2805.10, the BLM may include in any ROW grant such terms, conditions, and stipulations, which are in the public interest. This includes modifying the proposed use or changing the route or location of the facilities on BLM-administered lands. The BLM's need for action, to respond to Pacific Power's ROW application, arises from the Federal Land Policy and Management Act of 1976 (FLPMA) which establishes a multiple use mandate for management of federal lands, including energy generation and transmission facilities as outlined in 43 CFR Part 2800. Upon reviewing the scope of the proposed Project and the ROW applications, the BLM and JBLM YTC determined that the proposed Project constituted a major federal action and requires the preparation of an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA).

ALTERNATIVES

This SDEIS considers two alternatives: the NNR Alternative and the No Action Alternative. There are three variations of the (action) alternative analyzed: the NNR Alternative - Overhead Design Option (overhead construction for all route segments), the NNR Alternative with MR Subroute (overhead construction for all route segments), and the NNR Alternative - Underground Design Option (underground construction for two route segments, NNR-4 and NNR-6, totaling 10 miles). These three alternative variations are compared with the Agency Preferred Alternative in the SDEIS. The NNR Alternative variations considered in this SDEIS are either 40.3 or 47.7 miles in length. See Figure 2-2 and Section 2.3 in Chapter 2 for a diagram and discussion of the end-to-end alternatives.

As proposed by Pacific Power, most of the proposed transmission line would be constructed on H-frame wood pole structures between 65 and 90 feet tall and spaced approximately 650 to 1,000 feet apart depending on terrain, with single wood pole or steel monopole structures used in developed or agricultural areas. The single pole structures would be between 70 and 110 feet tall and spaced approximately 400 to 700 feet apart. The ROW width for the H-frame structure type would be between 125 to 150 feet and for the single pole structure type between 75 to 100 feet. The Project would also require upgrades to the Pomona Heights Substation located east of Selah and the Vantage Substation located east of the Wanapum Dam.

For the NNR Alternative - Underground Design Option, underground construction techniques considered in this SDEIS are based on industry standards and methods used on other transmission line projects. Pacific Power currently does not operate or maintain an underground line of this voltage, and the description of the construction components, technologies, methods, and disturbance assumptions are based on other projects implemented by utilities that have installed 230 kV underground facilities. Locations for undergrounding considered in this SDEIS occur along two route segments: NNR-4u and NNR-6u (see Figure 2-1). A permanent 30-foot ROW would be required for the underground duct bank and adjacent access road. Splice vaults (9 feet wide x 28 feet long x 10 feet deep) would be required approximately every 1,500 to 2,000 feet, and a five acre transition station would be required at each overhead/underground interface for the Underground Design Option.

ENVIRONMENTAL IMPACTS

Environmental impacts of the alternatives are related to: vegetation and special status plants; sage-grouse and their habitat; agricultural, residential, and military land uses; recreational activities and the displacement of recreational land uses; the visibility of the transmission line and roads from sensitive viewers; scenic views and change in natural scenery; potential incompatibility with the visual character of existing development; transportation and roadway systems; archaeological resources and properties listed on the National Register of Historic Places; sensitive Native American areas and uses; communities and landowner economic effects; public health and safety; climate and global warming; and Special Management Areas. Impacts are analyzed considering the implementation of Project Design Features (PDFs) and other mitigation measures where applicable as discussed in Chapter 2 and Chapter 4.

Vegetation

Long-term disturbance to vegetation would be similar for the NNR Alternative - MR Subroute, the NNR Alternative - Underground Design Option, and the DEIS Agency Preferred Alternative. The NNR Alternative - Overhead Design Option would disturb the least amount of vegetation. The DEIS Agency Preferred Alternative would disturb the lowest percentage of vegetation classified as a moderate impact. The NNR Alternative - Overhead Design Option and the NNR Alternative - Underground Design Option would disturb the most vegetation classified as moderate, primarily associated with long-term disturbance to sagebrush.

The miles of special status species polygons that would be crossed and the number of miles with special status plants documented during the surveys is the same for the NNR Alternative, regardless of design option. The DEIS Agency Preferred Alternative would cross a comparable number of special status species polygons and fewer miles of its route segments would cross locations with special status plants documented during plant surveys. One Washington Natural Heritage Program (WNHP) priority ecosystem would be crossed by NNR Alternative - MR Subroute. All alternatives compared in the SDEIS would cross similar miles of suitable habitat.

Wildlife

Overall, the DEIS Agency Preferred Alternative would cause the greatest amount of direct habitat loss to wildlife habitat and sage-grouse habitat while the NNR Alternative - Overhead Design Option would disturb the least amount of habitat. Compared to the NNR Alternative - Overhead Design Option the NNR Alternative - Underground Design Option would disturb more wildlife habitat and more sage-grouse habitat because it would require more vegetation removal through the excavation of a continuous trench for underground portions and would require a permanent road to access underground locations. Because the NNR Alternative - Overhead Design Option and the NNR Alternative - Underground Design Option closely parallel the existing Pomona-Wanapum 230 kV transmission line for the majority of their total length, utilizing nearby existing roads will reduce the need for new access roads, greatly decreasing the amount of direct habitat loss associated with the Project.

Greatest ground disturbance would occur with the construction of the DEIS Agency Preferred Alternative, and the least ground disturbance would occur with the NNR Alternative - Overhead Design Option. The NNR Alternative - MR Subroute would require construction in areas that are not located adjacent to an existing line and in areas with few or no access roads. The NNR Alternative - Underground Design would require greater ground disturbance in underground construction locations through trenching and new, permanent access road construction.

Due to the proximity to the existing Pomona-Wanapum 230 kV Transmission Line, the NNR Alternative - Overhead Design Option and the NNR Alternative - Underground Design Option it is unlikely that the addition of a structure 200 feet from a similar existing structure would have much, if any, effect on the density of corvids or raptors. Construction of the DEIS Agency Preferred Alternative would require nearly eight times the number of new structures greater than 0.25 mile from existing structures than the NNR Alternative - Overhead Design Option or NNR Alternative - Underground Design Option, and nearly three times more than the NNR Alternative - MR Subroute. Construction of the NNR Alternative - MR Subroute would require new H-frame poles in areas largely devoid of tall structures; corvid species may be most likely to use the new structures along Manastash Ridge that are closest to existing agriculture and residential development. Because a portion (two segments totaling ten miles) of the NNR Alternative - Underground Design Option would be undergrounded, it would require the fewest number of total structures, but the NNR Alternative - Underground Design Option would not reduce the number of structures greater than 0.25 mile from an existing structure, because all undergrounding locations closely parallel the existing transmission line. The close proximity of the underground sections to existing overhead lines would negate most of the benefit to wildlife that undergrounding might otherwise have.

The DEIS Agency Preferred Alternative crosses the fewest miles of moderate to high sensitivity wildlife habitat because much of the route travels through existing agricultural development or degraded habitat instead of sagebrush. The amount of special status habitat crossed by the NNR Alternative - MR Subroute is slightly lower than the NNR Alternative - Overhead Design Option or NNR Alternative - Underground Design Option.

A higher proportion of the DEIS Agency Preferred Alternative is within one mile of documented special status species raptor nests compared with the NNR Alternative, regardless of design option. The number of miles within 0.5 mile of a special status species occurrence record is also higher for the DEIS Agency Preferred Alternative than for the NNR Alternative. The amount of Priority Species Regional Area crossed is higher for the DEIS Agency Preferred Alternative than for the NNR Alternative.

The majority of the proposed NNR Alternative would be located within the USFWS-designated JBLM YTC Priority Areas for Conservation (PAC) for sage-grouse. Compared with the DEIS Agency Preferred Alternative, the NNR Alternative Overhead Design Option and the NNR Alternative Underground Design Option would have the lowest number of miles within the PAC, while the NNR Alternative - MR Subroute would have the most miles within the PAC. In addition, the location of the NNR Alternative - Overhead Design Option and the NNR Alternative - Underground Design Option are co-located with an existing transmission line for the majority of their length within the PAC. All of the NNR Alternative options would be just within the boundary of the Army-designated JBLM YTC Primary Sage-Grouse Protection Area for approximately one mile. The DEIS Agency Preferred Alternative is not located within any Army-designated Sage-Grouse Protection Areas.

Land Use, Recreation, Visual and Transportation

The NNR Alternative would have greater impacts on residential land use compared with the DEIS Agency Preferred Alternative which would have greater impacts on irrigated agriculture and dryland agriculture. The NNR Alternative - Underground Design Option and NNR Alternative - MR Subroute would have similar disturbance to JBLM YTC land while the DEIS Agency Preferred Alternative would have the least disturbance to JBLM YTC land. The NNR Alternative - MR Subroute would result in the greatest disturbance on state land leased for grazing or agriculture. The NNR Alternative - MR Subroute and NNR Alternative - Underground Design Option would each have slightly greater impacts on BLM grazing leases. Overall, the greatest mileage of high impacts on land use would occur for the DEIS Agency Preferred Alternative.

The mileage of low impacts on recreation resources would be highest for the NNR Alternative - MR Subroute and the fewest for the DEIS Agency Preferred Route. The greatest mileage of no identifiable impacts to recreational uses would occur for the DEIS Agency Preferred Route.

The DEIS Agency Preferred Alternative would require the most new and spur road construction, but would not require the crossing of I-82; it would require the crossing of State Route (SR) 243 in one location. All of the NNR Alternative Design Options would cross I-82 in two locations and would require the crossing of SR 243 in one location. Although the disturbance calculations used the same access road assumptions as the NNR Alternative - Overhead Design Option, the NNR Alternative - Underground Design Option would require the least amount of new access road construction, but grading requirements of the access road and duct bank would require the disturbance of more land in steep terrain.

The DEIS Agency Preferred Alternative would have the highest total mileage of high impacts on visual resources while the NNR Alternative - MR Subroute and the NNR Alternative - Overhead Design Option would have the lowest. Higher impacts between the NNR Alternative Design Options are a result of the higher contrasts in localized areas as a result of the installation of underground-to-overhead transition stations near sensitive viewers. Among the NNR Alternative Design Options, the NNR Alternative - MR Subroute would have the highest total mileage of high impacts. Both the DEIS Agency Preferred Alternative and the NNR Alternative, including Design Options, would be compliant with BLM's Interim Visual Resource Management (VRM) Class III designation.

Socioeconomics and Environmental Justice

Socioeconomic impacts on the Study Region economy would be predominantly beneficial, as job opportunities increase due to either of the Alternatives. Impacts as a whole would not greatly vary between the NNR Alternative Design Options. This lack of distinction arises because (1) impacts are so low as to be nearly imperceptible themselves and (2) the scale of construction (duration, employment, and purchases of local goods and services) varies only moderately between the NNR Alternative Design Options. Average on-site employment would total between 26.4 (NNR Alternative – Overhead Design Option) and 40.7 (DEIS Agency Preferred Alternative) workers. For the NNR Alternative, the distinction in the impacts between the different design options arises from the 7.3 miles in added length of the NNR Alternative - MR Subroute, which means slightly more investment and employment would be needed. However, such small differences in the initial stimuli to the regional economy caused by the alternatives would not create discernibly different socioeconomic impacts, when viewed region-wide or even by community.

No significant impacts on minority or low-income populations are expected with implementation of either of the Alternatives. Although some of the Census Block Groups within three miles of the NNR Alternative and the DEIS Agency Preferred Alternative do contain substantial populations of minority and low-income populations, appreciable concentrations of such populations are more distant than about a mile, limiting the potential impact to no more than minimal, and not significant. Differences in impacts among Alternatives would be extremely small.

Cultural Resources and Native American Concerns

Total ground disturbance, and therefore potential for disturbance of cultural sites, would be least for the NNR Alternative - Overhead Design Option and most for the DEIS Agency Preferred Alternative. However, fewer total cultural resources, traditional cultural properties (TCPs), archaeological sites, and ineligible (or assumed ineligible) National Register Sites are within 75 feet of the centerline of the DEIS Agency Preferred Alternative as compared to the NNR Alternative regardless of Design Option. The greatest number of total cultural sites, TCPs, archaeological sites, isolated finds, and ineligible (or assumed ineligible) sites within 75 feet of the centerline occur with the NNR Alternative - Underground and Overhead Design Options.

It has been assumed that visually sensitive resources include those with burials, rock features (cairns, alignments), talus pits, rock art (pictographs and petroglyphs), and rockshelters. The numbers of visually sensitive TCPs are similar for the Agency Preferred Alternative (4) and the NNR Alternative regardless of Design Option (5).

Wildland Fire

The DEIS Agency Preferred Alternative has the highest number of miles with moderate impacts compared with the NNR Alternative, regardless of Design Option. The NNR Alternative - MR Subroute has over twice as many miles of moderate impacts compared with the NNR Alternative - Overhead Design Option and NNR Alternative - Underground Design Option. High impact levels are not anticipated for the DEIS Agency Preferred Alternative or the NNR Alternative.

Water Resources

No long-term disturbance to water resources would occur with the construction, operation, and maintenance of the NNR Alternative - Overhead Design Option, NNR Alternative - MR Subroute, NNR Alternative - Underground Design Option, or the DEIS Agency Preferred Alternative. Differences in impact levels are very similar for the NNR Alternative Design Options and the DEIS Agency Preferred Alternative, with the majority of the impacts categorized as no identifiable. Ninety-seven percent of the impacts for the NNR Alternative - Overhead Design Option and the NNR Alternative - Underground Design Option are classified as no identifiable. Ninety-two percent of the impacts for NNR Alternative - MR Subroute and the DEIS Agency Preferred Alternative are classified as no identifiable. No moderate or high impacts to water resources are anticipated for the DEIS Agency Preferred Alternative or the NNR Alternative.

Geology and Soils

No long-term disturbance to geologic and soil resources would occur with the construction of the NNR Alternative - Overhead Design Option, the NNR Alternative - Underground, the NNR Alternative - MR Subroute, or the DEIS Agency Preferred Alternative. Overall impact levels are similar for the NNR Alternative - Overhead Design Option and the NNR Alternative - MR Subroute, with the majority of the impacts categorized as moderate to low; however, the NNR Alternative - Underground Design Option would create more moderate impacts due to the displacement of greater volumes of soil as a result of excavated areas. Geology and soil impacts resulting from open cut trenching are expected to be greater than those that would occur from the NNR Alternative - Overhead Design Option.

The risk to Project electric transmission service as a result of seismic activity or landslides would be substantially greater with the NNR Alternative - Underground Design Option due to the inability to span discovered faults. The DEIS Agency Preferred Alternative would cause similar low to no identifiable impact levels as the NNR Alternative - Overhead Design Option and NNR Alternative - MR Subroute, but the DEIS Agency Preferred Alternative would create disturbance in larger areas of potential high wind erosion soils.

Each of the NNR Alternative Design Options cross 14 faults while the DEIS Agency Preferred Alternative only crosses two. The NNR Alternative - Overhead and NNR Alternative - Underground Design Option would cross 2.1 miles of high landslide areas, the NNR Alternative - MR Subroute would cross 2.9 miles of high landslide areas, and the DEIS Agency Preferred Alternative would cross 3.0 miles of high landslide areas. While geotechnical investigations are included in the PDFs, a more comprehensive geotechnical investigation would be required along the entire NNR Alternative – Underground Design Option.

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TABLE OF CONTENTS

APPENDICES

FIGURES

TABLES

CHAPTER 1 PURPOSE AND NEED

1.1 NEED FOR SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

On January 4, 2013, the Bureau of Land Management (BLM) released a Draft Environmental Impact Statement (DEIS) for public review and comment, identifying an Agency Preferred Route Alternative paralleling an existing transmission line in Yakima County and generally following Road N and crossing the Saddle Mountains in Grant County (Alternative D in the DEIS). Public meetings were held in Selah and Desert Aire in February 2013 to provide the public an opportunity to give their input on the DEIS and Agency Preferred Route Alternative. The BLM received letters and e-mails containing more than 250 comments during the comment period which ended on March 8, 2013.

As a result of the comments received at the meetings and submitted in writing during the DEIS comment period, the BLM, Pacific Power and the U.S. Department of the Army (Army) Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) met and identified a new route that is located largely on JBLM YTC land. This new route is similar to a northern JBLM YTC route that was considered and eliminated from consideration because of the Western Electricity Coordinating Council (WECC) line separation requirements in place at the time the alternative was being considered. Previously, the separation distance required the placement of the line in areas that would create conflicts with JBLM YTC's aerial operations and training. Recently these separation requirements were revised by the electrical regulating authorities, WECC and the North American Electric Reliability Corporation (NERC), and now would allow a much closer distance between existing lines and the proposed Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line (Project) which would minimize impacts to JBLM YTC training operations and allow this New Northern Route (NNR) alternative to be reconsidered.

As was done with alternative routes analyzed in the DEIS, this NNR must now be developed into an alternative and evaluated for potential impacts. The BLM has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required. This SDEIS fully describes the NNR and identifies direct, indirect, and cumulative impacts as well as mitigation measures that could avoid, minimize, or reduce potential impacts. It builds on the work done in the January 2013 DEIS and, where appropriate, relies on the data presented and analyses done in the DEIS and includes references to that document throughout the text of this SDEIS. This SDEIS focuses the analysis on the NNR, as well as analysis on any significant new circumstances or information that has become available since the January 2013 publication of the DEIS. This SDEIS is prepared pursuant to the requirements of the National Environmental Policy Act (NEPA) of 1969 as amended (42 United States Code [U.S.C.] §§ 4321, et seq.) and subsequent regulations issued by the Council on Environmental Quality (CEQ) implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500 through 1508). The SDEIS was prepared in conformance with the BLM NEPA Handbook (BLM Handbook H-1790-1) and the U.S. Department of the Interior's Manual on NEPA (516 DM 1-7), which provides instructions for compliance with the CEQ regulations for implementing the procedural provisions of NEPA.

The BLM is the lead federal agency responsible for the preparation of this SDEIS. Cooperating Agencies and other agencies with expertise or review, approval, and permitting authority are the JBLM YTC, the Bonneville Power Administration (BPA), the U.S. Bureau of Reclamation (Reclamation), the Washington State Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), the Washington State Department of Natural Resources (DNR), Yakima County and Kittitas County.

After comments are received on this SDEIS, the DEIS and SDEIS will be merged into the Final Environmental Impact Statement (FEIS). Based on the analysis of all alternatives, a new Agency Preferred Alternative may be identified.

The FEIS will be used by BLM, JBLM YTC, and Reclamation to make a decision regarding Pacific Power's Application for Transportation and Utility Systems and Facilities on federal lands (SF-299), submitted to the BLM on October 31, 2008 (case file #WAOR 65753) and amended by Pacific Power on November 5, 2010. Each agency will issue its own Record of Decision regarding the matter before it for decision.

1.2 SUMMARY OF THE PROPOSED PROJECT

Pacific Power proposes to construct, operate and maintain a new 230 kV transmission line from Pacific Power's Pomona Heights Substation located just east of Selah, Washington in Yakima County to BPA's Vantage Substation located just east of the Wanapum Dam in Grant County, Washington (Project). Figure 1-1 shows the location of the proposed Project within the state of Washington and Figure 1-2 shows the Project Study Area and the location of the Pomona Heights and Vantage substations.

The NNR considered in this SDEIS is 41 to 48 miles in length. The route crosses federal land managed by the BLM, the JBLM YTC, Reclamation, and state land managed by WSDOT and DNR. Yakima, Kittitas, and Grant Counties are crossed by the NNR.

As proposed by Pacific Power, most of the transmission line would be constructed on H-frame wood structures between 65 and 90 feet tall. In developed areas, single wood or steel monopole structures between 80 and 110 feet tall would be used. The NNR transmission line route would cross the Columbia River below the Wanapum Dam on steel lattice structures that are approximately 200 feet tall. The existing Pacific Power Pomona Heights Substation and the existing BPA Vantage Substation would be upgraded by installing new equipment connecting the new 230 kV transmission line to the regional electric grid.

Vantage - Pomona Heights 230kV Transmission Line Project

Project Location

Figure 1-1

Project Features

Study Area

Base Features

State Boundary

County Boundary

Transportation

Interstate Highway

Water

Major River

Lake or Ocean

0 10 20 30 40 50 60 70 80
Miles

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POWER ENGINEERS

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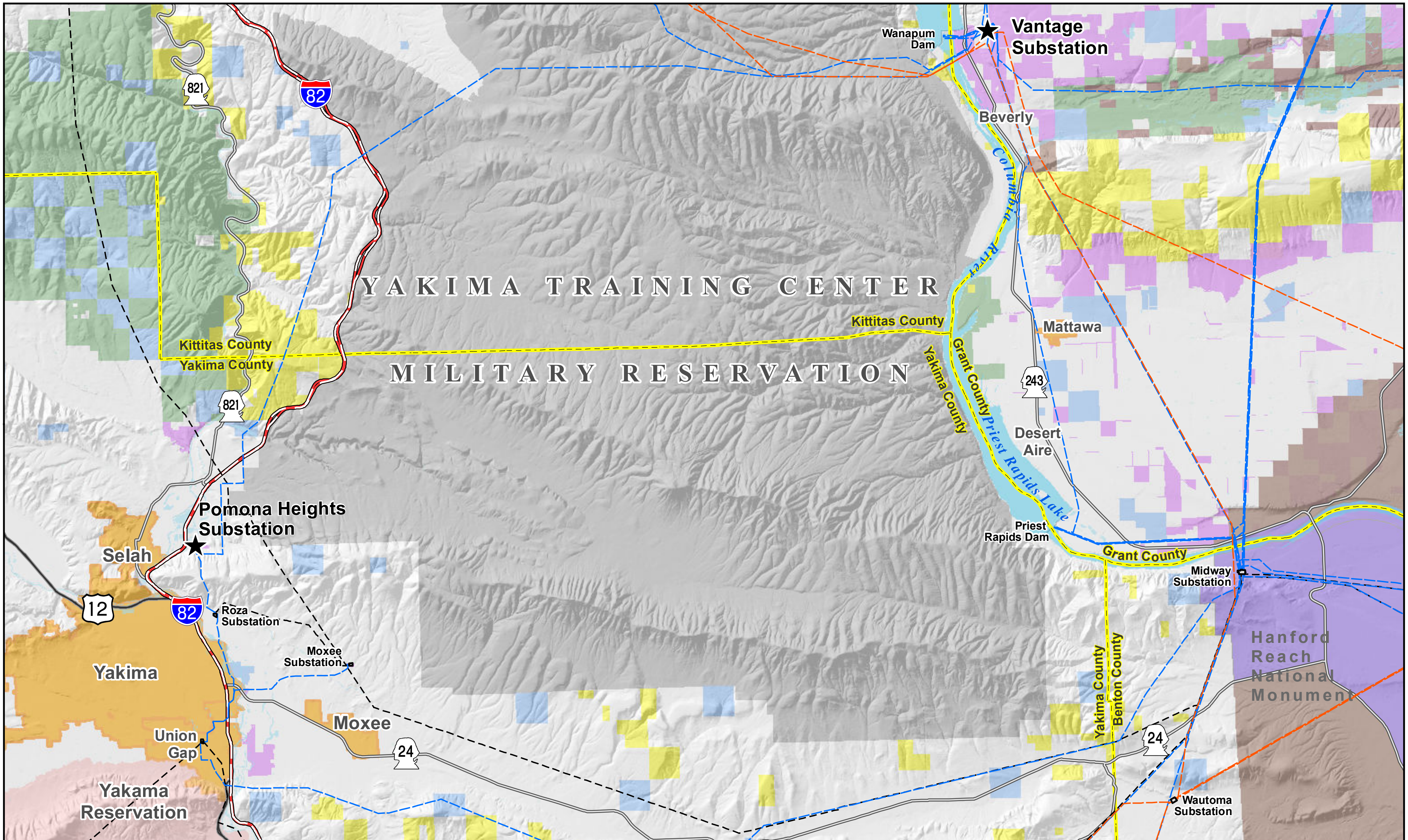

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 1-2 Project Study Area

Project Features
- Project Substation

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- County Boundary
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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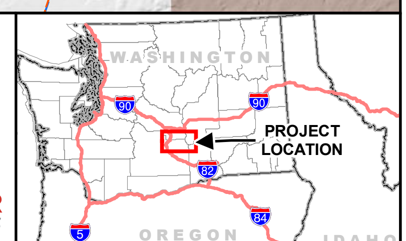

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1.3 BACKGROUND

1.3.1 Proponent

Pacific Power is part of PacifiCorp which has 1.7 million customers in six western states. Pacific Power provides electric service to almost 730,000 customers in Oregon, Washington, and northern California. Pacific Power, as a regulated utility, is required to provide safe and reliable service for all customers within its service territory.

1.3.2 Third-Party Contractor

POWER Engineers, Inc. (POWER), a third-party consultant under the direction of BLM, is assisting with the preparation of this SDEIS. POWER has certified that it does not have any financial or other interest in the decisions to be made pursuant to this EIS.

1.3.3 Regional Transmission System Study

The WECC, in conjunction with the NERC, has established System Planning and Operating Criteria that all transmission providers within the Western Interconnection must follow when planning and operating their transmission systems (NERC/WECC 2005; WECC 2008; NERC 2009). These standards and criteria require transmission providers to evaluate expected normal and potential abnormal operating conditions and plan adequate redundancy in the system (e.g., through construction of multiple transmission lines and locating multiple lines in wide geographically diverse transmission corridors) to meet expected system reliability performance. These standards and criteria define both the expected level of event severity (single and multiple line outages) and acceptable performance requirements. In part, the standards require transmission providers to evaluate multiple adjacent outages and, when applicable, the outage of all lines in a corridor to ensure the outage does not result in a cascading and uncontrolled loss of generation stations and outages of customer loads. While these standards and criteria exist for performance and reliability, it is the responsibility of the transmission provider, based on operational history and experience, to plan, design, and site transmission projects to meet system performance requirements and manage reliability, risks and costs.

In 2007, Pacific Power participated in a regional transmission system planning study to address reliability issues within the Mid-Columbia transmission system. To address these issues, the Mid-Columbia utilities including BPA, Grant County Public Utility District (PUD), Chelan County PUD, PacifiCorp, and Puget Sound Energy worked together with the Northwest Power Pool (NWPP) - Northwest Transmission Assessment Committee (NTAC) to perform a detailed screening of the transmission system exposure to overloading (NTAC 2007). As a result of the study, system reinforcement projects or upgrades were identified to address system conditions and overloading. The proposed Project was a reinforcement project that was identified for Grant, Benton, and Yakima counties to ensure reliability of the transmission network in the Mid-Columbia area.

The regional transmission study determined that loss of the existing Pacific Power Pomona-Wanapum 230 kV transmission line would result in a significant load shedding exposure on the transmission system and would also impact other transmission providers in the Mid-Columbia area with overloads of their existing transmission components. Based on 2007 loads and system activity during high load periods in the Yakima Valley, loss of the Pomona-Wanapum 230 kV transmission line would result in the need to shed up to 167 megawatts (MW). This load shed would occur through five different substations and would represent 33 percent of the 500 MW load in the Yakima area.

The regional transmission study showed that an outage of the Pomona-Wanapum 230 kV transmission line would result in redistribution of electrical flow across the BPA and Grant County PUD parallel transmission systems that also feed into Pacific Power's Yakima load area. This redistribution would result in loadings well above the acceptable limits of many existing transmission components on the other systems, putting the regional transmission system at risk of failure. The transmission system planning studies determined that an outage of the Pomona-Wanapum 230 kV transmission line would result in the overload of three Pacific Power high voltage transmission lines and two BPA high voltage transmission lines, potentially causing service interruptions in the Yakima Valley. The regional planning study showed that the addition of a Vantage to Pomona Heights 230 kV transmission line would eliminate the redistributed loads and the overloading of the adjacent transmission system and would ensure continued reliable and efficient service to the Yakima Valley.

In response to the findings of the regional transmission study described above, in October 2008, Pacific Power filed separate right-of-way (ROW) applications (SF-299) with the BLM and Army JBLM YTC to request grants of ROW across federal lands for the transmission line project. A revised SF-299 was submitted to the BLM and JBLM YTC on October 27, 2010 to reflect a change in routes under consideration since the submittal of the original SF-299 in 2008. An updated SF-299 was submitted to JBLM YTC on November 5, 2013 for the NNR. In April 2011, Pacific Power filed a ROW application with Reclamation to request a grant of ROW across Reclamation lands.

1.4 LEAD AND COOPERATING AGENCIES

1.4.1 Bureau of Land Management

It is the mission of the BLM to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations. The BLM is the lead federal agency responsible for preparation of this SDEIS and project oversight and compliance with the requirements of NEPA and other applicable laws and regulations. The BLM's Spokane District Manager is the Authorizing Officer (AO) responsible for the decision on whether to issue the requested BLM ROW and, if issued, the applicable terms, conditions, or other stipulations. The Spokane District Manager has designated the Wenatchee Field Office Manager as the AO's representative for this project. In the decision process, the BLM must consider how the BLM's resource management goals, objectives, opportunities, and/or conflicts relate to this non-federal use of public lands. Section 1.8 provides more discussion on the BLM consideration of current Resource Management Plan (RMP) guidelines, including plan conformance and potential conflicts.

1.4.2 Cooperating Agencies

The CEQ regulations implementing NEPA encourage the lead federal agency to invite other federal, state, tribal or local agencies with jurisdiction by law or special expertise with respect to environmental issues addressed in the analysis to serve as cooperating agencies in the preparation of the EIS (40 CFR Parts 1508.5 and 1501.6).

Although the BLM is the Lead Agency for compilation of this SDEIS, each of the nine Cooperating Agencies must make their own informed decisions on the applicant's proposal and request for ROWs and/or permits. Therefore, this SDEIS analyzes issues identified by each of the Cooperating Agencies and the public. There are numerous issues and concerns associated with Pacific Power's proposal. As such, the alternatives development and impact assessment (Chapters 2.0 and 4.0, respectively) are focused on those issues and concerns that would help the BLM and Cooperating Agencies to differentiate between alternatives and/or are critical to the decision-making process.

A summary of each Cooperating Agency's mission and general policy guidance, interests, and concerns with respect to the proposed Project, Project review, and/or permitting responsibilities is provided below.

1.4.2.1 U.S. Army Joint Base Lewis-McChord Yakima Training Center

The JBLM YTC is a formal Cooperating Agency responsible for processing Pacific Power's ROW application on the federal lands managed by the Army. The Army has established procedures to permit third parties to use Army-managed lands for purposes that do not conflict with their mission as a military training area. Furthermore, environmental stewardship and sustainability is an integral part of the Army's mission. Per this commitment, the Army must analyze and minimize impacts to resources that would result from decisions to grant ROWs for third party uses. The Army will use this SDEIS and the FEIS as the basis from which to make decisions related to granting ROW to Pacific Power for the construction, operation, and maintenance of the proposed Project and to establish the need for any required mitigation of impacts occurring on Army-managed lands.

1.4.2.2 Bonneville Power Administration

BPA is a formal Cooperating Agency because it owns and operates the existing Vantage Substation to which Pacific Power is proposing to interconnect the proposed Project. Vantage Substation is part of the Federal Columbia River Transmission System (FCRTS) and is owned and operated by BPA, a federal agency that is part of the U.S. Department of Energy (DOE). Under its Open Access Transmission Tariff (OATT), BPA maintains an Interconnection Request Queue to manage requests to interconnect to the FCRTS. BPA offers transmission interconnection to the FCRTS to all eligible customers on a first-come, first-served basis, with this offer subject to an environmental review under NEPA. In 2008, Pacific Power submitted its request to BPA to interconnect the proposed Project to BPA's Vantage Substation. BPA will use this SDEIS and the FEIS as the basis on which to make its decision on whether or not to accommodate Pacific Power's request for the proposed interconnection.

1.4.2.3 Bureau of Reclamation

Reclamation is a formal Cooperating Agency responsible for processing Pacific Power's ROW application (SF-299) filed on April 17, 2011, requesting a grant of ROW across federal lands managed by Reclamation. Reclamation will use this SDEIS and the FEIS as the basis from which to make decisions relating to granting a ROW to Pacific Power for construction, operation, and maintenance of proposed Project and the need for any required mitigation of impacts occurring on Reclamation-managed lands.

1.4.2.4 Yakima County

Yakima County is a formal Cooperating Agency because of its responsibility under county code to review the proposed Project which is subject to a Type II Land Use review. The review and associated public hearing is to determine that the development standards are met and that the Project is compatible with neighboring uses and consistency with County Code can be met. In order for Yakima County to conduct a Type II Land Use review and make a decision regarding the issuance of a Type II Administrative Permit, it is necessary for the Project to comply with the Washington State Environmental Policy Act (SEPA). Yakima County may choose to adopt this SDEIS and FEIS to satisfy SEPA requirements.

WSDOT will be a SEPA co-lead agency with Yakima County, and WSDOT's South Central Region Environmental Office is the nominal lead agency. WSDOT has final responsibility for the completion of all SEPA procedures and documentation. This SDEIS may be utilized by State and local governments in meeting SEPA requirements.

1.4.2.5 Kittitas County

Kittitas County is a formal Cooperating Agency and is required by its County Code to review transmission lines over 115 kV through a Conditional Use Permitting process. The application for a Conditional Use Permit (CUP) must be signed by all owners where a project is located before it can be accepted by the County. The CUP is subject to a public hearing where the proposal is considered by an independent Hearing Examiner who takes records and public testimony and makes recommendation to the Board of County Commissioners for final decision. A project proposal must be found to meet criteria outlined with the County's Code before the CUP is approved. A CUP must comply with the SEPA. Kittitas County may choose to adopt this SDEIS and FEIS to satisfy SEPA requirements.

1.4.2.6 Washington State Department of Transportation

WSDOT is a formal Cooperating Agency because of its responsibility to process Pacific Power's utility permit or franchise application(s) to cross the Interstate 82 (I-82) and State Route 243 (SR 243). In order for WSDOT to make a determination on Pacific Power's application(s), the Project will either need to comply with SEPA or WSDOT may need to conduct a separate SEPA analysis.

WSDOT will be a SEPA co-lead agency with Yakima County, and WSDOT's South Central Region Environmental Office is the nominal lead agency. WSDOT has final responsibility for the completion of all SEPA procedures and documentation. This SDEIS may be utilized by State and local governments in meeting SEPA requirements.

WSDOT would also be responsible for coordinating FHWA's review and concurrence of a permanent access break for a utility installation across I-82 providing an easement or utility franchise through WSDOT ROW and providing any additional documentation for compliance with NEPA and SEPA, the Endangered Species Act (ESA), and the National Historic Preservation Act (NHPA).

1.4.2.7 Federal Highway Administration

FHWA is a formal Cooperating Agency responsible for approving Pacific Power's application to use I-82 land owned by WSDOT. FHWA works with WSDOT to permit third parties to use interstate property for non-highway uses that do not impact safety and operations on the interstate and the proposed use shall not expose the facility's users to other hazards. FHWA will use this SDEIS and the FEIS as the basis from which to make decisions related to the proposed Project and, if necessary, to establish the need for any mitigation of impacts occurring on WSDOT-owned interstate lands.

1.4.2.8 U.S. Fish and Wildlife Service

USFWS is a formal Cooperating Agency because of its special expertise and jurisdiction by law of threatened, endangered, proposed, and candidate species; migratory birds; and bald eagles and golden eagles pursuant to the implementing regulations of the ESA (16 U.S.C. §1531 *et seq.*); the Migratory Bird Treaty Act (MBTA; 16 U.S.C. §§703-712) and Executive Order 13186; and the Bald and Golden Eagle Protection Act (16 U.S.C. §668-668d), respectively. In addition, USFWS has special expertise in management of greater sage-grouse, which the USFWS has found warrants protection under the ESA, but is precluded by other higher priority listing activities.

USFWS would be responsible for providing technical assistance, as necessary, in evaluating Project impacts to ensure threatened, endangered, proposed, and candidate species, migratory birds, and bald and golden eagles are identified and by providing avoidance and minimization techniques to reduce impacts from implementation of the Project. USFWS would also be responsible for consultation or conferencing with the lead federal agency to fulfill Interagency Cooperation obligations in accordance with Section 7(a) (2) of the ESA.

1.4.2.9 Washington State Department of Natural Resources

DNR is a formal Cooperating Agency responsible for approving or not approving Pacific Power's easements and access permit applications for crossing DNR managed uplands, and approving or not approving a use authorization for crossing State-Owned Aquatic Lands. Prior to processing permit applications, the Project will need to comply with Washington's SEPA and meet DNR's state substantive standards. DNR has special expertise in managing natural resources including natural areas, and will provide technical assistance to preserve and protect these environmentally sensitive areas consistent with state standards.

1.5 WASHINGTON STATE ENVIRONMENTAL POLICY ACT

In order for the affected counties and the WSDOT and other state agencies to assess applicant-requested permits and approvals for the proposed Project, it is necessary for the Project to comply with SEPA. Yakima and Kittitas counties and WSDOT may choose to adopt this NEPA EIS to satisfy SEPA requirements, as is allowed by Washington Administrative Code (WAC) 197-11-610. WSDOT will be a SEPA co-lead agency with Yakima County. As established in a Memorandum of Understanding between WSDOT and Yakima County, WSDOT's South Central Region Environmental Office is the nominal lead agency. WSDOT has final responsibility for the completion of all SEPA procedures and documentation. Yakima County has jurisdiction by law and special expertise in local planning and compliance with the Washington State Growth Management Act. The counties and WSDOT will provide additional public notice as required by State and local statutes when completing the SEPA review process.

The SEPA process is designed to work with other laws, such as NEPA, to provide a comprehensive review of a proposed project. Combining the review processes of SEPA and NEPA reduces duplication and delay by combining evaluations and considering all aspects of a proposal at the same time. This SDEIS may, therefore, be utilized by State and local governments in meeting SEPA requirements.

The SEPA process for the evaluation of the proposed Vantage to Pomona 230 kV Transmission Line Project utilizes an Environmental Checklist along with detailed information and analysis contained in the SDEIS to identify potential environmental impacts of the proposed Project. Appendix D contains the SEPA Environmental Checklist. Each question in the checklist is addressed and cross-references where detailed information in the SDEIS can be found.

1.6 PURPOSE AND NEED

1.6.1 Bureau of Land Management Purpose and Need

Pacific Power has submitted a ROW application to construct, operate, and maintain a 230 kV transmission line across BLM managed public lands. The BLM's action, processing the ROW application, is needed in order for the BLM to comply with applicable law governing applications for ROWs over public lands. The purpose of the BLM's action is to grant, grant with conditions, or to deny the ROW application.

The Federal Land Policy and Management Act of 1976 (FLPMA) provides that ROWs may be granted over public lands for systems of generation, transmission, and distribution of electric energy (43 U.S.C. § 1761(a) (4)). BLM regulations found at 43 CFR Part 2800 govern BLM ROW grant applications and ROW content.

Pursuant to 43 CFR Part 2801.2, it is BLM's objective to grant ROWs in accordance applicable BLM regulations and to control the use of ROWs on public lands in a manner that:

(a) Protects the natural resources associated with public lands and adjacent lands, whether private or administered by a government entity;
(b) Prevents unnecessary or undue degradation to public lands;
(c) Promotes the use of ROWs in common considering engineering and technological compatibility, national security, and land use plans; and
(d) Coordinates, to the fullest extent possible, all BLM actions under the regulations in this part with state and local governments, interested individuals, and appropriate quasi-public entities.

Pursuant to 43 CFR Part 2805.10, the BLM may include in any ROW grant such terms, conditions, and stipulations, which are in the public interest.

1.6.2 U.S. Army Yakima Training Center Purpose and Need

Pacific Power has submitted a ROW application to construct, operate, and maintain a 230 kV transmission line across JBLM YTC administered lands. The JBLM YTC action on this proposal would be to grant the use of Army administered lands.

The JBLM YTC need for action, to respond to Pacific Power's ROW application, arises from Army Regulation 405-80, Management of Title and Granting Use of Real Property, October 1997 and 32 CFR Part 643. Army Regulation 405-80 identifies the process under which Army controlled real property can be made available for non-Army purposes to private parties (e.g., Pacific Power).

32 CFR Part 643 sets forth the authority, policy, responsibility and procedure for making military real estate under the control of the Army available for use by other military departments, federal agencies, state and local governmental agencies, private organizations, or individuals.

1.6.3 Bonneville Power Administration Purpose and Need

Pacific Power has submitted a request to BPA to interconnect the proposed Project to the FCRTS at BPA's existing Vantage Substation. BPA's need for action, to respond to Pacific Power's interconnection request, arises from the procedures and processes for transmission interconnection requests that implement BPA's OATT. BPA will consider the following objectives or purposes in finalizing the agreement with Pacific Power to allow interconnection to the Vantage Substation.

- Maintain the electrical stability and reliability of the FCRTS;
- Continue to meet BPA's statutory and contractual obligations;
- Act consistently with BPA's environmental and social responsibilities; and
- Provide for cost and administrative efficiency.

1.6.4 Bureau of Reclamation Purpose and Need

Pacific Power has submitted a ROW application to construct, operate and maintain a 230 kV transmission line across Reclamation-managed public lands. The Reclamation action on this proposal would be the issuance of a land use authorization (specifically, a ROW grant) for the proposed non-federal use of public lands.

Reclamation's need for action, to respond to Pacific Power's ROW application, arises from 43 CFR Part 429, Use of Bureau of Reclamation Land, Facilities, and Waterbodies. These procedures are for use authorizations for such things as ROW requests like that of Pacific Power to cross Reclamation administered land.

1.7 DECISIONS TO BE MADE

This SDEIS is an informational document for agency decision-makers and the public which assesses the environmental effects of the proposed Project and ROW associated with the NNR. The specific decisions that will be made by BLM, JBLM YTC, BPA, Reclamation, FHWA, WSDOT, DNR and the counties are described below.

Separate authorizations would be issued by BLM and the Cooperating Agencies to permit construction, operation, and maintenance of the transmission line across lands managed or administered by each respective agency. The BLM and Cooperating Agencies will use the NEPA and SEPA processes and the resulting EIS to issue separate final decisions to approve, approve with conditions or modifications, or deny the authorizations.

Although the BLM is the lead federal agency responsible for the preparation of this SDEIS, the BLM's decision regarding a land use authorization for the proposed transmission line constitutes only a small portion of the overall project. Numerous other permits, approvals, and/or favorable decisions would be necessary in order to construct an end-to-end route between the Vantage and Pomona Heights substations. Furthermore, if the Project were approved, the BLM, Cooperating Agencies, and other agencies with permitting authority would attempt to reach agreement on the selected route, Project components, and stipulations. However, each entity reserves the right to make its own independent decision.

The considerations and/or decisions to be evaluated through this EIS process include, but are not limited to, the following:

- Whether to grant, grant with conditions, or whether to deny Pacific Power a ROW to construct, operate, and maintain the proposed facilities.
- Whether some or all mitigation measures identified in the EIS may be adopted or if additional measures may be required.

1.7.1 Bureau of Land Management

The BLM will decide whether to grant, grant with conditions, or to deny Pacific Power's application to construct, operate, and maintain a new 230 kV transmission line on lands managed by the BLM's Wenatchee Field Office. If the BLM issues a ROW grant, the BLM may include, without limitation, terms, conditions, and stipulations that the BLM determines to be in the public interest (43 CFR Part 2805.10). This includes modifying the proposed use or changing the route or location of the facilities on BLM-managed lands. The ROW grant will also incorporate or incorporate by reference standard BLM grant conditions found at 43 CFR Part 2805.12.

1.7.2 Cooperating Agencies

1.7.2.1 U.S. Army Yakima Training Center

The JBLM YTC will decide whether to grant, grant with conditions, or deny Pacific Power's application to construct, operate, and maintain the proposed Project on Army controlled real property for non-Army purposes.

1.7.2.2 Bonneville Power Administration

BPA will decide whether to allow the interconnection of the new Vantage to Pomona Heights 230 kV transmission line to BPA's Vantage Substation and the FCRTS.

1.7.2.3 Bureau of Reclamation

Reclamation will decide whether to grant, grant with conditions, or deny Pacific Power's application to construct, operate and maintain the proposed Project on lands managed by Reclamation. If Reclamation issues a grant, pursuant to 43 CFR Part 429, it will include standard terms and conditions, and may include additional terms, conditions, and stipulations.

1.7.2.4 Yakima County

Under Yakima County Code (YCC) Title 15, the proposed Project is subject to a Type II Land Use review. A Type II application shall be reviewed by the County Administrative Official and may be conditioned in order to ensure compatibility and compliance with the provisions of the zoning district and the goals, objectives and policies of the Yakima County Comprehensive Plan – *Plan 2015*. For the county to make a decision regarding the issuance of a Type II administrative permit, it is necessary for the Project to comply with SEPA.

1.7.2.5 Kittitas County

Kittitas County Code (KCC) 17.61.010(2)(b) states an electrical transmission line "exceeding 115,000 volts" is defined as a "Special Utility." Under KCC 17.61.020(6) "Special utilities may be authorized as a conditional use in all zoning districts." A CUP can be approved by the Board of County Commissioners after they receive a recommendation for approval or denial by an independent Hearing Examiner. The Hearing Examiner and Board must base their recommendation and approval upon criteria that the proposal is consistent with the intent, goals, policies, and objectives for the County's Comprehensive Plan; that it is essential or desirable to the public convenience and not detrimental to public health and safety or to the character of the surrounding neighborhood; and that the proposal complies with relevant development standards and criteria set forth in the KCC. Any conditional use proposal is subject to all other criteria within the KCC including, but not limited to, all building permit requirements.

1.7.2.6 Washington State Department of Transportation

Prior to construction, WSDOT would be responsible for: reviewing, processing, and executing Pacific Power's utility permit and/or franchise application(s) to cross I-82 and SR 243; issuing an access permit; and granting an easement or lease to cross WSDOT's property. After permitting but prior to construction, Pacific Power will need to coordinate with WSDOT to determine any necessary traffic control measures; landscaping for disturbed areas within WSDOT's property; and hydraulics-related issues.

1.7.2.7 Federal Highway Administration

FHWA will decide whether to approve, approve with conditions, or deny Pacific Power's application to construct, operate, and maintain the proposed Project on interstate lands owned by WSDOT. FHWA may approve non-highway uses of interstate property that do not impact safety and operations on the interstate as long as the proposed use shall not expose the facility's users (e.g., highway users) to other hazards (23 CFR Part 710 Subpart D).

1.7.2.8 Washington State Department of Natural Resources

DNR will decide whether to approve, approve with conditions, or deny Pacific Power's easements and access permit applications for crossing DNR-managed up-lands, and use authorization applications for crossing State-Owned Aquatic Lands.

1.7.3 Other Agency Approvals

1.7.3.1 Grant County

The proposed Project is subject to Shoreline Substantial Development Permit and Shoreline Conditional Use Permit pursuant to Grant County Shoreline Master Program (SMP). In addition to the SMP requirements, the Project is subject to review under SEPA, which will be required to be completed concurrently with the Substantial Development Permit. The structures for this transmission line may also be subject to local building permit requirements.

1.8 LAND USE PLAN CONFORMANCE

The BLM Spokane District RMP Record of Decision (ROD) (BLM 1987) is the approved land use plan applicable to BLM-managed lands within the proposed Project area. Federal regulations (43 CFR Part 1610.5-3(a)) states the following: “All future resource management authorizations and actions, as well as budget or other action proposals to higher levels in the Bureau of Land Management and Department, and subsequent more detailed or specific planning, shall conform to the approved plan.” In general, the 1987 ROD allows for a variety of land uses, including ROW grants, provided that those uses can occur within the sustained yield capability of the resource and that appropriate consideration is given to mitigating resource concerns (BLM 1987, p. 12).

The 1987 ROD specifically provides for ROW grants on BLM managed lands in the following manner:

> All public land will be available and open for utility and transportation corridor development except the Hot Lakes Research Natural Area (RNA) and Area of Critical Environmental Concern (ACEC), the Brewster Bald Eagle Roost and Juniper Forest ACECs, the Chopaka Mountain Wilderness Study Area (WSA), and the Juniper Dunes Wilderness Area Corridors have been identified and designated on BLM lands in Washington…Corridor widths may vary but are a minimum of 200 feet. Additional corridors will be considered on a case-by-case basis. Applicants will be encouraged to locate new facilities within existing corridors to the extent possible (BLM 1987, p. 27).

1.9 AUTHORIZATIONS, PERMITS, REVIEWS, AND APPROVALS

Various approvals and/or permits would be required from multiple agencies and jurisdictions to implement one or more of the components of the proposed Project. Table 1-1 lists the major federal, state, and local authorizations, permits, reviews, and approvals that may be required for the construction and operation of the proposed Project. Other authorizations, permits, reviews or approvals for construction and operation may be required. Pacific Power would be responsible for obtaining all permits and approvals required to implement the proposed Project.

TABLE 1-1 AUTHORIZATIONS, PERMITS, REVIEWS, AND APPROVALS

ACTION REQUIRING PERMIT, APPROVAL OR REVIEW	PERMIT/APPROVAL/ COMPLIANCE OR REVIEW	ACCEPTING AUTHORITY/ APPROVING AGENCY	LEGAL AUTHORITY OR POLICY GUIDANCE
FEDERAL			
Power Line Construction and Operation on BLM	NEPA Compliance EIS and ROD	BLM	NEPA, 42 U.S.C. §4321 40 CFR Parts 1500-1508
Power Line Construction and Operation on JBLM YTC	NEPA Compliance EIS and ROD	JBLM YTC, Army	NEPA, 42 U.S.C. §4321 40 CFR Parts 1500-1508 32 CFR Part 651

ACTION REQUIRING PERMIT, APPROVAL OR REVIEW	PERMIT/APPROVAL/ COMPLIANCE OR REVIEW	ACCEPTING AUTHORITY/ APPROVING AGENCY	LEGAL AUTHORITY OR POLICY GUIDANCE
Power Line Construction and Operation on BLM	ROW Grant	BLM	FLPMA 1976 (PL94-579) 43 U.S.C. §§1761-1771 and 43 CFR Part 2800
Power Line Construction and Operation on Reclamation	ROW Grant	Reclamation	43 CFR Part 429
Request for Interconnection to FCRTS	Interconnection Agreement	BPA	NEPA, 42 U.S.C. §4321 40 CFR Part 1500-1508
Power Line Construction and Operation on JBLM YTC	Grant of Use of Real Property	JBLM YTC, Army	Army Regulation 405-80 and 32 CFR Part 643
Construction, operation and abandonment of transmission lines across or within interstate ROW	Permit to cross Federal Aid Highway (Approval of breaking Limited Access line to cross Interstate-82)	Federal Highway Administration (FHWA)	Department of Transportation Act: U.S.C. 107, 111 23 CFR Part 1.23, 645, 710, and 771
Protection of Cultural Resources	Grant of ROW by BLM, JBLM YTC, and Reclamation National Historic Preservation Act (NHPA) Compliance Section 106	BLM and JBLM YTC (review by State Historic Preservation Office [SHPO] and affected Tribes)	NHPA of 1966: 36 CFR Part 800, 16 U.S.C. §47
Protection of Endangered Species	Grant of ROW by BLM or JBLM YTC Endangered Species Act ESA with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS)	USFWS and NMFS	ESA 1973 Amended: 16 U.S.C. §1531
Protection of Migratory Birds	Compliance	USFWS	MBTA 1918: 16 U.S.C. §§703-712, 50 CFR Part 1
Protection of Bald and Golden Eagles	Compliance	USFWS	Bald and Golden Eagle Protection Act 1972: 16 U.S.C. § 668
Protection of Special Status Species	Compliance	BLM and JBLM YTC	BLM Policy Manual 6840 and Army Regulation 200-1
Construction Sites with greater than one acre of land disturbed	Section 402 National Pollutant Discharge Elimination System, General Permit for Storm Water Discharge from Construction Activities and Storm Water Pollution Prevention Plan (SWPPP)	U.S. Environmental Protection Agency (USEPA)	Clean Water Act (CWA) 33 U.S.C. §1251 et seq. 40 CFR Part 122,123
Crossing 100-year floodplain, streams, or rivers	Floodplain Use Permit	U.S. Army Corps of Engineers (USACE)	40 U.S.C. §961
Construction in or modifications of floodplains	Compliance	Each federal agency issuing permits for use of federal land (BLM, JBLM YTC, BOR)	42 U.S.C. §4321 EO 11988 Floodplains

ACTION REQUIRING PERMIT, APPROVAL OR REVIEW	PERMIT/APPROVAL/ COMPLIANCE OR REVIEW	ACCEPTING AUTHORITY/ APPROVING AGENCY	LEGAL AUTHORITY OR POLICY GUIDANCE
Construction in or modifications of wetlands	Compliance	Each federal agency issuing permits for use of federal land (BLM, JBLM YTC, BOR)	42 U.S.C. §4321 EO 11990 Wetlands
Work in, over, or under Navigable Waters of the U.S. (Columbia River Crossing)	Section 10 Permit Joint Aquatic Resources Permit (JARPA)	USACE	Rivers and Harbors Act 1899 33 U.S.C. §322
Potential discharge into waters of the U.S.	Section 401 Permit JARPA	USACE	CWA Section 401 33 U.S.C. §1344 40 CFR Part 961
Discharge of dredge or fill material to a watercourse	Section 404 Nationwide Permit JARPA	USACE	CWA Section 404 33 U.S.C. §1344 40 CFR Part 230
Tower location and height relative to air traffic corridors	Form 7460-1 Notice of Proposed Construction or Alteration	FAA (Federal Aviation Administration)	49 U.S.C. §1501 Objects Affecting Navigable Airspace 13 CFR Part 77
STATE			
Power Line Construction and Operations on State lands	Easement	WA Dept of Natural Resources (DNR)	Revised Code of Washington (RCW) 79.36.510, WAC 197-11
Power Line Construction and Operations on State owned aquatic lands	Easement	WA Dept of Natural Resources (DNR)	RCW 79.105.210, 79.110, 79.36.355
SEPA Compliance on State lands	EIS/SEPA Checklist	DNR, WSDOT (Lead Agency)	WAC 173-802, 197-11
Potential discharge into waters of the U.S.	401 Permit, Joint Aquatic Resource Permits Application (JARPA)	DNR, WA Dept of Ecology (WDOE), WA Dept of Fish and Wildlife (WDFW)	WAC173-158
Discharge of dredge or fill material to a watercourse	404 Permit, JARPA	DNR, WDOE, WDFW	WAC 173-700
Power Line Construction and Operations on or over State roads	Utility Crossing Permit	WA State Dept of Transportation (WSDOT)	WAC 468-34 Utility Accommodation Policy M 22-86.01
Power Line Construction and Operations on WSDOT land	Easement	WA State Dept of Transportation (WSDOT)	
Power Line Construction and Operations on State lands	State Historic Preservation Compliance	WA Dept of Archeology and Historic Preservation	RCW 27.34, 44, 53, WAC 25-12, 19, 46, 48
COUNTY			
Power Line Construction and Operation within or on private property	Administrative Type II Permit and SEPA Compliance	Yakima County Board of County Commissioners	Yakima County Ordinance 15.18, 16.04
Power Line Construction and Operation within or on private property	Building Permit and SEPA Compliance	Grant County Building Department	Grant County Ordinance 23.04.040CC

ACTION REQUIRING PERMIT, APPROVAL OR REVIEW	PERMIT/APPROVAL/ COMPLIANCE OR REVIEW	ACCEPTING AUTHORITY/ APPROVING AGENCY	LEGAL AUTHORITY OR POLICY GUIDANCE
Power Line Construction and Operation within or on private property or use of County Road ROW	Conditional Use Permit, County Franchise Agreement for County Road ROW	Kittitas County Board of County Commissioners	KCC 12.56, RCW 36.55 KCC 15A, KCC17.15.050, KCC 17.15.060, KCC17.31 and KCC 17.60A
Provide control of airborne dust particles during construction	Dust Control Plan	Yakima Regional Clean Air Agency and Washington State Dept. of Ecology	Construction Dust Control Policy
Provide control of noxious weeds during construction and operation	Noxious Weed Management Plan	County Weed Control Districts (all that apply)	RCW 17.10, WAC 16-750 Noxious Weed List

1.10 SCOPING AND PUBLIC INVOLVEMENT

Public participation is essential for the environmental review process and informed decision making. A discussion of the scoping process, notices, activities, and public meetings held as part of scoping for the DEIS is presented in DEIS Section 1.9, Scoping and Public Involvement, which is incorporated by reference in this SDEIS.

On January 4, 2013, the BLM released the DEIS for public review and comment. The DEIS identified an Agency Preferred Route Alternative paralleling an existing transmission line in Yakima County and generally following Road N and crossing the Saddle Mountains in Grant County (Alternative D in the DEIS). Public meetings were held in Selah and Desert Aire in February 2013 to provide the public an opportunity to give their input on the DEIS and Agency Preferred Alternative. The BLM received letters and e-mails containing more than 250 comments during the comment period which ended on March 8, 2013.

As a result of the public and agency comments received during the public meetings and during the DEIS comment period, the BLM, Pacific Power and the JBLM YTC identified the NNR alternative, which is located largely on JBLM YTC land. The BLM determined that an SDEIS was required to analyze this new potential route.

Notification of the NNR alternative was sent on May 31, 2013 to the affected tribal governments including the Yakama Nation, Colville Confederated Tribes, and the Wanapum Band of Indians. A letter was also sent to over 1,100 potentially interested individuals, groups, organizations, and agencies on May 31, 2013, which contained an update on the status of the Project, and inform the parties about the location of the NNR alternative and the preparation of this SDEIS.

1.11 ISSUES IDENTIFIED

This section briefly describes the issues identified for further analysis in this SDEIS.

1.11.1 Issues Identified for Further Analysis During DEIS Scoping

The issues identified during the scoping process for the DEIS are presented in DEIS Section 1.10.11, Table 1-2 *Issues Raised by the Public and Government Agencies*, which is incorporated by reference in this SDEIS.

1.11.2 Issues Identified for Analysis in SDEIS

Many of the issues identified during the DEIS scoping process are applicable to the consideration and analysis of the NNR in this SDEIS. There are also new issues that pertain to the NNR. A summary of the issues identified for further analysis in this SDEIS is provided in this section.

TABLE 1-2 ISSUES RAISED BY THE PUBLIC AND GOVERNMENT AGENCIES

BIOLOGICAL RESOURCES
How would the proposed Project affect sage-grouse populations and habitat?
What would the effects of the proposed Project construction and operation be on special status wildlife species and birds protected under the Migratory Bird Treaty Act?
What would be the potential for avian collision during operation?
What would be the effect on vegetation from construction and maintenance of the proposed Project?
How much disturbance would occur in sagebrush and native grassland communities and what would be the effects?
What would be the effects to endangered, threatened, and sensitive plant species?
Would noxious weeds be introduced or spread into the ROW and how would they be controlled?
CULTURAL RESOURCES
What would the potential impacts be on cultural resources, including prehistoric and historic sites?
HUMAN HEALTH AND SAFETY
Would services such as global positioning system receivers, satellite dish receivers, cell phones, AM/FM radio, two way radio communication, television and Internet be disrupted?
Would electric and magnetic fields associated with transmission lines cause health effects?
LAND USE AND RECREATION
What residential areas and planned development would be affected?
Would there be any effect on recreational areas and opportunities?
What effect would there be on current use at dispersed and developed recreation sites and areas?
How would current and future recreation use in the area be affected by the Project?
NATIVE AMERICAN CONCERNS
Cultural properties in the vicinity of some of the alternative routes are of concern to several Native American Tribes.
SOCIOECONOMICS
What would be the effect on property values?
Would there be effects on low-income and minority populations or communities?
TRAFFIC AND TRANSPORTATION
What is the potential for increased public access on current access roads and future access roads constructed for the Project?
Would there be an effect on the environmental buffer surrounding the Selah Creek Rest Area?
What is the access for construction and operation?
Need to develop plan and profile for I-82 freeway crossings.
VISUAL RESOURCES
Would the proposed Project impact aesthetics and scenic views of private property owners and if so how much?
Do the visual effects on BLM land conform to Visual Resource Management Class objectives established in the BLM Resource Management Plan?
What is the structure placement in the vicinity of the scenic overlook of the Eastbound Selah Creek Rest Area?
Would the proposed Project impact aesthetics and scenic views of visitors to the Yakima River Canyon scenic corridor and, if so, how much?
How will visual impacts from the Project be mitigated/modified?

WILDLAND FIRE RISK
How would the transmission line affect fire management activities?
Would the proposed Project increase the risk of wildfire?
Could fire in the sage steppe impact the operation of the transmission line?
Would the proposed transmission line affect the aerial wildland fire suppression capability of JBLM YTC?
YAKIMA TRAINING CENTER OPERATIONS
Would the proposed Project impact JBLM YTC training operations?

CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the proposed Vantage to Pomona Heights 230 kV Transmission Line Project (Project), the alternatives analyzed in detail, and those alternatives that were considered but eliminated from further consideration. The following discussion pertains to activities and features that are common to the action alternatives (involving construction of the Project). The No Action Alternative is also described. Three alternatives were considered in this Supplemental Draft Environmental Impact Statement (SDEIS). The three alternatives are:

1) No Action
2) New Northern Route (NNR) Alternative (with and without the Manastash Ridge Subroute)
3) Draft Environmental Impact Statement (DEIS) Agency Preferred Route; provided as a reference point to illustrate the differences between it and the New Northern Route and Manastash Ridge Subroute.

2.1 PROJECT OVERVIEW

2.1.1 New Overhead 230 kV Transmission Line

Pacific Power proposes to construct, operate and maintain the new Vantage to Pomona Heights 230 kilovolt (kV) transmission line from its existing Pomona Heights Substation east of Selah in Yakima County, Washington to the existing Bonneville Power Administration (BPA) Vantage Substation east of the Wanapum Dam in Grant County, Washington. The NNR considered in this SDEIS is approximately 40.4 miles long. In comparison, the DEIS Agency Preferred Alternative is 66.7 miles long. The Manastash Ridge Subroute adds 11.9 miles to the NNR for a total length of approximately 47.7 miles (see Figures 2-1 and 2-2).

As proposed by Pacific Power, most of the proposed transmission line would be constructed on H-frame wood pole structures between 65 and 90 feet tall, typically, and spaced approximately 650 to 1,000 feet apart depending on terrain (see Figure 2-3). The H-frame structures may be up to 100 feet tall in limited areas (such as on ridges at canyon or deep valley crossings), but would typically be used in open flat to gently rolling terrain. In developed or agricultural areas, single wood or steel monopole structures would be used. The single pole structures would be between 70 and 110 feet tall and spaced approximately 400 to 700 feet apart. The right-of-way (ROW) width necessary/required for the H-frame structure type would range between 125 to 150 feet. The ROW width for the single pole structure would range between 75 to 100 feet. Dead-end or angle structures would require additional ROW width to accommodate guy wires and anchors. For the Columbia River crossing below the Wanapum Dam, steel lattice structures approximately 200 feet tall would be used to safely span the approximate 2,800-foot crossing. Illustrations of the structure types and typical design characteristics are presented in Section 2.4.1. Final design characteristics would be determined in the detailed design phase of the Project.

Construction of the transmission line would require vehicle, truck, and crane access to each new structure site for construction crews, materials, and equipment. Access along the transmission line ROW would include existing roads in their current condition, existing roads that would be improved as part of this Project and new access roads. The Project would use existing roads and trails wherever feasible to minimize the construction of new access roads. In areas that overland travel is not possible and where no roads are present, permanent new roads would be graded to a total width of between 14 and 24 feet (including both the travel surface and shoulders) depending on location and terrain. The roadway (cuts and fills) would remain for transmission line maintenance, but vegetation would be restored in accordance with agency requirements. Access would not be required from the Selah Cliffs Natural Area Preserve.

During construction of the transmission line, there would be temporary work areas at each structure site to facilitate the safe operation of equipment and construction operations. There would also be temporary work areas at pulling and tensioning sites, material staging sites, and turn-around areas.

Work areas would require a temporary disturbance area of 150 feet by 125 feet (18,750 square feet [sq. ft.]/0.43 acre) for H-frame structures and 150 feet by 80 feet (12,000 sq. ft./0.28 acre) for single pole structures.

Pulling and tension sites for stringing the conductor would require a temporary disturbance area of 125 feet by 400 feet (50,000 sq. ft./1.15 acres). Sites for pulling and tensioning would be located approximately every 11,000 feet (about 2.1 miles) or less.

Turn-around areas may be required in certain areas where construction travel would be restricted by rock outcrops, washes, ravines, or sensitive areas. Turn-around areas would typically require a temporary disturbance area of 60 feet by 60 feet (3,600 sq. ft./0.08 acre).

Several material staging areas, roughly five acres each, would be required for material and equipment storage and for staging construction activities. For this SDEIS, it is assumed that sites for material staging areas would be located on existing disturbed areas in areas approved by the landowner or agency. However, material staging areas would be determined during detail design and may include undisturbed areas, but preference would be given to currently disturbed sites.

Pacific Power's proposed Project as described above considers several of the "Overhead Design Options" that are considered feasible from the perspective of construction, operation, maintenance, and cost by Pacific Power (e.g., overhead steel or wood, H-frame, or single pole structures; see Section 2.4.1). In addition to the Overhead Design Option proposed by Pacific Power, this SDEIS analyzes the option of undergrounding segments of transmission line. The Underground Design Option is being analyzed in response to comments received from the U.S. Fish and Wildlife Service (USFWS) and Washington Department of Fish and Wildlife (WDFW) regarding potential Project impacts to greater sage-grouse (hereafter sage-grouse). The Underground Design Option is technically feasible, but construction and maintenance costs are expected to be higher than the Overhead Design Option; therefore, Pacific Power does not support this option at present. Nevertheless, an Underground Design Option is described and considered in this analysis. The analysis discloses potential effects and trade-offs of each Design Option based on technical feasibility.

Substation upgrades necessary for the Project were discussed and analyzed in the DEIS. Upgrades would occur to the Pomona Heights Substation and the Vantage Substation. Substation upgrade analyses are not part of this SDEIS, but are briefly described below.

2.1.2 Pomona Heights Substation Upgrades

The new 230 kV transmission line would enter Pacific Power's Pomona Heights Substation on the southeast corner of the substation, and the yard is being expanded in this direction. New steel H-frame terminal structures would be required. New line breakers, new switches, various bus connections, and other minor equipment and wiring would be installed to incorporate the new line into the interconnected regional electric transmission grid.

2.1.3 Vantage Substation Upgrades

The Vantage Substation is owned by BPA. A currently occupied bay would be vacated within the substation for termination of the new 230 kV transmission line. The new line would enter the east area of the substation. BPA would design and install the new equipment to interconnect the new 230 kV transmission line to the regional electric transmission grid. New substation equipment would be installed within the existing Vantage Substation fence.

2.2 DESCRIPTION OF ROUTE SEGMENTS

To present the analysis results clearly, the NNR Alternative has been divided into nine route segments (see Figure 2-1). Route segments were developed based on land ownership and jurisdiction, land cover and terrain, subroute segment, potential Design Options, and previous DEIS alternative locations (see Table 2-1 for Route Segment lengths). The NNR Alternative consists of a subroute that deviates from the NNR around Manastash Ridge (Route Segment MR-1; Manastash Ridge Subroute).

TABLE 2-1 ROUTE SEGMENT LENGTHS

ROUTE SEGMENT	LENGTH (MILES)
NNR-1	2.4
NNR-2	5.0
NNR-3	9.3
NNR-4o/NNR-4u	4.5
NNR-5	1.8
NNR-6o/NNR-6u	6.4
NNR-7	8.2
NNR-8	2.7
MR-1	11.9

The route segments are described as follows:

NNR-1 would begin at the existing Pomona Heights Substation, proceed south for a short distance, and then turn eastward along Sage Trail Road following an existing Pacific Power distribution line to the Joint Base Lewis McChord Yakima Training Center (JBLM YTC) property boundary. This route segment would cross the existing Pacific Power Pomona-Wanapum 230 kV transmission line. NNR-1 is identical to Route Segment 1a identified in the DEIS except on the extreme western section where it deviates from DEIS Route Segment 1a immediately adjacent to the Pomona Heights Substation. This deviation was made as an accommodation to an affected landowner. This route segment is only being considered as an Overhead Design Option. The total length of the NNR-1 route segment is 2.4 miles.

NNR-2 would be located within the JBLM YTC boundary. From the node with NNR-1, this route segment would proceed north for 1.0 mile roughly parallel to an existing fire break road. The route segment then proceeds west within the JBLM YTC boundary parallel to Temple Lane and passes a water storage tank parallel to the JBLM YTC perimeter road for a distance of 1.0 mile. A portion of the NNR-2 route segment parallels the BPA Ellensburg-Moxee No.1 115 kV transmission line which also is located within the JBLM YTC boundary. The route segment then turns north and remains on the western perimeter and within of the JBLM YTC boundary for a distance of 0.7 mile. The route segment in this location continues to parallel the BPA Ellensburg-Moxee No.1 115 kV transmission line and passes on the edge of the installation parade field to the intersection of Firing Center Road. The route segment then proceeds east along Firing Center Road for a distance of 1.0 mile. An existing JBLM YTC distribution line would be rebuilt under the 230 kV conductors on the new single pole 230 kV transmission structures along this portion of the route segment. The route segment then turns north on JBLM YTC for a distance of 1.3 miles, paralleling Evergreen State Road for 0.2 mile and ending south of the Interstate 82 (I-82) crossing point. The transmission line would be constructed on single poles for a portion of the NNR-2 route segment. This route segment is only being considered as an Overhead Design Option. The total length of the NNR-2 route segment is 5.0 miles.

NNR-3 would begin at the southern crossing of two I-82 crossings. This crossing would involve the placement of a transmission structure on the eastern side of the freeway within and at the boundary of JBLM YTC. The other transmission structure would be located on the western side of I-82 on private property west and north of the Selah Canyon Rest Area. The approximate distance of this crossing would be 740 feet and would utilize H-frame structures. This route segment would proceed north on H-frame structures crossing Selah Canyon and approximately 3,000 feet (0.6 mile) of Washington State Department of Transportation (WSDOT) land. The route segment would then proceed onto Bureau of Land Management (BLM) managed land to parallel Pacific Power's existing Pomona-Wanapum 230 kV transmission line. Transmission center line separation would be approximately 300 feet in this area. The route segment would then cross BLM-managed land for a distance of 3.8 miles, including a 0.1 mile section of private land in holding within the BLM parcel. Approximately 0.9 mile would pass through the western most portion of the BLM Yakima River Canyon Area of Critical Environmental Concern (ACEC). The route segment would then proceed onto private land, cross Burbank Creek, and again parallel the existing Pacific Power 230 kV Pomona-Wanapum transmission line for 5.6 miles, crossing numerous unnamed drainages and Lmuma Creek. Access to NNR-3 would not be required from the Selah Cliffs Natural Area Preserve. This route segment is only being considered as an Overhead Design Option. The total length of NNR-3 is 9.3 miles.

NNR-4o/NNR-4u would be located on privately owned and JBLM YTC-managed land and parallel the existing Pomona-Wanapum 230 kV transmission line, crossing it at two locations. Both an above ground option (Overhead Design Option-NNR-4o) and an underground option (Underground Design Option-NNR-4u) have been analyzed for this route segment. The Overhead and Underground Design Options are located along the same alignment. West of I-82, the route segment crosses the existing Pacific Power 230 kV transmission line, and proceeds west to the northern I-82 crossing. For the Overhead Design Option (NNR-4o), the freeway crossing would involve the placement of a transmission structure on the western side of the freeway south of Exit 11 on private property. This I-82 crossing would occur adjacent to and at the same location as the existing Pomona-Wanapum 230 kV transmission line crossing. The other structure would be placed on the eastern side of I-82 within JBLM YTC-managed land. The approximate length of this crossing would be 1,000 feet and H-frame structures would be utilized.

The Underground Design Option (NNR-4u) assumes transition stations (see Section 2.4.5.1 below) and an overhead crossing of I-82 that would be similar to the overhead option. Transition stations are assumed because this is a commonly used construction method utilized for underground systems, and is more simple and cost effective than alternative methods (e.g., horizontal directional drilling). The crossing of I-82 would be an overhead line between each of the transition stations within the I-82 ROW. The Underground Design Option would be undergrounded for a total of approximately 1.1 miles on the southwest side of the interstate on private land and approximately 3.2 miles within JBLM YTC-managed land on the northeast side of I-82. The remaining distance (about 1,000 feet or 0.2 mile) would consist of transition stations and an overhead line between the two crossing structures. The transition stations would be located on private land on the southwest side of the freeway and on JBLM YTC-managed land on the northeast side of I-82. The route segment would parallel the existing Pomona-Wanapum 230 kV transmission line with an approximately 200-foot separation across the southern portion of Manastash Ridge within JBLM YTC and cross the existing line again on the extreme southeast end of Badger Pocket. The total length of the NNR-4 route segment regardless of Design Option is 4.5 miles.

NNR-5 would be a short route segment located on the southern end of Badger Pocket inside of the JBLM YTC boundary on the south side of the existing Pomona-Wanapum 230 kV transmission line. This route segment is only being considered as an Overhead Design Option in the analysis. The total length of the NNR-5 route segment is 1.8 miles.

NNR-6o/NNR-6u would parallel the existing Pomona-Wanapum 230 kV transmission line west of Badger Pocket for 6.4 miles entirely within JBLM YTC. Line separation would be approximately 200 feet in this area. An analysis of an Overhead Design Option (NNR-6o) and an Underground Design Option (NNR-6u) will be considered for this route segment. The Overhead and Underground Design Options are to be located along the same alignment for analysis purposes. For NNR-6u, overhead to underground transition stations would be located on the east and west end where the route segment connects with NNR-5 and NNR-7. The total length of the NNR-6 route segment regardless of Design Option is 6.4 miles.

NNR-7 would be located in the northeastern portion of JBLM YTC. This route segment would proceed east and parallel the existing Pomona-Wanapum 230 kV transmission line. In addition, the route segment would parallel portions of the Puget Sound Energy (PSE) Wanapum -Wind Ridge 230 kV transmission line and the BPA Schultz-Wautoma No.1 500 kV transmission line within the JBLM YTC, and cross the John Wayne Pioneer Trail on to BLM-managed land west of the Columbia River. This route segment is only being considered as an Overhead Design Option. The total length of the NNR-7 route segment is 8.2 miles.

NNR-8 would begin on BLM-managed land on the west bank of the Columbia River. The route segment would proceed east 0.4 mile on BLM-managed land. An approximately 200-foot tall steel lattice structure would be located on the west bank of the Columbia River on BLM-managed land. The line would cross Huntzinger Road and the river to a steel lattice structure on the east side of the river located on Bureau of Reclamation (Reclamation) land. The Columbia River crossing would be approximately 2,800 to 3,000 feet in length depending on the final location of the steel lattice structures. The route would proceed east, crossing State Route (SR) 243 and then proceed north and east for 1.7 miles crossing the Grant County Public Utility District (PUD) Priest Rapids-Vantage 230 kV transmission line and the BPA Vantage-Hanford No.1 500 kV transmission line before turning north, crossing the BPA Vantage-Hanford No.1 500 kV transmission line and entering the Vantage Substation. This route segment is only being considered as an Overhead Design Option. The total length of the NNR-8 route segment is 2.7 miles.

MR-1 would begin at northern node of NNR-3 and cross the existing Pomona-Wanapum 230 kV west of I-82. It would then proceed northwest, crossing privately owned and Washington Department of Natural Resources (DNR) managed land, roughly paralleling I-82 approximately 0.5 to 1.0 mile to the west. It crosses I-82 just south of the Manastash Ridge designated viewpoint (located at Milepost 8.1) into JBLM YTC. After crossing I-82, this route segment crosses Manastash Ridge and proceeds southeast within JBLM YTC south of Badger Pocket. This route segment then crosses the existing Pomona-Wanapum 230 kV transmission line and terminates at the western node of NNR-5. This route segment is only being considered as an Overhead Design Option. The total length of the MR-1 route segment is 11.9 miles.

2.3 ALTERNATIVES

2.3.1 No Action

If no action is taken, the federal land ROWs for the Project would not be granted and the Project would not be constructed.

Pacific Power would not be able to address the reliability issues identified in the Northwest Power Pool (NWPP), Northwest Transmission Assessment Committee (NTAC) Mid-Columbia Transmission Study. Therefore, if an outage of the existing Pomona-Wanapum 230 kV transmission line were to occur, it could result in an overload of adjacent transmission systems and the failure of the regional transmission system. Additionally, the Proponent would be required to develop and implement a remedial action scheme and would therefore not be compliant with Western Electricity Coordinating Council (WECC) and Federal Energy Regulatory Commission (FERC) standards. This would also cause the Proponent to be non-complaint with NERC standards relating to the provision of reliable power.

2.3.2 Route Alternatives

The NNR Alternative is broken into route segments for analysis purposes. Route segments are combined to form end-to-end routes for comparative purposes. Two variations of the NNR Alternative are analyzed in this SDEIS: the NNR Alternative with the Manastash Ridge Subroute (route segment MR-1), and the NNR Alternative without the Manastash Ridge Subroute (replacing MR-1 with NNR-4o/4u). The route segment locations for both variations of the alternative are shown on Figure 2-1 and the two NNR Alternative variations are shown in Figure 2-2. Table 2-2 presents a comparison of the NNR Alternative, the Manastash Ridge Subroute, and the DEIS Agency Preferred Route for a number of metrics consisting of:

- Total Length
- Miles of Jurisdiction/Ownership Crossed
- Miles within each County
- Number of Parcels Crossed
- Number of Private Land Owners
- Miles of Agricultural Land Potentially Affected
- Miles of Existing Pacific Power Existing Distribution Rights
- Miles Paralleling Existing Transmission Lines within 200 feet

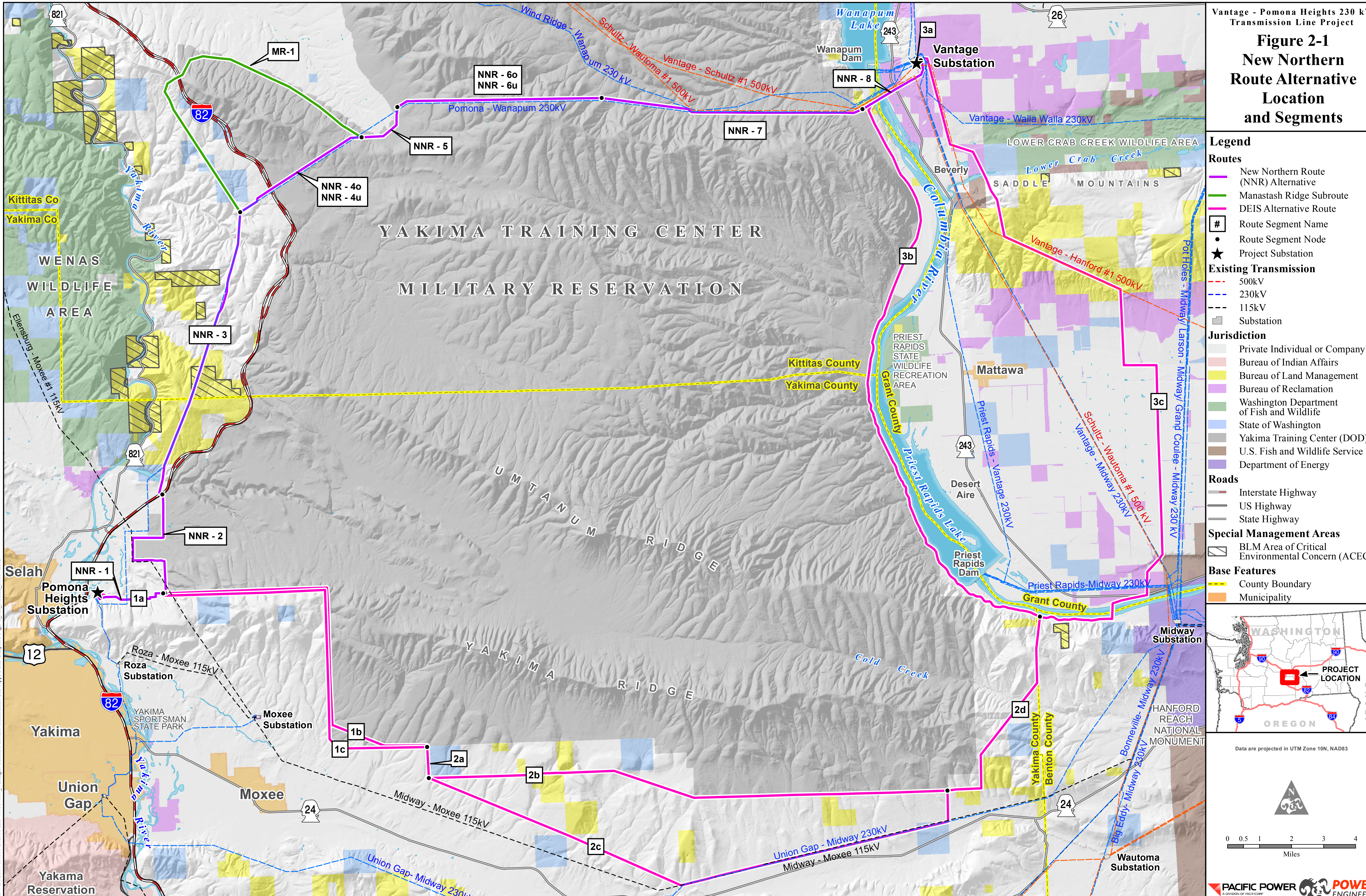

Figure 2-1 New Northern Route Alternative Location and Segments

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TABLE 2-2 ALTERNATIVE ROUTE COMPARISON SUMMARY

ROUTES	NNR ALTERNATIVE (Overhead Design Option and Underground Design Option)	NNR ALTERNATIVE WITH MR SUBROUTE	DEIS ALTERNATIVE D (AGENCY PREFERRED ALTERNATIVE)
Route Segments	NNR-1, NNR-2, NNR-3, NNR-4o or 4u*, NNR-5, NNR-6o or 6u*, NNR-7, NNR-8	NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6o, NNR-7, NNR-8	1a, 1b, 2a, 2c, 2d, 3a, 3c
Total Length (miles)	40.4	47.7	66.3
Ownership (miles crossed)			
<u>Federal</u>			
BLM	4.1	4.1	5.4
JBLM YTC	24.7	28.1	12.5
Reclamation	1.7	1.7	5.4
Total Federal Land	*30.5*	*33.9*	*23.3*
<u>State</u>			
WSDOT	0.8	0.8	0
DNR	0	1.7	1.0
Total State Land	*0.8*	*2.5*	*1.0*
<u>Other</u>			
Grant County Public Utility District	0.3	0.3	0.0
Private Land	8.5	10.7	41.6
Water	0.4	0.4	0.4
County (miles within county)			
Yakima	10.6	10.6	40.3
Kittitas	27.6	34.9	0.0
Benton	0.0	0.0	3.1
Grant	2.2	2.2	22.8
Parcels and Landowners			
Number of Parcels Crossed	95	107	160
Number of Private Landowners	33	32	46
Miles of Agricultural Land Potentially Affected	0.0	0.0	4.2
Miles of Paralleling Existing Transmission (w/in 200 feet)	31.1	26.9	15.3

Notes: *Overhead and Underground Design Options would occur in the same location
Numbers may not precisely add due to rounding

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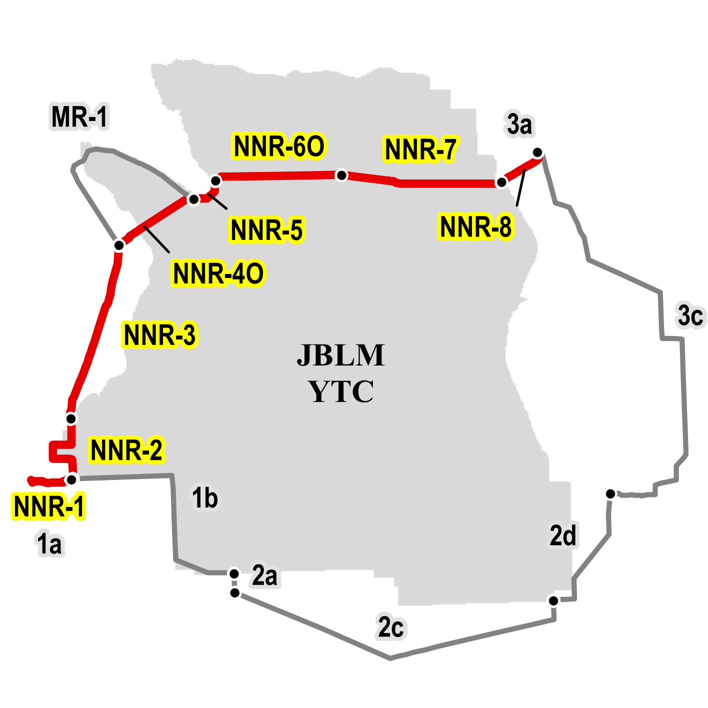
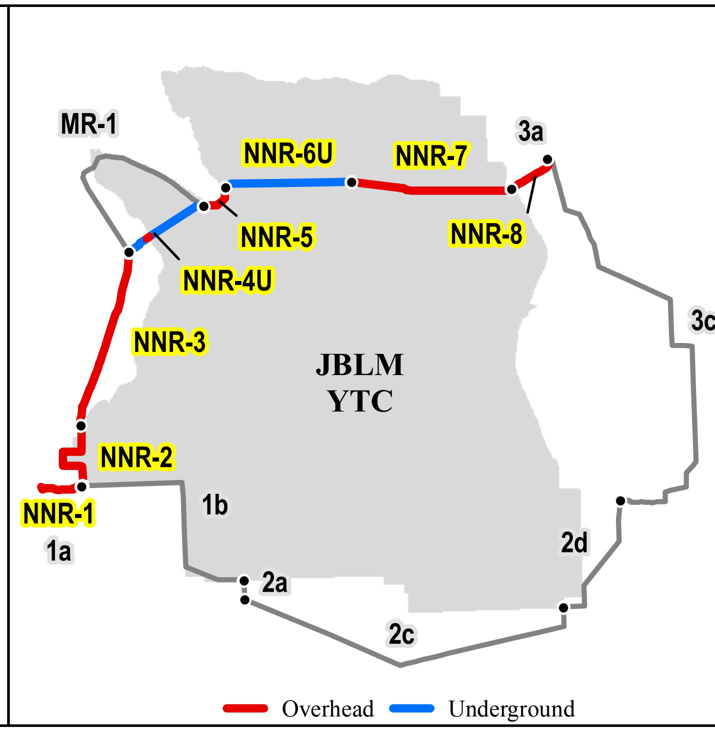
NNR Alternative



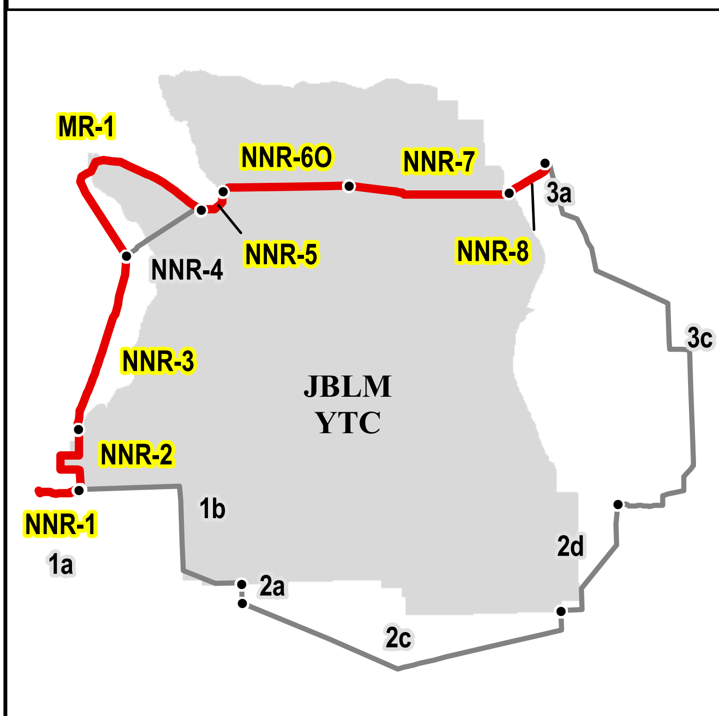
Total Length: 40.4 miles

NNR Alternative: Underground Design Option



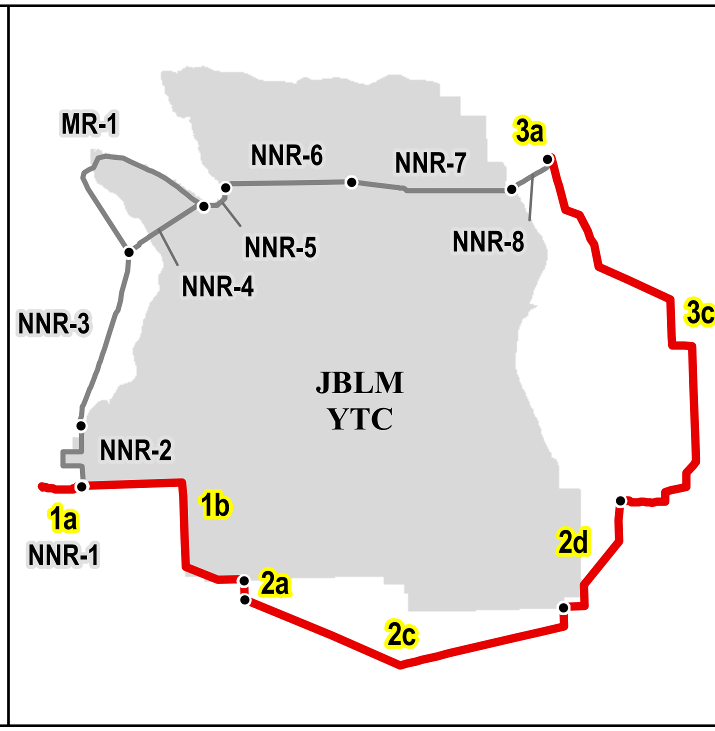
Total Length: 40.4 miles

NNR Alternative with MR Subroute



Total Length: 47.7 miles

Alternative D (Agency Preferred)



Total Length: 66.3 miles

NNR Alternative	NNR-1, NNR-2, NNR-3, NNR-4O, NNR-5, NNR-6O, NNR-7, NNR-8
NNR Alternative: Underground Design Option	NNR-1, NNR-2, NNR-3, NNR-4U, NNR-5, NNR-6U, NNR-7, NNR-8
NNR Alternative with Manastash Ridge (MR) Subroute	NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6O, NNR-7, NNR-8
Alternative D (Agency Preferred)	1a, 1b, 2a, 2c, 2d, 3a, 3c

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2-2 Schematic Illustration of Route Alternatives

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2.4 PROJECT ACTIVITIES AND FEATURES COMMON TO ACTION ALTERNATIVES

2.4.1 Design Options Considered in the Alternatives Impact Analysis

Potential design options are considered in the SDEIS to determine the potential impacts of the Project on resources identified in Chapters 3 and 4 based on the various design and construction techniques proposed. The two design options that are considered are: 1) the Overhead Design Option, and 2) the Underground Design Option. These two design options are referred to collectively hereafter as the "Design Options." Potential impacts of variations on the Design Options (e.g., steel single pole, wood single pole, steel H-frame, wood H-frame, undergrounding) are discussed in each of the resource sections in Chapter 4.2 through 4.16.

Disturbance assumptions, design, construction, operation, and maintenance characteristics of the Overhead Design Option are detailed in Sections 2.4.2, 2.4.3, and 2.4.4 below. Disturbance assumptions, design, construction, operation, and maintenance characteristics of the Underground Design Option are detailed in Section 2.4.5 below.

2.4.2 Overhead Transmission Line Design Option

This section describes the typical characteristics of the Project facilities.

2.4.2.1 New Vantage to Pomona Heights 230 kV Transmission Line Specifications

The typical design characteristics of the 230 kV transmission line are presented in Table 2-3. The components of the transmission line are described below, including structure types, foundations, conductors, insulators, and associated hardware and overhead groundwire.

2.4.2.2 Structures

The structures for the 230 kV transmission line would be either single-circuit H-frame wood or steel poles, or single wood or steel poles depending on location. H-frame wood pole structures are proposed for most of the line located in open terrain. The H-frame tangent structures would be between 65 and 100 feet tall and spaced approximately 650 to 1,000 feet apart depending on terrain. In developed, agricultural, or constrained areas, single wood or steel pole tangent structures would be used. The single pole tangent structures would be between 70 and 110 feet tall and spaced between 400 to 700 feet apart. Angle and dead-end structures would be guyed to ground anchors. For the Columbia River crossing, the structures would be approximately 200-foot tall steel lattice structures for the up to 2,800-foot crossing. The exact height of and distance between structures would be dictated by topographic and land use characteristics and safety requirements for conductor clearances. Structure design characteristics are identified on Table 2-3 and illustrated in Figures 2-3 and 2-4.

2.4.2.3 Foundations

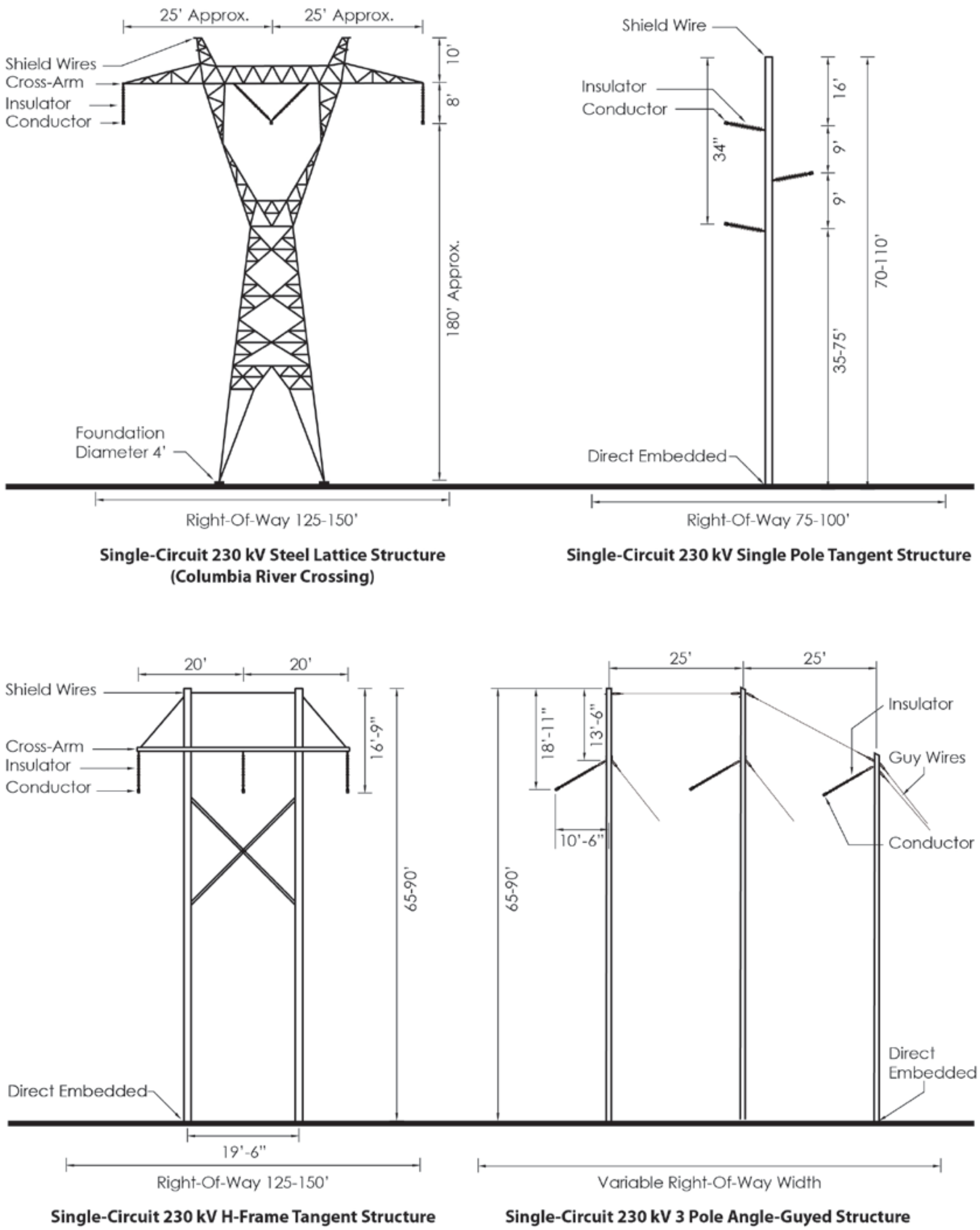
Direct Embedded-Wood/Steel Structures

Poles would be placed in augured holes, directly embedded into the ground and typically do not require concrete foundations. The embedment depth for poles up to 95 feet tall is typically 10 percent of the pole length plus two feet; for poles 100 feet and taller, 10 percent of the pole length plus three feet.

TABLE 2-3 DESIGN CHARACTERISTICS OF THE VANTAGE-POMONA HEIGHTS 230 KV TRANSMISSION LINE PROJECT-OVERHEAD DESIGN OPTION

FEATURE	DESIGN CHARACTERISTICS
Line Length	40.4 miles (NNR Alternative: Overhead and Underground Design Option) 47.7 miles (NNR Alternative with Manastash Ridge Subroute)
Type of Structure	H-frame wood poles-open terrain Single wood or steel poles in agricultural, developed and constrained areas
Structure Height	H-frame structures - 65 to 100 feet Single poles - 70 to 110 feet
Average Span Length	H-frame structures-650 to 1,000 feet Single poles - 400 to 700 feet
Number of Structures per Mile	H-frame structures - 6 to 8 Singles poles - 7 to 13
ROW Width	H-frame structures - 125 to 150 feet Single poles - 75 to 100 feet Dead-end and angle structures-Additional ROW required for guys and anchors (area determined by structure height and angle)
Land Disturbed (approximate):	
Temporary	
Structure Work Areas	
(H-frame Structures)	150 x 125 feet (18,750 sq. ft.)
(Single Poles)	150 x 80 feet (12,000 sq. ft.)
Turn-Around Areas	60 x 60 feet (3,600 sq. ft.)
Pulling and Tensioning Sites	125 x 400 feet (50,000 sq. ft.) Sites every 11,000 feet (2 miles) or less
Construction Yard/Staging Areas (existing disturbed areas)	5 acres; 3 yards required
Permanent	
Structure Base	
H-frame	20 inch diameter each pole = 40 inches
Single Pole	24 inches diameter
Steel Lattice	4 footings, 60 x 60 feet (3,600 sq. ft.)
Work Pads	30 x 40 feet (1,200 sq. ft.)
Access Roads	Minimum 14 feet wide up to 24 feet wide by length, depending upon terrain
Access Roads	Minimum 14 feet wide up to 24 feet wide by length, depending on terrain - approximately 1.1 to 2.5 miles (depending on slope) of new road per mile of transmission line where new road would be required. Existing roads would be used whenever possible.
Voltage	230,000 volts alternating current
Circuit Configuration	Single-circuit with 3 phases per structure
Conductor Size	1,272 kilo-circular mils (kcmil; 1.354 inch diameter) aluminum conductor steel reinforced
Ground Clearance of Conductor	28 feet minimum - up to 35 feet (typical) minimum of 34 feet clearance for I-82 crossings
Structure/Pole foundations	Poles generally would be placed in augured holes and tamped. Foundations may be required in rough terrain, uplift areas or large angles. Single-circuit steel lattice structures for Columbia River crossing would require steel reinforced concrete drilled piers.

FIGURE 2-3 TYPICAL 230 KV STRUCTURE TYPES



IMAGES NOT TO SCALE

FIGURE 2-4 PHOTOGRAPHS OF TYPICAL 230 KV STRUCTURE TYPES

Embedment depth is expected to be between 9 and 15 feet based on the structure heights proposed for the Project. The actual depth would depend on load and soil characteristics. No foundations would be required for the wood pole structures except where necessary due to local terrain conditions, areas of uplift, and at transmission angle points. The diameter of the hole excavated for embedment is typically the pole diameter plus 18 inches. When a pole is placed in a hole, native or select backfill would be used to fill the voids around the perimeter of the hole.

Drilled Concrete Piers-Steel Lattice Structures

The Columbia River crossing single-circuit steel lattice structures would require four foundations with one on each of the four corners of the lattice towers. The foundation diameter and depth would be determined during final design and are dependent on the type of soil or rock present at each specific site. Typically, the foundations for the single-circuit tangent lattice towers would be composed of steel-reinforced concrete drilled piers with a typical diameter of four feet and a depth of approximately 15 feet.

2.4.2.4 Conductors

The conductor (the wire cable strung between transmission line structures through which the electric current flows) would be aluminum stranded with a steel stranded reinforced core. The aluminum carries the majority of the electrical current and the steel provides the tensile strength to support the aluminum strands. The conductor size would be 1,272 kcmil (1.354 inch diameter). The proposed transmission line would be designed for one 230 kV three phase (three conductors) circuit and one shield wire.

Conductor phase to phase and phase to ground clearance parameters are determined in accordance with the National Electrical Safety Code (NESC) and Pacific Power design standards. This code provides for minimum distances between the conductors and the ground, crossing points of other lines and the transmission support structures, other conductors and a minimum working clearances for personnel during energized operation and maintenance activities (Institute of Electrical and Electronics Engineers [IEEE] 2007). Minimum conductor height above the ground or vegetation would be 28 to 35 feet, typically. The conductor height for the I-82 crossings, however, would be a minimum of 34 feet according to WSDOT. Minimum conductor clearances would dictate the exact height of each structure based on topography and safety clearance requirements. During detailed design, clearances may be increased to account for special situations that may arise in site-specific locations.

2.4.2.5 Insulators and Associated Hardware

Insulators, which are made of an extremely low conducting material such as porcelain, glass, or polymer, are used to suspend conductors from each structure. Insulators inhibit the flow of electrical current from the conductor to the ground or another conductor. The 230 kV transmission line would utilize polymer type insulators. The assemblies of insulators are designed to maintain electrical clearances between the conductors, structure and ground.

To protect conductors from lightning strikes, each structure would have one lightening protection shield wire installed near the top of each pole. Current from lightning strikes would be transferred through ground wire attached to structures into the ground. The shield wire would be grounded at regular intervals to meet NESC code and Pacific Power standards. The shield wire would be composed of extra high strength steel wire with a diameter of 0.360 inch and a weight of 0.273 pound per foot.

2.4.2.6 Interstate 82 Crossings

There would be three potential crossings of I-82 associated with the NNR Alternative (see Figures 2-5 through 2-7).

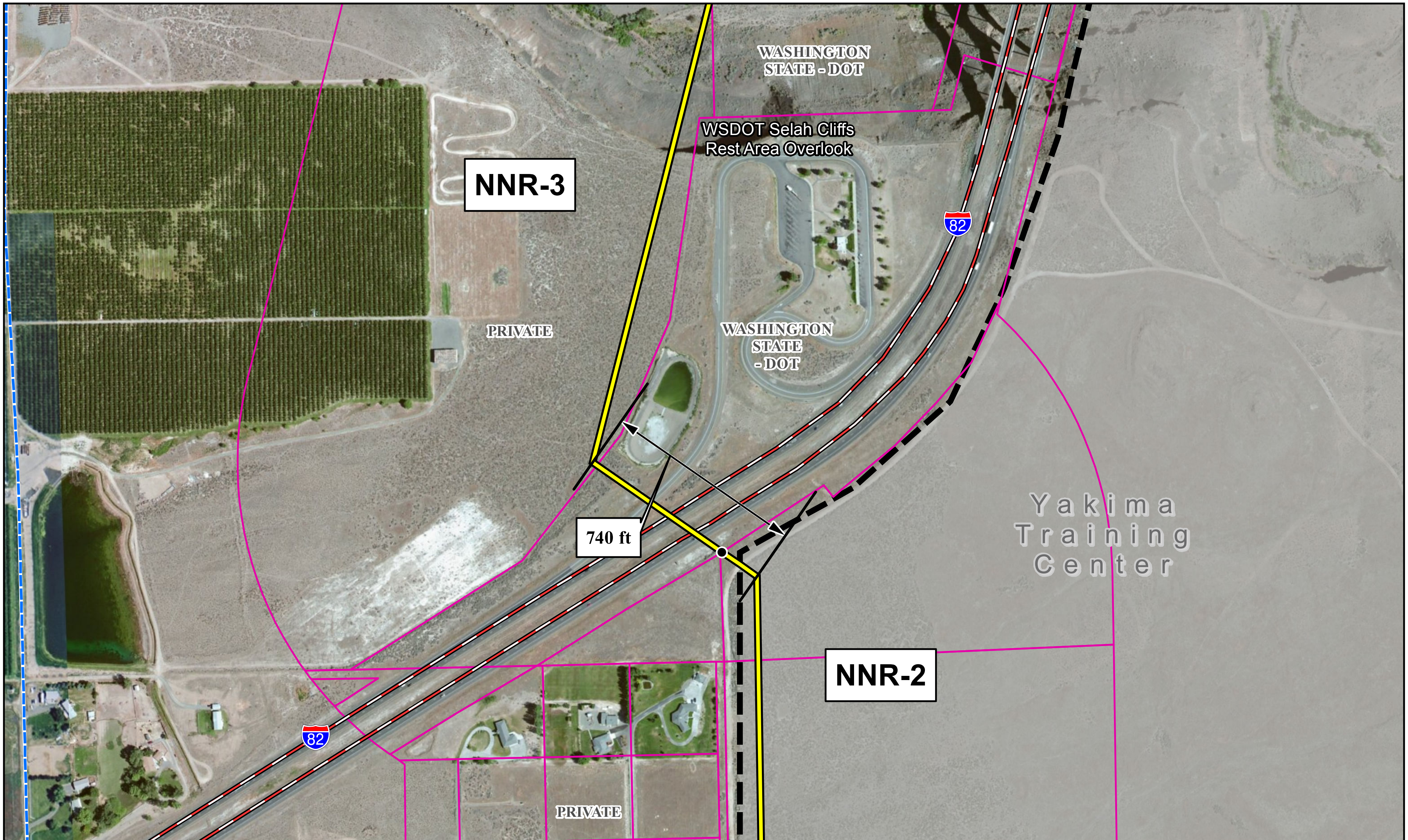
Crossing #1-Selah Creek Rest Area: This crossing would occur within route segment NNR-3 and would be a part of both the NNR Alternative and the NNR Alternative with the Manastash Ridge Subroute. The southern freeway crossing would involve the placement of one transmission structure on the eastern side of the freeway within the JBLM YTC boundary. The other transmission structure on the western side of the freeway would be placed on private property near a WSDOT pond and southwest of the Selah Cliffs Rest Area. No structures would be placed within the interstate ROW or the rest area. The approximate length of this crossing would be about 740 feet and would utilize H-frame structures. Conductor to ground clearance for this interstate crossing would be a minimum of 34 feet according to WSDOT. The crossing would not involve a break in access; therefore, approval from WSDOT at the regional level would be necessary. A detailed map showing the location of Crossing #1 is provided as Figure 2-5.

Crossing # 2-Exit 11: This crossing would occur for the NNR Alternative (route segment NNR-4o) or the NNR-Underground Design Option. For the NNR Alternative, the interstate crossing would involve the placement of one transmission structure on western side of the interstate south of Exit 11 on private property. This crossing would be at the same location as the existing Pomona-Wanapum 230 kV transmission line crossing of I-82 on its north side. The other structure would be placed on the eastern side of the freeway on the JBLM YTC. No structures would be placed within the interstate ROW. The approximate length on this crossing would be 1,000 feet and would utilize H-frame structures. Conductor to ground clearance of this interstate crossing would be a minimum of 34 feet according to WSDOT. The crossing would not involve a break in access, so approval from WSDOT at the regional level would be necessary. A detailed map showing the location of Crossing #2 is provided as Figure 2-6. The Underground Design Option (NNR-4u) would be similar to that shown in Figure 2-6, with the transition stations located on the west and east sides of the 1,000 foot overhead span on private and JBLM YTC land. A permanent access break, authorizing the use of Exit 11 by WSDOT, would be required for construction access.

Crossing # 3-Manastash Ridge: This crossing would occur with the NNR Alternative with the Manastash Ridge Subroute (route segment MR-1). This interstate crossing would involve the placement of a structure on private land on the west side of I-82 directly south of the West-bound Manastash Ridge Viewpoint. The other structure would be placed on the eastern side of the interstate on the JBLM YTC. The crossing length would be approximately 1,270 feet. Conductor to ground clearance of this interstate crossing would be a minimum of 34 feet according to WSDOT. No structures would be placed within the interstate ROW. A detailed map showing the location of Crossing #3 is provided as Figure 2-7.

2.4.2.7 State Highway 243 Crossing

Construction of the NNR transmission line Alternative would require crossing SR 243. A Utility Permit would be required from WSDOT. The transmission structures would not be placed within either the highway ROW or WSDOT's Control Zone.



Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 2-5
NNR Alternative I-82 Crossing #1 - Selah Creek Rest Area

Project Features

Alternative Route

Existing Transmission

Pomona - Wanapum 230 kV Transmission

Transportation

Interstate Highway

Jurisdiction

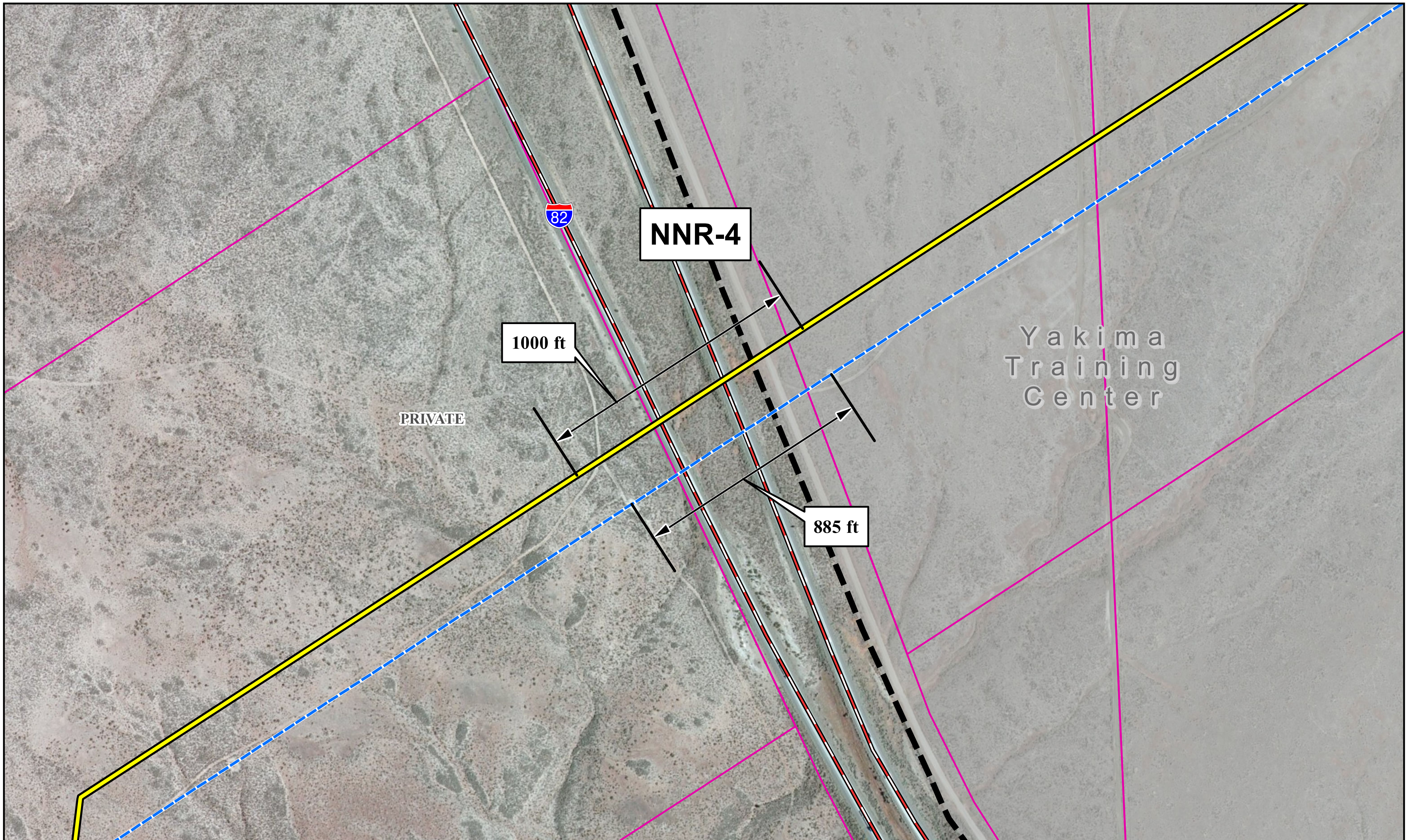
Parcel

Yakima Training Center (DOD)

0 500 1,000
Feet

PACIFIC POWER
A DIVISION OF PACIFICORP

POWER ENGINEERS



Vantage - Pomona Heights 230 kV
Transmission Line Project

Figure 2-6
NNR Alternative I-82
Crossing #2 - Exit 11

Project Features

Alternative Route

Existing Transmission

Pomona - Wanapum
230 kV Transmission

Transportation

Interstate Highway

Jurisdiction

Parcel

Yakima Training
Center (DOD)

0 500 1,000
Feet

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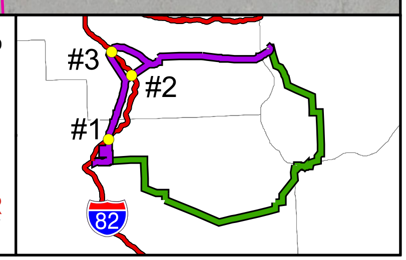

Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 2-7
Manastash Ridge Subroute Crossing #3 - Manastash Ridge Viewpoint

Project Features

Alternative Route

Existing Transmission

Pomona - Wanapum 230 kV Transmission

Transportation

Interstate Highway

Jurisdiction

Parcel

Yakima Training Center (DOD)

0 500 1,000
Feet

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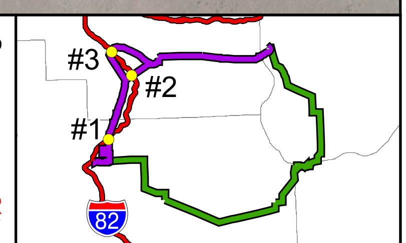


2.4.2.8 Right-of-Way Acquisition

Acquisition of Right-of-Way Across Federal Lands

New permanent and temporary land use rights are required for the construction and operation of the transmission line facilities such as the transmission line, access roads, and temporary work sites (e.g., ROW grant, easement, license agreement, franchise agreement, and fee simple). The proponent has filed ROW applications with the BLM, JBLM YTC, and Reclamation for transmission facilities located on federal land. The grant of ROW required would be:

- A width of between 125 feet and 150 feet for H-frame structures and 75 feet to 100 feet for single pole structures and for a specific number of miles across federal land.
- For a specific period of time (50 years, with renewal for the expected useful life of the Project).
- For an amount of additional ROW acreage that may be needed for access roads located outside of the transmission line ROW.

A ROW Grant issued under the Federal Land Policy and Management Act (FLPMA) is primarily dependent upon a reasonable period needed to accomplish the purpose of the authorization. ROW Grants under FLPMA generally do not exceed 30 years; however, grants of up to 50 years may be issued for major facilities/systems such as an electric transmission line 230 kV or greater (*BLM Policy and Procedures for Issuance of Long Term ROW Grants and Easements* under 43 Code of Federal Regulations [CFR] Parts 2800 and 2880, June 2007). The BLM regularly includes a provision for the option of ROW renewal for the expected useful life of the facility where the useful life is expected to extend beyond the initial term of the ROW Grant. Once a Record of Decision (ROD) has been issued, the applications would be finalized with Project design details. Once a Record of Decision and ROW Grant has been issued, Pacific Power would provide a Plan of Development with detailed design information.

Pacific Power Acquisition of Right-of-Way Across State Lands

In order to cross WSDOT-administered or DNR-administered lands, a ROW easement would be acquired using a utility permit or easement. A utility permit would be used for the crossing of state operated highway ROW. An easement would be required to cross or occupy state non-operating ROW, such as state parcels not associated with highway operations.

Washington State law, Revised Code of Washington 47.44 and Washington Administrative Code (WAC) 468-34, grants WSDOT the authority to issue Utility Permits and Franchises for the occupancy of highway ROWs to the persons, associations, private or municipal corporations, the federal government, or any agency for the purpose of constructing and maintaining transmission lines and other utilities. Environmental studies and environmental surveys will be completed as required by the responsible state agency(ies) prior to construction and as part of the permitting process. Easements must be obtained from adjoining properties prior to obtaining break in access authorization from WSDOT for construction, operation, and maintenance. Any point from inside or outside the state limited access ROW limited access hachures (mapped shown on applicable maps) that crosses over, under, or physically through the plane of the limited access, is an access break or “break in access,” including, but not limited to, locked gates and temporary construction access breaks.

The DNR would be responsible for approving Pacific Power’s easements and access permit applications for crossing DNR managed uplands, and approving a use authorization (easement) for crossing State-Owned Aquatic Lands. Depending on the structure and piling location in relation to the ordinary high water mark, Pacific Power may be required to obtain an additional easement or right-of-entry from DNR (Aquatics Division) if the project requires use of or construction on state-owned aquatic land. Prior to processing permit applications, the Project will need to comply with Washington's SEPA and meet the DNR's state substantive standards. Project crossing of the Columbia River or the Yakima River would require a use authorization. Geotechnical surveys on DNR Aquatic Lands also require right-of-entry.

Pacific Power Acquisition of Right-of-Way Across Private Lands

A ROW for transmission line facilities on private land would be purchased. All land rights would be acquired in accordance with federal and state laws and regulations. According to Pacific Power, every effort would be made to purchase land rights through reasonable negotiations with current owners. Once a route for the transmission line has been selected, a list of all landowners with title to property lying within the transmission line ROW would be obtained by Pacific Power from county records. Permission to enter the property would be requested by Pacific Power from the landowners for Project personnel to conduct surveys, real property appraisals, environmental studies, and geotechnical studies. Detailed legal descriptions would be prepared using survey data of the transmission line and access road ROWs; tract plats of the land rights to be acquired would be drawn.

After title evidence is obtained and land valuation and legal descriptions are completed, realty specialists would present formal offers to acquire the necessary land rights. Land rights would be acquired in the form of an easement contract for transmission line ROW. The realty specialist would explain the Project and contract to the landowners. If agreeable to both the landowner and realty specialist, the contract would be signed.

The executed contract would be recorded in the official records of the county, and the ROW would be insured with title insurance. The landowners would be paid the amount of the contract's consideration. All costs incidental to the contract's execution, such as recording fees, closing costs, and title insurance fees would be paid by Pacific Power.

If a necessary easement cannot be acquired through negotiation, Pacific Power may, in certain circumstances, acquire the easement through eminent domain (condemnation) proceedings. Eminent domain proceedings are a last resort and are only used if an agreement cannot be reached. Through the eminent domain process, a court determines the just compensation paid to the landowner.

After completion of construction, realty specialists would work with landowners to settle any construction damages to landowner property.

2.4.3 Overhead Transmission Line Design Option Construction

Pacific Power would not initiate any construction or other surface disturbing activities on the public land portion of the ROW until written approval of the BLM, JBLM YTC, Reclamation, WSDOT or DNR Authorized Officer is obtained, as appropriate. The specific authorization from the BLM would consist of a written Notice to Proceed (Form 2800-15).

Preconstruction conferences with each of the affected federal and state agencies would be conducted in order to introduce the contractors and their field representatives, discuss mitigation measures and schedules, and introduce each agency's point-of-contact prior to commencement of construction. As construction proceeds, the construction engineer or inspector would continue to monitor activities to ensure ROW compliance and to initiate modifications, where necessary. In environmentally sensitive areas, an environmental specialist with appropriate qualifications (i.e., biologist, archaeologist) would monitor construction activities to ensure compliance with any required protections and/or mitigation. Following completion of the construction, the transmission line would be mapped "as built" and separate construction project closure documents would be submitted to each of the federal and state agencies for review and agency record-keeping. Post-construction meetings with each of the agencies may be necessary to review the construction process.

The following sections detail the transmission line construction activities and procedures for the Project. Construction equipment and work force requirements are described in Section 2.4.3.14. Construction of the transmission line is discussed in the following sections according to the sequence of activities listed below.

1) Geotechnical surveys are conducted.
2) Centerline of transmission line surveyed and staked.
3) Access roads identified and constructed, where necessary.
4) ROW and structure sites cleared.
5) Work areas and set-up sites cleared, as needed.
6) Materials distributed along centerline.
7) Holes dug for transmission line structures.
8) Structures framed and erected.
9) Conductors and ground wires installed.
10) Construction sites cleaned-up and reclaimed.

2.4.3.1 Surveying the Centerline

The engineering survey would involve verifying and staking the centerline of the transmission line route; ROW boundaries; access roads; spur roads to structure sites; structure locations; and temporary work areas. Required cultural and biological resource surveys may begin once certain survey information is available and land rights are obtained. Depending on the route approved in the ROD, the centerline may be adjusted to accommodate detailed engineering requirements.

2.4.3.2 Overhead Transmission Design Option Disturbance Model, Access Roads, and Ground Disturbance Assumptions

Construction of the new 230 kV transmission line would require vehicle, truck and crane access to each new structure site for construction crews, materials, and equipment. Roads enable access to the ROW and structure sites for both construction and long-term maintenance of the transmission line. Short term, temporary impacts and long term, permanent impacts created as a result of Project construction, operations, and maintenance were modeled along the assumed centerlines based on the assumptions described below. This disturbance model was utilized to determine impacts on resources.

Transmission line ROW access would be provided through a combination of existing and new access roads, overland access, and/or improvement to existing roads. Roads would be upgraded or constructed in accordance with the Proponent’s standards for road construction, or according to land management agency requirements (such as those contained in BLM Manual 9113 [1985]). Existing paved and unpaved roads and trails would be used, where possible, for the transportation of materials and equipment from the storage yards to locations they are needed along the transmission line ROW. All construction access on federally managed public lands is subject to the approval of the appropriate land management agency prior to the initiation of construction. Other, state, and local landowners would require approvals before road construction could begin on their property. Additionally, approvals from the WSDOT would be needed for I-82 and SR 243 crossings; where a break in access would occur on I-82, approval from Federal Highway Administration would also be necessary.

All affected private landowners and agencies would be consulted before road construction begins. Specific plans for the construction, rehabilitation, and/or maintenance of roads, including the general locations of access roads, would be documented in the Plan of Development (POD). These plans would incorporate relevant requirements and stipulations from the agencies and landowners.

Where the proposed transmission line would parallel existing transmission lines or other linear features, the access roads along the existing utilities would be used wherever possible to minimize the amount of new road construction. However, these roads may require upgrading before they could be used for construction. All roads existing prior to construction would be left in a condition equal to or better than the condition prior to construction. Wherever existing roads could be used, only spur roads to structure sites may need to be constructed.

In some areas, only temporary roads would be needed. Typically, these temporary roads would be graded to a travel surface width of approximately 14 feet minimum (up to 24 feet maximum) depending on terrain. Turnout areas and curves in the road would require a wider surface width. Normally, a ditch drainage system would not be constructed for temporary roads.

Permanent access roads would be constructed where needed for construction and long-term maintenance. Permanent access roads would be graded to a travel surface width of approximately 14 feet minimum (up to 24 feet maximum) including road prism and cut/fill area depending on terrain and radius of road curve. Turnout areas and curves in the road would require a wider surface width. Culverts or other drainage structures would be installed as necessary across drainages, but the roads would usually follow the natural grade. Wherever possible, roads would be built at right angles to drainages. Clearings for construction of new roads or maintenance of existing roads typically occur five feet beyond the edge of the roadway on level ground. On hillside cuts or fills, clearings would be sufficient width to install the cut or fill without interference. According to the Proponent’s road development standards (PacifiCorp 2008), where side slopes exceed 60 percent, a full bench cut would be reburied to stabilize the slope bases. No side-casting of material would be allowed in these areas; end-haul of material (dump areas of removed earth where necessary) would be required to a designated location as approved by the landowner or land management agency. The level of ongoing maintenance of permanent roads would be determined by Pacific Power’s local maintenance and operations crews in accordance with state and federal agency stipulations.

Overland access would occur in areas where no grading would be needed and would be used to the greatest extent possible. Overland travel would consist of “drive and crush” and/or “clear and cut” travel. Drive and crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed but not cropped. Soil is compacted, but no surface soil is removed. Clear and cut is the removal of vegetation in order to improve or provide suitable access for equipment. Vegetation is removed using above ground cutting methods that leave the root crown intact. Soil is compacted but no surface soil is removed. In areas of dense vegetation, the surface organic material would be stripped from the ground within the roadway and cut or filled in some areas. Stripping would occur to a maximum depth of six inches unless it is necessary as deemed appropriate by the engineers. The stripped area would be compacted as necessary to provide an adequate surface.

In certain areas, it could be necessary to block roads after construction to restrict future access for general and undesired use. Such areas would be identified through negotiations with the landowner or land management agency. Methods for road closure or management may include installing locking gates or obstructing the path with earthen berms or boulders. Blocked access routes would have to be reopened, when necessary for Project maintenance, repair, inspection, etc.

For the purposes of calculating estimated impacts created as a result of the Project alternatives, eight levels of access (Levels 0 through 7) were developed (Access Levels). These Access Levels were based on the development standards detailed above and were numerically arranged based on the anticipated ground disturbance expected with Level 0 having the lowest ground disturbance per mile of transmission line and Level 7 having the most. The Access Levels incorporate the presence of existing roads, an assessment of their current conditions, and the anticipated road construction based on slope and vegetation cover. Level 0 was assigned in areas where no ground disturbance is anticipated, such as the crossing of surface water. Access Levels were assigned for each 0.1 mile increment along the NNR segments including the Manastash Ridge Subroute (see Appendix A: Map 1 – Access Map). Access levels were identical for both the Overhead Design Option and Underground Design Option (see Section 2.4.5). The ground disturbance levels are summarized in Table 2-4. For ground disturbance associated with the both the Overhead Design Option and the Underground Design Option, see Section 2.4.6.

Access levels were assigned along the assumed Project centerline by determining the location and condition of existing roads within the Project corridors based on field review and aerial photography analysis. During preliminary engineering, Pacific Power identified areas where helicopter construction would occur due to extreme slope and access limitations. These areas, as well as those areas where no road construction would occur because of the presence of water, were assigned an Access Level 0 and no ground disturbance was assumed related to access road construction (other permanent and temporary disturbance, such as structure base disturbance, was estimated, but not considered in Access Level determination). To determine the potential impact of access roads in other areas, existing roads, slope, and vegetation were considered. Existing roads were assigned a Level 1 or Level 2 designation, considering the extent to which they may require improvement.

TABLE 2-4 ACCESS LEVELS AND GROUND DISTURBANCE (OVERHEAD AND UNDERGROUND DESIGN OPTIONS)

ACCESS LEVEL	ACCESS SUMMARY	DISTURBANCE ASSUMPTIONS
Level 0	No Roads (at river crossing or helicopter construction); or Use Existing Improved Roads. No Preparation Required.	Crossing of the Columbia River (open water) and very steep terrain (helicopter construction); urbanized areas with improved roads; no road construction necessary.
Level 1	Overland Access in Flat Areas, Limited Disturbance in Flat Terrain (0 to 8%)	Low ground disturbance for new access road construction; assume generally overland access across grassy/low veg. areas and limited areas of grooming and grading; 4 to 5 inches of crushed rock applied in limited areas. Assume 10% of travel way graded, groomed, and/or graveled.
Level 2	Existing Improved Roads	Previously disturbed. Roads generally are in good condition, but may require small improvements at stream crossings, steep slope areas, and other locations. New ground disturbance would be minimal. New spur roads would be required to access each structure site; an average of 300 feet of new spur road for each structure. Spur roads would disturb approximately 0.4 acres per mile of transmission line.
Level 3	Roads that Require Improvement	Previously disturbed. Existing two-track or narrow unimproved roads would require improvement to make roads serviceable (e.g., mowing, grading) for construction. Low ground disturbance; assume approximately 0.5 to 1.0 mile of road improvements for each mile of transmission line. Road improvements would disturb approximately 0.75 to 1.0 acre per mile of transmission line. An average of 300 feet of spur roads would be required to access each structure site. Spur roads would disturb about 0.4 acre per mile of transmission line.
Level 4	Construct Road in Flat Terrain (0 to 8%)	Low to moderate ground disturbance for new access road construction; assume approximately 1.0 to 1.2 miles of new roads would be required for each mile of transmission line. Road construction would disturb approximately 1.7 to 2.0 acres per mile of transmission line.
Level 5	Construct Road in Sloping Terrain (8 to 15%)	Moderate ground disturbance for new access road construction; assume 1.2 to 1.5 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 2.0 to 2.5 acres per mile of transmission line.

ACCESS LEVEL	ACCESS SUMMARY	DISTURBANCE ASSUMPTIONS
Level 6	Construct Road in Steep Terrain (15 to 30%)	Moderate to high ground disturbance for new access road construction; assume approximately 1.5 to 2.0 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 2.5 to 3.4 acres per mile of transmission line.
Level 7	Construct Road in Very Steep Terrain (over 30%)	High to very high ground disturbance for new access road construction; assume approximately 2.0 to 3.0 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 3.4 to 5.0 acres per mile of transmission line.

Access Assumptions:
1) Permanent new access roads would be graded to travel service width of 14 feet, including cut and fill.
2) Spur roads would be an average of 300 feet in length.

The centerline was assigned Access Levels based on proximity to existing roads. Typically, paved, gravel, and wide dirt roads within 750 feet of the assumed centerline were given an Access Level 2 (as defined in Table 2-4). Within approximately 750 feet of the Access Level 2 (or 3) existing road, the assumed Project centerline was assigned the corresponding Access Level with the lower level given if both Level 2 and 3 were present within 750 feet of the assumed centerlines. The distance from existing roads criterion was used in areas with generally unrestricted access; I-82, for example, was not considered a road that would be used for access of the Project. Some roads were not considered accessible even if they were within 750 feet of the assumed centerlines.

Areas beyond 750 feet of an existing road were then assessed to determine the extent of potential road construction. During this access road assessment phase, areas where annual grassland vegetation or previously disturbed areas were identified based on Gap Analysis Program vegetation cover. In these areas, where slopes were less than eight percent, it was assumed that centerline access would be possible without grading new roads (overland access). Some isolated areas may require the laying of gravel or other ground disturbing activities. A 14-foot travel way will be groomed and graded where necessary. To determine the extent of new road construction, ground slope was determined based on digital terrain modeling. Intersection of the assumed centerline with the digital terrain model slope class (0 to 8%, 8 to 15%, etc.) determined access levels for each 0.1 mile increment where no existing roads occur and where overland access is not likely to occur.

2.4.3.3 Work Areas and Set-up Sites

Work areas are required at each structure site to facilitate the safe operation of equipment and construction operations. The size of the work area is driven by the need to lay down the poles, install the necessary hardware and frame them to full length. A temporary disturbance area of approximately 150 feet by 125 feet (18,750 sq. ft./0.43 acres) would be required at each H-frame structure location and an area of approximately 150 feet by 80 feet (12,000 sq. ft./0.28 acres) for single pole structure location.

Side hill construction would occur in certain areas requiring the establishment of leveled trails to access structures. Additionally, pads or leveled areas would be necessary for equipment set-up for installation of the poles. Typically, the blading for the trail would not exceed 12 feet, depending on the hill slope. The blading for the building pad would be done along the same area as the access road to reduce the overall amount of blading required for crane set-up and would not typically exceed 30 by 40 feet at the structure.

Pulling and tensioning sites for stringing the conductor would result in a temporary disturbance of 125 by 400 feet (50,000 sq. ft/1.15 acres.). Sites for pulling and tensioning would be located approximately every 11,000 feet (two miles) or less. This is the length of the longest reel of conductor that would be utilized by the Project. For mid-span setups, work areas are located within the 125-foot ROW and up to 250 feet in length. Setup sites for corners and heavy angles are the width of the ROW and up to 250 feet in length on both sides to allow for equipment to be set up in line with the pulling of the conductor. Additional set up sites could be selected by the contractor if approved by the landowner and/or land manager. Where feasible, all areas would be selected to allow access of equipment from roads and trails without requiring them to travel long distances on the ROW and would be located in more level areas so that blading would not be required.

Turn-around areas would be required in certain areas along the ROW where construction travel would be restricted by rock outcrops, washes, ravines, canals, or sensitive habitat areas. The turn-around areas would be located at the last structure that can be accessed by the road or trail, as well as the first structure on the other side of the restricted access area. Turn-around areas typically occupy an area of 60 feet by 60 feet (3,600 sq. ft.).

Specific structure locations, work areas, and set-up sites would be identified in the POD once a final route has been determined.

2.4.3.4 Pole and Foundation Installation

Wood/Steel Structure Direct Burial

Generally, pole excavations would be created with a vehicle-mounted power auger. Where conditions require the installation of pole foundations, excavations would be created with a backhoe or vehicle-mounted power auger. In extremely sandy areas, soils may be stabilized during excavation through the use of water or a gelling agent. An example of a gelling agent is "Novagel™" which acts as a viscosifier and soil stabilizer so that during foundation drilling the sidewalls do not collapse during the drilling process. After excavation is complete, the structures would be put in place by direct burial. Excavation activities would require access by the necessary equipment, including power auger or drill, crane, and material trucks. Refer to Table 2-5 for a list of the equipment and personnel necessary for installation of poles and foundations.

Poles would be placed in holes or foundations as soon as the holes are ready. In rare instances where holes are left open for any period of time, they would be covered and/or fenced to protect the public, livestock, and wildlife. Soils removed from holes would be stockpiled on the work area and used to backfill holes. All remaining soil not needed for backfilling would be spread on the work area unless otherwise directed by land owner or manager.

Single Steel Pole and Steel Lattice Structure Foundations

Some single steel poles and the steel lattice structures for the Columbia River crossing would require the installation of foundations which are typically drilled concrete piers. Holes for the foundation would be drilled using truck or track-mounted augers. Reinforced steel anchor bolt cages would be installed after excavation and prior to structure installation. These cages are designed to strengthen the structural integrity of the foundations and would be assembled at the nearest Project laydown yard and delivered to the structure site via flatbed truck. These cages would be inserted in the holes prior to pouring concrete. The excavated holes containing the reinforced anchor bolt cages would be filled with concrete. Chute debris from concrete trucks would be washed into the excavated holes.

2.4.3.5 Pole Assembly and Erection

Wood poles and associated hardware would be delivered to each pole work area by truck. Insulator strings and stringing sheaves would then be installed at each ground wire and conductor position while the pole is on the ground. Stringing sheaves would be used to guide the conductor during the stringing process for attachment onto the insulator strings. The assembled structure would then be hoisted into place by a crane or line truck. Figure 2-8 illustrates typical pole assembly activities.

2.4.3.6 Conductor and Shield Wire Installation

Conductors and shield wires would be placed on the transmission line structures by a process called stringing. The first step to wire stringing is the installation of insulators (if not already installed on the structures during ground assembly) and stringing sheaves. Stringing sheaves are rollers that are temporarily attached to the lower portion of the insulators at each transmission line structure to allow conductors to be pulled along the line. Figure 2-8 illustrates the sequence of steps in installing conductors. Additionally, bucket trucks would be used where required prior to stringing any transmission lines over highways, roads, power lines, structures, and other obstacles to prevent ground wire, conductors, or equipment contact during stringing activities. Bucket trucks are trucks fitted with a hinged arm ending in an enclosed platform called a bucket, which can be raised to let the worker in the bucket service portions of the transmission structure as well as the insulators and conductors without climbing the structure. Other safety measures such as barriers, flagmen, or other traffic control would be used.

Once the stringing sheaves and temporary clearance structures are in place, the initial stringing operation commences with the pulling of a lighter weight sock line through the sheaves along the same path the transmission line would follow. The sock line can be pulled in via helicopter or by ground-based equipment. The sock line is attached to the hard line, which follows the sock line as it is pulled through the sheaves. The hard line is then attached to the conductor, shield wire or fiber optic ground wire (OPGW) to pull them through the sheaves into their final location. Pulling the lines is accomplished by attaching them to a specialized wire stringing vehicle. Following the initial stringing operation, pulling and tensioning the line would be required to achieve the correct sagging or tension of the transmission lines between support structures.

Pulling and tensioning sites for 230 kV line construction would be required approximately every two miles along the ROW and would encompass approximately 1.1 acres each to accommodate required equipment. Equipment at sites required for pulling and tensioning activities would include tractors and trailers with spooled reels that hold the conductors and trucks with the tensioning equipment. To the extent practicable, pulling and tensioning sites would be located within the ROW. Depending on topography, minor grading may be required at some sites to create level pads for equipment. Finally, the tension and sag of conductors and wires would be fine-tuned, stringing sheaves would be removed, and the conductors would be permanently attached to the insulators at the transmission structures.

At the tangent and small angle structures, the conductors would be attached to the insulators using clamps to “suspend” the conductors from the bottom of the insulators. At the larger angle dead-end structures, the conductors cannot be pulled through and so are cut and attached to the insulator assemblies at the structure, thus “dead-ending” the conductors.

2.4.3.7 Helicopter Use

Access is required to each transmission structure site for construction and for operation and maintenance activities. Helicopters may be used to support these activities. Project construction activities potentially facilitated by helicopters may include delivery of construction laborers, equipment, and materials to structure sites; structure placement; hardware installation; and wire stringing operations. Helicopters may also be used to support the administration and management of the Project. Except in areas of extreme terrain which limits the construction of access roads as described in Section 2.4.3.2, the use of helicopter construction methods would not change the need for an access road system required for operating and maintaining the Project because vehicle access is required to each structure site regardless of the construction method employed.

For all helicopter activities, the construction contractor would work with the JBLM YTC Authorizing Officer to ensure that the appropriate notifications are made to coordinate the air space with other possible aircraft and helicopters in the area being used for military training, fire support, or other use.

2.4.3.8 Construction Yards/Staging Areas and Fly Yards

Several construction yards/staging areas, roughly five acres each, would be required for materials and equipment storage and staging and helicopter operations (fly yard) for construction activities. Possible locations would be identified during preliminary engineering design. All possible areas would be located on existing disturbed areas, and locations would be approved by land owner or land management agencies. The yards would serve as field offices, reporting locations for workers, parking space for vehicles and equipment and sites for temporary marshalling of construction materials.

2.4.3.9 Marking of Sensitive Areas

All sensitive areas, biological and cultural, would be marked on drawings and in the field prior to construction to ensure protection and avoidance of these areas. Marking in the field would consist of wooden stakes, which would be spray painted the same color (e.g., high visibility blue) for all sensitive areas. The stakes would represent general avoidance areas; no distinction between biological and cultural sites would be made. The marking would take place prior to construction. A preconstruction walk with the construction contractor would be conducted to identify avoidance areas in the field. After construction is complete in an area or when it has been determined there is no longer a threat to important biological and cultural resources, the stakes would promptly be removed to protect the sites location and significance from gaining unwanted attention and/or damage.

2.4.3.10 Erosion and Sediment Control

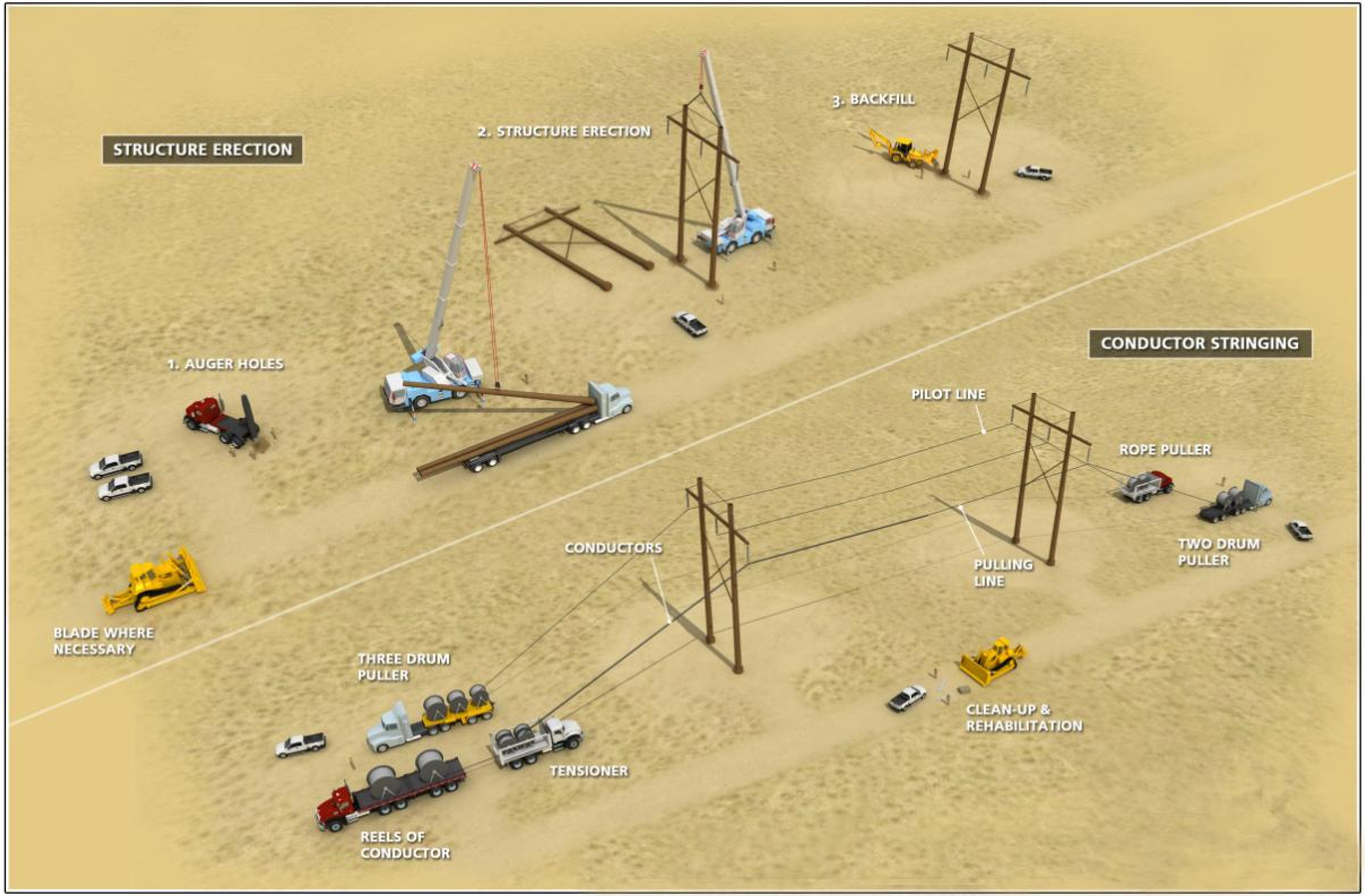
Erosion and sediment control may be necessary to prevent soil erosion in construction areas located on hillsides where a road to access a structure location or a leveled area is required to allow equipment set-up for pole installation. Applying and maintaining standard erosion and sediment control methods would minimize erosion. These may include weed-free straw wattles, weed-free straw bale barriers, and silt fencing which would be placed at construction boundaries. Gravel ramps may be installed at access points to public roadways, as needed, to prevent or minimize the tracking of mud, dirt, sediment, or similar materials onto paved roadways.

Erosion control structures such as waterbars, diversion channels, terraces, and slope roughening may be constructed if determined to be necessary to divert water and reduce soil erosion along the ROW or other areas disturbed by construction where slopes exceed 30 percent. Selection of appropriate erosion control materials would be based on soil properties, steepness of slope and anticipated surface flow or runoff, and would be detailed in the Project Stormwater Pollution Prevention Plan (SWPPP). Existing vegetation would be preserved to the maximum extent practicable during all phases of construction. Vegetation clearing would be kept to a minimum and occur only where construction plans call for it.

All disturbed areas would be re-seeded using a seed mixture as specified by the appropriate land management agency and best management practices for erosion control. Re-seeding would occur during the appropriate season(s) for successful establishment of new vegetation. On slopes greater than 30 percent, additional measures such as organic fiber mulching, geo-textile fabrics, and sod mats may be used.

Specific erosion and sediment control measures and locations would be specified in a SWPPP.

FIGURE 2-8 TYPICAL STRUCTURE ASSEMBLY AND WIRE INSTALLATION ACTIVITIES



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2.4.3.11 Disposal of Construction Debris and Site Clean-up

Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period. Refuse and construction debris would be removed from the sites and disposed of in an approved manner. Oil, fuels, and chemicals would not be dumped along the line. Oils, fuels, and chemicals would be properly characterized per federal and state regulations and then transported to an approved site for disposal. No open burning of construction trash would occur. Construction practices would comply with all applicable federal, state, and local laws and regulations concerning the use, storage, transportation, and disposal of hazardous materials.

All forms of refuse and waste produced along the ROW during construction would be collected and disposed of in a designated landfill or appropriate waste disposal site. Refuse and waste includes any discarded material, trash, garbage, packing material, containers, waste petroleum products, broken equipment, used parts, or excess construction materials.

2.4.3.12 Site Reclamation

The construction contractor (Contractor) would restore all lands disturbed during construction including but not limited to: access roads, tensioning and pulling sites, structure sites, work areas, and staging areas. Every effort would be made to restore the disturbed areas to original contours and conditions and to restore natural drainage within the ROW. Site reclamation would involve the personnel and equipment as shown in Table 2-5.

Sites would also be prepared for revegetation, including distribution of stockpiled soils and, where necessary, ripping or surface scarification. The Contractor would dispose of excess soils, rocks, and other materials that are unsuitable for site restoration as directed by the appropriate land management agency. Prepared sites would be reseeded utilizing agency-approved seed mixtures.

Any fences that were cut or otherwise modified during construction would be repaired and properly tensioned at the direction of private landowners and/or the Authorized Officer of the land management agency. Additionally, all gates or other features affected by construction activities would be repaired to their previous condition.

2.4.3.13 Fire Prevention and Suppression

All applicable fire laws and regulations would be observed during the construction period. All construction personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires. A Fire Protection and Control Plan would be developed.

Fire is a serious risk to construction personnel, materials, and equipment that could result in the loss of equipment, lost time in construction activity, and injury or death of personnel. The construction of the proposed Project would require the use of equipment and materials that are flammable and combustible. The line would be constructed in various vegetation types, ranging from farmland to scrub-shrub, which could ignite from either natural or manmade causes. Construction would also take place near energized transmission lines, which if struck by equipment or personnel, could result in fire.

All federal, state, and county laws, ordinances, rules, and regulations which pertain to prevention, pre-suppression, and suppression of fires would be strictly adhered to. This includes conformance with current Federal Wildland Fire Management Policy. All personnel would be advised of their responsibilities under applicable fire laws and regulations. It shall be the responsibility of the construction contractor to notify the appropriate federal, state, or local fire agency should a Project-related fire occur within or adjacent to the construction area. The construction contractor would be equipped with approved fire suppression tools and equipment.

Pacific Power would coordinate with federal, state, and local fire agencies at the onset on construction activities. The purpose of this coordination is to ensure that construction sites and personnel are equipped and trained to recognize and minimize fire hazards, to suppress a fire until firefighters can respond, and to locate pressurized and unpressurized water sources.

The construction contractor would be responsible for any fire started, in or out of the Project area, by its employees or operations during construction. The construction contractor would be responsible for notifying emergency response officials and initial attempts at fire suppression. The construction contractor would take aggressive action to prevent and suppress fires on and adjacent to the Project area, and would rehabilitate burned areas as directed by the appropriate land management agency.

Specific construction-related activities and safety measures would be implemented during construction of the transmission line in order to prevent fires and to ensure quick response and suppression in the event a fire occurs.

Once the Project is operational, continued operation of the transmission line provides stability to the entire interconnected transmission system, the appropriate land management agency with fire protection responsibilities would make every effort to avoid using fire-suppression techniques that could take the line out of service. If the appropriate land management agency determines that it must use fire-suppression techniques that could affect operation of the line, it would notify Pacific Power as soon as possible.

If Pacific Power becomes aware of an emergency situation that was caused by a fire that could damage the transmission line or its operation, it would notify the appropriate agency contact. Likewise, if federal, state, or local agencies become aware of an emergency situation that was caused by a fire on or threatening their respective lands and that could damage the transmission line or its operation, the affected agency would notify the appropriate Pacific Power contact.

Pacific Power would be responsible for any fire started in the Project working area during operation and maintenance of the line. Pacific Power would be responsible for notifying emergency response officials and initial attempts at fire suppression. All construction, operation, and maintenance vehicles would carry the required fire suppression equipment including (but not limited to) shovels, buckets and fire extinguishers.

2.4.3.14 Overhead Transmission Line Construction Workforce and Equipment

Table 2-5 shows the approximate number of workers and types of equipment that would be required to construct the Project. Various phases of construction may occur at different locations throughout the construction process, which would require several crews operating simultaneously at different locations. Construction of the Project, as proposed by Pacific Power, would take approximately one year to complete.

TABLE 2-5 OVERHEAD TRANSMISSION LINE CONSTRUCTION ESTIMATED PERSONNEL AND EQUIPMENT

ACTIVITY	PEOPLE	QUANTITY OF EQUIPMENT
Survey	3	1 pickup truck
Road Construction	3 to 4	2 bulldozers (D-8 Cat), 1 excavator 1 motor grader 1 vibratory roller 2 dump trucks 2 equipment and materials trailers 1 pickup truck 1 water truck (for construction and maintenance)
Direct embed pole holes and Footing Installation	6	1 hole digger Concrete trucks as required 1 water truck 2 pickup trucks 1 line truck
Material Haul	4	1 tractor/trailer 2 yard and field cranes or line trucks 1 fork lift
Structure Assembly Per crew 2 crews required	4	1 pickup truck 1 truck (2 ton)
Structure Erection Per crew 2 crews required	4	1 truck (2 ton) 1 pickup truck 1 bucket truck 1 crane 1 line truck
Wire Installation	8	1 wire reel trailer 1 diesel tractor 1 crane 1 line truck 3 pickup trucks 2 bucket trucks 2 3-drum pullers 1 single drum puller (large) 1 double bull-wheel tensioner (heavy) 1 static wire reel trailer OPGW
ROW Restoration and Cleanup	4	1 truck 1 motor grader 1 seeding and planting equipment 1 pickup truck 1 water truck

Note: Maximum total personnel for all tasks is 45 persons (actual personnel at any one time would be less).

2.4.4 Overhead Transmission Design Option Operation and Maintenance

The design, construction, operation and maintenance of the Project would meet or exceed the requirements of the NESC, which governs the design and operation of high-voltage utility systems, U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) standards and Pacific Power’s requirements for safety and protection of landowners and their property.

The transmission line would be protected with power circuit breakers and line relay protection equipment. If a conductor fails, power would typically be automatically removed from the line in less than 0.5 second. Lightning protection would be provided through overhead ground wires.

All buildings, fences, and other structures with metal surfaces located within 200 feet from the centerline of the ROW would be grounded as necessary. Typically, buildings located beyond 200 feet of the centerline would not require grounding. Other structures requiring grounding beyond 200 feet would be determined by the NESC standards. All metal irrigation systems that parallel the transmission lines for a distance of 1,000 feet or more and within 100 feet of the centerline would be grounded.

Operation and maintenance activities would include transmission line patrols, climbing inspections, structure and wire maintenance, insulator washing in selected areas as needed, and access road repairs. Necessary work areas around all structures would be kept clear of vegetation and the height of vegetation within the ROW would be limited. Periodic inspection and maintenance of each of the substations and communications facilities is also a key part of operating and maintaining the electrical system.

After the transmission line has been energized, land uses that are compatible with safety regulations would be permitted in and adjacent to the ROW. Existing land uses such as agriculture and grazing are generally permitted within the ROW. Incompatible land uses within the ROW include construction and maintenance of inhabited dwellings and any use requiring changes in surface elevation that would affect electrical clearances of existing or planned facilities.

Land uses that comply with state and local regulations could be permitted adjacent to the ROW. Compatible uses of the ROW on public lands would have to be approved by the appropriate federal and/or state land management agency. Permission to use the ROW on private lands would be determined by Pacific Power in consultation with the landowner.

2.4.4.1 Transmission Line Maintenance

Regular ground and aerial inspections would be performed in accordance with Pacific Power's established policies and procedures for transmission line inspection and maintenance. Pacific Power's transmission lines and substations would be inspected for corrosion, equipment misalignment, loose fittings, vandalism, and other mechanical problems. The need for vegetation management would also be determined during inspection patrols.

Inspection of the entire transmission line would be conducted semi-annually. Aerial inspection would be conducted by helicopter semi-annually and would require two or three crewmembers, including the pilot. Detailed ground inspections would take place on an annual basis using four-wheel drive trucks or off-highway vehicles (OHVs). The inspector would assess the condition of the transmission line and hardware to determine if any components need to be repaired or replaced or if other conditions exist that require maintenance or modification activities. The inspector would also note any unauthorized encroachments and trash dumping on the ROW that could constitute a safety hazard, and would report unauthorized use of the ROW to the landowner and/or land management agency.

2.4.4.2 Hardware Maintenance and Repairs

Routine maintenance activities are ordinary maintenance tasks that have historically been performed on transmission lines and are regularly carried out. The work performed is typically repair or replacement of individual components (no new ground disturbance), performed by relatively small crews using a minimum of equipment, and usually are conducted within a period from a few hours up to a few days. Work requires access to the damaged portion of the line to allow for a safe and efficient repair of the facility. Equipment required for this work may include 4x4 trucks, material (flatbed) trucks, bucket trucks (low reach), boom trucks (high reach), or man lifts. This work would be scheduled and would typically be required due to issues found during inspections. Typical items that may require periodic replacement include insulators, hardware or structure members. It is expected that these replacements would be required infrequently.

Pacific Power would safely conduct maintenance on the proposed 230 kV transmission using live-line maintenance techniques, which would avoid an outage to the critical transmission line infrastructure. For the 230 kV H-frame structures, this requires that adequate space be available at each structure site so that a bucket truck can be positioned to access the outside phases. To allow room at each structure for these activities in low slope areas, a pad area is required with the structure in the center of the ROW. The size and location of these required pads near the structures may vary depending on the side slope and access road routes at each site. The work areas and pads would be cleared to the extent needed to safely complete the work.

Wood poles are treated (e.g., Dazomet) to retard rotting and structural degradation. Personnel access structures by pickup, OHV, or by foot; inspect and test (including the subsurface) the poles; and then treat them by injecting preservatives into the poles. Wood pole inspections and treatments occur on a 10-year cycle.

2.4.4.3 Right-of-Way Repair

ROW repairs include grading or repair of existing maintenance access roads and work areas and spot repair of sites subject to flooding or scouring. Required equipment may include a grader, backhoe, four-wheel drive pickup truck, and a cat-loader or bulldozer. The cat-loader has steel tracks whereas the grader, backhoe, and truck typically have rubber tires. Repairs to the ROW would be scheduled as a result of line inspections or would occur in response to an emergency situation.

2.4.4.4 Vegetation Management

Work areas adjacent to electrical transmission structures and along the ROW must be maintained for vehicle and equipment access necessary for operations, maintenance, and repair including for live-line maintenance activities. Shrubs and other obstructions would be regularly removed near structures to facilitate inspection and maintenance of equipment and to ensure system reliability. At a minimum, trees and brush would be cleared within a 25-foot radius of the base or foundation of all electrical transmission structures and to accommodate equipment pads to conduct live-line maintenance operations.

Vegetation within the linear area along the ROW under the conductors and extending 10 feet outside the outermost conductor would be maintained to consist of grasses and low growing shrubs or short trees less than five feet tall at maturity. Every effort would be made to ensure that mature sagebrush is maintained intact as it typically does not exceed five feet in height. An area extending from 10 feet outside the outermost conductor to the edge of the ROW would be maintained to consist of tall shrubs or short trees up to 25 feet high at maturity.

When conductor ground clearance is greater than 50 feet, for example a canyon or ravine crossing with high ground clearance at mid-span, trees and shrubs would be left in place as long as the conductor clearance to the vegetation tops is 50 feet or more.

Noxious weed control will be described in detail in the POD’s Noxious Weed and Invasive Plant Management Plan. This plan will be consistent with the Spokane District RMP and 1992 RMP amendment (BLM 1985, 1992), JBLM YTC Noxious Weed Control Plan (JBLM YTC 2002), Executive Order 13112 (Invasive Species), the Federal Noxious Weed Act, and Washington State Noxious Weed Laws. The plan will describe the pre-construction inventory; prevention measures and treatment methods before and during construction; and monitoring and treatment measures that would be implemented following construction. If revegetation cannot be done immediately following construction, the appropriate interim noxious weed control measures discussed in the Noxious Weed and Invasive Plant Management Plan will be implemented until revegetation can occur.

2.4.4.5 Emergency Response

The operation of the transmission system is remotely managed and monitored from control rooms at PacifiCorp's operation center in Portland. Electrical outages or variations from normal operating protocols would be sensed and reported at this operation center. As well, the substations are equipped with remote monitoring, proximity alarms, and, in some cases, video surveillance.

The implementation of routine operation and maintenance activities on transmission lines would minimize the need for most emergency repairs. Emergency maintenance activities are often those activities necessary to repair natural hazard, fire, or man-caused damages to a line. Such work is required to eliminate safety hazards, prevent imminent damage to the transmission line, or to restore service in the event of an outage. In the event of an emergency Pacific Power would respond as quickly as possible to restore power.

The necessary equipment for emergency repairs is similar to that necessary to conduct routine maintenance. However, on occasion, additional equipment may be required. For example, where the site of the outage is remote, helicopters may be used to respond quickly to emergencies. In practice, as soon as an incident is detected, the control room dispatchers would notify the responsible operations staff in the area(s) affected and crews and equipment would be organized and dispatched to respond to the incident. Pacific Power would notify the appropriate agency contacts or private landowner regarding the emergency and required access to carry out the emergency repairs. Although restoration of the line would have priority, every effort would be made to protect crops, plants, wildlife, and resources of importance.

2.4.5 Underground Transmission Line Design Option

2.4.5.1 Underground Construction Components and Construction Technologies and Techniques

Underground construction techniques considered in this SDEIS are based on industry standards and methods used on other transmission line projects. Due to the lack of similar projects in this region, this SDEIS considers industry methodology developed in highly urbanized areas. This methodology may differ substantially from the methodologies that may be used for this Project. However, geography, land uses, and physiographical conditions were different in many cases (e.g., highly urbanized areas) from those that are found in the Vantage-Pomona Heights Project area. Pacific Power has not in the past and does not currently construct, operate, or maintain any 230 kV underground transmission lines in their service area and none have been constructed by other utilities in a similar setting (rural, undeveloped sage-brush dominated land) in this region. The description of the construction components, technologies, methods, and disturbance assumptions are based on other projects implemented by utilities that have installed 230 kV underground facilities elsewhere in the United States. Although Pacific Power currently does not operate or maintain an underground line of this voltage, undergrounding is considered as a Design Option for analysis.

Locations for undergrounding considered in this SDEIS occur along two route segments: NNR-4u and NNR-6u (see Figure 2-1). Section 2.2 describes the location and Design Options considered in the analysis for each of the route segments. A permanent 30-foot ROW would be required for the duct bank and adjacent access road.

Information in this section is partially derived from the Electric Power Research Institute (EPRI) Report on the Assessment of Current Underground and Overhead Transmission Line Construction and Maintenance in the United States (EPRI 2008). EPRI is an independent non-profit organization that brings scientists, engineers, academia, and industry together to conduct research, for development and demonstration relating to the generation, delivery and use of electricity. EPRI applies stringent standards of objectivity through their advisory structure and by recruiting independent researchers and technical authorities from around the world.

High voltage underground transmission lines have markedly different technological requirements than lower voltage underground distribution lines. Some types of underground high voltage transmission lines require extensive cooling systems to dissipate the heat generated by the transmission of bulk electricity. The extremely high cost of large cooling systems and other special design requirements has limited the application of underground transmission systems for long distance electric transmission. In contrast, overhead conductors are cooled by the open air surrounding them. Placing the conductors on towers puts these conduits of energy above most human activity on the ground in a transmission corridor and deals effectively with the issue of heat build-up and dissipation.

Open Cut Trenching

The most commonly used method of installation for underground transmission lines is open cut trenching. Utilizing primarily mechanized digging equipment, this method of installation creates a trench with given dimensions per design criteria. Trenching activity in the work area is governed by OSHA standards; state and local laws are often applicable as well. To mitigate safety concerns for personnel and equipment, sheeting and shoring are often required. A SWPPP would be implemented to reduce hazards caused by excess water within the work area. If groundwater is encountered, dewatering would be performed (EPRI 2008). During trenching, topsoil would be stripped and stockpiled to prevent comingling of soil and subsoil materials (rock, etc.) that may reduce seeding/revegetation success. Examples of open cut trenching are shown in Figures 2-9 and 2-10.

FIGURE 2-9 OPEN CUT TRENCHING (EPRI 2008)

FIGURE 2-10 UNDERGROUND CABLE CONSTRUCTION ROW WITH SINGLE CABLE OPEN TRENCH

When excavation is complete, the trench bottom would be graded per design for construction of the cable system. Pipe or conduit, depending on the type of cable system, are placed within the trench using spacers or others means of stabilization. This insures that the cable or conduit maintains the correct position and dimension during backfilling. To allow for routine maintenance and cable installation, manholes may be placed within the cable system. Low thermal resistive backfill maybe selected to allow for heat dissipation from the trench, as excess heat can be detrimental to underground conduit systems. Backfills are often created and tested at local batch plants. Topsoil would be placed above the excavated subsoil or engineered backfill material.

Underground Vaults

Large concrete vaults buried at regular intervals are required for underground construction. The primary function of the vault is for pulling and splicing the cables during construction and for permanent access, maintenance and repair of cables. For two sets of cables, two parallel underground vaults, approximately 9 feet wide by 28 feet long by 10 feet deep are required approximately every 1,500 to 2,000 feet. Figure 2-11 shows typical underground vault installation. Topsoil would be placed above the excavated subsoil or engineered backfill material.

FIGURE 2-11 TYPICAL UNDERGROUND VAULT INSTALLATION (EPRI 2008)

Underground Cable Technologies

There are four basic underground cable technologies for underground circuits:

- Solid Dielectric (Cross-Linked Polyethylene [XLPE])
- Gas Insulated Transmission Line (GIL)
- Pipe-type (Fluid Filled or High Pressure Fluid-Filled [HPFF])
- Self-Contained Fluid Filled (SCFF)

Solid Dielectric Cable

The typical cable consists of a stranded copper or aluminum conductor; semi-conducting extruded conductor shield; extruded dielectric insulation; extruded semiconducting insulation shield; a lead, aluminum, copper or stainless steel sheath moisture barrier; and a protective jacket. A metallic shield, tape, or drain wire is required to carry fault current when a sheath is not used. Newer cable technology uses a high voltage extruded dielectric insulation of XLPE.

Gas Insulated Transmission Line

GIL technology at 230 kV and higher voltage levels has been implemented primarily within substations and not for transmission lines. GIL has been incorporated into substation designs with the length typically limited to distances less than 1,000 feet. The high cost and lack of experience with respect to longer underground transmission lines and questions of reliability are more of a concern than with other more prominent cable technologies for underground circuits.

High Pressure Fluid Filled Cable

HPFF cable systems are a pipe-type system where three single phase cables are located within a single steel pipe. HPFF cables use Kraft paper insulation or a laminated polypropylene paper (LPP) insulation that is impregnated with dielectric fluid to minimize the insulation breakdown under electrical stress. Since the system requires a continuous high pressure, pumping plants are required every 7 to 10 miles along the route, assuming a relatively flat topography. The pumping plants are responsible for maintaining a constant pressure on the system, but must have large reserve tanks to facilitate the expansion and contraction of the dielectric fluid as the system undergoes thermal cycling. To maintain an operable pipe-type system, cathodic protection must be applied to the cable pipes to mitigate corrosion. This in turn helps prevent fluid leaks which pose both an operational and an environmental concern. If a loss of coolant fluids were to occur it would result in environmentally hazardous coolant materials contaminating the surrounding soil. A coolant fluid leak can be caused by several means including thermal expansion and contraction of the cable due to power cycling, ground movement, splice breakage, termination movement, improper installation, and a cable fault. The fluid is under pressure, so if a leak occurs, it can spread. Using an HPFF system does provide high reliability, but requires additional equipment, resulting in additional opportunity for component failure, and specially trained personnel are required to maintain these systems.

Self Contained Fluid Filled Cable

SCFF cable systems are very similar to the HPFF systems. The cable is typically constructed around a hollow tube, used for fluid circulation, and uses Kraft paper or the same LPP insulation materials. Because the fluid system is self-contained the volume of fluid required is significantly less; however, the same distribution of pumping plants would be required. While SCFF cable systems have the longest running history at the extra high voltage levels, their use is typically limited to long submarine cable installations.

Superconducting Cables

Research is currently underway in the advancement of high temperature superconductors (HTS). Utilizing a unique cable design where all three phases are centered concentrically on a single core, the cables are capable of displaying low electric losses with the same power transfer capabilities as compared with a standard non-superconducting cable. The core, filled with a cryogenic fluid, super cools the conducting material resulting in extremely low losses and high electrical power transfer capacities. Most HTS systems are located adjacent to large metropolitan areas, where they are capable of transferring large quantities of power a few thousand feet at the distribution line level (12 to 34.5 kV). However, technological advances in the last few years have seen the first 138 kV HTS system installed in Long Island, New York in early 2008. Because HTS systems have not been established at the 230 kV or 500 kV voltage levels, superconducting cable would not be a technology option for this Project.

Reactive Power Compensation-Maintaining Stable Power Flow

The characteristics of the underground cable insulating material and the close proximity of the cables to one another results in the cable system introducing high reactive loads (voltage rise) onto the electrical system that affect safe and reliable power flow. These reactive loads (voltage rise) would have to be offset with above ground compensation stations located every 7 to 20 miles to maintain stable power flow along the transmission line route (Xcel Energy Inc. 2011). A further consideration is that the electrical system as a whole may or may not be capable of reliably accommodating these very significant reactive power loads, making the integration of long underground alternating current power lines into the overall power grid questionable or infeasible.

Design Considerations

The following are key considerations for underground transmission line design of a 230 kV cable system:

- A 230 kV cable system would consist of multiple cables per phase to achieve the target power transfer requirements and to provide redundancy in the case of a cable failure.
- Concrete encased duct banks would be installed at a minimum cover depth of three feet or as required by routing design and would be backfilled with specially engineered thermally favorable backfill to assist in heat dissipation, if necessary.
- To obtain further redundancy, multiple duct banks per circuit are required to minimize same mode failures of the systems.

- Depending upon installation location, a permanent access road approximately 14 feet in width would be required to perform operation and maintenance activities.
- The total construction surface impact of the underground cable system would be approximately 55 to 60 wide feet at a minimum, plus any permanent access roads, or approximately 70 to 75 feet wide total surface disturbance.
- Splicing of the cable would be required approximately every 1,500 to 2,000 feet. Splicing would be performed inside large underground vault structures. Vault dimensions would be approximately 9 feet wide by 28 feet long by 10 feet high, depending upon the cable manufacturer splice and cable racking requirements.
- Depending on the terrain characteristics, burial depths may need to be increased to avoid heating the soil and changing the conditions of the vegetation and wildlife habitat above the duct bank or pipe type cables.
- Underground to overhead transition stations would be required at each end of the underground transmission line, and at each intermediate reactive compensation stations. Each transition station would require between 1 to 2 acres, with each site consisting of pedestal type termination structures and reactors (similar to a large power transformer in appearance). In addition to these structures, A-frame dead-end structures, approximately 80 feet tall, would be required at each end of the system.

Reliability and Maintenance of Underground Transmission Lines

The frequency with which customers experience a power outage and the duration of the power outage are the criteria with which electric reliability is typically measured. The outage frequency of overhead systems is usually greater than that of underground systems. However, the duration of an overhead outage can be substantially shorter than an underground-related outage. Failures in underground transmission facilities can be more difficult to troubleshoot and repair than those in overhead facilities. It often takes more time to locate and diagnose problems, as well as to perform the necessary repairs, to underground transmission lines than is typically experienced with overhead lines. As a result, the time the circuit is out of service is increased. Underground line repairs, depending on the system, can be disruptive to the environment; are time-intensive; and relatively costly. Both overhead and underground facilities become less reliable with age, making long-term reliability an issue (EPRI 2008).

While underground transmission lines are relatively immune to weather conditions, they are vulnerable to washouts, seismic events, cooling system failures, and inadvertent excavation. Other possible causes for cable failure include water intrusion into the cable, overheating of the cable, high voltage transients, thermal movement during load cycling, and aging of the cable. The repairs of high-voltage underground cable systems have relatively long outage times compared to repairs of traditional overhead lines. When a fault occurs the circuit is out of service and cannot be placed back into service until repair and test of the system is completed. Because the cable contains a central hollow duct in the conductor that carries cooling dielectric fluid, outage levels can be lengthy until fluid levels are restored. Qualified cable splicing personnel may be difficult to retain on short notice. It would take at least 5 to 10 days to mobilize qualified technicians and equipment to splice a failed cable. The minimum outage duration for locating, excavating, and repairing a single cable failure is estimated to be at least 20 days.

The Wisconsin Public Service Commission (WPSC), an independent regulatory agency, issued a report in 2011 titled *Underground Electric Transmission Lines* (WPSC 2011). According to the report, the varying circumstances of an underground line failure dictate the duration of an outage. Repair person availability and skill level, as well the availability of parts, all contribute to the length of time it takes to repair an underground line failure. On the average, it takes between 5 and 9 days to repair an outage on a cross-linked polyethylene (XLPE underground transmission line. Repair time for a high pressure, gas-filled (GIL) underground transmission often takes longer (8 to 12 days). Depending on the extent of the damage, repairing a fault in a HPFF system can take from 2 to 9 months. The duration of an outage and the time it takes to repair the line increases with the number of splices in the system. Allowing quick and easy access to the system via concrete vaults at splice locations can reduce the duration of an outage. Outages tend to be longer when a splice is directly buried, as is occasionally seen with suburban and rural XLPE lines.

For pipe-type lines, the line must be de-energized and the pipe pressure reduced below 60 per square inch before any probes are put into the pipe to locate a leak. The line must be out of service for a day, for some leak probes, before the tests can begin. The fluid on each side of the line failure is frozen approximately 25 feet out from the failure point in order to repair a pipe-type line. The pipe would be opened and the line inspected. Repairs may include a new splice or cable replacement and splicing. Upon completion of the repair, the fluid in the pipe would be thawed and the line would be slowly re-pressurized, tested, and put back in service. As a result, a couple of extra days are required before the line can be reenergized (WPSC 2011). Emergency response time for underground transmission lines is often affected because hampered by the fact most of the underground transmission material suppliers are located in Europe.

Horizontal Directional Drilling (HDD)

As an alternative to open trenching or the use of overhead transmission lines and transition stations, horizontal directional drilling (HDD) is a trenchless method of installing transmission lines and other utilities where surface and near-surface features must remain undisturbed. HDD would be technically feasible as an alternative construction method of the Underground Design Option instead of the use of transition stations, such as the crossing of I-82 for the proposed Project.

Horizontal directional drilling is a process where a conduit pipe is placed in a hole drilled along an underground arc between insertion and reception pits on each end using a bore machine, which is essentially a specialized drilling rig placed at a horizontal angle. A boring machine pushes and guides a drilling head connected to hollow pipe into the ground at a designated angle based on site conditions. As each joint of drill pipe advances into the ground through the “pilot hole”, a new one is added behind it. When the bore head and rod emerge on the opposite side of the crossing, a special cutter, called a back reamer, is attached and pulled back through the pilot hole. The reamer bores out the pilot hole so that the pipe can be pulled through. Once the drilling is complete and the conduit is in place, the underground cable (e.g., solid dielectric cable) may be fed through the conduit.

HDD requires extensive geotechnical study to identify soil formations at the potential bore sites of the drilling area to determine appropriate design and drilling techniques. This must be conducted before decisions on the pipe design or installation techniques can be made. The purpose of the investigation is not only to determine if HDD is feasible, but to establish the most efficient implementation procedures. The study would identify soil types, rock inclusions, areas of hardpan, soil strength and stability characteristics, and potential groundwater occurrence. Based on the study, the best boring route can be determined, drilling tools and procedures would be selected, and the pipe designed. The extent of the geotechnical investigation depends on the pipe diameter, bore length, and the nature of the crossing.

Drilling fluid or drilling mud, typically a mixture of water, and bentonite (clay) or polymer, is used during the drilling process to aid in stabilizing the bore hole, cooling the cutting head, removing cuttings, and lubricating the passage of the conduit pipe. Bentonite is non-toxic and commonly used in farming practices. The drilling fluid is sent into a machine called a “reclaimer” which removes the drill cuttings and maintains the proper viscosity of the fluid. Drilling fluids are designed to match the soil and cutter. They are monitored throughout the process to ensure that the bore hole stays open, pumps remain operational, and drilling fluid circulation throughout the borehole is maintained. Drilling muds are "thixotropic" and thus thicken when left undisturbed after bore removal. However, unless cementitious materials are added, the thickened mud is approximately as stiff as very soft clay.

There is a potential for drilling fluid release or "frac-out" during installation, which can occur when pressure in the drill hole is not maintained and a loss of circulation of drilling fluid occurs. Frac-out is typically caused by pressurization of the drill hole beyond the containment capability of the overburden soil material, which allows the drilling fluid to flow to the ground surface. Releases can be caused by fractures in bedrock or other voids in the geologic strata that allow the fluid to surface even if down hole pressures are low. Providing adequate depth of cover for the installation can substantially reduce the potential for inadvertent releases or frac-out.

2.4.5.2 Typical Underground Construction Activities

Duct Bank Requirements for Off-Road Construction

For off-road construction or construction not occurring within an existing roadway, installation of an underground cable would require a dedicated area for construction consisting of a permanent access road for future maintenance and repair activities and an additional temporary access road during the initial construction for equipment and temporary storage of materials.

The entire length of the ROW would be cleared of all vegetation to accommodate installation of the underground cable. The total construction surface impact area for underground cable construction and installation would be approximately 55 to 60 feet or greater in width along the entire underground route to accommodate trenching machines or excavators, truck mounted rock drills, dump trucks to haul out excavated material unsuitable for backfill and to haul in backfill material.

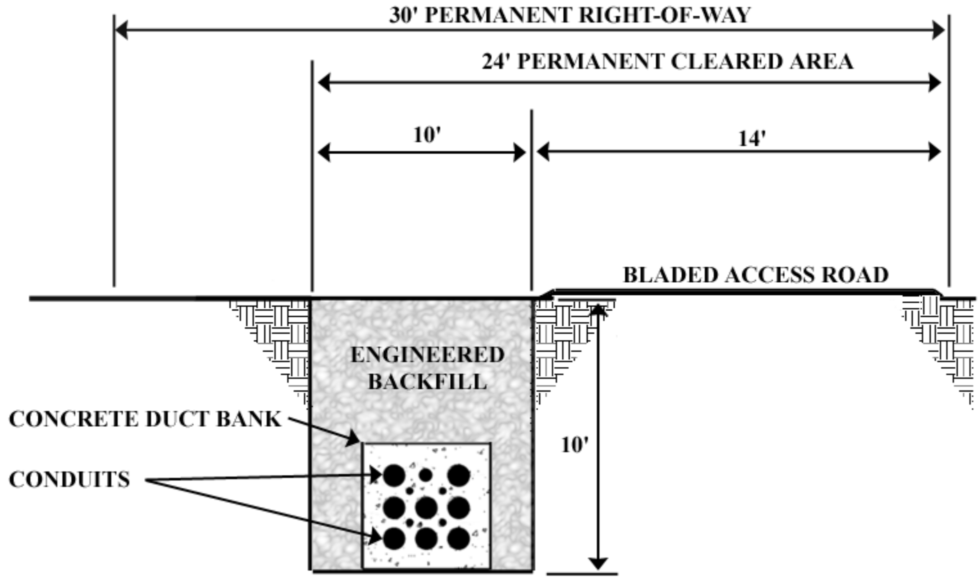
A permanent access road of approximately 14 feet in width would be required to perform operation and maintenance (see Section 2.4.3.2). A permanent cleared surface area would be required for the width of the cable structure duct bank: 5 to 10 feet wide plus the permanent 14 foot access road for a total permanent cleared area of approximately 24 feet wide (see Figure 2-12). Disturbance assumptions along the proposed centerlines for access roads are considered identical for the Overhead Design Option and Underground Design Option in this SDEIS (see Table 2-4 and Section 2.4.3.2).

Splice Vault Requirements

The outside dimensions of splice vaults for 230 kV underground cables are approximately 9 feet wide by 10 feet tall and up to 28 feet long. The installation of each splice vault therefore typically requires an excavation area approximately 10 feet wide, 11 feet deep, and 30 feet long. The actual burial depth of each vault would vary, based on the cable manufacturer's splice and cable racking requirements, site-specific topographic conditions and on the depth of the adjacent cable sections that must interconnect within the vault.

Splice vaults would require a permanent cleared area for future access for maintenance and transmission cable repairs, and an additional temporary cleared area for construction activities. Within the easements for the splice vaults, certain uses such as the development of structures and growth of shrubs and trees would be prohibited to avoid duct bank damage and impacts to the operation of the cables.

FIGURE 2-12 TYPICAL DUCT BANK AND ACCESS ROAD SECTION



Construction Procedures

The first step in the underground construction process would be to deploy appropriate erosion and sedimentation controls (e.g., catch basin protection, silt fence or straw bales) at locations where soils would be disturbed.

Open Cut Trenching

To install the duct bank, a trench would be excavated approximately 6 to 10 feet deep and approximately 5 to 10 feet wide (for trench depths requiring shoring to stabilize the sidewalls). Excavated material (e.g., subsoil) would be placed directly into dump trucks and hauled away to a designated suitable disposal site or hauled to a temporary storage site for screening/testing prior to final disposal or re-used in the excavations for backfill. If groundwater is encountered, dewatering would be performed in accordance with authorizations from applicable regulatory agencies and may involve discharge to catch basins, temporary settling basins, temporary holding tanks or vacuum trucks. When bedrock or subsoils primarily consisting of large boulders are encountered, blasting may be required. See Figures 2-9 and 2-10 for photographs of open cut trenching.

Duct Bank Installation

The duct bank system would consist of 6 to 8 inch polyvinyl chloride (PVC) conduits for the XLPE cables; two-inch PVC conduits for the ground continuity conductors; and four-inch PVC conduits for the fiber optic relaying cables and the temperature sensing fiber cables. The conduit would be installed in sections, each of which would be about 10 to 20 feet long and would have a bell and spigot connection. Conduit sections would be joined by swabbing the bell and spigot with glue then pushing the sections together. After installation in the trench, the conduits would be placed into spacers that hold the conduit in the desired configuration and then encased in high strength concrete. If required, the trench would then be backfilled with a low-strength fluidized thermal backfill with sufficient thermal characteristics to help dissipate the heat generated by the cables.

Trenching, conduit installation, and backfilling would proceed progressively along the route such that relatively short sections of trench (typically 200 feet per crew) would be open at any given time and location.

Splice Vault Installation

At intervals of approximately 1,500 to 2,000 feet along the route, pre-cast concrete splice vaults would be installed below ground. The length of an underground cable section between splice vaults and, therefore, the locations of the splice vaults are determined based on engineering requirements and land constraints. Engineering requirements include: the maximum allowable cable pulling tensions; maximum allowable cable sidewall pressure; and cable weight/length that can fit on a reel and be safely shipped. The specific locations of splice vaults would be determined during final engineering design. Figure 2-13 shows typical underground splice vault installation (duel vaults).

For safety purposes, the splice vault excavation would be shored and fenced. Each vault would have two entry points to the surface. After backfilling, these entry points would be identifiable as manhole covers, which would be set flush with the ground.

Conduit Testing

After the vaults and duct bank are in place, the conduits would be swabbed and tested (proofed) using an internal inspection device (mandrel) to check for defects. Mandrelling is a testing procedure in which a “pig” (a painted aluminum or wood cylindrical object that is slightly smaller in diameter than the conduit) is pulled through the conduit. This is done to ensure that the “pig” can pass easily, verifying that the conduit has not been crushed, damaged, or installed improperly.

Cable Installation

After successful proofing, the transmission cables and ground continuity conductors would be installed and spliced. Cable reels would be delivered by tractor trailers to the vault sites, where the cable would be pulled into the conduit using a truck-mounted winch and cable handling equipment. To install each transmission cable and ground continuity conductor within the conduits, the large cable reel would be set up over the splice vault and a winch would be set up at one of the adjacent splice vault locations. The cables and the ground continuity conductors (during a separate mobilization) would then be inserted in the conduits by winching a pull rope attached to the ends of each cable. The splice vaults would also be used as pull points for installing the temperature sensing fiber optic cables under a separate pulling operation. In addition, pull boxes would be installed near the splice vaults for the pulling and splicing operations required for the remaining fiber optic cables.

Cable Splicing

After the transmission cables and ground continuity conductors are pulled into their respective conduits, the ends would be spliced together in the vaults. Because of the time-consuming precise nature of splicing high-voltage transmission cables, the sensitivity of the cables to moisture (moisture is detrimental to the life of the cable), and the need to maintain a clean working environment, splicing XLPE cables involves a complex procedure that requires a controlled atmosphere. This “clean room” atmosphere would be provided by an enclosure or vehicle that must be located over the manhole access points during the splicing process. It is expected to take approximately five to seven days to complete the splices in each splice vault. Each cable and associated splice would be stacked vertically and supported on the wall of the splice vault via a racking system. During commissioning, access to splice vaults may be required.

Underground to Overhead Transition Stations

High voltage underground transmission lines require transition stations whenever the underground cable connects to overhead transmission. The appearance of a transition station is similar to that of a small switching station. The size is governed by whether reactors or other similar components are required. They range in size from approximately one to two acres. Transition stations also require grading, access roads and storm water management facilities. Figure 2-13 is a photograph of a small transition station. Two transition stations would be required for each segment of undergrounding.

FIGURE 2-13 TRANSITION STATION AND STRUCTURES (WPSC PHOTO)

Site Reclamation and ROW Permitted Uses

Site reclamation is similar to the description for overhead transmission with the exception that access must be maintained along the entire length of the ROW for inspection and repair. Following construction, the ROW must be kept clear of vegetation with long roots; but shrubs may be established. Herbaceous vegetation would be allowed to return to the ROW. For the proposed Project, this would mean native herbaceous perennial grasses would be established to provide ground cover and soil stabilization.

2.4.5.3 Underground Transmission Line Temporary and Permanent Disturbance

Based on the typical design and construction features described in Section 2.4.5.1 and 2.5.2, the following assumptions were applied to the Underground Design Option route segments (NNR-4u and NNR-6u) to determine potential ground disturbance (see Tables 2-9, 2-11 and 2-12). Identical access road assumptions were used for the Overhead Design Option and the Underground Design Option (see Table 2-8 and Section 2.4.3.2).

TABLE 2-6 UNDERGROUND DISTURBANCE ASSUMPTIONS

PROJECT FEATURE	AREA
Access Roads	(see Section 2.4.3.2 and Table 2-4)
Short Term Disturbance	
Work Area	60 feet wide; 7.3 acres per mile
Long Term Disturbance	
Duct Bank	10 feet wide; 1.2 acres per mile
Slice Vaults	(included in 10 feet wide duct bank area)

2.4.6 Ground Disturbance Associated with Design Options

Tables 2-7 through 2-11 summarize short-term and long-term disturbance assumptions by route segment for each of the Design Options and project components. Table 2-12 summarizes the total short term and long disturbance for all activities.

The Overhead Design Option disturbance calculations are based on engineering, construction, operations and maintenance requirements of the 230 kV transmission line and were calculated in addition to the access road assumptions. Table 2-8 shows summary calculations of short-term, construction related impacts associated with work areas necessary for the installation and assembly of H-frame, single pole and steel lattice structures and conductor pulling and tensioning sites as described in Chapter 2.4.3.3 through 2.4.3.6 for the Overhead Option. The appropriate calculation was then made based on the use of H-frame or single pole structures and number of angle/dead-end structures (e.g., number of poles per mile, number of angle/dead end structures) for each route segment. The disturbance area for pulling and tensioning sites was evenly distributed across each route segment (e.g., 50,000 sq. ft. every two miles or 2,500 sq. ft. per 0.1 mile increment) to account for this disturbance along short segments. Table 2-10 summarizes the long term disturbance calculations associated with the auguring and installation of poles and foundations as described in Section 2.4.3.4 and the clearing and leveling of work pads in areas over eight percent slope for the installation of structures as described in Section 2.4.3.4 by route segment and alternative. A summary total of short term and long term disturbance based access roads, temporary work areas and set-up areas is shown in Table 2-12.

Underground disturbance calculations were based on the assumptions detailed in Section 2.4.5 and are included in Tables 2-7, 2-9, 2-11, and 2-12. Access road assumptions were identical for underground design (e.g., access levels for route segment NNR-6o is identical to NNR-6u). Short term disturbance for the Underground Design Option shown in Table 2-9 included assumptions for cleared areas necessary for construction along the trench. Long term disturbance for the Underground Design Option are shown in Table 2-11 and include assumptions for the transition stations and duct banks (including splice vaults) for each of the underground segments. Disturbance assumptions shown in Table 2-11 assume transition stations for the I-82 as previously stated in Section 2.2 (for NNR-4u Design Option).

End to end alternative disturbance assumptions (NNR, Manastash Ridge Subroute, and DEIS Preferred Alternative D) shown in Tables 2-7, 2-8, 2-10 and 2-12 assume Pacific Power proposed overhead construction.

TABLE 2-7 ACCESS ROAD DISTURBANCE - OVERHEAD AND UNDERGROUND DESIGN OPTIONS

ROUTES	SHORT TERM DISTURBANCE		LONG TERM DISTURBANCE				TOTAL SHORT TERM ACCESS DISTURBANCE		TOTAL LONG TERM ACCESS DISTURBANCE	
	Overland Access 14' wide by length, (Access Level 1)		Improve Existing Roads and Construct New Spur Roads (Access Levels 2 or 3)		Blade New, 14' wide x length (Access Levels 4, 5, 6, or 7)					
	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
Route Segments										
NNR-1	0	0.00	70, 560	1.62	0	0.00	0	0.00	70,560	1.62
NNR-2	0	0.00	149,940	3.44	0	0.00	0	0.00	149,940	3.44
NNR-3	739	0.02	261,660	6.01	429,106	9.85	739	0.02	690,766	15.86
NNR-4o	739	0.02	132,300	3.04	72,442	1.66	739	0.02	204,742	4.70
NNR-4u	739	0.02	132,300	3.04	72,442	1.66	739	0.02	204,742	4.70
NNR-5	0	0.00	49,980	1.15	9,240	0.21	0	0.00	59,220	1.36
NNR-6o	0	0.00	191,100	4.39	41,395	0.95	0	0.00	232,495	5.34
NNR-6u	0	0.00	191,100	4.39	41,395	0.95	0	0.00	232,495	5.34
NNR-7	0	0.00	244,020	5.60	0	0.00	0	0.00	244,020	5.60
NNR-8	0	0.00	67,620	1.55	15,523	0.36	0	0.00	83,143	1.91
MR-1	739	0.02	144,060	3.31	1,236,312	28.38	739	0.02	1,380,372	31.69
Alternative										
NNR*	1,478	0.03	1,167,180	26.79	567,706	13.03	1,478	0.03	1,734,886	39.83
Manastash Ridge Subroute	2,218	0.05	1,311,240	30.10	1,804,018	41.41	2,218	0.05	3,115,258	71.52
DEIS Agency Preferred Alternative	11,088	0.25	1,534,680	35.23	1,719,749	39.48	11,088	0.25	3,254,429	74.71

* NNR Alternative Overhead Design Option and Underground Design Option access road disturbance assumptions are identical.

TABLE 2-8 AREAS WITH SHORT TERM, TEMPORARY DISTURBANCE - OVERHEAD DESIGN OPTION

ROUTES	TANGENT H-FRAME STRUCTURES WORK AREAS 150' x 125' (18,750 sq. ft.)		TANGENT SINGLE POLE STRUCTURES WORK AREAS 150' x 80' (12,000 sq. ft.)		ANGLE/DEAD END STRUCTURES WORK AREAS 125' x 125' (15,625 sq. ft.)		STEEL LATTICE WORK AREAS 200' x 250' (50,000 sq. ft.)		PULLING AND TENSIONING SITES 125' x 400' (50,000 sq. ft.)		TOTAL SHORT TERM STRUCTURE AND WORK AREA DISTURBANCE	
<u>Route Segment (OH)</u>	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
NNR-1	39,375	0.90	252,000	5.79	125,000	2.87	0	0.00	60,000	1.38	476,375	10.94
NNR-2	433,125	9.94	216,000	4.96	109,375	2.51	0	0.00	127,500	2.93	886,000	20.34
NNR-3	1,220,625	28.02	0	0	62,500	1.43	0	0.00	232,500	5.34	1,515,625	34.79
NNR-4o	603,750	13.86	0	0	46,785	1.08	0	0.00	115,000	2.64	765,625	17.58
NNR-5	236,250	5.42	0	0	46,785	1.08	0	0.00	45,000	1.03	328,125	7.53
NNR-6o	853,123	19.59	0	0	31,250	0.72	0	0.00	162,500	3.73	1,046,875	24.03
NNR-7	1,089,375	25.01	0	0	46,875	1.08	0	0.00	207,500	4.76	1,343,750	30.85
NNR-8	275,625	6.33	0	0	46,875	1.08	100,000	2.30	57,500	1.32	480,000	11.02
MR-1	1,561,875	35.86	0	0	109,375	2.51	0	0.00	297,500	6.83	1,968,750	45.20
<u>Alternative</u>												
NNR (OH)	4,751,250	109.07	468,000	10.74	515,625	11.84	100,000	2.30	1,007,500	23.13	6,842,375	157.08
NNR (UG)	3,294,375	75.63	468,000	10.74	437,590	10.05	100,000	2.30	730,000	16.76	5,029,875	115.47
Manastash Ridge Subroute (OH)	6,313,125	144.93	468,000	10.74	625,000	14.35	100,000	2.30	1,305,000	29.96	8,811,125	202.28
DEIS Agency Preferred Alternative	6,720,000	154.27	1,860,000	42.70	531,248	12.20	100,000	2.30	1,667,500	38.28	10,878,748	249.74

* Both Alternatives would require an additional three sites totaling five acres (217,800 sq. ft.) for Construction Yard/Staging Areas on previously disturbed land

TABLE 2-9 AREAS WITH SHORT TERM, TEMPORARY DISTURBANCE-UNDERGROUND DESIGN OPTION

ROUTES	TOTAL SHORT TERM WORK AREA DISTURBANCE CLEARED AREA FOR CONSTRUCTION 60 ft Wide (31,680 sq. ft per 0.1 mile)	
	Square Feet	Acres
Route Segment		
NNR-4u	1,457,280	33.45
NNR-6u	2,059,200	47.27
Alternative		
NNR Alternative: Underground Design Option	3,516,480	80.72

TABLE 2-10 AREAS WITH LONG TERM, PERMANENT DISTURBANCE-OVERHEAD DESIGN OPTION

ROUTES	STRUCTURES										TOTAL LONG TERM STRUCTURE AND WORK AREA DISTURBANCE	
	TANGENT H-FRAME STRUCTURES 20" Diameter Poles (2) + auger holes = 7.5 sq. ft. x 2 =15 sq. ft. per structure		TANGENT SINGLE POLE STRUCTURES 24" Diameter Pole + auger hole = 8 sq. ft. per structure		ANGLE/DEAD END STRUCTURES 30" Diameter Poles (3) + auger holes + guys = 7 sq. ft. x 3 =24 sq. ft. per structure		STEEL LATTICE 4 Footings, 60'x60' (3,600 sq. ft.)		WORK PADS AT EACH STRUCTURE 30x40' (1,200 sq. ft.) >8% slope			
Route Segment	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
NNR-1	32	0.00	168	0.00	192	0.00	0	0.00	27,720	0.64	28,112	0.65
NNR-2	347	0.01	144	0.00	168	0.00	0	0.00	20,400	0.47	21,059	0.48
NNR-3	977	0.02	0	0.00	96	0.00	0	0.00	75,600	1.74	76,673	1.76
NNR-4o	483	0.01	0	0.00	72	0.00	0	0.00	28,560	0.66	29,115	0.67
NNR-5	189	0.00	0	0.00	72	0.00	0	0.00	7,560	0.17	7,821	0.18
NNR-6o	683	0.02	0	0.00	48	0.00	0	0.00	53,760	1.23	54,491	1.25
NNR-7	872	0.02	0	0.00	72	0.00	0	0.00	68,880	1.58	69,824	1.60
NNR-8	221	0.01	0	0.00	72	0.00	7,200	0.17	13,373	0.19	13,373	0.31
MR-1	1,250	0.03	0	0.00	168	0.00	0	0.00	97,440	2.24	98,858	2.27
Alternative												
NNR (OH Design Option)	3,801	0.09	312	0.01	792	0.02	7,200	0.17	290,760	6.67	300,465	6.90
NNR (UG)	2,635	0.06	312	0.01	672	0.02	7,200	0.17	208,440	4.79	216,859	4.98
Manastash Ridge Subroute	4,568	0.10	312	0.01	888	0.02	7,200	0.17	359,640	8.26	370,208	8.50
DEIS Agency Preferred Alternative	5,376	0.12	1,240	0.03	816	0.02	7,200	0.17	195,240	4.48	209,838	4.82

TABLE 2-11 AREAS WITH LONG TERM, PERMANENT DISTURBANCE-UNDERGROUND DESIGN OPTION

ROUTES	Overhead to Underground Transition Stations (2 acres each)		Duct Bank 10' feet wide, includes Splice Vaults (see Table 2-6 for Additional 14' Access Road Disturbance Calculation)		TOTAL LONG TERM STRUCTURE AND WORK AREA DISTURBANCE	
	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
Route Segment						
NNR-4u	348,480	8.00	24,288	0.56	372,768	8.56
NNR-6u	174,240	4.00	34,320	0.79	208,560	4.79
Alternative						
NNR Alternative: Underground Design Option	522,720	12.00	58,608	1.35	581,328	13.35

TABLE 2-12 TOTAL DISTURBANCE BY OVERHEAD AND UNDERGROUND ROUTE SEGMENT AND ALTERNATIVE

ROUTES	TOTAL SHORT TERM DISTURBANCE		TOTAL LONG TERM DISTURBANCE	
	Square Feet	Acres	Square Feet	Acres
Route Segment				
NNR-1	476,375	10.94	98,672	2.27
NNR-2	886,000	20.34	170,979	3.93
NNR-3	1,516,364	34.81	767,439	17.62
NNR-4o	766,364	17.59	233,857	5.37
NNR-4u	1,458,019	33.47	577,510	13.26
NNR-5	328,125	7.53	67,041	1.54
NNR-6o	1,046,875	24.03	286,986	6.59
NNR6u	2,059,200	47.27	441,055	10.13
NNR-7	1,343,750	30.85	313,844	7.20
NNR-8	480,000	11.02	96,513	2.22
MR-1	1,969,489	45.21	1,479,230	33.96
Alternative				
NNR (OH)	6,843,853	157.11	2,035,351	46.73
NNR (UG)	8,547,833	196.23	2,316,214	53.17
Manastash Ridge Subroute (OH)	8,813,343	202.33	3,485,466	80.02
DEIS Agency Preferred Alternative	10,889,836	250.00	3,464,301	79.53

2.5 PROJECT DESIGN FEATURES COMMON TO ACTION ALTERNATIVES

The Project Design Features (PDFs) and environmental protection measures described in this section have been incorporated into the Project design and would be implemented during construction and operation of the proposed Vantage to Pomona Heights 230 kV Transmission Line Project. The measures are designed to avoid or minimize environmental impacts from Project construction, operation, maintenance, and decommissioning activities. These are items that Pacific Power has committed to implement as part of the Project development.

The PDFs address identified Project impacts. They were developed through an iterative process during the impact analysis among the Project Proponent, the BLM, and cooperating agencies. The process involved conducting the impact analysis and then adding standard operating procedures, environmental protection measures, and best management practices to the Proposed Action and alternatives. Project (initial) impacts were determined assuming the applicable PDFs would be implemented as part of the Project (e.g., Project Description). Mitigation Measures identified in Chapter 4 would be applied to reduce initial impacts identified (see Section 4.1.1).

The PDF measures in this section will be reviewed, revised, and developed further, as appropriate, to reduce impacts associated with specific resource concerns (e.g., cultural, biological, visual resources) and for consistency with applicable laws and resource management policies. The PDF will be included, as revised, in the POD for this Project. The POD will be reviewed by the federal land management agencies. If the Project is authorized, the POD will be used by each agency in crafting a ROW and other Project-related authorization, as appropriate.

Notwithstanding the foregoing, the federal agencies are solely responsible for managing the federal lands and resources under their respective jurisdictions in accordance with applicable laws. Each federal agency retains discretion to exclude PDF provisions from the POD, the ROW, or other Project approvals, or to modify them as needed, when the agency determines that PDF provision will not aid in meeting the agency's statutory responsibilities. In view of this, it is anticipated that private landowners and state and local land and resource management agencies will ensure that their respective Project-related ROWs, permits, and other approvals incorporate elements of the PDF that are necessary to protect their interests.

2.5.1 General

GEN-1
All construction vehicle movement outside the ROW will be restricted to pre-designated access, contractor-acquired access, or public roads unless approved by the authorized land managers and/or landowner.

GEN-2
The spatial limits of construction activities will be predetermined with activity restricted to those limits. Land management agencies and landowners will approve all construction spatial limits in coordination with the construction contractor. No paint or permanent discoloring agents to indicate survey or construction activity limits will be applied to rocks, vegetation, fences, structures, etc. Work areas will be identified and sensitive areas will be flagged as described in the POD to alert construction personnel that those areas are to be avoided.

GEN-3
In construction areas where re-contouring is not required, vegetation will be left in place wherever possible and original contour will be maintained to avoid excessive root damage and allow for re-

sprouting. Disturbance will be limited to overland driving where feasible to minimize changes in the original contours.

GEN-4
To minimize ground disturbance, the alignment of any new access roads or cross country route will follow the landform contours where practicable, provided that such alignment does not cause additional impacts to resource values. Any new access road or cross country route will be approved by the appropriate land manager and/or landowner prior to use.

GEN-5
In construction areas (e.g., marshalling yards, structure site work areas, spur roads from existing access roads) where ground disturbance is significant or where re-contouring is required, surface reclamation will occur as required by the landowner or land management agency. The method of reclamation will normally consist of, but is not limited to, returning disturbed areas back to their natural contour, reseeding, installing cross drains for erosion control, placing water bars in the road, and filling ditches.

All areas on the BLM, JBLM YTC, and Reclamation lands that are disturbed as a part of the construction and/or maintenance of the proposed power line will be drill seeded where practicable with a seed mixture appropriate for those areas, unless an alternative method (e.g., broadcast seeding) is required due to slope or terrain. The BLM, JBLM YTC, and Reclamation will prescribe seed mixtures to fit each range site on their respective ownerships. Drill seeding will be done in late October or November to maximize the chance of success. The agencies may recommend broadcast seeding as an alternative method in some cases. In these cases, seed will be applied at 1.5 to 2.0 times the drill seeding rate when broadcasted and the seed will be promptly covered by methods such as harrowing, raking, or rolling with a culti-packer.

A Reclamation, Revegetation, and Monitoring Framework Plan identifying the reclamation stipulations will be developed and incorporated in the final POD. Revegetation monitoring for a designated time period will occur as required by the appropriate land manager and/or landowner. The Reclamation, Revegetation, and Monitoring Framework Plan will be approved by the BLM, JBLM YTC, and Reclamation prior to issuance of their respective authorizations.

GEN-6
A POD including specific plans to address mitigation requirements will be prepared in consultation with the federal agencies (BLM, JBLM YTC, BOR) prior to construction being authorized. These plans will detail additional measures required to minimize potential proposed Project impacts on cultural and natural resources and health and human safety. Plans typically include reclamation and re-vegetation of the ROW, resource protection, noxious weed control, dust control, hazardous spill prevention, fire prevention, and storm water pollution prevention.

GEN-7
The POD will outline any required monitoring guidelines for the construction, operation, and maintenance of the line in order to avoid inadvertent impacts to resources. Each agency may appoint an authorized inspector to oversee construction activities, inspect construction, and determine if environmental protection is being accomplished in accordance with terms of applicable documents including the ROW and the approved POD. Pacific Power will conduct a training program to inform construction crews of all ROW, permit, and other requirements and restrictions relevant to proposed Project construction.

GEN-8
Prior to construction, all supervisory construction personnel will be instructed on the protection of cultural, paleontological, and ecological resources and invasive species preventative measures. To assist

in this effort, the construction contract will address: (a) federal and state laws regarding antiquities, fossils, mineral materials, plants, and wildlife including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.

GEN-9
All waste products and food garbage from construction sites will be deposited in covered waste receptacles and removed daily. Garbage will be transported to an approved or designated suitable disposal facility.

GEN-10
Within the limits of standard tower design and in conformance with engineering and Pacific Power requirements, structures will be placed as to avoid sensitive features, including but not limited to, wetlands, riparian areas, water courses, sensitive habitats and species, and cultural resources.

GEN-11
Construction holes left open overnight will be covered to prevent livestock or wildlife from falling in.

2.5.2 Biological Resources

BIO-1
Prior to construction, all supervisory construction personnel will be instructed on the protection of ecological resources. To assist in this effort, the construction contract will address: (a) federal and state laws regarding plants and wildlife; (b) the importance of these resources and the purpose and necessity of protecting them; and (c) methods for protecting sensitive resources.

BIO-2
Reasonable and prudent measures and terms and conditions identified during the consultation period under Section 7 of the Endangered Species Act (ESA; 1973) as amended will be adhered to as specified by the USFWS. Conservation measures identified by USFWS during consultation will be applied on a discretionary basis. If conferencing occurs on species proposed for listing under ESA between the BLM and USFWS, recommendations for reducing adverse effects provided by the USFWS in a conference report will be considered by the BLM.

BIO-3
Special status species or other species of particular concern will be considered in accordance with management policies set forth by appropriate land management agencies (e.g., BLM, JBLM YTC, and Reclamation). This would entail conducting surveys for special status plant and wildlife species along the proposed transmission line route and associated facilities (e.g., access and spur roads, staging areas) as agreed upon by the agencies. In cases where such species are identified, appropriate action will be taken to avoid adverse impacts on the species and their habitats. This may include altering the placement of roads or structures, where practical, as approved by the agencies.

BIO-4
Populations of plant species of concern will be delineated on Project maps as “Avoidance Areas” and will be marked in the field prior to the start of construction. Field marking will consist of wooden stakes spray painted the same color (e.g., high visibility blue) for all sensitive areas. Populations of plant species of concern will be staked with a 100-foot buffer around the edge of each population. Stakes shall be placed such that they can easily been seen from the adjacent stake. Staking of populations will be done by a qualified botanist during the time of year when the species of concern can be readily identified. After construction activities are complete or no longer pose a concern in a given area, the stakes will be

promptly removed. In the event any special status plants would require relocation, permission will be obtained from the agencies.

If avoidance or relocation is not practical, the topsoil surrounding the plants will be salvaged, stored separately from subsoil and spread during the rehabilitation process. This will be done to preserve the seed bank and localized species habitat conditions. All borrow material and soil to be used for rehabilitation or any part of the Project will be weed free. Weed free borrow material will be obtained from sites inspected by a qualified botanist or environmental inspector knowledgeable about noxious weeds.

BIO-5
To eliminate the spread of noxious weeds and invasive species from Project activities, a Noxious Weed and Invasive Plant Management Plan will be developed and incorporated into the final POD. The plan will be developed in consultation with the Agencies and local weed control districts and will describe: the pre-construction inventory; prevention measures and treatment methods before and during construction; and monitoring and treatment measures that would be implemented following construction. Out of concern for sage-grouse, fire prevention and sagebrush preservation, the Noxious Weed and Invasive Plant Management Plan will emphasize control of cheatgrass during construction, operation and maintenance, to the extent practical, the establishment of cheatgrass before, during, and after establishment of reclaimed vegetation.

BIO-6
Ground disturbance will be limited to that necessary to safely and efficiently install the proposed facilities and will be described in detail in the POD.

BIO-7
Pacific Power will prepare a Reclamation, Re-vegetation, and Monitoring Framework Plan in consultation with the agencies. The Plan will specify disturbance types and appropriate re-vegetation techniques to be applied to proposed Project work areas and access roads. Techniques will be approved by the appropriate land management agency and would include reseeding with certified weed-free native or other acceptable species. The Plan will include construction, operation and maintenance procedures approved by the appropriate land management agency for use of access roads and temporary work areas.

BIO-8
Wildlife and plant protection plans will be developed identifying specific measures to protect biological resources. Required protection measures could include timing restrictions, ROW clearance surveys prior to construction which are conducted during the appropriate season for the detection of target species, and the use of biological monitors to protect biological resources during construction.

In situations where impacts to sensitive plants cannot be avoided by construction activities, the transplanting of plants will be considered by the appropriate land management agency. The criteria for transplanting will be included in the POD for the Project. The criteria will be formulated in coordination with the BLM and cooperating agencies in compliance with federal and state law, regulation, and policy regarding sensitive species. Depending on species and conditions, the transplanting of special status plants may include the following: seed collection, propagation, planting and supplemental watering for one or two seasons; or transplanting and supplemental watering for one or two seasons. If any new populations of plant species of concern are discovered on federal lands during Project surveys or construction, these findings will be reported within 48 hours to the appropriate federal land management agency. Any newly discovered populations on federal land will be protected in accordance with applicable laws and resource management policies.

If any new populations of federal or state listed wildlife species are discovered during Project surveys or construction, these findings will be reported within 48 hours to the appropriate federal and/or state land management agency. Any newly discovered populations will be protected in accordance with applicable laws and the resource management policies of the state and federal agencies.

BIO-9
Use an agency-approved mixture of certified weed-free native and non-native species or seed for revegetation in areas where non-native species are already well established (i.e., disturbed grassland). Revegetation materials will meet the requirements of federal, state, and county noxious weed control regulations and guidelines.

BIO-10
Comply with all federal, state, and county noxious weed control regulations and guidelines.

BIO-11
Wash all equipment before entering the Project area and when leaving areas where noxious weeds are present.

BIO-12
Minimize the blading of native plant communities during construction, operation, and maintenance consistent with safe construction practices.

BIO-13
Restrict construction and maintenance activities during sensitive periods (breeding or nesting). Restricting these activities would eliminate the potential disturbance of wildlife during these critical periods of their life cycles, as identified in the Plant and Wildlife Species Protection Measures Appendix of the POD and the Sage-grouse Habitat Mitigation Framework Plan.

- Avoid construction activities within 0.25 to 1.0 mile radius of an active raptor nest, if possible, unless specific features (e.g., terrain, barriers) dictate reduced buffers. Spatial buffers and seasonal restrictions would vary depending on the species (Romin and Muck 2002): Nests of any raptor species not specified here would be buffered by 0.25 mile. Specified nest buffers include:

    - Bald eagle nest – 1.0 mile buffer from January through August.
    - Burrowing owl – 0.25 mile buffer from March through August.
    - Ferruginous hawk – 0.5 mile buffer from March through July.
    - Golden eagle – 0.5 mile buffer from January through August.
    - Osprey – 0.5 mile buffer from April through August.
    - Peregrine falcon – 1.0 mile buffer from February through August.
    - Prairie falcon – 0.25 mile buffer from April through August.

- Greater sage-grouse:
    - Avoid construction or maintenance activities within four miles of active leks from February 1 to June 15 to protect lekking, nesting, and early brood-rearing (Stinson et al. 2004; Cadwell et al. 1994).
    - Avoid construction or maintenance activities within sage-grouse winter habitat from December 1 through February 1 if winter conditions are exceptionally severe. Severe winter conditions would consist of snow cover much higher than normal (e.g., above sagebrush height) or temperatures much lower than normal. Winter construction or

maintenance activities within sage-grouse winter habitat will be coordinated with the JBLM YTC Public Works Department.

- Migratory birds:
  - Avoid construction or maintenance activities during the migratory bird breeding season, typically from March 1 through July 31. If construction or maintenance activities must occur during this time period, qualified biologists will conduct clearance surveys prior to activity. If migratory bird nests are identified, spatial buffers of at least 100 feet around the nest will be initiated. Individual nests will not be marked. Spatial buffers and seasonal restrictions would vary depending on the species. No ROW mowing will occur during the nesting season.

- Bald eagle wintering areas:
  - Construction or maintenance activities within 0.25 mile of a bald eagle winter roost would occur between 8:00 a.m. and 5:00 p.m.

- Big game seasonal restrictions:
  - Avoid construction or maintenance activities within big game wintering areas during the wintering season, typically December 1 through March 1, or as defined by WDFW for each big game population in question.

BIO-14
New or improved access (e.g., blading, widening existing access), that is not required for Project maintenance or by the land management agencies, will be closed or rehabilitated following construction. Closing access roads would protect the resources in that area from further disturbance by limiting new or improved accessibility by OHVs and other motorized vehicles.

BIO-15
If sensitive wildlife species are discovered during construction, operation, and maintenance activities within the ROW or designated and approved work areas, a protective buffer zone will be established and the appropriate federal or state agency will be contacted immediately.

BIO-16
Speed limits for travel on newly constructed roads will be posted at 25 miles per hour (mph) in order to reduce the potential for wildlife collision. Overland travel areas will have speed limits of 15 mph.

BIO-17
The Project will be designed to conform to raptor-safe design standards, including *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee [APLIC] 2006), *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012) and PacifiCorp's *Bird Management Program Guidelines* (2006).

BIO-18
Any temporary fences constructed in sage-grouse habitat, as part of the proposed Project, will be fitted with markers to reduce the potential for sage-grouse collision. Any existing fences that are repaired during construction would also be fitted with markers.

BIO-19
Bird flight diverters will be installed in locations with known avian mortality through collision with transmission line infrastructure.

BIO-20
Routing and siting the proposed transmission line would maximize the use of existing utility corridors and closely parallel the existing transmission line within those corridors, typically staying within 200 to 300 feet of its centerline. The use of existing transmission line corridors will minimize impacts through the use of already established ROWs, road networks, etc.

BIO-21
Whenever possible, locations of the new structures will match the spans of adjacent transmission lines.

BIO-22
Perch deterrents will be installed on new transmission structures within four miles of an active lek.

BIO-23
No pets will be allowed on the Project site during construction, operation, and/or maintenance.

BIO-24
No persistent surface water sources or other potential mosquito breeding habitat will be created.

2.5.3 Land Use and Recreation

LU-1
Existing improvements and on the ground structures (e.g., fences, roads, gates) will be repaired or replaced (if they are damaged or destroyed by construction or maintenance activities) to their condition prior to disturbance as agreed to by the parties involved.

LU-2
Fences and gates will be replaced or repaired to their original condition as required by the landowner or the land management agency in the event that they are removed, damaged, or destroyed by construction activities. Fences would be braced before cutting. Temporary gates or enclosures will be installed only with the permission of the landowner or the land management agency and will be removed/reclaimed following construction. Temporary gates will be kept closed and locked, depending on agreement with the land management agency and private landowners.

LU-3
All existing roads will be left in a condition equal to or better than their condition prior to the construction of the transmission line as agreed upon by the appropriate land management agency and private landowners.

LU-4
Consultation with the landowner or land management agency will be conducted to identify facility locations that create the least potential for negative impacts to their property and its uses.

LU-5
Construction staging areas and pulling sites will be located adjacent to existing roads where practical. Coordination with landowners will be conducted to establish construction areas (such as conductor pulling and splicing areas and construction yards).

LU-6
During Project construction, it may be necessary to remove livestock from areas where heavy equipment operations are taking place. Arrangements will be made with landowners and livestock owners to keep livestock out of these areas during those periods.

LU-7
To limit new or improved accessibility into the area by OHVs and other non-authorized motorized vehicles, road access will be controlled in accordance with the management directives of the agencies and landowners.

LU-8
All required land use permits and other authorizations must be obtained by Pacific Power or its contractor(s), prior to the initiation of Project construction.

LU-9
Construction will be timed, where practical, to minimize disruption of normal seasonal activities for cropland (planting and harvesting) and non-irrigated rangeland as well as avoiding peak use periods (i.e., weekends and holidays) at parks, recreation, and preservation areas. Construction activities will be coordinated with relevant agencies and/or landowners prior to construction.

LU-10
Advanced notice of construction activities will be given to landowners and residents potentially affected by construction activities. Adequate access to existing land uses will be provided during periods of construction and landowners will be notified of alternative access. Nighttime construction near noise-sensitive land uses (e.g., residences) will be avoided.

LU-11
Construction operations will avoid, to the extent feasible, the disturbance of agricultural soil during the wet season. The use of heavy equipment on agricultural land will be minimized to avoid soil compaction. Construction crews would reduce the amount of soil compaction by working when the ground is not wet, using equipment with more tires and wider tires to distribute the weight of the vehicle, and tilling the severely compacted areas after construction is completed or using ground mats when the ground is wet.

LU-12
Pacific Power will obtain encroachment permits or other legal agreements from appropriate authorities for each affected federal, state, and local roadway. Such permits are needed for roads that would be crossed by the transmission line, as well as for the parallel roads where transmission line construction activities would require the use of the public ROW (e.g., temporary lane closures).

LU-13
Notify in advance appropriate federal, state, or local emergency service providers to avoid restricting movements of emergency vehicles. Local agencies would then notify respective police, fire, ambulance, and paramedic services. Notify local agencies of the proposed locations, nature, timing, and duration of any construction activities and advise of any access restrictions that could impact their effectiveness.

LU-14
Determine which aerial applicators operate in the Project area. Provide written notification to all aerial applicators stating when and where the new transmission lines and structures would be erected in order to educate pilots to presence of the transmission line. Provide all aerial applicators with aerial photographs or topographic maps clearly showing the transmission lines and structures in relation to agricultural lands.

LU-15
Provide a schedule of construction activities to all landowners who could be affected by construction.

LU-16
Pacific Power will compensate landowners for any new land rights required for ROW easements over their land or for the right to construct new, temporary, or permanent access roads.

LU-17
Plan and conduct construction activities to minimize temporary disturbance, displacement of crops, and interference with agricultural activities.

LU-18
Restore compacted cropland soils to pre-construction conditions.

LU-19
Pacific Power will compensate landowners for any damage to property including crops during construction and maintenance activities.

LU-20
Install marker balls on the conductor and lights on towers at the Columbia River crossing if required by the Federal Aviation Administration (FAA).

2.5.4 Transportation

TR-1
For safety at highway and road crossing, structures will be placed at the maximum feasible distance from the highway or road crossing within limits of standard structure design height.

TR-2
Prior to the start of construction, a Traffic Management Plan will be submitted to the WSDOT and applicable public works departments. The Plan will direct the Pacific Power's construction contractor to implement procedures that will minimize traffic impacts. Routing of construction traffic will be coordinated with WSDOT and applicable county public works departments.

TR-3
Oversize or overweight vehicles will comply with applicable federal, state, and county requirements.

TR-4
When slow or oversized wide loads are in transit to and from work areas, advanced signs and traffic diversion equipment will be used to improve traffic safety. Pilot cars will be used as WSDOT dictates depending on load size and weight. Permits will be obtained for these oversized or overweight loads as required by WSDOT and applicable county public works departments.

TR-5
In consultation with WSDOT, JBLM YTC, and the counties, detour plans and warning signs in advance of any traffic disturbances will be provided. Proper road signs and warnings will be used.

TR-6
Flaggers will be employed as necessary to direct traffic when large equipment is exiting or entering public roads to minimize the risk of accidents, as detailed in a WSDOT approved Traffic Management Plan. A Traffic Management Plan will be necessary if construction vehicles will be entering/exiting I-82 outside of interchange areas or if flaggers are needed.

TR-7
Project personnel and contractors will be instructed and required to adhere to speed limits commensurate with road types, traffic volumes, vehicle types and site-specific conditions to ensure safe and efficient traffic flow.

TR-8
Following construction or during construction as necessary to maintain safe driving conditions, any damage to existing roadways caused by construction vehicles will be repaired. Repairs will be coordinated as appropriate with WSDOT and/or the counties.

TR-9
To reduce impacts on roads where direct access from roadways is allowed, stabilized construction access areas adjacent to roads would be used, and would consist of a pad of aggregate rock underlain with geotextile fabric, crushed rock, steel rumble pad or equivalent per applicable agency-approved best management practice. Whenever practicable, access pads would be sloped downward into the disturbed area to prevent dust, soil, and gravel discharges onto the roadway.

TR-10
If sediment is tracked off-site, roads would be cleaned thoroughly by shoveling or sweeping at the end of each day, and more frequently if necessary, with removed sediment being transported to an appropriate disposal area.

2.5.5 Visual Resources

VIS-1
No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate limits of survey or construction activity.

VIS-2
In residential areas, the structures will be placed, to the extent practicable, in such a way as to reduce the visual impact on the residences and inhabitants.

VIS-3
Locate construction staging areas away from visually sensitive locations. The contractor hired to construct the transmission line will be responsible for determining appropriate staging locations in coordination with the appropriate land management agencies.

VIS-4
Locate new access roads within previously disturbed areas wherever possible.

VIS-5
Contractors will maintain a clean construction site, with litter being removed daily and all related equipment and materials being removed following completion of construction.

VIS-6
To reduce visual contrasts caused by glare created by standard aluminum conductors (wires), non-specular conductors will be used.

VIS-7
Whenever possible, locations of the new structures will match the spans of adjacent transmission lines.

2.5.6 Cultural Resources

CUL-1
Pacific Power will implement stipulations of a Memorandum of Agreement (MOA) or Programmatic Agreement (PA) prepared and signed by the BLM, the Army, Reclamation, other federal agencies, Washington State Historic Preservation Officer, and other parties according to the requirements of Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR Part 800). The MOA or PA will define the Area of Potential Effects (APE); procedures for identifying cultural resources within the APE; evaluating their significance; assessing effects; avoiding or mitigating adverse effects; emergency discoveries; reporting; Native American consultation; and other topics.

CUL-2
Pacific Power will oversee an intensive pedestrian cultural resource survey on all federal and state lands and on private lands where permission of the land owner has been granted prior to survey. The survey will be conducted within all areas of possible physical disturbance within the APE of the selected alternative following BLM manual guidelines. The APE for the undertaking includes all involved federal, state, and private lands and is defined as follows:

- The transmission line APE shall be the width of the ROW along the centerline.
- The APE for any existing unpaved access roads/existing roads which may require improvement and new roads shall be a 100-foot wide corridor, 50 feet on both sides of the proposed road centerline, plus a turning radius of 60 feet where needed. In steeper terrain the 100-foot wide corridor may be wider to allow for cut and fill activities.
- The APE for staging areas, lay-down areas, pulling and tensioning areas, and any other temporary use areas shall be the footprint of such areas plus a 200-foot buffer extending in all directions.
- The APE for geotechnical drilling will include the boring location and a 100-foot radial buffer plus new or improved access roads to the drill site.
- The APE for assessing visual effects on cultural resources will be land within a specific distance of the transmission line as determined by the BLM.

CUL-3
In consultation with appropriate land managing agencies and the State Historic Preservation Officer, specific mitigation measures will be developed and implemented to mitigate any adverse effects. These may include Project modifications to avoid adverse impacts, monitoring of construction activities and data recovery studies.

CUL-4
Prior to construction, all supervisory construction personnel will be instructed on the protection of cultural resources. To assist in this effort, the construction contract will address: (a) federal and state laws regarding antiquities, including collection and removal; (b) the importance of these resources and the purpose and necessity of protecting them; (c) tribal concerns; and (d) methods for protecting sensitive resources.

CUL-5
In the event that unknown cultural resources are discovered during construction activities of the Project or should those activities directly or indirectly impact known resources in an unanticipated manner, the following actions, at a minimum, will be initiated by Pacific Power, the agency having jurisdiction over the land involved, or a representative duly authorized to perform these tasks:

- All activities will halt in the immediate vicinity of the discovery and all actions that might adversely affect the property would be redirected to an area at least 200 feet from the point of discovery.
- Pacific Power and the Authorized Officer at the land management agency having jurisdiction over the land involved would be notified immediately by phone and written confirmation of the discovery. If there is a cultural resource monitor at that location or in the general area, that person will be called in to assess the discovery. The assessment would include the nature of the resource (types and kinds of artifacts and features), the spatial extent of the resource, and the nature of the deposition or exposure.
- In the event a cultural resource specialist or other necessary persons are not immediately available, Pacific Power and/or the agency having jurisdiction may be required to cover or otherwise protect the discovery until such a time that the appropriate parties can be present for inspection and evaluation.
- The cultural resource specialist will complete the appropriate inventory form and send it to appropriate parties for review and comment.
- The site will be evaluated by qualified cultural resource personnel in terms of the criteria of eligibility for the National Register of Historic Places established under 36 CFR Part 60.4.
- If the site is determined to be damaged, a damage assessment will be conducted by an approved cultural resource specialist.
- Pacific Power will consult with BLM or other appropriate federal land managing agencies, the Tribes, and, when State or private land is involved, the Washington State Historic Preservation Officer to determine if and when construction activities in the location of the discovery may resume.
- If human remains are found on private or state land, Pacific Power will implement notification procedures as required by state law. If human remains are found on federal land, Pacific Power will abide by the requirements of the Native American Graves Protection and Repatriation Act and other appropriate laws and regulations.

CUL-6
The BLM may require a cultural resource monitor be present during construction in areas the BLM or other land management agency determines to be culturally sensitive.

CUL-7
Sensitive areas will be delineated on Project maps as “avoidance areas” (without noting specific resources). The maps will also show established work areas and areas where overland travel or other disturbance is to be avoided. Maps will be provided to construction personnel. The avoidance areas will be marked in the field prior to construction by qualified cultural resource personnel.

Field marking will consist of wooden stakes all spray painted the same color (e.g., high visibility blue) for all sensitive areas. After construction activities are complete or no longer pose a concern in a given area, the stakes will be promptly removed.

Construction crews and vehicles will use established roads and approved routes for travel. Cross country travel will not be allowed in sensitive areas or locations. If roads or designated routes cross through sensitive areas that may be affected by off-road travel, signs indicating off-road travel is not allowed will be installed during construction activities. The signs will be promptly removed following completion of work in a particular area to protect sensitive areas and prevent unwanted attention.

2.5.7 Wildland Fire

WF-1
Pacific Power and its contractors, as appropriate, will initiate discussions with local fire districts, regional fire prevention staff, and BLM and JBLM YTC fire personnel prior to construction to provide transmission line safety training, including safety procedures for conducting fire suppression activities near a power line.

WF-2
The construction contractor will fuel all highway-authorized vehicles off-site to minimize the risk of fire. Fueling of construction equipment that is transported to the site via truck and is not highway authorized will be done in accordance with regulated construction practices and federal, state, and local laws. Helicopters will be fueled and housed at local airfields or at staging areas.

WF-3
Carry fire suppression equipment including (but not limited to) shovels, buckets, and fire extinguishers on all construction, operation, and maintenance vehicles.

WF-4
A Fire Protection and Control Plan will be developed and incorporated into the POD. The Fire Protection and Control Plan will include measures to be implemented during construction and maintenance, such as: restricting smoking to designated areas; restricting equipment parking to sites cleared of all flammable material; equipping vehicles with appropriate fire suppression tools and equipment; and training Pacific Power and/or its contractors on fire safety, minimizing fire hazards, to safely suppress a fire until firefighters can respond.

Pacific Power and/or its contractors will notify the federal, state, and local agencies of any fires and comply with all rules and regulations administered by the federal, state, and local land management agencies concerning the use, prevention, and suppression of fires including any fire prevention orders that may be in effect at the time of the permitted activity. Pacific Power and/or its contractors will be held liable for the cost of fire suppression, stabilization, and rehabilitation when they are responsible for the cause of the fire event. In the event of a fire, personal safety will be the first priority of Pacific Power and/or its contractors.

2.5.8 Climate and Air Quality

AQ-1
Road construction and maintenance will include dust control measures, as required and identified in the approved POD.

AQ-2
All requirements of those entities having jurisdiction over air quality matters will be adhered to. Any necessary dust control plans would be developed and permits for construction activities will be obtained.

AQ-3
Use water trucks to control dust during construction operations when necessary.

AQ-4
Cover construction materials if they are a source of blowing dust.

AQ-5
Limit the amount of exposed soil, including dirt piles and open pits, to a minimum. Stabilize exposed earth/soils through compost, plastic, mulch, straw, biodegradable erosion control blanket, or other appropriate method within seven days of grading/exposure.

AQ-6
All vehicle engines are to be in good operating condition to minimize exhaust emissions. Engine idling shall be kept to a minimum.

AQ-7
Submit the Project Description and Dust Control Plan, included as part of the POD, to the Yakima Regional Clean Air Agency and Washington State Department of Ecology for approval prior to construction. Submit a copy of the approved plan to Yakima Training Center Public Works-Environmental Compliance for review prior to construction.

AQ-8
Prevent wind erosion by reseeding with an appropriate seed mixture as soon as reasonably possible following construction activities.

AQ-9
Construction and maintenance vehicles are to travel at 25 mph or less on unpaved roads and at construction sites to minimize dust, and in accordance with posted speed limits.

AQ-10
Open burning of construction trash will not be allowed.

2.5.9 Soils, Geology and Water Resources

SGW-1
Roads will be built at right angles to streams to the extent practicable. Existing public roads will be utilized to the extent possible. Appropriately sized culverts will be installed where needed. All construction and maintenance activities will be conducted in a manner that would minimize disturbance to vegetation, drainage channels, and stream banks. Where applicable, construction and maintenance will be conducted in accordance with local road construction and maintenance standards. In addition, road construction will include dust-control measures during construction in sensitive areas, as required.

SGW-2
Disturbed areas around structures, at pulling and tensioning sites, and on the edges of roadways will be rehabilitated following construction (as specified by the agencies and the Authorized Officers) and in accordance with the Noxious Weed and Invasive Plant Management Plan and the Reclamation, Revegetation, and Monitoring Framework Plan.

SGW-3
A pre-construction field verification of landslide prone areas will be made. Design changes to roads may be needed based on the field verification.

SGW-4
A geotechnical engineering report will be prepared prior to construction that appropriately addresses risks to structures and roads due to geological hazards.

SGW-5
The construction contractor will mark construction limits within agricultural fields or grasslands to minimize disturbance.

SGW-6
Inspect and maintain tanks and equipment containing oil, fuel, or chemicals for drips or leaks and to prevent spills onto the ground or into state waters or Waters of the United States.

SGW-7
Maintain and repair all equipment and vehicles on impervious surfaces away from all sources of surface water.

SGW-8
Vehicle and equipment refueling and the storage of potentially hazardous materials will not occur within a 100-foot radius of a waterbody, a 200-foot radius of all identified private water wells, and a 400-foot radius of all identified municipal or community water supply wells. For route segments on JBLM YTC, refueling will not occur within 656 feet of any drainage (wet or dry) and parking or staging of vehicles will be at least 328 feet from drainages. Spill preventative and containment measures or practices will be incorporated as needed, as identified in the Spill Prevention, Control, and Countermeasure Plan.

SGW-9
Provide spill prevention kits at designated locations on the Project site and at the hazardous material storage areas.

SGW-10
Stabilize cut and fill slopes.

SGW-11
Minimize erosion by applying and maintaining standard erosion and sediment control methods. These may include using certified weed-free straw wattles and bale barriers and silt fencing which would be placed at construction boundaries and where soil would be disturbed near a wetland or waterbody. Specific erosion and sediment control measures and locations will be specified in a SWPPP as part of the POD.

SGW-12
Construction operations will avoid, to the extent feasible, the disturbance of soil during the wet season. Construction crews will reduce the amount of soil compaction by working when the ground is not wet, using equipment with more tires and wider tires to distribute the weight of the vehicle, and tilling the severely compacted areas after construction is completed or using ground mats when the ground is wet.

SGW-13
To the extent possible, topsoil should be placed separately from sub-soils/bedrock during excavation and not comingled. Replace soil in reverse order.

2.5.10 Public Health and Safety

PHS-1
Pacific Power will respond to complaints of radio or television interference generated by the transmission line by investigating the complaints and implementing appropriate mitigation measures. The transmission

line will be patrolled on a regular basis so that damaged insulators or other transmission line equipment that could cause interference, are repaired or replaced.

PHS-2
Mitigation will be applied as needed to eliminate induced currents and voltages onto conductive objects (should they occur) sharing a ROW to the mutual satisfaction of the parties involved.

PHS-3
Hazardous materials will not be drained onto the ground or into streams or drainage areas. All construction waste including trash and litter, garbage, other solid waste, petroleum products and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials weekly.

PHS-4
Appropriate safety guidelines will be followed as required by federal regulations (29 CFR Parts 1910.109) and state regulations (WAC 296-52) relating to blasting operations, should blasting be necessary. Contractors will coordinate with WSDOT prior to blasting within 1,320 feet of I-82 or SR 243.

PHS-5
Appropriate traffic control measures will be utilized to ensure public safety during construction and as detailed in a WSDOT approved Traffic Management Plan. The contractor will coordinate with WSDOT in advance of any traffic delays or road blockages, especially prior to holidays.

PHS-6
Towers and/or ground wire will be marked with highly visible devices where required by governmental agencies (e.g., FAA).

PHS-7
Limit construction activities to daytime hours.

PHS-8
During final design, limit the conductor surface gradient to meet the IEEE Radio Noise Guideline.

PHS-9
During construction, identify objects such as fences, metal building, pipelines, and other metal objects within or near the ROW that have the possibility for induced potentials and currents and implement electrical grounding of these objects according to Pacific Power and NESC standards.

PHS-10
During final design and construction, identify areas where large equipment is anticipated and provide sufficient conductor clearance to ground to meet the NESC five milliampere rule or limit the size or access of large equipment.

PHS-11
Pacific Power will identify and provide a public liaison person before and during construction to respond to concerns of neighboring entities and persons, including residents, about noise and other construction disturbances and or concerns.

PHS-12
Pacific Power will establish a toll-free telephone number for receiving questions or complaints during construction and develop procedures for responding to callers.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED

The cooperating agencies considered several alternatives to the proposed Project. Some alternatives were eliminated from further consideration because they were technically or economically infeasible, would violate reliability criteria and standards, or because their successful implementation was determined by the agencies to be remote or speculative.

2.6.1 Alternative Transmission Projects

2.6.1.1 Double Circuit Existing Pomona-Wanapum 230 kV Transmission Line

This option was considered to determine whether it would be feasible to replace the existing Pomona-Wanapum single-circuit 230 kV transmission line with a new double-circuit transmission line on a single set of structures in the existing ROW, thereby constructing the needed line without having to increase the ROW size and creating new impacts to the surrounding environment. This alternative was determined to be infeasible and was eliminated from further consideration because it would violate mandatory North American Electric Reliability Corporation (NERC) and WECC standards of reliability and approved criteria for line separation as discussed below.

The last transmission line built by Pacific Power to serve the electrical loads in the Yakima Valley was the Pomona-Wanapum 230 kV transmission line which was constructed in the mid-1970s. Since that time, energy demand in the Yakima Valley has continued to grow. Pacific Power planning studies have identified the loss of the existing Pomona-Wanapum 230 kV transmission line as the single most critical outage condition on the Mid-Columbia system.

Transmission systems in the United States must be planned, operated, and maintained so that they meet the NERC reliability standards. Additionally, transmission systems in the western United States must also meet the reliability standards of the WECC. Pacific Power's existing transmission system in the Yakima area no longer meets these reliability standards due to load growth in the Yakima area.

Pacific Power participated in a regional transmission system planning study (NTAC 2007) to address reliability issues within the Mid-Columbia transmission system. To address these problems the Mid-Columbia utilities including BPA, Grant County PUD, Chelan County PUD, Pacific Power, and Puget Sound Energy worked together with the NWPP, NTAC to study the Mid-Columbia transmission system and define needed reinforcements. The Wanapum/Vantage-Midway Area 230 kV study was completed in November 2007.

The study determined that loss of the existing Pomona-Wanapum 230 kV transmission line would result in a significant load shedding exposure on the transmission system and would also impact other transmission providers in the Mid-Columbia area with overloads of existing transmission components. Based on 2007 loads and system activity during high load periods in the Yakima Valley, loss of the Pomona-Wanapum 230 kV transmission line would result in the need to shed up to 167 megawatts (MW). This load shed would occur through five different substations and would represent 33 percent of the 500 MW load in the Yakima area. Load shedding means that power would not be able to be delivered and available to the Yakima area because power delivery would have to be curtailed to prevent the overload and failure of parallel transmission systems serving the Yakima area as explained below.

The regional transmission study showed an outage of the existing Pomona-Wanapum 230 kV transmission line would result in redistribution of electrical flow across the BPA and Grant County PUD parallel transmission systems that also feed into Pacific Power’s Yakima load area. This redistribution then results in loadings well above the acceptable limits of many existing transmission components on the other systems putting the regional transmission system at risk of failure. The transmission system planning studies determined that an outage of the existing Pomona-Wanapum 230 kV transmission line would result in the overload of three Pacific Power high voltage transmission lines and two BPA high voltage transmission lines, potentially causing service interruptions in the Yakima Valley. The regional planning study showed that the addition of the new Vantage to Pomona Heights transmission line would eliminate the redistributed loads and the overloading of the adjacent transmission system.

The planned line would mitigate the risk discussed above and ensure compliance with NERC and WECC mandatory reliability standards. Each existing and proposed transmission element must comply with the system performance requirements of NERC reliability standards and WECC system performance standards. If the standards are not meet then the Pacific Power transmission system would be in violation of the mandatory NERC/WECC reliability standards in the Yakima area and subject to NERC compliance and enforcement action.

In 2012 WECC revised standards regarding transmission line separation. WECC revised the standard related to Adjacent Transmission Circuits. It modified the distance between the structure centerline separation from "less than the longest span length of two transmission circuits at the point of separation or 500 feet to separation between their centerlines less than or equal to 250 feet at the point of separation" (WECC 2013).

The separation requirement is derived from both NERC and WECC System Performance Standards. The NERC standard TPL-003-0, update October 2012, states that the network must be able to supply demand under contingency conditions as defined in Category C.5, which includes clearing of "any two circuits of a multiple circuit powerline." The revised WECC standard (TPL-001-WECC-CRT-2) goes further by stating that Adjacent Transmission Circuits on separate towers must meet the NERC Category C.5 criteria.

The reason for WECC's adoption of the new Adjacent Transmission Circuits standard with a separation distance between centerlines of 250 feet is to require transmission owners to place adjacent circuits on separate tower structures rather than using double-circuit towers. The justification for the change in the centerline distance is based on WECC Western Interconnection transmission reliability data for years 2008 through 2011 comparing outages of circuits on a common ROW and circuits on common structures when two or more circuits went out of service. The average annual outage data showed that the number of two-circuit outages within a 10-minute period reduces from 0.288 outages per 100 miles on a common structure to 0.136 outages per 100 miles on separate structures in a common ROW. The outage data also suggest the average annual outage frequency for two circuits in a common ROW on separate towers is even less than the average annual outage frequency for two circuits not in a common ROW. WECC concluded that the outage data suggest that requiring further separation (greater than 250 feet) would not provide a significant reduction in the outage frequency (WECC 2012).

Placing the existing Pomona-Wanapum transmission line and the proposed Vantage-Pomona transmission line on the same set of poles would violate NERC and WECC reliability standards and would not provide the needed reliability of a physically separate line.

The alternative of double circuiting the existing Pomona-Wanapum 230 kV transmission line was eliminated from further consideration because it would violate mandatory NERC and WECC reliability criteria regarding separation standards for multiple circuits serving the same load (i.e., Yakima Valley).

2.6.1.2 New Vantage-Midway 230 kV Transmission Line

The Lower-Mid-Columbia 230 kV transmission system delivers power to the lower voltage load area systems and transfers surplus power out of the Mid-Columbia area. The major load areas receiving power from the system include: Yakima County, Grant County, and Benton County (Tri-Cities area). The 230 kV transmission system is exposed to thermal violations during the summer ambient temperatures and peak conditions. Additionally, there is exposure to voltage collapse for bus contingencies at the Wanapum/Vantage Substation.

The objective of the regional transmission system planning study was to determine the best reinforcements to mitigate the thermal violations and exposure to voltage collapse identified on the Lower-Mid-Columbia 230 kV system. The study focused on the Wanapum/Vantage to Midway transmission. Power flow studies were used to analyze the system for three reinforcement plans. The performance of each plan was compared to identify the plan that provides the most benefit. Benefit was measured in terms of system loading relief and mitigation of thermal violations.

Three major reinforcement options were studied and compared:

1. A new Vantage-Pomona 230 kV line (proposed Project)
2. A new Vantage-Midway 230 kV line
3. Tying the Wanapum-Walla Walla, Midway-Potholes-Coulee, and Midway-Rocky Ford-Coulee 230 kV lines together at their crossing about 12.6 miles east of Wanapum substation along the Walla Walla line to create a new 230 kV path between Wanapum/Vantage and Midway (an alternative to building an new Vantage-Midway line)

The study concluded that even with a new Vantage-Midway 230 kV line, the existing Wanapum-Pomona 230 kV line would still overload for N-1 Union Gap-Midway and N-2 Midway Bus 3 contingencies in the 2012 case. In the 2017 case, the Wanapum Bus contingency would produce a reactive shortage and voltage collapse without a new Vantage-Pomona 230 kV line.

The study determined that building a new Vantage-Pomona 230 kV line provided the most benefit to the system and outperformed building a new Vantage-Midway 230 kV line (Option 2) or tying the Wanapum-Walla Walla, Midway-Potholes-Coulee, and Midway-Rocky Ford-Coulee 230 kV lines together at their crossing about 12.6 miles east of Wanapum substation along the Walla Walla line to create a new 230 kV path between Wanapum/Vantage and Midway (Option 3).

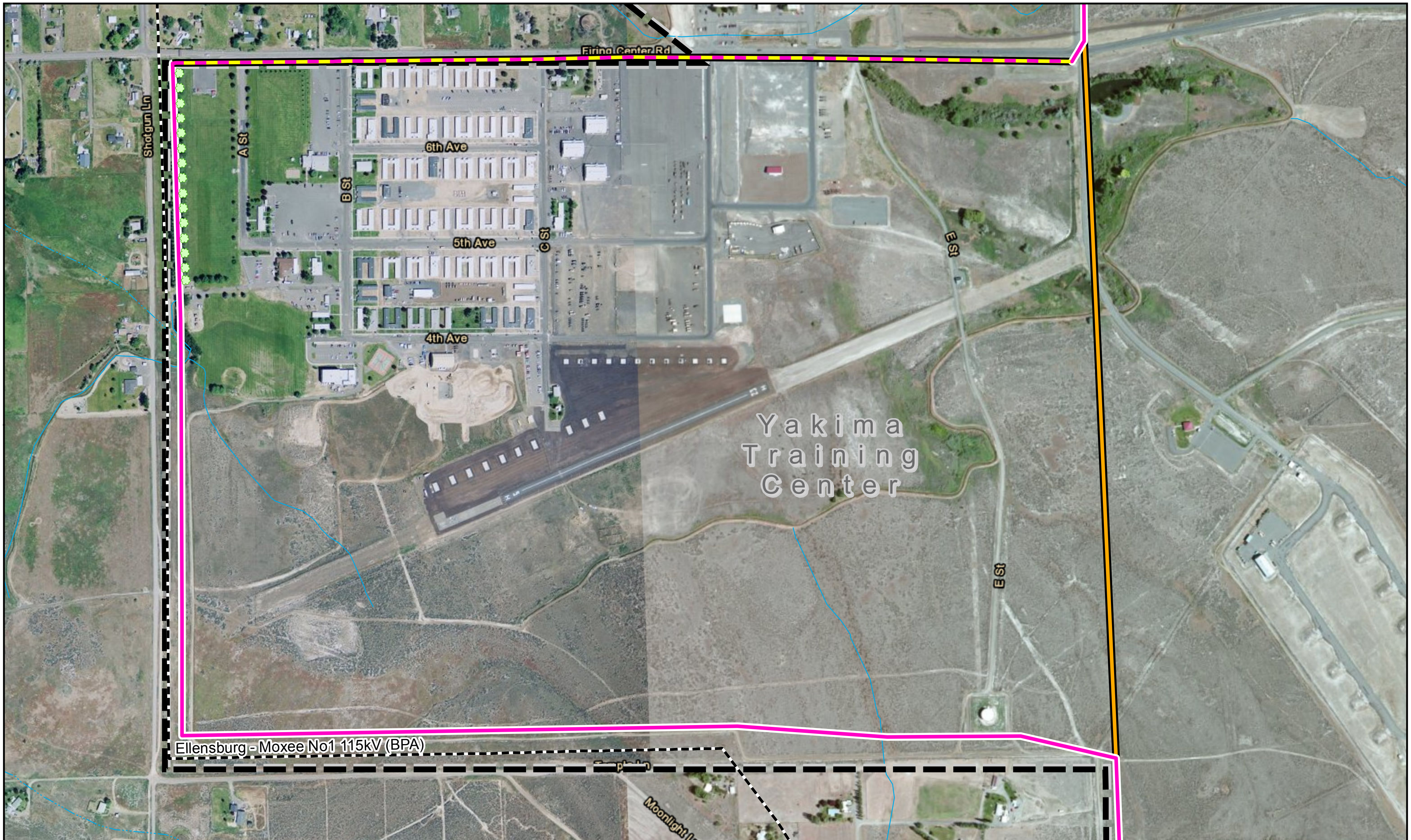
Additionally, the study concluded that a new Vantage-Pomona 230 kV line would still be required even if a new Vantage-Midway 230 kV line was constructed.

Based on the findings of the NTAC, Mid-Columbia Transmission Study Group, the alternative of building a new Vantage-Midway 230 kV transmission line was eliminated from further study because the system studies did not show that it would provide the required system loading relief, and therefore would be ineffective.

2.6.2 Underground Construction through JBLM YTC

2.6.2.1 Introduction

Undergrounding Design Options in limited areas of the Project are considered in this SDEIS in response to agency comments on the DEIS regarding sage-grouse received by the WDFW and USFWS. During the development of potential undergrounding options to address sage-grouse concerns, the Army proposed undergrounding a section of the NNR through the cantonment area in the location shown below in Figure 2-14.



Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2-14
JBLM YTC
Underground Route Considered and Eliminated

Underground Route Considered and Eliminated

New Northern Route (NNR) Alternative

NNR Alternative: Underbuild along Firing Center Road

Trees to be replanted

115 kV Transmission Line

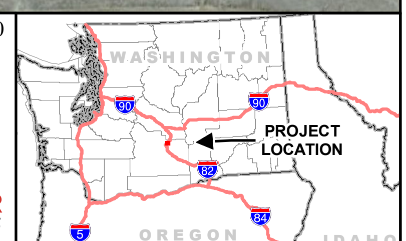
Yakima Training Center

Aerial Photography: ESRI Imagery Service as of 5/20/2014

0 250 500 750 1,000 1,250 1,500
Feet

PACIFIC POWER
A DIVISION OF PACIFICORP

POWER ENGINEERS



Undergrounding specific segments of the NNR Alternative as a Design Option is discussed above in Section 2.4.5. Undergrounding through JBLM YTC along route segment NNR-2 as a Design Option was considered on JBLM YTC between in the Cantonment Area near the Vagabond Army Heliport and Ammunition Supply Point in a north-south direction for a distance of up to 0.5 mile. Undergrounding was considered primarily to mitigate the visual and land use impacts of overhead structures on features such as the JBLM YTC headquarters, the heliport, the parade field, and Wilson Field. Undergrounding the transmission line on the base in this area would require the construction of two transition stations (1 to 2 acres each) in the area: 1) North: Located northeast of the heliport, south of Firing Center Road and east of E Street 2) South: Located in the vicinity east/northeast of the water tower and about 1,000 feet southwest of the Ammunition Supply Point.

This Design Option applied to route segment NNR-2 was considered and eliminated because it would:

- Require the construction of two transition stations that would permanently preclude future development of up to four acres of the Cantonment Area that serves as the administrative center for most training activities at JBLM YTC;
- Preclude the development of 1.5 acres within the Cantonment Area due to the duct bank ROW restrictions and necessary access road;
- Cause substantial disruption of underground utilities serving the Ammunition Supply Point, resulting in the need to relocate and reconstruct the utilities. This work would adversely affect the safe operation and maintenance of the Ammunition Supply Point;
- Undergrounding east of the Vagabond Army Heliport would interfere with a proposed runway expansion; and
- An alternative to undergrounding was available through re-routing around the perimeter of the Cantonment Area (NNR-2).

2.6.3 Non-Transmission Alternatives

2.6.3.1 Distributed Generation

Distributed generation is placement of small generators within load pockets in urban areas. Distributed generation is typically less than 5.0 MW in net generating capacity that is located on distribution feeders near customer load. Examples of distributed generation include fuel cells, micro turbines, photovoltaic solar facilities, wind, landfill gas, and digester gas. Distributive generation is implemented, where feasible, in major population centers. Distributed generation is not a practical or reasonable alternative to the proposed Project because this alternative alone would not address the overloading and reliability issues that would occur with an outage of the existing Pomona-Wanapum 230 kV transmission line and it would not address the need to provide another transmission path that could serve the over 500 MW load in the Yakima area, which the proposed Project is intended to provide. Therefore, this alternative was eliminated from further consideration.

2.6.3.2 Energy Conservation and Load Management

“Energy conservation” refers to the more efficient use of electricity by customers in order to reduce load demand. Conservation incentive programs are designed to reduce energy consumption per customer, providing an increase in energy resources for new loads. “Load management” refers to power supply system improvements by a utility.

Load management programs direct all customer demand to be moved away from peak load hours, freeing existing resources to serve additional peak loads. While energy conservation and load management can somewhat reduce the demand for electric energy, they will likely not reduce the load growth to zero, thereby eliminating the need for new generation sources and new transmission lines to serve increased loads. Energy conservation and load management cannot be considered a reasonable alternative to the proposed Project. Therefore, this alternative was eliminated from further consideration.

2.6.4 Route Alternatives Considered and Eliminated

Multiple preliminary route alternatives for the proposed Vantage to Pomona Heights 230 kV Transmission Line Project were identified and presented for public and agency review during the scoping period for the DEIS from January 5, 2010 through March 8, 2010. During 2010, there were numerous changes to the route alternatives presented in the formal scoping period. As a result of the changes to the route alternatives, the BLM opened a second comment period between January and February 2011 to receive comments on the revised route alternatives.

The DEIS described the route alternatives that were considered and eliminated and the reasons for eliminating certain route alternatives. The DEIS Section 2.6.4 Route Alternatives Considered and Eliminated is incorporated by reference into this document.

This SDEIS does not identify other route alternatives considered and eliminated. The focus of the SDEIS is the evaluation of the NNR Alternative /Manastash Ridge Subroute and comparison of the NNR/Manastash Ridge Subroute with the Agency Preferred Route Alternative identified in the January 2013 DEIS.

2.7 COMPARISON OF ALTERNATIVES AND SUMMARY OF IMPACTS

This section presents a summary comparison of the NNR Alternative, Manastash Ridge Subroute, and the DEIS Agency Preferred Alternative based on impacts identified and summarized from Chapter 4 of this document with mitigation measures and PDFs implemented.

TABLE 2-13 ALTERNATIVE COMPARISONS: LAND USE, TRANSPORTATION, RECREATION AND VISUAL RESOURCES

RESOURCE/ISSUE	NNR – OH Alternative	NNR w/MR Alternative	NNR – UG Alternative	DEIS Agency Preferred Alternative
Land Use/Transportation/Recreation				
Ownership (miles crossed)				
Federal	30.5	33.9	30.5	23.3
State	0.8	2.5	0.8	1.0
Private	8.5	10.7	8.5	41.6
Other	0.7	0.7	0.7	0.4
Resources (acres Long-Term Disturbance)				
Residential	2.7	2.7	2.7	1.8
Irrigated Agriculture	0	0	0	8.7
Dryland Agriculture	0	0	0	15.2
Military Use	21.9	39.6	39.6	11.2
# Private Landowners	33	32	33	46
New Road Construction (access/spur)	23.5	39.4	23.5	37.0
Residual Impacts (miles)				
Land Use				
High	0	0	0	0.9
Moderate	30.5	35.8	30.5	23.4
Low	9.5	11.5	9.5	38.7
No Identifiable	0.4	0.4	0.4	3.3
Recreation				
High	0	0	0	0
Moderate	0	0	0	0
Low	29.5	36.9	29.5	28.1
No Identifiable	10.9	10.8	10.9	38.2
Visual				
	Immediate foreground and foreground views from residences, travel corridors and recreation areas: -Sage Trail Road and residences located in the area of JBLM YTC primarily - Selah Creek Rest Area Overlook, Selah Cliffs NAP, Selah Butte Watchable Wildflower recreation area moderate impacts - Crosses I-82 in two locations lowest total mileage of high impacts	Immediate foreground and foreground views from residences, travel corridors and recreation areas: -Sage Trail Road and residences located in the area of JBLM YTC primarily - Selah Creek Rest Area Overlook, Selah Cliffs NAP, Selah Butte Watchable Wildflower recreation area moderate impacts - Crosses I-82 in two locations	Immediate foreground and foreground views from residences, travel corridors and recreation areas: -Sage Trail Road and residences located in the area of JBLM YTC primarily - Selah Creek Rest Area Overlook, Selah Cliffs NAP, Selah Butte Watchable Wildflower recreation area moderate impacts - Cross I-82 in two locations Higher impacts result of the higher contrasts in	Immediate foreground and foreground views from residences, travel corridors and recreation areas: -Sage Trail Road, Grant County rural, and Beverly residences primarily -Saddle Mt. Management Area, Milwaukee Corridor, Beverly Sand Dunes, Burkett Lake, Saddle Mountains Hang Gliding Launch recreation areas affected - SR 243 crossing Does not cross high volume interstate highway (I-82) Highest total mileage of high impacts

RESOURCE/ISSUE	NNR – OH Alternative	NNR w/MR Alternative	NNR – UG Alternative	DEIS Agency Preferred Alternative
			localized areas as a result of the installation of underground-to-overhead transition stations near sensitive viewers	
Residual Impacts (miles)				
High	4.8	14.1	5.3	16.5
Moderate	3.7	5.8	4.3	31.7
Low	31.9	27.8	30.8	18.1

TABLE 2-14 ALTERNATIVE COMPARISONS: WILDLIFE AND VEGETATION RESOURCES

RESOURCE/ISSUE	NNR – OH Alternative	NNR w/MR Alternative	NNR – UG Alternative	DEIS Agency Preferred Alternative
Wildlife				
Sage-Grouse Active or Inactive Leks (#)				
Within 0.6/2.0/3.0/4.0 mile*	0/0/0/2	0/0/0/2	0/0/0/2	0/2/5/*
Sage-Grouse Historic Leks (#)				
Within 0.6/2.0/3.0/4.0 mile*	3/6/8/14	1/5/8/14	3/6/8/14	1/2/4/*
Sage-Grouse Population Range (acres within ROW)				
0-80% Core Population Range	0	0	0	140.2
95% Population Range	0	0	0	255.7
Miles within the JBLM YTC Sage-Grouse PAC	38.2	46.0	38.2	42.9
Disturbance to Sage-Grouse Habitat (acres)				
Suitable	85.3	120.1	115.1	144.3
Marginal	54.0	60.1	69.0	26.8
Unsuitable	64.7	80.0	81.7	158.4
New Transmission Line Structures (#)				
Total Number of New Structures	328	383	251	499
New Structures Greater than 0.25 Mile from an Existing Transmission Line	50	135	50	339
Direct Disturbance to Wildlife Habitat (Acres)	204	266	260	330
Wildlife Habitat of Moderate or High Sensitivity (miles crossed)	30.7	30.1	30.7	26.1
Documented Special Status Species (miles crossed)				
Raptor Nest within 1 Mile	10.4	9.0	10.4	20.1
Point within 1 Mile	4.9	4.9	4.9	8.2
Priority Species Regional Areas (miles crossed)	5.5	6.0	5.5	7.2
Impact Levels (miles crossed)				
High	0	0	0	0
Moderate	35.5	36.6	35.5	40.1
Low	4.8	11.1	4.8	26.22
No Identifiable	0	0	0	0
Vegetation				
Special Status Species Habitat Suitability (miles crossed)				
Suitable/Marginal Habitat	29.3/8.6	31.2/11.4	29.3/8.6	27.6/20.3
Special Status Plants and Ecosystems (miles crossed)				
WNHP Special Status Plant Polygons	7.1	7.1	7.1	7.5
Special Status Plants Found During Surveys	2.6	2.6	2.6	1.0
WNHP Priority Ecosystems	0	0.4	0	2.9
Total Vegetation Disturbance	45.2	65.1	68.0	38.4
Impact Levels (miles crossed)				
High	0	0	0	0
Moderate	30.7	31.0	30.7	26.5
Low	7.1	11.6	7.1	21.6
No Identifiable	2.5	5.1	2.5	18.2

*The DEIS assessed leks out to three miles. Based on input from wildlife management agencies, the SDEIS analysis was expanded to include leks out to four miles.

TABLE 2-15 ALTERNATIVE COMPARISONS: CULTURAL RESOURCES AND OTHER ISSUES

RESOURCE/ISSUE	Alternative			
	NNR - OH	NNR w/MR	NNR - UG	DEIS Agency Preferred Alternative
Cultural Resources				
within 75'/250' of Centerline				
Archeological Sites	38/35	38/36	38/35	27/49
Isolated Finds	20/24	15/19	20/24	15/26
Architectural Resources	1/1	1/1	1/1	2/2
Total Cultural Resources	63/64	59/60	63/64	47/81
National Register Sites				
Eligible	1/1	1/1	1/1	2/2
Not Eligible	21/25	16/20	21/25	15/28
Unevaluated	42/38	42/39	42/38	30/51
Water Resources				
Total Miles of Water Resource Crossed	1.2	3.6	1.2	4.9
Total Acres of Water Resource (Long Term) Disturbance	0	0	0	0
Residual Impacts				
High	0	0	0	0
Moderate	0	0	0	0
Low	1.2	3.6	1.2	4.9
NI	39.1	44.1	39.1	61.4
Geologic Resources				
30% Slope or greater crossed (miles)	10.8	13.8	10.8	3.0
Mapped Landslide (High Hazard) crossed (miles)	2.1	2.9	2.1	3.0
High Water erodibility (acres long-term disturbance)	8.3	10.9	11.8	36.9
Total (Short Term & Long Term) Disturbance (acres)	157.1	202.3	196.2	249.7
Construction Costs (w/out ROW) (millions)	$17.3	$19.8	$59.2 to $82.5 [1]	$28.9

[1] Assuming of 10 to 15 times cost ($427,634 per mile average) of overhead estimate (10.9 miles; Route Segments NNR 4u & NNR-6u).

CHAPTER 3 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the environment and resources that the alternatives described in Chapter 2 may potentially affect. Chapter 3 describes the current condition of each resource and relevant characteristics that may be subject to impacts from the Project. Environmental resource baseline information is presented comparing potential impacts from the route alternatives and the no action alternative which are analyzed in Chapter 4.

Identified resources that may be affected by the Project have been carried forward for analysis and are discussed in Chapters 3 and 4. These resources include:

- Vegetation and Special Status Plant Species
- Wildlife and Special Status Wildlife Species
- Land Jurisdiction and Land Use
- Recreation
- Special Management Areas
- Transportation
- Visual Resources
- Socioeconomics
- Environmental Justice
- Cultural Resources and Native American Concerns
- Wildland Fire Ecology and Management
- Climate and Air Quality
- Water Resources
- Geology and Soils

Resource inventories were developed for the area within the analysis corridors in sufficient detail to assess the potential impacts that could result from the proposed Project. The width of the analysis corridors along each alternative route segment differs for each of the resource disciplines, depending on the area that potentially could be affected. The precise location of the centerline would be determined through engineering surveys of the selected route prior to construction. Land use, geology and soils, water, and cultural resources were inventoried within a two-mile wide corridor (one mile on either side of the assumed centerlines of the alternative route segments). Biological resources were also inventoried within the two-mile wide corridor. Visual resources were inventoried within a six-mile wide corridor (three miles on either side of the assumed centerlines). Data and information for social and economic conditions in the Project area are based on county and state-wide data and cannot be tailored to the analysis corridors.

Maps illustrating resource data within the Project area and analysis corridors are located in Appendix A. Resource data was documented along the alternative route segments. The resource discussions in this chapter reference the route segments shown on the resource maps, providing a geographic reference to the resource data.

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3.2 VEGETATION AND SPECIAL STATUS PLANT SPECIES

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the new Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to vegetation and special status plant species along the New Northern Route (NNR) and subroute, including those raised during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

This section describes the general vegetation, special status plant species and noxious weeds present within the Project area. For the purposes of this analysis, the Project area for vegetation and special status plant species was defined as a two-mile wide corridor; one mile on either side of route segment and subroute centerlines. Please note that the two-mile buffer around each route segment overlaps with the adjacent route segments. This was done to allow for a discrete discussion of the affected environment and comparison of each route segment.

3.2.1 Data Sources

The evaluation was conducted using planning documents, Project-specific field studies, digital data sources and previously conducted studies. Sources utilized included:

- U.S. Department of the Army (Army), Final Environmental Impact Statement (EIS) for Fort Lewis Army Growth and Force Structure Realignment, July 2010.
- Hanford Reach National Monument Final Comprehensive Conservation Plan and EIS, August 2008.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) Cultural and Natural Resource Management Plan (RMP), January 2002.
- Spokane District RMP (1985) and Record of Decision (ROD) (1987) and the 1992 RMP amendment (BLM 1992a) and ROD (BLM 1992b).
- Sage-Grouse Habitat Assessment Report (Appendix B-2).
- Special Status Plant Species Survey Report (Appendix B-3).
- Noxious Weed Survey Report (Appendix B-4).
- Washington Connected Landscapes Project: Analysis of the Columbia Plateau Ecoregion (Washington Wildlife Habitat Connectivity Working Group 2012).
- Digital element occurrence records of current and historical rare and imperiled species were obtained from Washington National Heritage Program (WNHP).
- Washington Gap Analysis Program (GAP) was obtained from the U.S. Geological Survey (USGS) Gap Analysis Program.

3.2.2 Current Conditions and Trends, Regional Overview

3.2.2.1 Vegetation Cover Types

Vegetation cover types were assessed using aerial photos, JBLM YTC vegetation data (JBLM YTC 2002), GAP data and fire history data. This information is provided in Appendix A: Vegetation and Fire History Map and Appendix B-3: Special Status Plant Report. A summary of the vegetation cover types within the Project area is presented in Table 3.2-1 and is described for each route segment in Section 3.2.4.

The Project area lies within the Columbia Plateau ecoregion. The Columbia Plateau is an arid sagebrush (*Artemisia* spp.) steppe and grassland that is surrounded by ecoregions that are typically moister, forested and mountainous (U.S. Environmental Protection Agency [USEPA] 2010). Plant communities within the Project area and its immediate vicinity have been altered by roads, urban development, military activities, livestock grazing, agriculture, noxious weeds and invasive species, and fire. Vegetation cover types present within the Project area are described below.

Annual Grassland

Annual grasses present in the Project area are comprised of field brome (*Bromus arvensis*), bulbous bluegrass (*Poa bulbosa*), and cheatgrass (*Bromus tectorum*). Annual grasslands cover approximately 24 percent of the Project area (20,314 acres).

Bitterbrush/Perennial Grassland

Antelope bitterbrush (*Purshia tridentata*) with a perennial bunchgrass understory of bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*), needle and thread grass (*Hesperostipa comata*), and Thurber's needlegrass (*Achnatherum thurberianum*) occurs on a small portion of the Project area (10.5 acres; less than 0.1 percent).

Forb

For the Project area, forbs are typically present and included as components of other vegetation cover types (e.g., sagebrush/perennial grassland). However, there are locations where forbs are the most prevalent vegetation type, typically along or near the tops of ridges or hills. Forbs comprise approximately 2.5 percent (2,107.9 acres) and consist of narrowleaf mock goldenweed (*Nestotus stenophyllus*) and thyme-leaf buckwheat (*Eriogonum thymoides*) with a perennial grass understory (JBLM YTC 2002).

Perennial Grassland

Perennial grasslands include vegetation dominated by bunchgrasses with occasional shrubs. Principal perennial grasses within the Project area include: crested wheatgrass (*Agropyron cristatum*), bluebunch wheatgrass, Sandberg bluegrass, Idaho fescue (*Festuca idahoensis*), needle and thread grass, squirreltail (*Elymus elymoides*) and Thurber's needlegrass. Perennial grasslands cover approximately 1.9 percent of the Project area (1,616 acres).

Rabbitbrush/Annual Grassland

Rubber rabbitbrush (*Ericameria nauseosa*) typically occurs where prior disturbance has removed sagebrush. Within the Project area, rubber rabbitbrush occurs with an understory of annual grasses, such as cheatgrass. Rabbitbrush/annual grasslands occur on approximately 40 acres (less than 0.1 percent) within the Project area.

Sagebrush/Perennial Grassland and Sagebrush/Annual Grassland

Within the Project area, sagebrush shrublands consist of big sagebrush (*Artemisia tridentata*) and stiff sagebrush (*Artemisia rigida*). Stiff sagebrush typically occurs on rocky shallow soils with primarily Sandberg's bluegrass (JBLM YTC 2002). Sagebrush shrublands with a perennial grass understory is the most common vegetation cover type within the Project area, covering 57.6 percent (47,981.8 acres) of the Project area. Sagebrush shrublands with an annual grass understory comprise 0.1 percent of the Project area (120.5 acres).

Riparian/Wetland

Very few wetlands and riparian areas occur within the Project area. The majority of riparian areas within the Project area are seasonally moist uplands. These drier riparian areas are typically vegetated with upland shrubs, including sagebrush. A small wetland is present in the JBLM YTC Cantonment Area (NNR-2). Vegetation at this wetland included narrowleaf willow (*Salix exigua*), purple loosestrife (*Lythrum salicaria*), water speedwell (*Veronica anagalis-aquatica*), mountain rush (*Juncus arcticus* ssp.

littoralis), common rush (*Juncus effusus*), slenderbeak sedge (*Carex athrostachya*), water horsetail (*Equisetum fluviatile*) and hardstem bulrush (*Schoenoplectus acutus* var. *acutus*). For more information on water resources in the Project area, refer to Section 3.14 - Water Resources.

Agriculture

Agricultural lands in the Project area are primarily used for cultivation of fruit trees, vineyards and row crops. Livestock grazing occurs on both public and private lands. For more information on farming and grazing activities in the Project area, refer to Section 3.4 - Land Jurisdiction and Land Use.

3.2.2.2 Noxious Weeds and Invasive Plant Species

Many exotic plant species are found within the Project area, but only a portion of these are designated as noxious weeds. Noxious weeds are non-native species that spread quickly, are difficult to control and cause ecological and economical damage (Washington State Noxious Weed Control Board [WSNWCB] 2014). The Washington State Department of Agriculture maintains a list of noxious weeds to be controlled in Washington (WSNWCB 2014). Class A noxious weeds have limited distribution in the state and state law requires their eradication. Class B noxious weeds are either absent or have limited distribution throughout the state. The goal for Class B noxious weeds is to contain the infestations to their current locations and prevent their spread to new areas. Class C noxious weeds are already widespread in the state; counties can choose to either enforce their control or can focus on educating residents about controlling these noxious weeds. In addition to the state designated noxious weed list, each County and District Noxious Weed Control Board can develop and enforce a list of weeds that are considered noxious in their county or district (WSNWCB 2014).

Within the right-of-way (ROW) corridor for each of the NNR route segments, qualified botanists conducted a complete, floristic pedestrian survey to target noxious weed species on accessible federal and state lands. Federal and state lands were considered inaccessible if there was restricted access on the JBLM YTC, safety issues (e.g., near the interstate), access issues crossing private lands, dangerously steep terrain, and other logistic concerns. Portions of route segments and the majority of Route Segment Manastash Ridge (MR)-1 were not surveyed because of route adjustments that were made following completion of the surveys. The noxious weed survey occurred May 13-20, 2013 and July 27, 2013. State and county-listed noxious weeds documented during the 2013 noxious weed survey are presented in Table 3.2-2.

Noxious weeds within the Project area are scattered and patchy in distribution, with the exception of burningbush (*Bassia scoparia*) and Russian thistle (*Salsola iberica*) which were ubiquitous and often the most dominant plant in the community across most accessible federal lands (Table 3.2-2). Many of the areas where noxious weeds were documented during the survey were associated with disturbance. The larger infestations were primarily associated with roads, JBLM YTC’s fire break, and areas with past fire events. The Noxious Weed Report is included in its entirety in Appendix B-4.

TABLE 3.2-1 SUMMARY OF VEGETATION COVER TYPES (ACRES) WITHIN THE PROJECT AREA BY ROUTE SEGMENT

VEGETATION COVER TYPE	ACRES WITHIN PROJECT AREA (ONE MILE FROM EITHER SIDE OF ROUTE SEGMENT CENTERLINES)								
	NNR-1	NNR-2	NNR-3	NNR-4	NNR-5	NNR-6	NNR-7	NNR-8	MR-1
Agriculture	560.2	1,639.3	602.7	579.5	833.4	536.9	0	0	3,868.3
Annual Grassland	3,286.1	3,545.5	6,179.7	1,346.3	19.8	13.8	0	195.2	5,727.6
Bitterbrush/Perennial Grassland	0	0	0	3.5	3.5	0	0	0	3.5
Developed/Disturbed/Firebreak	18.5	81.9	5.8	8.2	11.2	3.0	24.5	7.5	722.4
Forb	0	0	0	215.4	486.9	1,216.6	58.2	0	130.8
Intermittent Stream/Dry Gully	0.6	1.0	1.8	1.8	1.2	3.6	6.2	0.6	1.6
Noxious Weeds	0	2.3	1.7	0	0	0	0	0	0
Open Water/Canal	460.0	0.3	0.2	0	0	0	409.5	647.5	0
Perennial Grassland	154.2	276.6	44.6	302.7	47.7	459.0	75.4	19.7	236.2
Rabbitbrush/Annual Grassland	20.0	19.0	0	0	0	0	0.5	0.5	0
Riparian/Wetland	12.5	0.6	57.7	0.1	0	20.7	4.8	0.4	0.1
Rock/Basalt Cliffs	0	3.7	7.6	0.7	0	0.3	0.2	0.2	0.7
Sagebrush/Annual Grassland	0	15.8	40.4	34.8	0	3.2	0	2.0	24.3
Sagebrush/ Perennial grassland	358.4	1,793.0	6,912.0	5,297.3	2,852.2	7,996.0	11,945.9	4,454.9	6,372.1
Tree (poplar)	0.5	3.1	0	0	0	0	0	0	0
Total[1]	4,871.0	7,382.1	13,854.2	7,790.3	4,255.9	10,253.1	12,525.2	5,328.5	17,087.6

[1]Numbers are rounded and may not sum exactly.

TABLE 3.2-2 NOXIOUS WEEDS SPECIES DOCUMENTED IN PROJECT AREA

SPECIES NAME	LEGAL NOXIOUS STATUS[1,2,3,4]		LOCATION OF SPECIES (ROUTE SEGMENT)	TOTAL NUMBER OF OCCURRENCES	TOTAL ACRES DOCUMENTED (WITHIN ROW[5,6,7])
	WASHINGTON	COUNTY			
Russian knapweed *Acroptilon repens*	Class B	G, K, Y	NNR-2, NNR-3	12	3.2
Burningbush[5] *Bassia scoparia* (=*Kochia scoparia*)	Class B	G	NNR-1, NNR-2, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8	-	-
Hoary cress *Cardaria draba*	Class C	G, K	NNR-5	2	>0.1
Spiny plumeless thistle *Carduus acanthoides*	Class B	G	NNR-5	1	>0.1
Diffuse knapweed *Centaurea diffusa*	Class B	G, K, Y	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-8	35	24.4
Canada thistle *Cirsium arvense*	Class C	G, K	NNR-1, NNR-2, NNR-5	7	0.3
Bull thistle *Cirsium vulgare*	Class C	G, K	NNR-5	2	>0.1
Field bindweed *Convolvulus arvensis*	Class C	G, K	NNR-2, NNR-8	3	>0.1
Horseweed *Conyza canadensis*	Class C	K	NNR-2	1	0.1
Common St. Johnswort *Hypericum perforatum*	Class C	G, K	NNR-5	2	>0.1
Dalmatian toadflax *Linaria dalmatica* ssp. *dalmatica*	Class B	G, K, Y	NNR-1, NNR-2	3	1.3
Purple loosestrife *Lythrum salicaria*	Class B	G, K, Y	NNR-2	1	>0.1
Reed canarygrass *Phalaris arundinacea*	Class C	G, K, Y	NNR-2	1	>0.1
Sulpur cinquefoil *Potentilla recta*	Class B	G,K,Y	NNR-5	1	>0.1
Russian thistle[5] *Salsola iberica (=S. kali)*	Class C	K	NNR-1, NNR-2, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8	-	-
Puncturevine[6] *Tribulus terrestris*	Class B	G, K, Y	NNR-1	1	1.6

Sources: [1]Whitson et al. 1999, [2]Noxious Weed Control Board of Grant County 2013, [3]Kittitas County Noxious Weed Control Board 2011, [4]Yakima County Noxious Weed Board 2011; State of Washington Noxious Weed Designations: Class A – have a limited distribution in Washington. State law requires that these weeds be eradicated; Class B - are either absent from or limited in distribution in some portions of the state but very abundant in other areas. The goals are to contain the plants where they are already widespread and prevent their spread into new areas; Class C – are already widespread in Washington State. Counties can choose to enforce control, or they can educate residents about controlling these noxious weeds (WSNWCB 2014); County Noxious Weed Lists: G=Grant; K=Kittitas; Y=Yakima. [5]Burningbush and Russian thistle were not mapped due to their ubiquitous and often dominant nature across most accessible federal lands. [6]Portions of route segments and the majority of Route Segment MR-1 were not surveyed because of route adjustments that were made following completion of the surveys. [7]Acreages are approximate and include a buffer, where appropriate.

Several invasive plant species that do not have designation as a noxious weed were also found within the Project area; the most prevalent was cheatgrass. Cheatgrass is an invasive annual grass native to Europe that can significantly alter native sagebrush steppe communities through competition and an increase in wildland fire frequency (Billings 1994). In some locations, cheatgrass can become so dense that few perennial grasses or shrub species are present (Mosley et al. 1999). Refer to Section 3.12 - Wildland Fire Ecology and Management, for more information on cheatgrass and fire cycles.

3.2.2.3 Special Status Plant Species

Special status plant species for this analysis includes plant species currently listed under the federal Endangered Species Act (ESA) as Threatened or Endangered and species proposed for federal listing as Threatened or Endangered. It also includes species listed by the U.S. Fish and Wildlife Service (USFWS) as Candidates for federal listing under the ESA and species designated as federal Species of Concern. Candidate species receive no statutory protection under the ESA; however, the USFWS encourages cooperative conservation efforts for these species because they are, by definition, species that may warrant future protection under the ESA. Federal Species of Concern are species that may be rare or declining, but are not formally listed under the ESA. Additionally, special status plant species also include those species listed by Washington State as Endangered, Threatened, or Sensitive and BLM designated Sensitive Species for the State of Washington. The designation of special status plant species in this document refers to any plant species currently included on any of these lists.

The special status plant species list was developed utilizing the following data:

- Special status species known to occur Grant, Kittitas and Yakima counties;
- Washington State Threatened and Endangered species; and
- JBLM YTC, the WNHP (2010), BLM (Interagency Special Status/Sensitive Species Program [ISSSSP] 2008 and 2012; Boyter 2011 and 2013), and USFWS Threatened, Endangered, Candidate and Species of Concern.

The list was further refined by evaluating known occurrences, habitat requirements, elevation and suitable habitat within the Project area. Sixty-seven special status plant species were identified as occurring or having the potential to occur within the Project area. The comprehensive list of special status plant species for the Project area is included in Appendix B-3 (Special Status Plants Report).

Qualified botanists conducted a complete, floristic pedestrian survey for the targeted special status plants on accessible federal and state lands within the proposed 150-foot wide ROW. Portions of route segments and the majority of Route Segment MR-1 were not surveyed because of route adjustments that were made following completion of the surveys and after the seasonal survey window. Federal and state lands comprise approximately 75 percent of the total ROW; the remaining 25 percent is comprised of non-federal (e.g., private and county) land and was not surveyed. Of the 715.1 acres of federal and state lands within the 150 feet wide ROW, 205.3 acres (29 percent) were accessible and surveyed. Two surveys were conducted (May and July 2013) on accessible federal and state land to address the different phenology (timing of flowering and/or fruiting) of the target special status plant species. Appendix B-3 (Special Status Plants Report) lists each species' phenology and the targeted survey month. The May survey occurred within accessible federal and state lands and the July survey took place only at wetland and riparian areas along accessible federal lands.

An assessment of weather conditions (temperature and precipitation) and plant phenology during the mid-May 2013 survey indicated that the timing of flowering and fruiting was approximately one month ahead of anticipated conditions (compared with the previous June 2011 surveys). The survey time periods were adjusted to account for the plant phenology found during the May 2013 survey. It was determined that the mid-May survey should serve as the late June survey and a follow-up survey in late July would be conducted in wetland habitats (including surveying for Ute ladies'-tresses) and where potential noxious weed or special status plant species were located and needed to be documented and mapped. The remaining 509.8 acres of federal and state lands were not surveyed due to inaccessibility. Table 3.2-3 presents a summary of the total amount of land present within the 150-foot ROW corridor compared with the amount of land surveyed for special status plants.

TABLE 3.2-3 TOTAL AMOUNT OF FEDERAL AND STATE LAND SURVEYED COMPARED WITH THE TOTAL AMOUNT OF LAND PRESENT WITHIN THE 150-FOOT ROW CORRIDOR

ROUTE SEGMENT	TOTAL ACRES	FEDERAL AND STATE LAND WITHIN ROW (150-FT CORRIDOR)		NON-FEDERAL/STATE LAND WITHIN ROW (ACRES)	TOTAL PERCENT OF ROW SURVEYED (FEDERAL/STATE AND NON-FEDERAL LAND)
		TOTAL ACRES	AMOUNT SURVEYED (ACRES AND %)		
NNR-1	43.4	2.8	2.8 (100%)	40.6	6.5%
NNR-2	91.2	90.5	79.7 (88.1%)	0.7	87.4%
NNR-3	168.6	77.6	33.6 (43.4%)	91.1	20.0%
NNR-4	82.5	60.6	26.3 (43.3%)	21.9	31.8%
NNR-5	32.4	32.4	29.6 (91.5%)	0	91.5%
NNR-6	117.1	117.1	0 (0%)	0	0%
NNR-7	149.6	149.6	2.4 (1.6%)	0	1.6%
NNR-8	49.9	32.6	30.3 (93.1%)	17.4	60.7%
MR-1	215.5	151.9	0.4 (0.3%)	63.6	0.2%

No federally-listed plant species are known to occur within the Project area; however, five species listed as Endangered, Threatened, or Candidate are suspected to occur within the Project area. More information on these species is provided in Table 3.2-4. No plant species within the Project area (Grant, Kittitas and Yakima Counties) are proposed for listing under the ESA. In addition, no proposed or designated Critical Habitat is present within or adjacent to the Project area (USFWS 2012a and 2012b). Of the five species listed as Endangered, Threatened, or Candidate and suspected to occur in the Project area, none were located during the surveys (Appendix B-3 Special Status Plants Report).

In addition to federally-listed plant species, twenty-one Washington state-listed and BLM Sensitive plant species are known to occur within the Project area. Table 3.2-5 presents a summary of these species and the location of the closest route segment. Three special status plant species were located during the special status plant surveys: Pauper milkvetch (*Astragalus misellus var. pauper*), Hoover's desert-parsley (*Lomatium tuberosum*), and hedgehog cactus (*Pediocactus simpsonii var. robustior*). Information on these species is presented in Table 3.2-5 and discussed in more detail below. All occurrences were located during the May survey, but some were confirmed during the July survey (Appendix B-3 Special Status Plants Report).

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TABLE 3.2-4 FEDERALLY LISTED SPECIES SUSPECTED TO OCCUR WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL INFORMATION[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	POTENTIAL TO OCCUR IN PROJECT AREA
Umtanum desert buckwheat	*Eriogonum codium*	T, WE	The entire known range of Umtanum desert buckwheat is on federally owned land in the Hanford National Monument, Washington. Other potential locations within the lower Columbia River Basin were intensively searched for additional populations of *E. codium* in 1996 and 1997, however no other populations were found.	G1/S1	One population occupying approximately 489 acres is known to occur within region.	Umtanum desert buckwheat does not appear to be fire adapted. A human-caused fire destroyed 10 to 20 percent of the one known population in 1996. Other potential threats include off-highway vehicle (OHV) use. The individual plants are long-lived with low seed germination rates and high seedling mortality.	Flat to gently sloping microsites near the top of the steep, north-facing basalt cliffs near salt scrub habitats overlooking the Columbia River; restricted to the exposed top of the basalt Lolo Flow. Assoc. include spiny hopsage and cheatgrass; 1,100-1,320 feet.	May to late-August	Low; one known population exists and appears to be restricted to the exposed top of one particular basalt flow (the Lolo flow). Not documented in surveys.
Ute ladies'-tresses	*Spiranthes diluvialis*	T, WE	Ute ladies'-tresses occurs in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington and Wyoming.	G2G3/S1	Not known to occur within the Upper Columbia and Yakima Basins.	The riparian habitat on which Ute ladies'-tresses depends has been drastically modified by urbanization and agriculture and development. Habitat loss or degradation from competition from non-native plants and vegetation succession are the most widespread threats.	Moist meadow habitats along floodplains, oxbows and stream and river terraces; subirrigated or spring-fed abandoned stream channels and valleys; and lakeshores; specifically, swales, narrow meander channels and similar wetland and riparian habitats in valley bottom landscapes that retain moisture through late-summer.	mid-July to August	Low to moderate; limited potential habitat in the Project area. Not documented in surveys.
Wenatchee Mountain checker-mallow	*Sidalcea oregana* var. *calva*	E, WE	The known historical and current range of Wenatchee Mountain checker-mallow is restricted to Chelan County, Washington. The historical range covered an area approximately 11 by 3 miles, and extended southeast of Leavenworth, Washington. Only five existing populations are known to occur.	G5/S1	Two populations occupying approximately 326 acres are known to occur within the region.	Wenatchee Mountain checker-mallow plants are subject to high levels of seed predation by weevils and other insects. Primary threats include hydrological disturbance, ground disturbance associated with timber harvest, development and agriculture, competition from non-native grasses, fire, infestation by aphids, and predation by livestock.	Populations are generally found in wetter portions of open forest-moist meadow habitats. May also be found in open conifer forests dominated by ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*), on the perimeter of shrub and hardwood thickets dominated by quaking aspen (*Populus tremuloides*), along permanent or intermittent streams in sparsely forested draws and near seeps, springs, or small drainages. 1,900-3,200 feet.	May to June	Low; outside known range. Limited available habitat. Not documented in surveys.
White Bluffs bladderpod	*Physaria douglasii* ssp. *tuplashensis*	T, WT	Only one population is known to occur. This population is along the upper edge of the White Bluffs of the Columbia River in Franklin County, Washington.	G2/S2	One population occupying approximately 4,851 acres is known to occur within the region.	Primary threats include groundwater movement from adjacent, up-slope agricultural activities causing landslides in the White Bluffs; an infestation of yellow starthistle (*Centaurea solstitialis*), a nonnative weed; OHVs; and wildland fire.	Found growing on dry, barren, nearly vertical exposures of calcium carbonate soil (high pH). Associated species include buckwheat milkvetch (*Astragalus caricinus*), Geyer's milkvetch (*Astragalus geyeri*), desert dodder (*Cuscuta denticulata*), dwarf-evening-primrose (*Camissonia pygmaea*), and Sandberg bluegrass. The elevation ranges from 780 to 890 feet.	June to July	Low; limited habitat potential. Species is restricted to a very small area along the Columbia River and outside the Project area. Not documented in surveys.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL INFORMATION[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	POTENTIAL TO OCCUR IN PROJECT AREA
Wormskiold's northern wormwood	*Artemisia borealis* var. *wormskioldii*	C, BLM-S, WE	There are only two known existing occurrences of Wormskiold's northern wormwood. These occurrences are located approximately 202 river miles apart along the Columbia River in Washington. One occurrence is located on an island in the Priest Rapids Reservoir, north of the town of Beverly, Washington.	G5/S1	One population occupying approximately 276 acres is known to occur within the region.	Primary threats include altered water regimes, erosion, trampling, OHV compaction, and exotic species invasions. Historically known populations and suitable habitat in Washington and in Oregon have been lost due to dam construction.	Restricted to exposed basalt, cobbly-sandy terraces and sand habitat along the banks of the Columbia River. Elevation ranges from 160 to 500 feet.	April to May	Low to moderate; limited suitable habitat. Not documented in surveys.

Sources: BLM 2012, USFWS 2012a,b, USFWS 2013a,b, USFWS 2004a, USFWS 1995, Hitchcock et al. 1969, Hitchcock and Cronquist 1973, NatureServe 2011, WNHP and BLM 2005, WNHP 2010, Camp and Gamon 2011, and Center for Plant Conservation 2010a,b. [1]Key: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; BLM-S – BLM Washington Sensitive; WE – Washington State Endangered; WT – Washington State Threatened. [2]NatureServe Rankings: G1-critically imperiled; G2-imperiled; G3-vulnerable; G5-secure; S1- critically imperiled; S2-imperiled. [3]The Yakima and Upper Columbia River Basins watershed data was used to provide regional context information.

TABLE 3.2-5 STATE-LISTED AND BLM SENSITIVE SPECIES KNOWN TO OCCUR AND DOCUMENTED WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL INFORMATION[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	ROUTE SEGMENT(S) LOCATED WITHIN ONE MILE OF KNOWN OCCURRENCE	DOCUMENTED DURING PLANT SURVEY (ROUTE SEGMENT)
Annual sandwort	*Minuartia pusilla* var. *pusilla*	WA State Review Group 1	Annual sandwort is known from British Columbia, south to California, Nevada and Arizona. In Washington it has been found in Grant, Chelan, Whitman, Spokane, Walla Walla, and Klickitat counties.	G5T3T5	One population occupying approximately 23 acres is known to occur within the region.	The primary threat to annual sandwort is damage from OHVs.	Plains, open pine forest, chaparral slopes and dry rock cliffs. Elevations range from 25-7,900 feet; in Washington it is known to occur at 800 feet.	April to June	NNR-8	
Basalt daisy	*Erigeron basalticus*	SOC, BLM-S, WT	Basalt daisy is endemic to a small area in Washington, approximately 11 by 3 miles. Exclusively along the Yakima River Canyon and Selah Creek.	G2/S2	Five populations occupying approximately 1,369 acres are known to occur within the region.	Primary threats include basalt mining, railroad and highway maintenance and construction and potential spray drift from adjacent agricultural fields.	Cliff crevices on basalt cliffs, in rocky canyons; Yakima River and Selah Creek. Associated with the Yakima Basalt Formation, which occurred during the late Miocene; 1,250-1,500 feet.	May to June	NNR-2, NNR-3	
Beaked spike-rush	*Eleocharis rostellata*	WS	Beaked spike-rush is known from Vancouver Island to Nova Scotia, Canada south to northern Mexico and the Greater Antilles and in the South American Andes. In Washington, beaked spike-rush is currently known from Grant and Yakima counties.	G5/S2	Six populations occupying approximately 563 acres are known to occur within the region.	The primary threat is invasion of habitat by exotic species and increasing density of woody species.	Marshes and boggy sites around lakes, in alkaline or highly calcareous areas, often around hot springs; also in coastal salt marshes; 500-1,850 feet.	June to September	NNR-8	
Bristle-flowered collomia	*Collomia macrocalyx*	BLM-S, WS	Bristle-flowered collomia occurs from north-central Oregon into central Washington. In Washington, it is known from Kittitas and Yakima counties in the Columbia Basin physiographic province.	G3G4/S1	Nine populations occupying approximately 869 acres are known to occur within the region.	The primary threat to the species is invasion of habitat by non-native species, in particular cheatgrass. Other threats include grazing, OHV use and military training.	Dry, open places at lower elevations; sparsely vegetated and associated with sagebrush steppe; a cryptogram crust is present on the rocks and soil; early spring, flowers ephemeral; 850-2,100 feet.	April to May	NNR-7, NNR-8	

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL INFORMATION[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	ROUTE SEGMENT(S) LOCATED WITHIN ONE MILE OF KNOWN OCCURRENCE	DOCUMENTED DURING PLANT SURVEY (ROUTE SEGMENT)
Caespitose evening-primrose	*Oenothera caespitosa* ssp. *caespitosa*	BLM-S, WS	Caespitose evening-primrose is known from eastern Oregon eastward, through Montana and Wyoming, to the Dakotas. In Washington, it occurs in Kittitas, Yakima, Grant, and Benton counties in the Columbia Basin physiographic province.	G5/S2	Nine populations, occupying approximately 1,737 acres are known to occur in the region.	Primary threats to caespitose evening-primrose include habitat disturbance by grazing, road construction and maintenance, land conversion and mineral extraction. The occurrences in Washington are located in areas that have undergone, or are undergoing, natural and human-caused disturbances and in areas with no evidence of disturbance. The degree to which it may require some level of disturbance is unclear.	Talus slopes, road cuts and dry hills; as well as along the flat river terrace of the Columbia River; associated with sagebrush (*Artemisia tridentata* or *Artemisia rigida*); 400-1,200 feet.	June to August	NNR-6, NNR-7, NNR-8	
Columbia milkvetch	*Astragalus columbianus*	SOC, BLM-S, WS	Restricted to an area approximately 25 miles by 5 miles along the west side of the Columbia River in Yakima, Kittitas, and Benton counties, Washington.	G3/S3	Nineteen populations occupying approximately 34,579 acres are known to occur within the region.	Primary threats are the continued degradation of habitat by military training activities and livestock grazing and increased competition by exotic invasive species. Orchard development has also resulted in recent losses of habitat and populations. Columbia milkvetch increases in numbers following low intensity fires. Erosion events, such as along dirt roads, can also create suitable habitat for colonization; however, it does not use these disturbed habitats to expand its range.	Dry often sandy places with sparse vegetation usually on slopes but sometimes on flats; associated with shrub-steppe vegetation zone; 500-2,100 feet.	March to May	NNR-7, NNR-8	
Coyote tobacco	*Nicotiana attenuata*	BLM-S, WS	Southern B.C. and northern Idaho and Montana to Baja CA, New Mexico and northwest Mexico, east of the Cascades. In Washington, it is known to occur in Douglas, Grant, Kittitas, Klickitat, and Yakima counties. Historic sites are known from Chelan and Franklin counties.	G4/S2	Thirteen populations occupying approximately 1,794 acres are known to occur within the region.	Threats to coyote tobacco include invasive plants and activities leading to increased erosion, including livestock grazing, agriculture, military training activities, OHV use, herbicides and road maintenance.	Dry, sandy bottom lands, dry rocky washes and in other dry open places; 400-10,000 feet.	June to August	NNR-6	
Dwarf evening-primrose	*Camissonia pygmaea*	BLM-S, WS	Regional endemic known from eastern Washington (Benton, Douglas, Franklin, Grant, and Kittitas counties), eastern Oregon (Gilliam, Grant, Harney, and Wheeler counties) and Idaho (Jerome County).	G3/S3	Nineteen populations occupying approximately 6,564 acres are known to occur within the region.	Primary threats to dwarf evening-primrose include resource extraction (gravel pits), road construction and herbicide drift. Invasion by non-native weedy species will likely pose a threat in the future. Illegal OHV use, and off-site irrigation. Dwarf evening-primrose occurs in habitats that are maintained in an open condition by erosion and the generally harsh environment. Due to the unstable nature of the habitat and the annual life cycle, it is likely that the number, size and location of the populations vary from year to year.	Sagebrush and lower foothills; unstable soil or gravel in steep talus slopes, dry washes, banks and roadcuts; growing with big sagebrush and wild buckwheat.	May to July	NNR-7, NNR-8	
Geyer's milk-vetch	*Astragalus geyeri*	BLM-S, WT	Geyer's milk-vetch is known from southeast Oregon to California and Nevada and eastward through southern Idaho to Wyoming and Utah and Grant County, Washington.	G4/S1	Eight populations occupying approximately 1,689 acres are known to occur within the region.	Primary threats include agricultural conversion, OHVs, and grazing.	Arid sandy soils, flat to dunes; sandy desert, especially on dunes; 630-670 feet.	April to July	NNR-8	

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL INFORMATION[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	ROUTE SEGMENT(S) LOCATED WITHIN ONE MILE OF KNOWN OCCURRENCE	DOCUMENTED DURING PLANT SURVEY (ROUTE SEGMENT)
Gray cryptantha	*Cryptantha leucophaea*	SOC, BLM-S, WS	Gray cryptantha is a regional endemic in the Columbia and Lower Yakima Rivers in the Western Columbia Basin. It occurs from Wenatchee, Washington to The Dalles, Oregon. In Washington, it is currently known from Benton, Franklin, Grant, Kittitas, Walla Walla, and Yakima counties and historically Douglas County.	G2G3/S2S3	Thirty-three populations occupying approximately 16,169 acres are known to occur within the region.	Primary threats include OHV use and increased weed invasions. Changes in sand deposition and agricultural conversion also pose threats. Gray cryptantha restricted primarily to sand dunes that are not completely stabilized (i.e., areas where there is still some movement of sand).	Dry, often sandy places; with sparse vegetation, usually on slopes but sometimes on flats; near the Columbia and lower Yakima rivers; 300-2,500 feet.	April to May	NNR-7, NNR-8	
Great Basin gilia	*Aliciella leptomeria*	WT	Great Basin gilia is distributed throughout the Great Basin from California to Washington, Idaho, New Mexico, and Colorado. In Washington, the documented occurrences in Grant, Benton and Franklin counties are several hundred miles north of previously known ranges.	G5/S1	Eight populations occupying approximately 1,320 acres are known to occur within the region.	Several of the known populations are within portions of the Hanford Reach National Monument are open to the public and could be affected by recreational use. Great Basin gilia populations are also vulnerable to ground disturbance and weedy species.	Open sandy or rocky areas; dry open places at low elevations, especially in sandy or sandy soil, gravelly bluffs and on caliche; associated with sagebrush steppe; 470-6,890 feet.	Mid May to June	NNR-8	
Hedgehog cactus	*Pediocactus simpsonii var. robustior*	BLM-S, WS	Hedgehog cactus ranges from eastern Washington to Nevada. In Washington, it has been found in Yakima, Kittitas, Chelan, Douglas, and Grant counties.	G4/S2	Fourteen populations occupying approximately 11,895 acres are known to occur within the region.	The primary threat to hedgehog cactus is collecting by cactus collectors.	Thin, rocky soil on ridge tops, desert valleys and low mountains; found at elevations from 1,000 to 4,000 feet in Washington; associated with scabland sagebrush (*Artemisia rigida*).	May to August	NNR-3	NNR-3
Hoover's desert-parsley	*Lomatium tuberosum*	SOC, BLM-S, WS	Hoover's desert-parsley is endemic to Washington and is known only from Yakima County and adjacent portions of Benton, Grant, and Kittitas counties.	G2G3/S2S3	Twenty two populations occupying approximately 13,210 acres are known to occur within the region.	Primary threats include gravel extraction, road construction, military training activities, and grazing. Herbicide drift from nearby agricultural lands and noxious weed establishment may also pose threats. The environment of Hoover's desert-parsley is quite harsh (hot, dry, and rocky), loose, and unstable. These factors tend to eliminate most of the competition from other vegetation.	Loose rocky slopes and basalt drainage channels; rocky hillsides; 600-2,300 feet.	March to May	NNR-2, NNR-3	NNR-3
Hoover's tauschia	*Tauschia hooveri*	SOC, BLM-S, WT	Hoover's tauschia is a regional endemic, extending from Toppenish Ridge in south central Yakima County, northward to the southeastern foothills of the Wenatchee Mountains in east-central Kittitas County.	G2/S2	Twenty-eight populations occupying approximately 13,911 acres are known to occur within the region.	Orchard expansion and housing development may result in some degradation or loss of habitat. Herbicide spray drift may affect some populations. Grazing, OHV use, and road construction are also potential threats. The Hoover's tauschia sites generally do not have enough vegetation present to carry a fire.	Sagebrush scablands, often barren rocky clay.	March to May	NNR-3	

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL INFORMATION[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	ROUTE SEGMENT(S) LOCATED WITHIN ONE MILE OF KNOWN OCCURRENCE	DOCUMENTED DURING PLANT SURVEY (ROUTE SEGMENT)
Longsepal globemallow	*Iliamna longisepala*	BLM-S, WS	Longsepal globemallow is a regional endemic of central Washington. It is known to occur only in Kittitas, Chelan, and Douglas Counties.	G3/S3	Forty-five populations occupying approximately 15,482 acres are known to occur within the region.	The primary threat is fire suppression. Additional threats include road construction and maintenance, logging, OHV use, recreation, grazing, and introduction of nonnative species.	Dry open hillsides and gravelly streamsides of sagebrush and open ponderosa pine forests; lower levels on the east side of the Cascade Mountains; 500-4,500 feet	June to September	NNR-6	
Miner's candle	*Cryptantha scoparia*	BLM-S, WS	Miner's candle is found in Washington, Oregon, California, Idaho, Nevada, Montana, Wyoming, Utah, and Colorado. In Washington, it is known to occur in Benton, Yakima, Grant, and Kittitas counties.	G4?/S1	Four populations occupying approximately 401 acres are known to occur within the region.	Threats to this species include grazing, OHV use, development, and possible competition with exotic plants.	Dry, open slopes and flats, commonly among sagebrush; gravel bars and alluvial slopes and thin gravelly soil over basalt; 1,200-1,280 feet.	May to June	NNR-7	
Naked-stemmed evening-primrose	*Camissonia scapoidea ssp. scapoidea*	BLM-S, WS	Naked-stemmed evening-primrose occurs from eastern Oregon and Washington through southern Idaho to Wyoming, south to Colorado. In Washington, it is known only from Kittitas County.	G5/S1	Two populations occupying approximately 229 acres are known to occur within the region.	Primary threats include gravel extraction, invasion by weedy species, and military training activities. Naked-stemmed evening-primrose is apparently adapted to some disturbance since it occurs on a sandy unstable substrate.	Mostly in the sagebrush desert; especially on rocky or sandy soil; 600-900 feet.	May to July	NNR-7, NNR-8	
Pauper milkvetch	*Astragalus misellus var. pauper*	BLM-S, WS	Pauper milkvetch is endemic to eastern Washington. It is known to occur in Klickitat, Yakima, Kittitas, and Douglas Counties, with historical records also from Benton and Franklin Counties.	G4T3/S3	Eleven populations occupying approximately 11,491 acres are known to occur within the region.	The primary threats to Pauper milkvetch are from soil disturbing activities such as grazing, road construction, and military training.	Sagebrush steppe, often in low sage open areas; open ridgetops and upper slopes and rarely middle and lower slopes; 500-3,000 feet.	April to June	NNR-2, NNR-3	NNR-3
Suksdorf's monkeyflower	*Mimulus suksdorfii*	BLM-S, WS	Suksdorf's monkeyflower ranges from California to Washington, Montana, Wyoming, Colorado, and Arizona. In Washington, it occurs in Benton, Chelan, Grant, Kittitas, Klickitat, and Yakima counties.	G4/S2	Twenty-five populations occupying approximately 8,776 acres are known to occur within the region.	Degradation of habitat by livestock, agriculture, and military training activities.	Open, moist, or rather dry places, from the valleys and foothills to rather high elevations in the mountains; associated with sagebrush steppe.	May to August	NNR-6, NNR-7	
Weakstem cryptantha*	*Cryptantha flaccida (formerly C. rostellata)*	BLM-S, WT	Weakstem cryptantha is known from central Washington south to central California. In Washington, it is known to occur in Kittitas, Grant, Klickitat, Garfield, and Asotin Counties, with historical records also from Yakima and Walla Walla Counties.	G4/S2	Six populations occupying approximately 816 acres are known to occur within the region.	Primary threats include grazing, erosion and invasion of habitat by exotic species.	Dry, open places at elevations from 600-2,900 feet. Most locations are within big sagebrush/bluebunch wheatgrass habitat types.	April to June	NNR-6, NNR-7	
White eatonella	*Eatonella nivea*	BLM-S, WT	White eatonella is known from the Great Basin, southeast Oregon, western Nevada, and Washington. In Washington, it occurs in Grant and Kittitas counties.	G4G5/S1	Seven populations occupying approximately 853 acres are known to occur within the region.	Primary threats include trampling and disturbance to the substrate by domestic livestock, gravel extraction, disturbance from recreationalists (rock climbers, bicyclers, and OHV uses), disturbance from activities associated with military training, and invasion by exotic species. Its habitat appears to suggest that it is a poor competitor with other vegetation.	Dry, sandy desert or volcanic areas; populations are on bare soil in sparsely vegetated sagebrush steppe, associated with other annuals.	April to May	NNR-7, NNR-8	

Sources: BLM 2012, USFWS 2010a, Hitchcock et al. 1969, Hitchcock and Cronquist 1973, WNHP and BLM 2005, WNHP 2013, WNHP 2012a,b,c, and Camp and Gamon 2011. [1]Key: SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; BLM-STR – BLM Washington Strategic; WE – Washington State Endangered; WT – Washington State Threatened; WC – Washington State Candidate, WS – Washington State Sensitive; WR – Washington State Rare; WM – Washington State Monitor; WR1 – Washington State review group 1; and WX – Washington State possibly extinct or extirpated.

[2]NatureServe Rankings: G1-critically imperiled; G2-imperiled; G3-vulnerable; G4-apparently secure; G5-secure; S1- critically imperiled; S2-imperiled; S3-vulnerable. *Weakstem cryptantha information presented is based on data compiled for *C. rostellata*. .[3]Region is defined as the Yakima and Upper Columbia River Basins watersheds were used to provide regional context information for special status plants

As not all land within the 150-foot ROW corridor was surveyed, additional special status species and populations could occur within the Project area. For each route segment, potential habitat for special status plants was estimated using documented vegetation cover types and desktop data interpretation for areas not surveyed. Data sources for aerial interpretation included 2001 JBLM YTC vegetation data (JBLM YTC 2002), GAP data, and fire history data. Based on the habitat requirements of special status plants that occur or have the potential to occur within the ROW, estimated potential habitat was further categorized as suitable, marginal, and unsuitable. Unsuitable habitat included: agricultural land; developed, road, or firebreak; irrigation canal; open water; and watered poplar (tree cover type). Marginal habitat included: annual grassland, perennial grassland, rabbitbrush/annual grassland, and sagebrush annual grassland. Suitable habitat included: basalt cliff/rock, sagebrush/perennial grassland, aspen, intermittent stream, or dry gully and riparian. Table 3.2-6 presents a summary of habitat suitability by route segment.

TABLE 3.2-6 SPECIAL STATUS PLANT SPECIES LOCATIONS AND HABITAT SUITABILITY BY ROUTE SEGMENT

ROUTE SEGMENT	SPECIAL STATUS PLANTS THAT OCCUR OR HAVE THE POTENTIAL TO OCCUR WITHIN THE ROW[1]	HABITAT SUITABILITY[2] (ACRES)		
		SUITABLE HABITAT	MARGINAL HABITAT	UNSUITABLE HABITAT
NNR-1	None	8.4 acres—predominately sagebrush/perennial grassland, with some intermittent stream/dry gully	18.8	16.3
NNR-2	None	20.0 acres—predominately sagebrush/perennial grassland, with one small wetland	30.4	40.6
NNR-3	Pauper milkvetch, basalt daisy, Hoover's desert-parsley, hedgehog cactus and Hoover's tauschia	103.8 acres—predominately sagebrush/perennial grassland, followed by basalt cliff/rock, intermittent stream/dry gully and wetland/riparian	63.5	1.3
NNR-4	None	39.2 acres—predominately sagebrush/perennial grassland, followed by bitterbrush/perennial grassland and intermittent stream/dry gully	27.9	12.9
NNR-5	None	29.8 acres—predominately sagebrush/perennial grassland, with some intermittent stream/dry gully	0.0	2.6
NNR-6	Suksdorf's monkeyflower	95.3 acres—sagebrush/perennial grassland	7.2	0.0
NNR-7	Caespitose evening-primrose, Dwarf evening-primrose, bristle-flowered collomia, gray cryptantha, weakstem cryptantha, miner's' candle and Suksdorf's monkeyflower	149.5 acres—sagebrush/perennial grassland	0.0	0.1
NNR-8	Columbian milkvetch, dwarf evening-primrose, gray cryptantha and annual sandwort	26.1 acres—predominately sagebrush/perennial grassland, with some wetland/riparian and basalt cliff	13.8	10.1
MR-1	None	79.2 acres—sagebrush/perennial grassland	88.6	47.7

[1]Hedgehog cactus, Hoover's desert-parsley and Pauper milkvetch were identified during the special status species survey. As a portion of Route Segments NNR-6 and NNR-7 and the majority of Route Segment MR-1 were not surveyed because of route adjustments that were made following completion of the surveys, WNHP data and survey data were used to identify special status species polygons that overlap the ROW. WNHP species data include buffers and species may not be present within the ROW.
[2]Unsuitable habitat included: agricultural land; developed, road, or firebreak; irrigation canal; noxious weeds; open water; turfgrass; and watered poplar/ornamental tree. Marginal habitat included: annual grassland; perennial grassland; rabbitbrush/annual grassland; and sagebrush annual grassland. Suitable habitat included: basalt cliff/rock; bitterbrush/perennial grassland; sagebrush/perennial grassland; aspen; intermittent stream or dry gully; and riparian/wetland. Refer to Table 3.2-5 for a detailed description of habitat requirement for each special status species.

Annual Sandwort

Annual sandwort is a Washington State Review Group 1 species. It is known to occur from British Columbia south to California, Nevada and Arizona. In Washington, it has been documented in Grant, Chelan, Whitman, Spokane, Walla Walla, and Klickitat Counties. With the region, one population occupying approximately 23 acres is known to occur. The primary threat to annual sandwort is from off-highway vehicles (OHVs).

WNHP data indicates that annual sandwort intersects Route Segment NNR-8 for approximately 0.3 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor.

Basalt Daisy

Basalt daisy is a federal Species of Concern (SOC), BLM Sensitive, and Washington Threatened species. It is endemic to Washington and occurs exclusively in a small area (approximately 33 square miles) along the Yakima River and Selah Creek Canyons. The Project area is adjacent to the Selah Cliffs Natural Area Preserve, which was established in 1993 to protect basalt daisy (DNR 2014). Five populations occupying approximately 1,369 acres are known to occur in Washington. Primary threats to basalt daisy include basalt mining, railroad and highway maintenance and construction, and herbicide spray drift from nearby agricultural fields (WNHP and BLM 2005; Camp and Gamon 2011).

Within the proposed Project area, basalt daisy is known to occur where Route Segment NNR-3 crosses Selah Creek Canyon (for approximately 0.7 mile). This species was not documented during the special status plant surveys; however, the steep canyon wall above Selah Creek was not surveyed due to safety and access limitations.

Bristle-flowered Collomia

Bristle-flowered collomia is a BLM Sensitive and a Washington Sensitive species. This species is distributed from north-central Oregon into central Washington. In Washington, it is known to occur in Kittitas and Yakima Counties. Within the region, nine populations occupying 869 acres are known to occur. Primary threats to bristle-flowered collomia are habitat loss through non-native plant invasion, grazing, OHV use, and military training (WNHP and BLM 2005).

WNHP data indicates that bristle-flowered collomia intersects Route Segment NNR-7 for approximately 0.2 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. As this entire route segment was not surveyed due to route adjustments made following the special status plant survey, this species could have the potential to occur within the ROW.

Caespitose Evening-Primrose

Caespitose evening-primrose is a BLM Sensitive, and Washington Sensitive species. This species is known from eastern Oregon eastward, through Montana and Wyoming to the Dakotas. In Washington it occurs in Kittitas, Yakima, Grant, and Benton Counties. Within the region, nine populations occupying approximately 1,737 acres are known to occur. Primary threats to caespitose evening-primrose include habitat disturbance through grazing, road construction and maintenance, land conversion, and mineral extraction (WNHP and BLM 2005).

WNHP data indicates that caespitose evening-primrose is known to occur within the Project area; less than one mile from Route Segment NNR-6. As this entire route segment was not surveyed due to route adjustments made following the special status plant survey, this species could have the potential to occur within the ROW.

Columbia Milkvetch

Columbia milkvetch is a federal SOC, BLM Sensitive, and a Washington Sensitive species. Columbia milkvetch is restricted to an area approximately 25 miles by 5.0 miles along the west side of the Columbia River in Yakima, Kittitas, and Benton counties. In the region, nineteen populations are known to occur on approximately 34,579 acres. Primary threats to this species are the continued degradation of habitat by military training activities and livestock grazing, increase competition by exotic invasive species, and loss of habitat by orchard development (WNHP and BLM 2005).

WNHP data indicates that Columbia milkvetch is known to occur within the Project area; less than one mile from Route Segment NNR-7. As the entire ROW was not surveyed, Columbia milkvetch could be present.

Dwarf Evening-Primrose

Dwarf evening-primrose is a BLM Sensitive and Washington Sensitive species. It is a regional endemic known from eastern Washington, eastern Oregon, and Idaho. In Washington, it is known to occur in Benton, Douglas, Franklin, Grant, and Kittitas Counties. Within the region, nineteen populations are known to occur occupying 6,564 acres. Primary threats to dwarf evening-primrose include resource extraction, road construction, herbicide drift, and invasion of non-native species (WNHP and BLM 2005; Camp and Gamon 2011).

WNHP data indicates that dwarf evening-primrose intersects Route Segment NNR-7 for approximately 0.4 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. As the entire ROW was not surveyed, dwarf evening-primrose could be present.

Gray Cryptantha

Gray cryptantha is a federal SOC, BLM Sensitive, and Washington Sensitive species. It is endemic to the Columbia and Lower Yakima Rivers in Washington and Oregon. In Washington, it is known to occur in Benton, Franklin, Grant, Kittitas, Walla Walla, and Yakima Counties. Thirty-three populations occupying 16,169 acres are known to occur. Primary threats to gray cryptantha include OHV use, and competition from invasive and noxious weeds (WNHP and BLM 2005; Camp and Gamon 2011).

WHNP data indicates that gray cryptantha intersects Route Segment NNR-7 for approximately 0.4 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor.

Hedgehog Cactus

Hedgehog cactus is a BLM Sensitive and Washington Sensitive Species. This species ranges from eastern Washington to Nevada, and has been found in Yakima, Kittitas, Chelan, Douglas, and Grant counties in Washington. In Washington, hedgehog cactus is found in thin, rocky soil on ridge tops, desert valleys, and low mountains at elevations from 1,000 to 4,000 feet. This species is often associated with scabland sagebrush. The greatest threat to hedgehog cactus is from cactus collectors (WNHP and BLM 2005).

WNHP records indicate that two occurrences of hedgehog cactus have been documented within the Project area; less than one mile from Route Segment NNR-3 (Table 3.2-5). One occurrence of hedgehog cactus was documented during the special status plant survey within the ROW of Route Segment NNR-3 (Table 3.2-5). This occurrence consisted of 34 individuals scattered across 4.6 acres, of which 0.9 acre is located within the ROW. Current threats to this occurrence of hedgehog cactus include development, invasive and exotic species, and competition from cheatgrass.

Hoover’s Desert-Parsley

Hoover’s desert-parsley is a federal SOC, BLM Sensitive Species, and a Washington State Sensitive Species. This species is known to occur only in Washington, with 22 populations occurring in Yakima County and adjacent portions of Benton, Grant, and Kittitas Counties. Habitat for Hoover’s desert-parsley consists of loose rocky slopes and basalt drainage channels at elevations from 600 to 2,300 feet. The greatest threats to Hoover’s desert-parsley include gravel extraction, road construction, military training activities and grazing (Camp and Gamon 2011).

WNHP records indicate that seven occurrences of Hoover’s desert-parsley have been documented within the Project area; less than one mile from Route Segments NNR-2 and NNR-3 (Table 3.2-5). One occurrence of Hoover’s desert-parsley was documented during the special status plant survey along Route Segment NNR-3 (Table 3.2-5). This occurrence consisted of approximately 21 individuals scattered across 0.2 acre of a basalt flow. WNHP data indicates that occurrences of Hoover’s desert parsley intersect Route Segment NNR-3 for approximately 1.2 miles; however, these locations include large buffers, so it is uncertain whether additional occurrences intersect the ROW corridor. Current threats to this occurrence of Hoover’s desert-parsley include development and invasive and exotic species (e.g., cheatgrass).

Hoover’s Tauschia

Hoover’s tauschia is a federal SOC, BLM Sensitive, and Washington Sensitive species. Hoover’s tauschia is regionally endemic extending from south-central Yakima County to east-central Kittitas County (WNHP and BLM 2005). Within the region, 28 populations occupying approximately 13,911 acres are known to occur. Potential threats to Hoover’s tauschia include loss and degradation of habitat through orchard expansion and housing, grazing, OHV use, and road construction. Fire is typically not a threat because Hoover’s tauschia sites generally do not have enough vegetation present to carry a fire (WNHP and BLM 2005).

WNHP data indicates that Hoover’s tauschia intersects Route Segment NNR-3 for approximately 0.4 mile. These locations include large buffers; therefore, it is uncertain whether this occurrence intersects the ROW corridor.

Miner’s Candle

Miner’s candle is a BLM Sensitive and Washington Sensitive species. It is found in Washington, Oregon, California, Idaho, Nevada, Montana, and Wyoming. Within Washington, it is known to occur in Benton, Grant, Kittitas, and Yakima Counties. Four populations are known to occur within the region, occupying approximately 401 acres. Threats to this species include grazing, OHV use, development, and competition with non-native plants (WNHP and BLM 2005; Camp and Gamon 2011).

WNHP data indicates that Miner's candle intersects Route Segment NNR-7 for approximately 0.5 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. As the entire ROW was not surveyed, miner's candle could be present.

Pauper Milkvetch

Pauper milkvetch is a BLM Sensitive Species and a Washington State Sensitive Species. This species is found only within Washington, with known occurrences in Klickitat, Yakima, Kittitas and Douglas Counties and historical records from Benton and Franklin Counties. Habitat for pauper milkvetch consists of sagebrush steppe, often in low sage open areas, open ridgetops and upper slopes. It occurs at elevations from 500 to 3,000 feet. The greatest threats to pauper milkvetch are from soil disturbing activities such as grazing, road construction and military training (Camp and Gamon 2011).

WNHP records indicate that two occurrences of pauper milkvetch have been documented within the Project area; less than one mile from Route Segments NNR-2 and NNR-3 (Table 3.2-5). One occurrence of pauper milkvetch was documented during the special status plant survey along Route Segment NNR-3 (Table 3.2-5). This occurrence consisted of approximately 1,800 individuals scattered across 34.6 acres, of which 12.6 acres is located within the ROW. Current threats to this occurrence of pauper milkvetch include current and future development and invasive and exotic species (e.g., cheatgrass, diffuse knapweed, and Russian knapweed).

Suksdorf's Monkeyflower

Suksdorf's monkeyflower is a BLM Sensitive and Washington Sensitive species. The distribution of Suksdorf's monkeyflower ranges from California to Washington, Montana, Wyoming, Colorado, and Arizona. In Washington, it is known to occur in Benton, Chelan, Grant, Kittitas, Klickitat, and Yakima Counties. Within the region, 25 populations occupying approximately 8,776 acres are known to occur. Potential threats to Suksdorf's monkeyflower include habitat degradation by livestock, agriculture and military training activities (Camp and Gamon 2011).

WNHP data indicates that Suksdorf's monkeyflower intersects Route Segment NNR-6 for 0.3 mile. These locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor.

Weakstem Cryptantha

Weakstem cryptantha is a BLM Sensitive and a Washington Threatened species. Weakstem cryptantha is known to occur in central Washington south to central California. In Washington, it is known to occur in Kittitas, Grant, Klickitat, Garfield, and Asotin Counties. Within the region, six populations occupying approximately 816 acres are known to occur. The primary threats to weakstem cryptantha include grazing, erosions, and habitat loss through the invasion of exotic plant species (Camp and Gamon 2011).

WNHP data indicates that weakstem cryptantha is known to occur within the Project area; less than one mile from Route Segment NNR-6. As this entire route segment was not surveyed, it is possible that weakstem cryptantha could occur within the ROW.

3.2.2.4 Priority Ecosystem

The WNHP identifies species and ecosystems that are priorities for conservations efforts. Priority species and ecosystems are those that are rare or have very limited distribution (WNHP 2009). The priority species and ecosystems are giving a priority rating of 1, 2, or 3. Priorities are based on how well each is represented within existing natural areas, rarity and degree of threat; with Priority 1 communities being the rarest and with the highest degree of threat (Washington Department of Natural Resources [DNR] 2011). The status of priority ecosystems with the potential to occur in the Project area were reviewed and documented during the field survey (WNHP 2009). Five priority ecosystems are present within five miles of Route Segments NNR-3, NNR-4, NNR-7, NNR-8 and MR-1 (Table 3.2-7).

TABLE 3.2-7 PRIORITY ECOSYSTEMS DOCUMENTED IN PROJECT AREA

PRIORITY ECOSYSTEM	ROUTE SEGMENT(S) LOCATED WITHIN 5 MILES	NUMBER OF OCCURRENCES	TOTAL ACRES PRESENT WITHIN 5 MILES OF ROUTE SEGMENT(S)	PRIORITY OF ECOSYSTEM		
				1	2	3
Antelope bitterbrush-Indian ricegrass (*Achnatherum hymenoides*)	NNR-7, NNR-8	1	8	X		
Big sagebrush-Bluebunch wheatgrass (*Artemisia tridentata-Pseudoroegneria spicata*)	MR-1, NNR-3, NNR-4	1	134			X
Big sagebrush-Idaho fescue (*Artemisia tridentata-Festuca idahoensis*)	MR-1	1	8			X
Intermountain Basins Active and Stabilized Dune	NNR-7, NNR-8	6	2,863	X		
Stiff sagebrush-Sandberg bluegrass (*Artemisia rigida-Poa secunda*)	MR-1	1	8			X

Source: WNHP 2013 and WNHP 2009. Priority 1 species/ecosystems are in danger of extinctions across their range. Priority 2 species/ecosystems may become endangered across their range and Priority 3 species/ecosystems are vulnerable and declining.

3.2.3 Current Management Considerations

Federal and state legislation applicable to vegetation resources in the Project area are described below.

Endangered Species Act
The ESA directs federal agencies to conserve Endangered and Threatened species and to ensure that actions authorized, funded, or carried out by the agency are not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated Critical Habitat.

BLM Special Status Species Management
BLM Manual 6840 – Special Status Species Management authorizes each BLM State Director to designate and protect Sensitive Species on lands managed by the BLM. This proposed Project must comply with BLM Manual 6840 which provides goals and objectives for the management of BLM Sensitive Species.

Executive Order 13112
Executive Order 13112 (Invasive Species) requires federal agencies address invasive species concerns and to not authorize or carry out new actions that would cause or promote the introduction of invasive species.

Federal Noxious Weed Act
The Federal Noxious Weed Act established a federal program to control and manage nonindigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.

Washington State Noxious Weed Laws
Chapter 17.10 Revised Code of Washington is the primary weed law for Washington. Its goal is to limit Washington's economic loss due to noxious weeds in and around agricultural and natural areas. This holds landowners, including state and county land agencies, responsible for controlling noxious weeds on their property. It also establishes a program for administering the noxious weed law, which is carried out by the Washington State Noxious Weed Control Board, Washington Department of Agriculture, and County and District Noxious Weed Control Boards.

Chapter 16-750 Washington Administrative Code (WAC) contains the Noxious Weed List, which is updated on an annual basis, definitions and descriptions.

Chapter 16-752 WAC contains a plant quarantine list that is maintained and regulated by the Washington State Department of Agriculture. This quarantine list contains ornamental plants that are or have the potential to become a noxious weed.

3.2.4 NNR Route Segment Specific Considerations

3.2.4.1 Route Segment NNR-1

Route Segment NNR-1 parallels Sage Trail Road and an existing distribution line. Vegetation within the two-mile wide Project area for Route Segment NNR-1 is comprised primarily of disturbed shrub-steppe dominated by annual grasses such as cheatgrass (3,286.1 acres, 67.5 percent) and shrub-steppe that has been converted to agriculture (560.2 acres, 11.5 percent; Table 3.2-1). Approximately 7.4 percent (358.4 acres) of Route Segment NNR-1 within the two-mile wide Project area consists of big sagebrush with an understory of native perennial bunchgrasses. Route Segment NNR-1 crosses a concrete-lined irrigation canal and several intermittent or ephemeral drainages with no riparian vegetation. Riparian vegetation is present along the Yakima River, west of the route segment.

No special status plants are known to occur within the Route Segment NNR-1 Project area and none were identified during the sensitive plant survey (Table 3.2-5). One hundred percent of federal lands (2.8 acres) within the Route Segment NNR-1 ROW were surveyed for special status plants; however, the majority of the Route Segment NNR-1 ROW is comprised of non-federal land (40.6 acres) and was not surveyed (Table 3.2-3). Approximately 8.4 acres of suitable habitat, 18.8 acres of marginal, and 16.3 acres of unsuitable habitat is present within this route segment’s ROW. No priority ecosystems are present within five miles of the Route Segment NNR-1 ROW.

Four noxious weed species were identified and mapped on federal and state land during the noxious weed survey and include: diffuse knapweed (*Centaurea diffusa*), Canada thistle (*Cirsium arvense*), Dalmatian toadflax (*Linaria dalmatica* ssp. *dalmatica*) and puncturevine (*Tribulus terrestris*). Approximately 3.9 acres of federal and state land within the Route Segment NNR-1 ROW are occupied by these four noxious weed species; however, burningbush and Russian thistle occurrences within the Route Segment NNR-1 ROW were not mapped because of their abundance and frequency of occurrence on federal land within the Route Segment NNR-1 ROW (Table 3.2-2; Appendix B-4 Noxious Weed Report).

3.2.4.2 Route Segment NNR-2

Route Segment NNR-2 parallels an existing JBLM YTC fire break road, existing roads and an existing transmission line (BPA Ellensburg-Moxee No.1 115 kV). The majority of the Route Segment NNR-2 Project area (two-mile wide corridor) is comprised of annual grasses (3,545.5 acres, 48.0 percent) and sagebrush/perennial grassland (1,793.0 acres, 24.3 percent; Table 3.2-1). Approximately 20 acres of rabbitbrush/annual grassland is present within one mile of Route Segment NNR-2, occurring along the JBLM YTC firebreak. The Project area for vegetation and special status plants encompasses land (e.g., agricultural land) that would not be crossed by the proposed ROW. Route Segment NNR-2 crosses an irrigation canal on JBLM YTC and several un-named intermittent or ephemeral drainages. This route segment also crosses one palustrine wetland bisected by JBLM YTC's 7th Avenue Road. This palustrine wetland is highly disturbed and contains two noxious weeds: purple loosestrife (*Lythrum salicaria*) and reed canarygrass (*Phalaris arundinacea*).

Three special status species, Basalt daisy, Hoover's desert parsley and Pauper milkvetch, are known to occur within the Route Segment NNR-2 Project area (Table 3.2-5). No special status species were identified during the special status plant surveys. Basalt daisy occurs in crevices in basalt cliffs on canyon walls and this occurrence is associated with the Selah Creek Canyon. Basalt daisy was not identified during the special status plant survey; however, as it occurs on steep canyon walls that were not surveyed, basalt daisy could occur with the Project area (Table 3.2-6). The majority of the Route Segment NNR-2 ROW is comprised of federal lands and state lands, with approximately 88.1 percent (79.7 acres) of this route segment surveyed for special status plants (Table 3.2-3). Approximately 20.0 acres of suitable habitat, 30.4 acres of marginal and 40.6 acres of unsuitable habitat is present within this route segment's ROW (Table 3.2-6). No priority ecosystems are present within five miles of Route Segment NNR-2.

Eight noxious weed species were identified and mapped on federal land within the Route Segment ROW during the noxious weed survey and include: Russian knapweed (*Acroptilon repens*), diffuse knapweed, Canada thistle, field bindweed (*Convolvulus arvensis*), horseweed (*Conyza canadensis*), Dalmatian toadflax, purple loosestrife and Reed canarygrass. Approximately 13.9 acres of federal and state land within the Route Segment NNR-2 ROW are documented as occupied by these eight noxious weed species. For two additional identified species (burningbush and Russian thistle), occurrences were not mapped because of their abundance and frequency of occurrence on federal land within the Route Segment NNR-2 ROW (Table 3.2-2; Appendix B-4 - Noxious Weed Report).

3.2.4.3 Route Segment NNR-3

Route Segment NNR-3 crosses Washington Department of Transportation (WSDOT), BLM, and private land. Approximately 0.9 mile would pass through the western edge of the BLM Yakima River Canyon Area of Critical Environmental Concern, which was designated for the preservation of basalt daisy and Hoover's desert parsley. Vegetation within the Route Segment NNR-3 Project area consists primarily of annual grasses (6,179.7 acres, 44.6 percent) and sagebrush with a perennial grass understory (6,912.0 acres, 49.9 percent; Table 3.2-1).

The ROW for Route Segment NNR-3 parallels a palustrine wetland. This wetland is an excavated pond associated with the eastbound Selah Creek Rest Area and contains no wetland vegetation. Route Segment NNR-3 ROW crosses several un-named intermittent or ephemeral drainages and three streams categorized as perennial: Burbank Creek, Lmuma Creek, and Selah Creek. Riparian vegetation is present along Burbank and Lmuma Creeks. Selah Creek contains perennial flow for much of the season (JBLM YTC 2002); however the reach of Selah Creek within the Route Segment NNR-3 Project area appears to be intermittent.

Five special status species (Basalt daisy, Hedgehog cactus, Hoover's desert parsley, Hoover's tauschia, and Pauper milkvetch) are known to occur within the Route Segment NNR-3 Project area (Table 3.2-5). Basalt daisy occurs in crevices in basalt cliffs on canyon walls and this occurrence is associated with the Selah Creek Canyon. Three special status plant species were identified during the plant surveys: hedgehog cactus, Hoover's desert-parsley and Pauper milkvetch. The hedgehog cactus occurrence consisted of approximately 34 individuals scattered across 4.6 acres, of which 0.9 acre is located within the proposed ROW. One occurrence of Hoover's desert parsley was documented for NNR-3 during the special status plant surveys of the proposed ROW. This occurrence consisted of approximately 21 individuals scattered across 0.2 acre of a basalt flow. The Pauper milkvetch occurrence consisted of approximately 1,800 individuals within 34.6 acres, of which 12.6 acres are located within the proposed ROW. Basalt daisy was not identified during the special status plant survey; however, as it occurs on steep canyon walls that were not surveyed, basalt daisy could occur with the Route Segment NNR-3 ROW. Hoover's tauschia was not documented during the special status plant surveys. WNHP data indicates that Hoover's tauschia intersects Route Segment NNR-3 for approximately 0.4 mile; however, these locations include large buffers, therefore, it is uncertain whether this occurrence intersects the ROW corridor. Forty-three percent of federal and state lands (23.4 acres of BLM-managed land and 10.2 acres of WSDOT land) within this route segment's ROW was surveyed for special status plants; however, the remainder of Route Segment NNR-3 is comprised of non-federal land (91.1 acres) and was not surveyed (Table 3.2-3). Approximately 103.8 acres of suitable habitat, 63.5 acres of marginal and 1.3 acres of unsuitable habitat is present within this route segment (Table 3.2-6). One priority ecosystem, big sagebrush-bluebunch wheatgrass, is present within five miles of Route Segment NNR-3 (Table 3.2-7).

Two noxious weed species were identified and mapped on federal and state land during the noxious weed survey and include: Russian knapweed and diffuse knapweed. Approximately 0.1 acre of federal and state land within the Route Segment NNR-3 ROW has these two noxious weed species present. For two additional species (burningbush and Russian thistle), occurrences were not mapped because of their abundance and frequency of occurrence on federal land within the Route Segment NNR-3 ROW (Table 3.2-2; Appendix B-4 - Noxious Weed Report).

3.2.4.4 Route Segment NNR-4

Route Segment NNR-4 is located on privately owned, JBLM YTC land, and WSDOT ROW. This route segment parallels the existing Pacific Power Pomona-Wanapum 230 kV transmission line and crosses through a JBLM YTC bivouac area that has been dissected by roads. The majority of vegetation within one mile of this route segment is comprised of sagebrush/perennial grassland (5,297.3 acres. 68 percent; Table 3.2-1). Approximately 17.3 percent of vegetation within the Route Segment NNR-4 Project area consists of annual grassland (1,346.3 acres).

The Route Segment NNR-4 ROW crosses several un-named intermittent or ephemeral drainages with little to no riparian vegetation present.

No special status plants are known to occur within of the Route Segment NNR-4 Project area and none were identified during the special status plant survey of the proposed ROW (Table 3.2-5). Forty-three percent of federal lands (26.3 acres) within this route segment were surveyed for special status plants; however, the remainder of Route Segment NNR-4's ROW is comprised of non-federal land (21.9 acres) and was not surveyed (Table 3.2-3). Approximately 39.2 acres of suitable habitat and 27.9 acres of marginal habitat and 12.9 acres of unsuitable habitat are present within this route segment's ROW (Table 3.2-6). One priority ecosystem, big sagebrush-bluebunch wheatgrass, is present within five miles of Route Segment NNR-4 (Table 3.2-7).

One noxious weed species, diffuse knapweed, was identified and mapped on federal and state land during the noxious weed survey. Diffuse knapweed occurs on approximately 11.8 acres of federal and state land within Route Segment NNR-4's ROW. Two additional species (burningbush and Russian thistle) occurrences were not mapped because of their abundance and frequency of occurrence on federal land within the Route Segment NNR-4 ROW (Table 3.2-2; Appendix B-4 - Noxious Weed Report).

3.2.4.5 Route Segment NNR-5

Route Segment NNR-5 is located at the southern end of Badger Pocket, within the JBLM YTC boundary. Vegetation within this short route segment's Project area consists of the following cover types: sagebrush/perennial grassland (2,852.2 acres, 67.0 percent), agriculture (833.4 acres, 19.6 percent), and forbs (486.9 acres, 11.4 percent; Table 3.2-1). Forbs are present within the Route Segment NNR-5 ROW, typically along or near the tops of ridges or hills and consist of narrowleaf mock goldenweed and thyme-leaf buckwheat with a perennial grass understory (JBLM YTC 2002). The Route Segment NNR-5 ROW crosses several intermittent or ephemeral drainages with no riparian vegetation present. This route segment also crosses Badger Creek, which is intermittent or ephemeral within the Project area and contains no riparian vegetation.

No special status plant species are known to occur within the Route Segment NNR-5 Project area and none were identified during the special status plant survey of the proposed ROW (Table 3.2-5). Approximately 91.5 percent (29.6 acres) of federal and state lands within this route segment's ROW were surveyed for special status plants (Table 3.2-3). Approximately 29.8 acres of suitable habitat, 0 acres of marginal habitat, and 2.6 acres of unsuitable habitat is present within this route segment's ROW (Table 3.2-6). No priority ecosystems are known to occur within five miles of Route Segment NNR-5.

Seven noxious weed species were identified and mapped on federal and state land during the noxious weed survey and include: hoary cress (*Cardaria draba*), spiny plumeless thistle (*Carduus acanthoides*), diffuse knapweed, Canada thistle, bull thistle (*Cirsium vulgare*), common St. Johnswort (*Hypericum perforatum*), and sulphur cinquefoil (*Potentilla recta*). Approximately 1.1 acres of federal and state land within Route Segment NNR-5's ROW has these seven noxious weed species present. Two additional species (burningbush and Russian thistle) occurrences were not mapped because of their abundance and frequency of occurrence on federal land within the Route Segment NNR-5 ROW (Table 3.2-2; Appendix B-4 - Noxious Weed Report).

3.2.4.6 Route Segment NNR-6

The Route Segment NNR-6 ROW parallels the existing Pacific Power Pomona-Wanapum 230 kV transmission line and is located entirely on JBLM-YTC. Vegetation within this route segment's Project area consists primarily of sagebrush/perennial grassland cover type (7,996.0 acres, 78.0 percent; Table 3.2-1). Within one mile of Route Segment NNR-6, forbs (e.g., narrowleaf mock goldenweed and thyme-leaf buckwheat) are also present on approximately 1,216.6 acres (11.9 percent).

The Route Segment NNR-6 ROW crosses several un-named intermittent or ephemeral drainages. A section of this route segment parallels Foster Creek and is within 0.4 mile at its closest location. The ROW for Route Segment NNR-6 also parallels Johnson Creek. At its nearest point, Johnson Creek lies approximately one mile south of Route Segment NNR-6. Both Foster and Johnson Creeks are perennial streams and contain forested riparian vegetation.

Five special status species are known to occur within the Route Segment NNR-6 Project area: caespitose evening-primrose, coyote tobacco, longsepal globemallow, weakstem cryptantha, and Suksdorf's monkeyflower (Table 3.2-5). No special status plant species were identified during the surveys of the proposed ROW. Route Segment NNR-6's ROW is comprised entirely of federal lands. Surveys were not conducted along the entire length of this route segment's ROW due to route adjustments made following the completion of plant surveys (Table 3.2-3). Approximately 95.3 acres of suitable habitat, 7.2 acres of marginal habitat, and 0 acres of unsuitable habitat is present within this route segment's ROW (Table 3.2-6). No priority ecosystems are known to occur within five miles of Route Segment NNR-6.

No noxious weeds are known to occur along Route Segment NNR-6's ROW; however, a portion of this route segment was not surveyed due to route adjustments made after noxious weed surveys occurred.

3.2.4.7 Route Segment NNR-7

Route Segment NNR-7 is located on the northeastern side of JBLM YTC and parallels the existing Pacific Power Pomona-Wanapum 230 kV transmission line. The majority of vegetation within this route segment's Project area consists of the sagebrush/perennial grassland cover type (11,945.9 acres, 95.4 percent; Table 3.2-1). The ROW for Route Segment NNR-7 crosses several un-named intermittent or ephemeral drainages. Route Segment NNR-7 also parallels Johnson Creek. At its nearest point, Johnson Creek lies approximately one half mile south of Route Segment NNR-7. Johnson Creek is perennial and contains forested riparian vegetation.

Ten special status species are known to occur within the Route Segment NNR-7 Project area: bristle-flowered collomia, caespitose evening-primrose, Columbia milkvetch, dwarf evening-primrose, gray cryptantha, miner's candle, naked-stemmed evening-primrose, Suksdorf's monkeyflower, weakstem cryptantha, and white eatonella; however, none were identified during the special status plant surveys of the proposed ROW(Table 3.2-5). Approximately 1.6 percent (2.4 acres) of federal and state lands within this route segment's ROW was surveyed for special status plants (Table 3.2-3). Approximately 149.5 acres of suitable habitat, 0 acres of marginal habitat, and 0.1 acre of unsuitable habitat is present within this route segment's ROW (Table 3.2-6). Two priority ecosystem types are located within five miles of Route Segment NNR-7: Antelope bitterbrush-Indian ricegrass and Intermountain Basins Active and Stabilized Dune (Table 3.2-7).

No noxious weeds are known to occur within the ROW for Route Segment NNR-7; however, a portion of this route segment was not surveyed due to route adjustments made after noxious weed surveys occurred.

3.2.4.8 Route Segment NNR-8

Route Segment NNR-8 starts on BLM managed land and crosses Bureau of Reclamation (Reclamation), Grant County PUD land, and WSDOT ROW. This short route segment crosses the Columbia River. Vegetation within one mile of this short route segment is comprised primarily of sagebrush/perennial grassland (4,454.9 acres, 83.6 percent; Table 3.2-1). A small amount (0.5 acre) of rabbitbrush/annual grassland is present within the Columbia River floodplain, within the Route Segment NNR-8 Project area. Some riparian vegetation is present along the margins of the Columbia River.

WNHP data indicates that annual sandwort, beaked spike-rush, bristle-flowered collomia, caespitose evening-primrose, Columbia milkvetch, dwarf evening-primrose, Geyer's milk-vetch, gray cryptantha, Great Basin gilia, naked-stemmed evening-primrose, and white eatonella are known to occur within the Route Segment NNR-8 Project area (Table 3.2-5). None of these species were identified in the special status plant survey. Ninety-three percent of federal and state lands (7.1 acres of BLM-managed land and 23.2 acres of Reclamation land) within this route segment's ROW were surveyed for special status plants; however, the remainder of Route Segment NNR-8 is comprised of non-federal land (17.4 acres) and was not surveyed (Table 3.2-3). Approximately 26.1 acres of suitable habitat, 13.8 acres of marginal habitat, and 10.1 acres of unsuitable habitat is present within this route segment's ROW (Table 3.2-6). Two priority ecosystem types are located within five miles of Route Segment NNR-8: Antelope bitterbrush-Indian ricegrass and Intermountain Basins Active and Stabilized Dune (Table 3.2-7).

Two noxious weed species, diffuse knapweed and field bindweed, were identified with the Route Segment NNR-8 ROW. Two additional species (Russian thistle and burningbush) occurrences were not mapped because of their abundance and frequency of occurrence on federal land within the Route Segment NNR-8 ROW. These two weed species comprise approximately 0.1 acre of the route segment's ROW (Table 3.2-2; Appendix B-4 - Noxious Weed Report).

3.2.4.9 Route Segment MR-1

Route Segment MR-1 crosses private, DNR and JBLM-YTC lands, and WSDOT ROW. Vegetation within one mile of this route segment is comprised of a mixture of sagebrush/perennial grassland (6,372.1 acres, 37.3 percent), agriculture (3,868.3 acres. 22.6 percent), and annual grassland (5,727.6 acres, 33.5 percent; Table 3.2-1). The Route Segment MR-1 ROW crosses several un-named intermittent and ephemeral drainages. This route segment ROW also crosses Scorpion Coulee Creek, which appears to be intermittent and contains little to no riparian vegetation.

No special status plants are known to occur within the Route Segment MR-1 Project area and none were identified during the special status plant surveys. Approximately 0.3% (0.4 acre) of federal and state lands within this route segment's ROW were surveyed for special status plants due to route adjustments and the identification of Route Segment MR-1 following completion of the plant surveys. An additional 63.6 acres is comprised of non-federal land and was not surveyed (Table 3.2-3). Approximately 79.2 acres of suitable habitat, 88.6 acres of marginal habitat and 47.7 acres of unsuitable habitat is present within this route segment's ROW (Table 3.2-6). Three priority ecosystem types are located within five miles of MR-1: big sagebrush-bluebunch wheatgrass, big sagebrush-Idaho fescue and stiff sagebrush-Sandberg bluegrass (Table 3.2-7).

As described above for special status plants, Route Segment MR-1 was identified as a subroute following the completion of noxious weed surveys and, as such, no noxious weed surveys have been conducted for this route segment's ROW.

3.3 WILDLIFE AND SPECIAL STATUS WILDLIFE SPECIES

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to wildlife and special status wildlife species along the NNR and Manastash Ridge (MR) subroute, including those raised during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

The proposed Project would cross known habitat for fish, wildlife, and special status animal species. Special status wildlife species include the following: those species listed under the Endangered Species Act (ESA) as endangered, threatened, proposed, or candidate species; BLM sensitive species; U.S. Fish and Wildlife Service (USFWS) species of concern; and Washington State listed threatened, endangered, or priority species. This section describes the wildlife species and associated wildlife habitat present in the Project area.

For the purposes of the analysis for special status animal species and habitat, the Project area was defined as a two-mile wide corridor, one mile from either side of alternative route segment centerlines; however, where appropriate, the Project area was expanded to address potential impacts to species based on known ranges and potential to occur within the Project area. The Project area was expanded to address impacts to sage-grouse based on input from Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) and USFWS. For sage-grouse, the analysis area is defined as an eight-mile wide corridor surrounding the NNR and MR Subroute: a four-mile buffer of the route centerline. The Project area included in the DEIS for sage-grouse consisted of a two-mile wide corridor. Please note that the buffer around each route segment overlaps with the adjacent route segments. This was done to allow for a discrete discussion of the affected environment and comparison of each route segment. As a result, the sum of the route segment analysis areas is greater than the overall route analysis area for each alternative.

Special status wildlife species that are either documented or have a reasonable likelihood to occur within the Project area are discussed below. Locations of special status species documented near the Project area by the Washington Department of Fish and Wildlife ([WDFW] 2013) are shown on the Sensitive Wildlife Resources Map in Appendix A.

3.3.1 Data Sources

The assessment of wildlife and special status wildlife species and habitat was conducted using species occurrence data obtained from the Washington Natural Heritage Program (WNHP), WDFW, JBLM YTC, and BLM; Project-specific field studies; planning documents; previously conducted studies; and resource management plans. Sources reviewed included:

- U.S. Department of the Army (Army), Final Environmental Impact Statement (EIS) for Fort Lewis Army Growth and Force Structure Realignment, July 2010.
- Hanford Reach National Monument Final Comprehensive Conservation Plan and EIS, August 2008 (USFWS 2008).
- JBLM YTC Cultural and Natural Resource Management Plan (RMP), January 2002.
- Spokane District RMP (1985) and Record of Decision (ROD) (1987) and the 1992 RMP Amendment (BLM 1992a) and ROD (BLM 1992b).
- Sage-Grouse Survey Reports (2010 and 2011) for the Proposed Vantage to Pomona 230 kilovolt (kV) Transmission Line Project (POWER Engineers, Inc. [POWER] 2011).

- Sage-Grouse Survey Report (2013) for the Proposed Vantage to Pomona 230 kV Transmission Line Project (Appendix B-1).
- Digital element occurrence records of current and historical rare and imperiled species were obtained from WNHP.
- Priority habitat and species (PHS) data were obtained from WDFW.
- Wildlife protection areas and sage-grouse data were obtained from JBLM YTC.
- BLM geographic information system data for area habitats and special status species observations.
- Sage-Grouse Habitat Assessment Reports (POWER 2011 and Appendix B-2).
- Washington Gap Analysis Program (GAP) data was obtained from the U.S. Geological Survey (USGS).

A comprehensive list of special status wildlife species with the potential to occur in the Project area was compiled utilizing occurrence data from BLM, JBLM YTC, WDFW and WNHP; the federal threatened and endangered species list for each county located within the Project area; State of Washington listed species; the BLM sensitive species list; and JBLM YTC sensitive species. The species list also included other sensitive species protected under the Bald and Golden Eagle Protection Act and/or Migratory Bird Treaty Act (MBTA) and game species which may occur within the area. Through habitat suitability assessments, evaluations of species range, known occurrences and discussion with BLM, JBLM YTC, and USFWS biologists this species list was refined to include 70 focal species. These species are discussed in Sections 3.3.3.2, Federally Threatened and Endangered Species, and 3.3.3.3, Species of Concern and State-Listed Species, and are presented in Tables 3.3-3 and 3.3-7.

3.3.2 Current Management Considerations

Federal and state statutes applicable to biological resources in the Project area are similar to those described for Vegetation and Special Status Plant Species (Section 3.2) with the additions described below.

Migratory Bird Treaty Act
The MBTA was enacted in 1918 in order to put an end to the commercial trade of migratory birds and their feathers. The act implements treaties and conventions between the U.S., Canada, Mexico, Japan, and the former Soviet Union for the protection of migratory birds. This Act decrees that all “migratory” birds and their parts (including eggs, nests, and feathers) are fully protected. Under this Act, it is unlawful to pursue, hunt, take, capture, kill, possess, offer to or sell, barter, purchase, deliver, transport, or receive any “migratory” birds (including parts, nests, eggs or other product, manufactured or not; USFWS 2011a). In practice, virtually all native bird species in the U.S. are protected under MBTA, with the exception of upland game birds (order Galliformes: e.g., grouse and quail); most bird species with non-migratory life-histories are protected under the act as well (USFWS 2013a). A complete list of protected species is available at http://www.fws.gov/migratorybirds/regulationspolicies/mbta/mbtandx.html. While the USFWS is the lead federal agency charged with protecting “migratory” birds within the U.S., under Executive Order 13186 all other federal agencies are charged with conserving and protecting “migratory” birds and the habitats on which they depend.

Executive Order 13186
Executive Order 13186 (January 10, 2001; Responsibilities of Federal Agencies to Protect Migratory Birds) directs federal agencies to take certain actions to further implement the MBTA. This includes developing and implementing a Memorandum of Understanding (MOU) with the USFWS promoting the conservation of migratory bird populations. A MOU between the BLM and USFWS has also been released that describes a collaborative approach to conserving bird populations (BLM and USFWS 2010).

The Bald and Golden Eagle Protection Act
The Bald and Golden Eagle Protection Act of 1940 provides for the protection of bald and golden eagles by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, and export or import of any bald or golden eagle, alive or dead, including any part, nest, or egg unless allowed by permit (16 United States Code [U.S.C.] §668 (a); 50 Code of Federal Regulations [CFR] Part 22.3; USFWS 2011a).

Sage-Grouse Management
An overview of the regulatory environment specifically related to sage-grouse in the Project area is summarized here and described in greater detail in Appendix B-5 - Sage-grouse Technical Report.

Federal Regulations and Policies
Sage-grouse are listed as Threatened by the state of Washington and are a BLM Sensitive species (Schroeder et al. 2003; Stinson et al. 2004). In 2001, USFWS determined that the western subspecies of sage-grouse (*Centrocercus urophasianus phaios*) met the requirements of a Distinct Population Segment (DPS); therefore, the USFWS is reanalyzing this designation since the eastern and western subspecies are no longer considered separate taxa. Petitions for listing sage-grouse range-wide were filed in 2002, 2003, and 2005. The USFWS concluded that listing sage-grouse was not warranted (USFWS 2005). In 2008, a status review was initiated by the USFWS to address new information that had become available since 2005 (USFWS 2008). Based on new information available, USFWS determined in March 2010 that the range-wide listing of sage-grouse under ESA was warranted, but the listing was precluded in order to complete higher priority listing actions. Range-wide the sage-grouse is considered a Candidate species under ESA (USFWS 2010a). The USFWS is scheduled to make a final listing determination (i.e., either listing sage-grouse as Threatened or Endangered or determining that it does not warrant listing) by 2015.

In 2013, the USFWS Conservation Objectives Team (COT) published the Greater Sage-grouse Conservation Objectives: Final Report (COT Report; USFWS 2013b). The COT Report provides guidelines and objectives for the conservation of sage-grouse. The main objective identified in the COT Report is to minimize habitat threats to the species so as to meet the objective of the 2006 Western Association of Fish and Wildlife Agencies' Greater Sage-Grouse Comprehensive Conservation Strategy to reverse negative population trends and achieve a neutral or positive population trend. A key component of the COT Report is the identification of Priority Areas of Conservation (PACs), which are considered key habitats essential for sage-grouse conservation. The COT Report identifies four PACs within the state of Washington, two of which have extant populations, Moses Coulee and Yakima Training Center, and two historic populations undergoing reintroduction efforts with translocated birds. With the exception of a portion of NNR-8, the Project is located entirely within the Yakima Training Center PAC (Figure 3.3-1 Sage-Grouse Priority Area for Conservation).

In addition to the COT Report, BLM's Washington, D.C. office (WO) has issued two recent Instruction Memoranda (IMs) for sage-grouse: WO IM 2012-043, Greater Sage-Grouse Interim Management Policies and Procedures (BLM 2011a); and WO IM 2012-044, BLM National Greater Sage-Grouse Land Use Planning Strategy (BLM 2011b). The Columbia Basin DPS of sage-grouse are addressed in other policies and planning efforts and are not covered by WO IM 2012-043. WO IM 2012-044 provides direction to the BLM for the consideration of conservation measures identified in two documents: A Report on National Greater Sage-Grouse Conservation Measures (Sage-Grouse National Technical Team 2011) and the National Greater Sage-Grouse Planning Strategy (BLM 2011c). The National Greater Sage-Grouse Planning Strategy excludes the Washington State DPS, stating that they will be addressed through other policies and planning efforts (BLM 2011c).

State Regulations and Policies

In 2004, the state of Washington published the Greater Sage-Grouse Recovery Plan (Recovery Plan) to summarize the current knowledge of sage-grouse in Washington and to outline strategies to increase population size and distribution. This Recovery Plan delineated distinctive regions in Washington, called management units (MUs), to focus recovery efforts in those areas most likely to contribute to reaching recovery objectives. Fourteen management units were delineated based on current occupancy, land ownership, location, topography, and habitat quantity, condition and potential (Stinson et al. 2004). The four MUs that would be crossed by the Project right-of-way (ROW) corridor include: Rattlesnake Hills, JBLM YTC, Umtanum Ridge and Saddle Mountains (see Figure 3.3-2). The eight-mile wide sage-grouse analysis area also encompasses land within the Potholes MU. The MUs are further designated as:

> *Regularly Occupied Habitat* - Regularly Occupied Habitat includes intact sagebrush communities known to be occupied by resident breeding populations of sage-grouse and are considered to be of highest conservation value. MUs within the eight-mile wide sage-grouse analysis area designated as Regularly Occupied Habitat are: JBLM YTC, Rattlesnake Hills and Umtanum Ridge.
>
> *Connectivity Habitat* - Connectivity Habitat includes movement corridors between seasonally used areas and between populations, and includes areas important for providing habitat connections. There are no MUs within the eight-mile wide sage-grouse analysis area designated as Connectivity Habitat. Colockum MU, designated as Connectivity Habitat, is located approximately five miles north of Route Segments NNR-4 and NNR-5.
>
> *Occasionally Occupied Habitat* - Occasionally Occupied Habitat includes habitat that may be occupied on a seasonal or irregular basis, but is not regularly occupied by sage-grouse. Within the eight-mile wide sage-grouse analysis area, Saddle Mountains MU is designated as Occasionally Occupied Habitat.
>
> *Expansion Habitat* - Expansion Habitat includes areas where expansion could occur through an improvement in habitat quality. The Potholes MU is within the eight-mile wide sage-grouse analysis area and has been designated as Expansion Habitat.

The Recovery Plan's goal is to establish a viable population of sage-grouse in a substantial portion of its historic range in Washington, with specific recovery objectives focusing on the breeding season population. The Recovery Plan states that recovering sage-grouse to a viable population will require an increase in population density, an expansion of occupied areas, and an improvement in habitat quality. Current and past management efforts focused on maintaining the existing populations and distributions of sage-grouse, while recovery efforts will focus on increasing the numbers and distribution of sage-grouse in Washington. Some of the designated MUs will require substantial restoration efforts to support breeding and wintering populations and may require coordinated efforts between public and private land managers to maintain and improve habitat (Stinson et al. 2004).

JBLM YTC Regulations and Policies

JBLM YTC has developed a Western Sage-Grouse Management Plan (Livingston 1998) that describes the current knowledge of and threats facing sage-grouse on the JBLM YTC. It outlines protection measures and procedures to be followed to ensure that the JBLM YTC sage-grouse population persists into the future. JBLM YTC has designated two sage-grouse protection zones: primary and secondary. The primary protection zone includes areas that are considered as essential sage-grouse habitat. Secondary protection zones provide indirect benefits to sage-grouse (JBLM YTC 2002). JBLM YTC began formal monitoring and research in 1989. Telemetry studies have been conducted and sage-grouse lek surveys are conducted on an annual basis. Refer to Appendix B-5 - Sage-grouse Technical Report for additional information JBLM YTC sage-grouse management and protection zones.

3.3.3 Current Conditions and Trends, Regional Overview

3.3.3.1 Species and Habitats - General

The vegetative communities associated with the Project area support a diversity of wildlife, including approximately 22 species of reptiles and amphibians, 174 species of birds, and 50 species of mammals (JBLM YTC 2002). General wildlife species and the four general habitat classifications are discussed below and presented in Tables 3.3-1 and 3.3-2. For detailed descriptions of land cover types and associated plant species, refer to Section 3.2 Vegetation and the Vegetation and Fire History Map in Appendix A.

The Project area lies within the Columbia Plateau ecoregion. The Columbia Plateau is an arid sagebrush (*Artemisia* spp.) steppe and grassland that is surrounded by ecoregions that are typically moister, forested, and mountainous (U.S. Environmental Protection Agency [USEPA] 2010). Before the arrival of Euro-American settlers in the early 1800s, approximately 15 million acres of steppe habitat existed in eastern Washington (Daubenmire 1970; Stinson et al. 2004). Currently, it is estimated that about 50 percent, approximately 7.4 million acres, remains in Washington. The majority of the shrub-steppe vegetation was lost to agricultural cropland; however, roads, residential and commercial development, and inundation by reservoirs have also contributed to the reduction in shrub-steppe habitat (Stinson et al. 2004).

Over half of the Project area is within the JBLM YTC, which lies within the largest remaining contiguous block of relatively intact shrub-steppe in the state of Washington (JBLM YTC 2002). Elevations along the proposed route range from approximately 500 to 3,350 feet above mean sea level. The most frequently occurring habitat types in the Project area include shrublands (47,981.8 acres; 57.6 percent), annual grasslands (20,314.0 acres; 24.4 percent) and agricultural/pastures (8,620.3 acres; 10.3 percent; Table 3.3-2). The Project area sagebrush-steppe habitat is mostly intact, but some fragmentation has occurred from the invasion of non-native plants, roads, residential development, livestock grazing, agricultural land use, and altered fire-regimes.

Very few wetlands and riparian areas occur within the Project area. The majority of riparian areas within the Project area are seasonally moist uplands. These drier riparian areas are typically vegetated with upland shrubs, including sagebrush. For more information on water resources in the Project area, refer to Section 3.14 - Water Resources, and the Water Resources and Wetlands Map in Appendix A.

TABLE 3.3-1 REPRESENTATIVE WILDLIFE SPECIES AND ASSOCIATED HABITAT TYPES PRESENT WITHIN THE PROJECT AREA

HABITAT TYPE			
SHRUB-STEPPE	GRASSLAND AND FORB	CLIFF	RIPARIAN, WETLAND, AND AQUATIC
Birds American goldfinch Brewer's sparrow California quail chukar common nighthawk ferruginous hawk golden eagle grasshopper sparrow lark sparrow lazuli bunting loggerhead shrike mourning dove prairie falcon ring-necked pheasant sage sparrow* sage thrasher* sage-grouse* Swainson's hawk vesper sparrow western kingbird	Birds Brewer's blackbird Brewer's sparrow burrowing owl common nighthawk horned lark lark sparrow loggerhead shrike long-billed curlew northern harrier vesper sparrow western meadowlark	Birds canyon wren rock wren chukar ferruginous hawk golden eagle great horned owl prairie falcon	Birds American crow American kestrel American robin bald eagle black-billed magpie brown-headed cowbird Bullock's oriole dusky flycatcher eastern kingbird great horned owl house wren lazuli bunting mourning dove northern flicker red-tailed hawk song sparrow violet-green swallow western wood peewee yellow warbler
Mammals badger bighorn sheep coyote deer mouse elk Merriam's shrew mule deer northern pocket gopher pronghorn* pygmy rabbit* sagebrush vole*	Mammals northern pocket gopher yellow-bellied marmot	Mammals big brown bat bighorn sheep bushy-tailed woodrat coyote fringed myotis little brown bat mule deer western small-footed bat yellow-bellied marmot	Mammals raccoons porcupine mink beaver montane voles
Reptiles and Amphibians pygmy short-horned lizard sagebrush lizard*	Reptiles and Amphibians racer	Reptiles and Amphibians gopher snake nights nake racer sagebrush lizard striped whipsnake western rattlesnake	Reptiles and Amphibians Pacific tree frog long-toed salamander painted turtle

*Denotes a sagebrush obligate species; this table is not intended to be a comprehensive list, but rather a representation of wildlife species associated with habitat types present in the Project area. Sources: Paige and Ritter 1999; Dobkin and Sauder 2004; Dobler et al. 1996; Rich et al. 2005; WDFW 2006a; JBLM YTC 2002; Knutson and Naef 1997; Thomas 1979; Grant 1997; and Swearingen 2009.

TABLE 3.3-2 SUMMARY OF DOMINANT LAND COVER TYPES (ACRES) WITHIN THE PROJECT AREA BY ROUTE SEGMENT

COVER TYPE	ACRES WITHIN PROJECT AREA (ONE MILE FROM EITHER SIDE OF ROUTE SEGMENT CENTERLINES)[1]								
	NNR- 1	NNR-2	NNR-3	NNR-4	NNR-5	NNR-6	NNR-7	NNR-8	MR-1
Shrub-Steppe Cover Types									
Bitterbrush/Perennial Grassland	0	0	0	3.5	3.5	0	0	0	3.5
Rabbitbrush/Annual Grassland	20.0	19.0	0	0	0	0	0.5	0.5	0
Sagebrush/Annual Grassland	0	15.8	40.4	34.8	0	3.2	0	2.0	24.3
Sagebrush/Perennial grassland	358.4	1,793.0	6,912.0	5,297.3	2,852.2	7,996.0	11,945.9	4,454.9	6,372.1
Grassland and Forb Cover Types									
Annual Grassland	3,286.1	3,545.5	6,179.7	1,346.3	19.8	13.8	0	195.2	5,727.6
Forb	0	0	0	215.4	486.9	1,216.6	58.2	0	130.8
Perennial Grassland	154.2	276.6	44.6	302.7	47.7	459.0	75.4	19.7	236.2
Cliff Cover Type									
Rock/Basalt Cliffs	0	3.7	7.6	0.7	0	0.3	0.2	0.2	0.7
Riparian, Wetland, and Aquatic Cover Types									
Intermittent Stream/Dry Gully	0.6	1.0	1.8	1.8	1.2	3.6	6.2	0.6	1.6
Open Water/Canal	460.0	0.3	0.2	0	0	0	409.5	647.5	0
Riparian/Wetland	12.5	0.6	57.7	0.1	0	20.7	4.8	0.4	0.1
Tree	0.5	3.1	0	0	0	0	0	0	0
Disturbed Cover Types									
Agriculture	560.2	1,639.3	602.7	579.5	833.4	536.9	0	0	3,868.3
Developed/Disturbed/Firebreak	18.5	81.9	5.8	8.2	11.2	3.0	24.5	7.5	722.4
Noxious Weeds	0	2.3	1.7	0	0	0	0	0	0
Total[1]	4,871.0	7,382.1	13,854.2	7,790.3	4,255.9	10,253.1	12,525.2	5,328.5	17,087.6

[1]Please note that each route segment's Project area (2-mile buffer around each route segment) overlaps with the adjacent route segments. This was done to allow for a discrete discussion of the affected environment and comparison of each route segment. Numbers are rounded and may not sum exactly. Refer to section 3.2 Vegetation for a discussion of each land cover type and the Vegetation and Fire History Map in Appendix A.

Shrub-Steppe

In the Project area, shrub-steppe habitat consists primarily of big sagebrush (*Artemisia tridentata*) and stiff sagebrush (*Artemisia rigida*). Stiff sagebrush typically occurs on rocky shallow soils with Sandberg's bluegrass (JBLM YTC 2002). Sagebrush shrublands with a perennial grass understory is the most common vegetation cover type within the Project area, covering 57.6 percent (47,981.8 acres) of the Project area. Sagebrush shrublands with an annual grass understory comprise 0.1 percent of the Project area (120.5 acres).

Shrub-steppe habitats are used by a diverse group of wildlife species. Some of these are sagebrush obligates (restricted to sagebrush habitats during the breeding season or year-round) or sagebrush dependent species (near-obligates; occurring in both sagebrush and grassland habitats). Sagebrush obligates include the sage sparrow, Brewer's sparrow (*Spizella breweri*), sage thrasher, sage-grouse, sagebrush vole (*Lemmiscus curtatus*), sagebrush lizard (*Sceloporus graciosus*), and pronghorn (*Antilocapra americana*; Paige and Ritter 1999). As these species breed only in shrub-steppe habitats, disturbance or conversion of shrub-steppe to agricultural or annual grasslands directly affects their distribution. Shrub-steppe habitats typically provide unobstructed views over large areas, creating ideal hunting conditions for some raptors. Raptors that breed and/or forage in shrub-steppe habitats include prairie falcon (*Falco mexicanus*), ferruginous hawk, Swainson's hawk (*Buteo swainsoni*), and golden eagle (*Aquila chrysaetos*; Dobkin and Sauder 2004; Dobler et al. 1996). Wildlife species commonly found in shrub-steppe habitat are presented in Table 3.3-1.

Annual and Perennial Grasslands

Annual grasslands in the Project area are typically dominated by annual grasses, such as cheatgrass (*Bromus tectorum*). Annual grasslands cover approximately 10 percent of the Project area (20,314 acres). Most native shrub-steppe birds either do not use cheatgrass or occur at lower densities where it is the predominant ground cover (Shaw et al. 1999). However, cheatgrass monocultures produce an open landscape that is used by wildlife species including the long-billed curlew and burrowing owl (*Athene cunicularia*; Rich et al. 2005).

Within the Project area, perennial grasslands are less common (1.9 percent; 1,616 acres) and are dominated by perennial bunchgrasses such as crested wheatgrass (*Agropyron cristatum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), needle and thread grass (*Hesperostipa comata*), squirreltail (*Elymus elymoides*) and Thurber's needlegrass (*Achnatherum thurberianum*). Many of the same species found in shrub-steppe habitats utilize perennial grasslands, including Brewer's sparrow, vesper sparrow, lark sparrow, loggerhead shrike, common nighthawk, and northern pocket gopher. Wildlife species commonly found in grasslands are presented in Table 3.3-1.

Rock/Basalt Cliffs

Rock talus and exposed rock habitats are important nesting and cover habitats for a variety of wildlife species. Rock/basalt cliffs occur on approximately 13.4 acres (less than 0.1 percent) within the Project area. Cliff and talus slope habitats support small amounts of vegetation, and provide shade, cover, nesting, and rearing sites. Cliffs are considered a priority habitat by the WDFW (2008). Many predators, such as coyotes are likely to forage in rock/talus habitats due to the occurrence of small mammals. Bighorn sheep and mule deer are also likely to use these habitats. Sagebrush lizard, western rattlesnake (*Crotalus viridis*), night snake, gopher snake (*Pituophis catenifer*), striped whipsnake, and racer (*Coluber constrictor*) are all associated with rocky areas (WDFW 2006a; JBLM YTC 2002). Wildlife species commonly found in basalt cliff habitat are presented in Table 3.3-1.

Riparian and Wetland Communities

Riparian and wetland communities comprise a small portion of the Project area, but these communities are characterized by higher productivity and greater habitat and species diversity compared to adjacent uplands (Knutson and Naef 1997). Riparian and wetland habitats are used by a variety of species including bald eagle, red-tailed hawk (Buteo jamaicensis), American kestrel (Falco sparverius), great horned owl, and song sparrow (Melospiza melodia). Wildlife species commonly found in riparian and wetland areas are presented in Table 3.3-1.

The majority of riparian areas within the Project area are seasonally moist uplands. These drier riparian areas are typically vegetated with upland shrubs, including sagebrush. A small wetland is present in the JBLM YTC Cantonment Area (Route Segment NNR-2). Burbank Creek (Route Segment NNR-3) and Foster Creek (NNR-6) support wooded riparian vegetation, primarily dominated by black cottonwood and willow. For more information on water resources and riparian and wetland vegetation, refer to Sections 3.14 Water Resources, 3.2 Vegetation, and Appendix A - Project Maps.

Existing Infrastructure and Disturbances

Within the Project area, sagebrush-steppe habitat has been fragmented by the invasion of non-native plants, roads, residential development, livestock grazing, agricultural land use, and altered fire-regimes. The proposed NNR Alternative closely parallels the existing Pacific Power Pomona-Wanapum 230 kV transmission line that primarily uses H-frame poles similar to the ones identified for the proposed Project. At the eastern end of the Project area (NNR-7 and NNR-8), one additional 230 kV transmission line (Puget Sound Energy Wanapum-Wind Ridge) and two 500 kV lines (Bonneville Power Administration [BPA] Schultz-Wautoma No.1 and BPA Vantage-Schultz No.1) exist within one mile of the proposed NNR Alternative. Other prominent infrastructure and disturbance within the Project area includes urban and suburban development, JBLM YTC facilities, bivouac areas and training activities, road networks (Interstate [I] 82, state and county highways, all-weather gravel access roads for military training, and numerous light-duty dirt roads), agricultural areas, communication towers, canals, and fire breaks. Generally speaking, infrastructure and disturbance is heaviest at the southwestern end of the NNR Alternative Project area (NNR-1 and NNR-2) and lightest along the north-central portion near Route Segment NNR-6. Locations of existing infrastructure and disturbance are discussed in Section 3.3.4 (Route Segment Considerations).

Wildfires have occurred within and near the eight-mile wide Project area, the majority of which were concentrated within the JBLM YTC boundary. Due to the type and intensity of military training that occurs at the JBLM YTC, the incidence and risk of fire is higher compared with adjacent lands and naturally occurring fire cycles. The incidence of fire ignition and spread at the JBLM YTC has been declining since 1996 due to improvements to their fire management policy, increased support and maintenance of firebreaks (JBLM YTC 2002).

Livestock grazing occurs outside of JBLM YTC on both public and private lands. In addition to grazing on private land, grazing leases are authorized on BLM land and Washington State Department of Natural Resources (DNR) state trust land. Livestock grazing, which decreases cover of native forbs and perennial bunchgrasses, ended on JBLM YTC land in 1995 (Livingston 1998). Spring and summer habitat suitability for sage-grouse depends on sufficient cover of forbs and bunchgrasses.

3.3.3.2 Federally Threatened, Endangered and Candidate Species

Seven species listed as endangered, threatened, or candidate occur, or are likely to occur, within the Project area (Table 3.3-3). More detail on these species is provided in the following sections.

Bull Trout

Bull trout was listed as a Threatened species under the ESA in June 1998 (USFWS 1998) and is a candidate for state listing by the WDFW (2013a). Critical habitat has been designated for bull trout, including the Yakima River and its tributaries and the mainstem of the Columbia River (USFWS 2010b). Bull trout have specific habitat requirements that influence their distribution and abundance, including water temperature, cover, channel form and stability, spawning and rearing substrate, and migratory corridors (WDFW 2000). They need cold water to survive, so they are seldom found in waters where temperatures exceed 59 to 64 degrees Fahrenheit (˚F). Within the middle Columbia River Bull trout also require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors (USFWS 2011b).

Historically, bull trout were found throughout the Pacific Northwest, Montana, Idaho, and northern California, as well as Nevada (Knowles and Gumtow 2005). Bull trout are known to occur within the reaches of the Yakima and Columbia Rivers that are located within the Project area. Within the Project area, aside from the Yakima and Columbia Rivers, only Johnson and Lmuma Creeks (tributaries of the Yakima River) are known to support fish populations; however, bull trout is not known to occur in either of those streams (AECOM Environmental 2010; JBLM YTC 2002). The results of a stream temperature monitoring study indicates that, within the Project area, Johnson, Lmuma, and Selah Creeks were potentially suitable for some use, but temperatures were generally much higher than the preferred spawning temperature. Bull trout are not known to spawn within JBLM YTC because the streams are too small and not cold enough over a long enough time period to provide suitable spawning and rearing habitat; however, bull trout could use streams for short periods for foraging (AECOM Environmental 2010). In addition, most streams in the Project area do not have continuous flow to either the Yakima or Columbia Rivers during the time in which bull trout would potentially be spawning or migrating to spawn. Bull trout in the Columbia River DPS enter tributary streams between from April to September and spawn from September to mid-October (WDFW 2000; BioAnalysts 2004; Whitesel et al. 2004). At the time bull trout enter tributary streams north of the Project area, temperatures in the Columbia River varied from 42 to 67 degrees Fahrenheit (˚F) and tributary mean daily temperatures ranged from 46 to 63˚F indicating that water temperatures did not appear to limit bull trout migration (BioAnalysts 2004).

TABLE 3.3-3 FEDERALLY LISTED SPECIES THAT OCCUR OR POTENTIALLY OCCUR WITHIN THE PROJECT AREA

SPECIES	STATUS[1]	OCCURRENCE[2]	ROUTE SEGMENTS[3]	Shrub Steppe Cover Types[4]				Grassland and Forb Cover Types			Cliff Cover Type	Riparian, Wetland, and Aquatic Cover Types				Disturbed Cover Types		
				Bitterbrush/Perennial Grassland	Rabbitbrush/Annual Grassland	Sagebrush/Annual Grassland	Sagebrush/Perennial Grassland	Annual Grassland	Forb	Perennial Grassland	Rock/Basalt Cliffs	Intermittent Stream/Dry Gully	Open Water/Canal	Riparian/Wetland	Tree	Agriculture	Developed/Disturbed/ Firebreak	Noxious Weeds
Bull trout *(Salvelinus confluentus)*	T, WC, CH	Present	NNR-1, NNR-3, NNR-4, NNR-5, NNR-7, NNR-8, MR-1										S	S				
Chinook salmon - Upper Columbia Spring Run *(Oncorhynchus tshawytscha)*	E, WC, CH	Present	NNR-7, NNR-8										S	S				
Greater sage-grouse *(Centrocercus urophasianus)*	C, BLM-S, WT	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	M	M	M	S					M		M				
Gray wolf *(Canis lupus)*	E, WE	Possible	NNR-3, NNR-4, NNR-5, NNR-6, NNR-7	S	S	S	S	S	S	S	S	S		S	S			
Steelhead - Upper Columbia River *(Oncorhynchus mykiss)*	T, WC, CH	Present	NNR-7, NNR-8										S	S				
Steelhead - Middle Columbia River *(Oncorhynchus mykiss)*	T, WC, CH	Present	NNR-1, NNR-3										S	S				
Washington ground squirrel *(Urocitellus washingtoni)*	C, BLM-S, WC	Possible	NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	S	S	S		S					S	

Sources: WDFW 2013a, BLM 2007, USFWS 2010a,b,c.

[1] Status: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; WE – Washington State Endangered; WT – Washington State Threatened; WC – Washington State Candidate, WS – Washington State Sensitive; and WR – Washington State Rare; CH – designated critical habitat.

[2]Occurence: Present – species documented within the Project area; Likely - species likely to occur based on presence of suitable habitat and local species abundance and nearby occurrences; Possible – species may occur based on presence of marginal or suitable habitat and/or occurrences within 25 to 50 miles, depending on species mobility; Very Unlikely – species is very unlikely to occur due to lack of habitat and/or Project area is well outside of species known range (at least 25 to 50 miles, depending on species mobility).

[3] Route Segments: Route segments with potential for species occurrence are listed.

[4]Cover Types: S – cover type provides suitable habitat for this species; M – cover type provides marginal habitat for this species.

Chinook Salmon (Upper Columbia River Spring Run)

The Upper Columbia River Spring Run Chinook salmon Evolutionarily Significant Unit (ESU) was listed as Endangered under the ESA in August 1999 (USFWS 1999) and is listed as a Candidate species by the WDFW. The ESU includes all naturally spawned populations occurring in all accessible river reaches in the Columbia River tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington.

Critical habitat has been designated for the Upper Columbia River Spring Run Chinook salmon ESU and includes the entire Columbia River Corridor downstream of Rock Island Dam, including the reach of the Columbia River within the Project area. This corridor, which connects the ESU with the Pacific Ocean, is used by rearing/migrating juveniles and migrating adults and was deemed by the National Marine Fisheries Service to be of high conservation value to the Upper Columbia River Spring Run Chinook ESU (NOAA 2005). In the Project area, upriver migration starts in early May and extends through August, with spawning occurring upriver of the Project area from late August to mid-September (Army 2010). Downstream migration of juveniles occurs primarily in May and June (NOAA 2013). While the migration corridor is adjacent to the JBLM YTC Installation, the JBLM YTC is excluded from the Critical Habitat designation for this ESU pursuant to the National Defense Authorization Act for Fiscal Year 2004 (Public Law 108-136; Army 2010). Tributaries of the Columbia River in and near the Project area, including the Yakima River, are not part of the Upper Columbia River Spring Run Chinook salmon ESU; they are part of the Mid-Columbia River Spring Run Chinook salmon ESU which is not listed under the ESA (NOAA 2013).

Gray Wolf

In Washington, the gray wolf received listing as federally Endangered in March 1967. As of 2011, the nearest confirmed wolf pack was located in north-central Kittitas County, northwest of the Project area. Within Washington, other packs are confirmed in the northern and northeastern parts of the state. The Project area borders the DPS of gray wolves that was delisted in May 2011; however, gray wolves are listed as Endangered within the Project area (USFWS 2011c).

Historically, wolves were found throughout most or all of Washington, but were extirpated from the state by the 1930s through trapping, poisoning, and shooting. Wolves are generalists in their habitat use and are opportunistic carnivores. Within their historical distribution, wolves occurred in habitats that had large ungulates present, including forests, shrub-steppe, prairies, swamps, and coastal areas. Wolves hunt large prey species, such as deer, elk, and moose, but will also prey on smaller animals, scavenge carrion and occasionally eat fish and vegetation (WDFW 2011a).

As of December 2012, 51 wolves in nine confirmed packs are present within Washington. The closest confirmed wolf pack is located northwest of Ellensburg, approximately 30 miles from the Project area (Becker et al. 2013). Potential suitable habitat exists in the Project area.

Steelhead (Middle Columbia River DPS and Upper Columbia River DPS)

The Project area overlaps with the Middle Columbia River steelhead DPS and the Upper Columbia River steelhead DPS; both are currently listed as Threatened under the ESA (NOAA 2013). Steelhead typically prefer fast water in small-to-large main stem rivers, and medium-to-large tributaries. Although they will also use smaller streams with sufficient water flow, they tend to spawn in the main stem of streams where the water flow is high (Healey 2003).

The Middle Columbia River steelhead DPS includes all naturally spawned anadromous populations below impassable barriers in tributaries of the Columbia River from above Wind River, Washington up to and including the Yakima River. Critical Habitat has been designated (NOAA 2000) and includes the Yakima River, located within one mile of Route Segments NNR-1 and NNR-3, and lower Burbank Creek located within one mile of Route Segment NNR-3. The Critical Habitat also includes lower Lmuma Creek downstream from, but not within one mile of, Route Segments NNR-3, NNR-4, and MR-1 (NOAA 2013).

The Upper Columbia River steelhead DPS includes all naturally spawned anadromous populations below impassable barriers in streams of the Columbia River Basin upstream from the Yakima River, to the Canadian border (NOAA 2013). Within the Project area, the Columbia River is designated Critical Habitat. While the Columbia River is adjacent to the JBLM YTC Installation, the JBLM YTC is excluded from the Critical Habitat designation for this DPS pursuant to the National Defense Authorization Act for Fiscal Year 2004 (Public Law 108-136; Army 2010).

Washington Ground Squirrel

The Washington ground squirrel is a candidate for listing under the ESA (USFWS 2007a). It is also a candidate for state listing (WDFW 2013a). The range of the Washington ground squirrel has decreased dramatically, due mostly to loss and fragmentation of habitats (Rickart and Yensen 1991).

Washington ground squirrels are most commonly found in dry, open sagebrush or grassland habitats. They occur in areas with silty-loam or sandy soils along hillsides, in ravines, and on river bottoms. Washington ground squirrels feed on a wide variety of grasses, green forbs, roots, bulbs, seeds, seed pods, and some insects (Rickart and Yensen 1991). Adults emerge from hibernation in late January through March and feed throughout spring and into summer to accumulate body fat (NatureServe 2011). Adults are active until late May or early June and juveniles until late June or early July. During hot weather, Washington ground squirrels are the most active in the morning (NatureServe 2011; Rickart and Yensen 1991).Washington ground squirrels may spend up to eight months a year in hibernation or aestivation in their underground burrows. This period of seasonal dormancy encompasses the temperature extremes of both winter and summer.

The Washington ground squirrel occurs in grassland and shrubland habitats of the Columbia Plateau east and south of the Columbia River in Washington (WDFW 2013b). The nearest documented location is approximately 12 miles east of the Project, in Grant County (WDFW 2012). Ground squirrel surveys conducted in 2004 located occupied sites just north of the crest of the Saddle Mountains, well outside of the Project area (Finger et al. 2007). Suitable habitat occurs within the Project area.

Greater Sage-Grouse

Sage-grouse species ecology, and regional and local population status and trends are summarized below and described in detail in Appendix B-5 - Sage-grouse Technical Report.

Ecology and population status

Sage-grouse is a sagebrush-obligate species of the western United States and Canada (Schroeder et al. 1999). Sage-grouse are known for their breeding displays in early spring when males congregate in open areas within sagebrush and perform elaborate displays that include inflating their gular sacs. Females select mates at these breeding display grounds, called “leks”, and then nest, typically within four miles of a lek (Connelly et al. 2000).

The historical distribution of sage-grouse in Washington spanned the extent of shrub steppe and meadow steppe habitats of the Columbia Basin of eastern Washington in an area exceeding 22,000 square miles. Sage-grouse populations have declined dramatically due to habitat loss and fragmentation associated with conversion of native sagebrush landscapes for human land uses (principally agriculture) and widespread degradation of remaining habitat through poor land management practices and the invasion of aggressive exotic weeds (Stinson et al. 2004). The population size in Washington declined more than 50 percent between 1970 and 2011. The current range within Washington is now approximately eight percent of the presumed historic range and limited to two populations with a total of approximately 1,200 sage-grouse (Robb and Schroeder 2012). The Moses Coulee population, numbering approximately 930 birds, is found in Douglas and Grant Counties on mostly private land. The second population is located in Kittitas and Yakima Counties on the JBLM YTC land which is used for combat readiness training. In 2013, the sage-grouse population at JBLM YTC was estimated to be at 221 birds. The proposed Project approximately follows the western and northern edges of the JBLM YTC sage-grouse population (see Figure 3.3-2). Both populations are considered isolated from each other as well as the more distant populations in Oregon and Idaho (Stinson et al. 2004).

Habitat Connectivity

Maintenance and restoration of habitat connectivity have important implications for the genetic and demographic health of wildlife populations. Anthropogenic features and land uses can reduce connectivity by fragmenting habitat and hindering the movement of wildlife. Fragmented landscapes with reduced connectivity support fewer animals and isolated local populations face higher local extinction rates and lower likelihood of recolonization as well as loss of genetic diversity (Beissinger and McCullough 2002). Development and agriculture have fragmented sagebrush-steppe within Washington and habitat connectivity is degraded and threatened for sage-grouse (Washington Wildlife Habitat Connectivity Working Group [WHCWG] 2010).

The JBLM YTC sage-grouse population is isolated from the Mansfield Plateau/Moses Coulee population by more than 30 miles and from populations in Oregon and Idaho by about 150 miles (Robb and Schroeder 2012). These populations have reduced genetic diversity relative to populations outside of Washington, and differ genetically from each other suggesting a recent genetic bottleneck and little gene-flow between these populations (Benedict et al. 2003; Oyler-McCance et al. 2005).

Sage-grouse exhibit two types of long-distance movements: 1) natal dispersal (movement a juvenile makes from its natal home range to its adult home range) and 2) seasonal migrations. Minimal existing dispersal information indicates average natal dispersal distances for juvenile sage-grouse is approximately five miles, though movements of up to 20 miles have been recorded for adult females in Washington. Sage-grouse in the JBLM YTC population are non-migratory with only localized movements between seasonal use areas, whereas some birds in the Mansfield Plateau/Moses Coulee population exhibit migratory patterns (Robb and Schroeder 2012).

The WHCWG completed a statewide connectivity analysis (WHCWG 2010) and a Columbia Plateau connectivity analysis (WHCWG 2012), including a species-specific connectivity analysis for sage-grouse (Robb and Schroeder 2012).

Sage-grouse specific WHCWG analyses identified four Habitat Concentration Areas (HCA) within Washington. These include the JBLM YTC and Mansfield Plateau/Moses Coulee populations already mentioned and two reintroduced populations, one in the northern Crab Creek drainage in Lincoln County and one on the Yakama Reservation in Yakima County. Sage-grouse were translocated to the Yakama Reservation in 2006, but as of 2012 there were no confirmed observations of breeding activity (Robb and Schroeder 2012).

The WHCWG analyzed connectivity among the four HCAs by assigning resistance values to various landcovers and anthropogenic features along potential routes that sage-grouse may take if they attempted to travel from one HCA to another. The resistance values relied upon published literature and the professional judgment of biologists and expert reviewers. Resistance values for anthropogenic features ranged from 0 (e.g., 1,640 to 3,280-foot buffer of 230 kV transmission line) to 99 (housing with less than 10 acres/dwelling unit). Transmission lines were given a resistance value of 7 for single 230 kV line and 3 for 1,640-foot buffer. For two adjacent 230 kV lines the resistance values were not doubled, but increased by approximately 25 percent (9 for double line; 4 for 1,640-foot buffer; 1 for 0.6-mile buffer; Robb and Schroeder 2012).

The WHCWG analysis identified the linkage between the JBLM YTC HCA and the Mansfield Plateau/Moses Coulee HCA as “fairly good” (see Figure 3.3-3). Much of the habitat along this corridor is shrub steppe that is protected within state-owned wildlife areas. Impediments to this linkage include the relative steepness of the terrain, and disturbance associated with I-90, several existing transmission lines, and wind energy development. Conditions for movement are best in the central portion of the linkage, but there are areas of concern at both ends. Near its northern end, the modeled corridor is constricted as it crosses the Columbia River near Rock Island Dam. Near the southern end, north of I-90 and the proposed Project, the linkage is constricted by wind energy development (Robb and Schroeder 2012).

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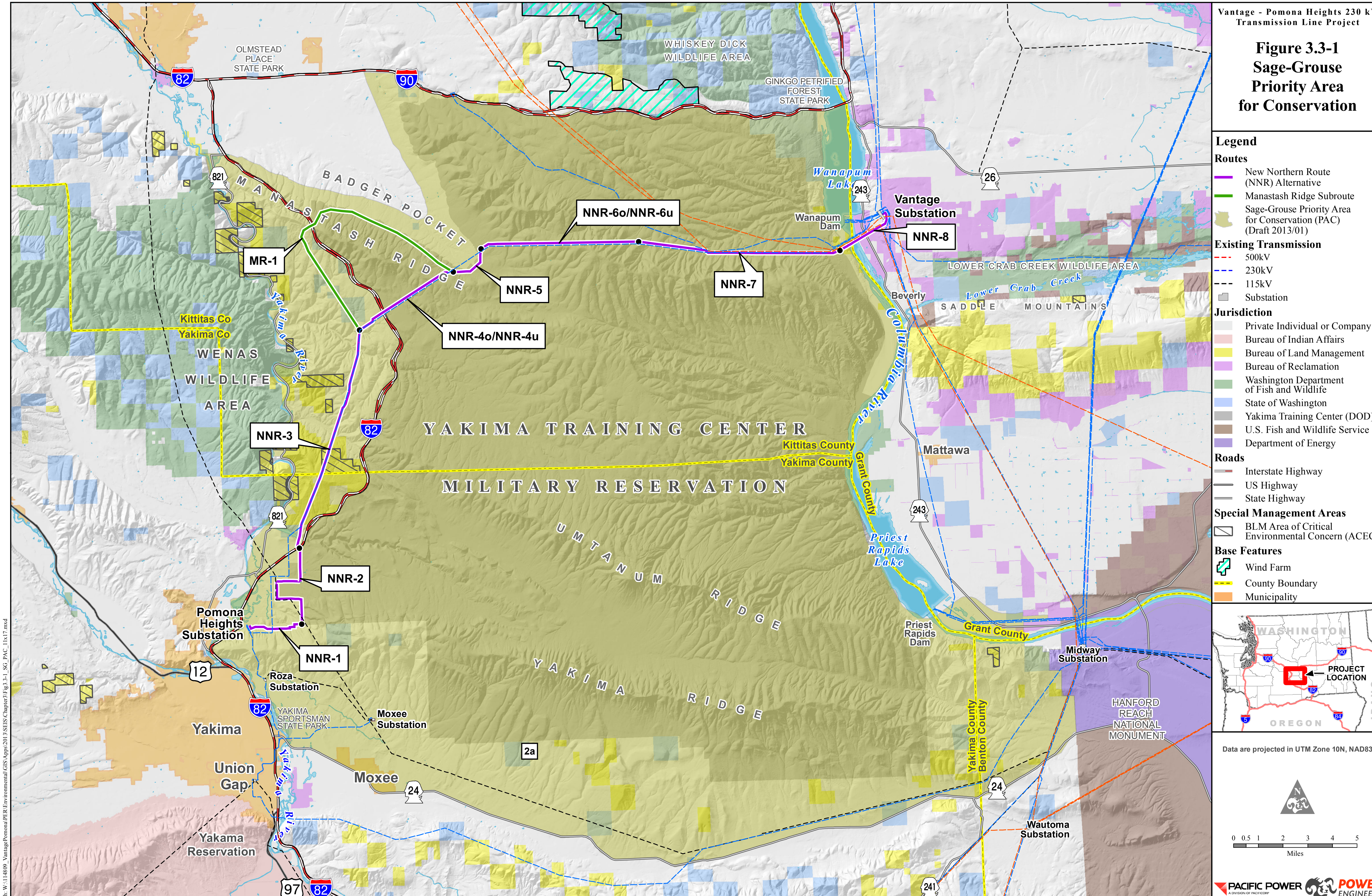
Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 3.3-1 Sage-Grouse Priority Area for Conservation



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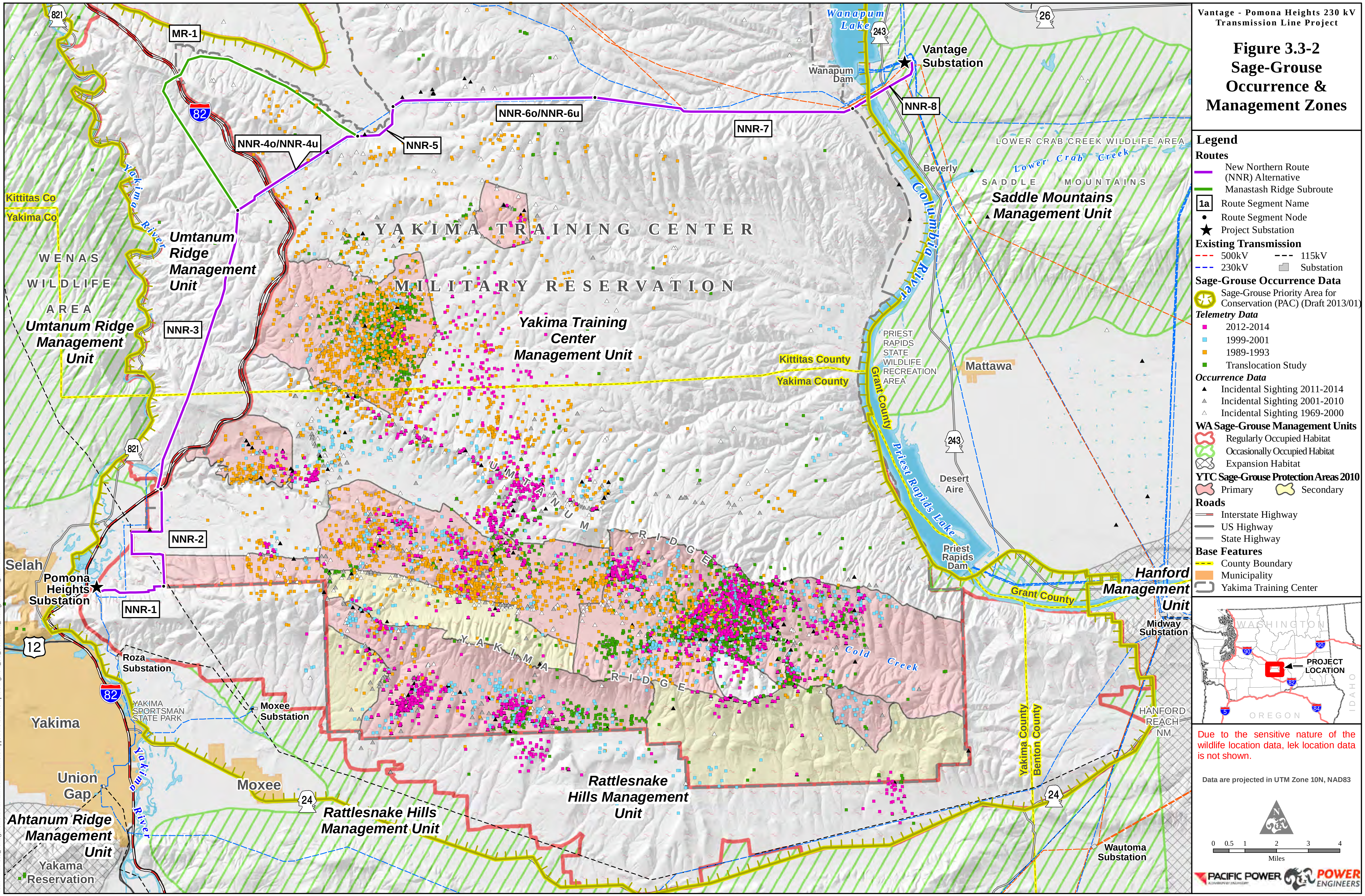

Vantage - Pomona Heights 230 kV Transmission Line Project
Figure 3.3-2
Sage-Grouse Occurrence & Management Zones
Legend
Routes
New Northern Route (NNR) Alternative
Manastash Ridge Subroute
1a Route Segment Name
Route Segment Node
Project Substation
Existing Transmission
500kV
115kV
230kV
Substation
Sage-Grouse Occurrence Data
Sage-Grouse Priority Area for Conservation (PAC) (Draft 2013/01)
Telemetry Data
2012-2014
1999-2001
1989-1993
Translocation Study
Occurrence Data
Incidental Sighting 2011-2014
Incidental Sighting 2001-2010
Incidental Sighting 1969-2000
WA Sage-Grouse Management Units
Regularly Occupied Habitat
Occasionally Occupied Habitat
Expansion Habitat
YTC Sage-Grouse Protection Areas 2010
Primary
Secondary
Roads
Interstate Highway
US Highway
State Highway
Base Features
County Boundary
Municipality
Yakima Training Center
WASHINGTON
PROJECT LOCATION
OREGON
IDAHO
Due to the sensitive nature of the wildlife location data, lek location data is not shown.
Data are projected in UTM Zone 10N, NAD83
0 0.5 1 2 3 4
Miles
PACIFIC POWER
POWER ENGINEERS
MR-1
NNR-1
NNR-2
NNR-3
NNR-4o/NNR-4u
NNR-5
NNR-6o/NNR-6u
NNR-7
NNR-8
Wanapum Lake
Wanapum Dam
Vantage Substation
LOWER CRAB CREEK WILDLIFE AREA
Lower Crab Creek
Beverly
SADDLE MOUNTAINS
Saddle Mountains Management Unit
YAKIMA TRAINING CENTER
MILITARY RESERVATION
Yakima Training Center Management Unit
Columbia River
Kittitas County
Yakima County
Grant County
PRIEST RAPIDS STATE WILDLIFE RECREATION AREA
Mattawa
Priest Rapids Lake
Desert Aire
Priest Rapids Dam
Hanford Management Unit
Midway Substation
HANFORD REACH NM
Yakima County
Benton County
Wautoma Substation
Kittitas Co
Yakima Co
WENAS WILDLIFE AREA
Umtanum Ridge Management Unit
Yakima River
UMTANUM RIDGE
YAKIMA RIDGE
Cold Creek
Selah
Pomona Heights Substation
Roza Substation
YAKIMA SPORTSMAN STATE PARK
Moxee Substation
Yakima
Union Gap
Moxee
Ahtanum Ridge Management Unit
Yakama Reservation
Rattlesnake Hills Management Unit
Rattlesnake Hills Management Unit
82
821
12
24
26
243

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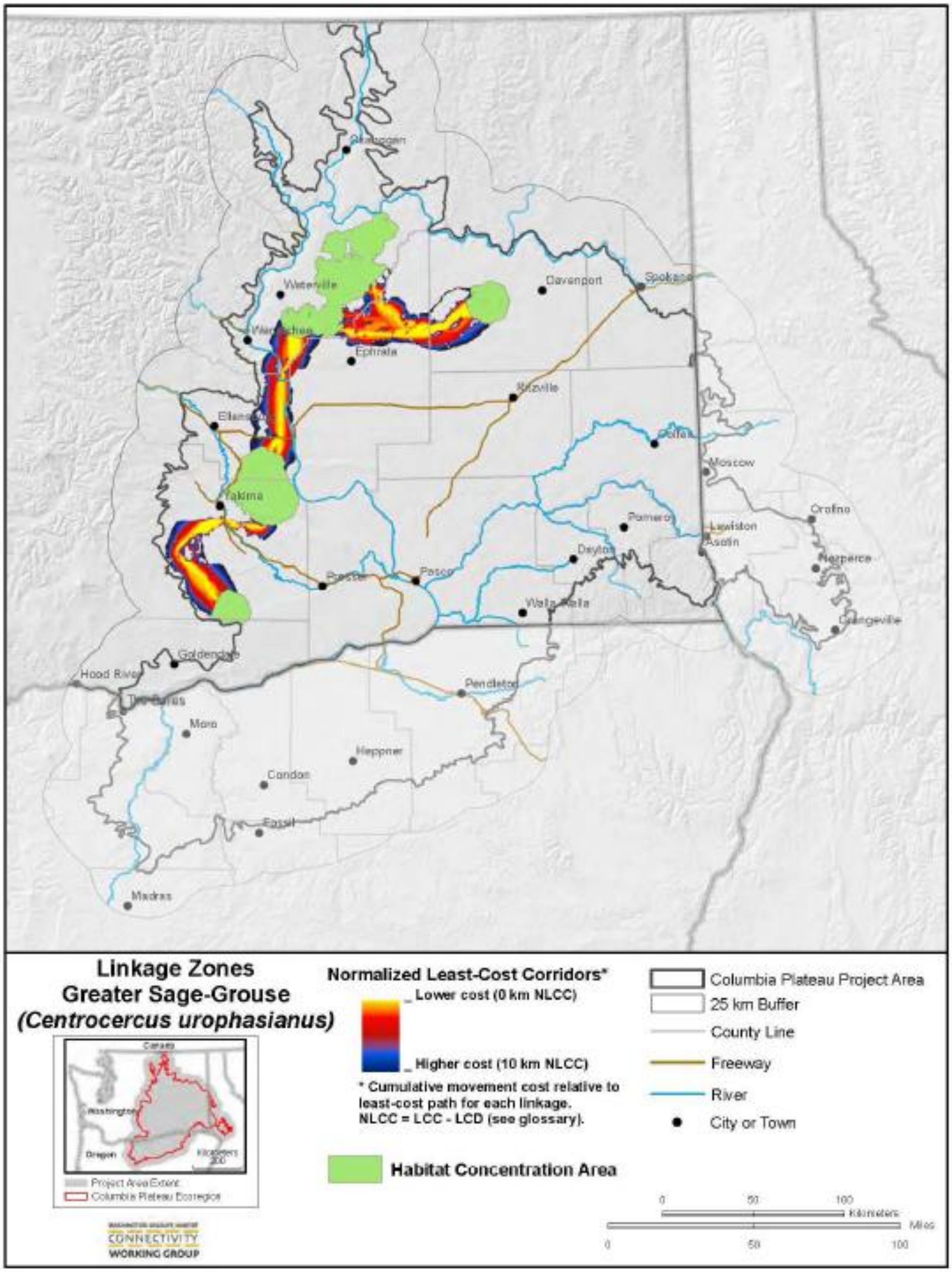

FIGURE 3.3-3 CONNECTIVITY ZONES IDENTIFIED BY WHCWG MODELING (FIGURE TAKEN FROM ROBB AND SCHROEDER 2012).

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<u>Habitat Use</u>

With the exception of NNR-8, all of the route segments are within the Yakima Training Center PAC (Figure 3.3-1) and cross WDFW Management Units designated as Regularly Occupied Habitat. The portion of NNR-8 that is east of the Columbia River is designated as Occasionally Occupied Habitat. The eight-mile wide sage-grouse analysis area also encompasses land within Expansion Habitat and land not designated for sage-grouse management (Figure 3.3-2).

The proposed MR Subroute and NNR route segments avoid passing through any of JBLM YTC's protection zones. A small stretch within NNR-2 passes immediately adjacent to the edge of a primary protection zone. Most of the western two-thirds of the NNR is within four miles of various primary protection zones located east and south of the NNR. There are no secondary protection zones within four miles of the NNR (Figure 3.3-2).

The eight-mile wide sage-grouse analysis area is dominated by shrub-steppe vegetation, with the most prevalent vegetation cover types including: 1) sagebrush steppe with a perennial grass understory and 2) annual grassland/noxious weeds. Other common cover types include: 1) sagebrush steppe with an annual grass understory, 2) perennial grassland, 3) forb-dominated communities and 4) agricultural, developed and disturbed areas. Other shrublands and riparian areas are present, but make up a relatively small part of the eight-mile wide analysis area.

Generally, sagebrush steppe with a perennial grass understory has the best potential to provide year-round suitable habitat for sage-grouse. Other shrubland and grassland habitat types have some potential to provide suitable or marginal habitat during one or more seasons depending on surrounding habitat and site-specific characteristics. Suitability of habitat for sage-grouse depends on several site-specific factors, including: 1) sagebrush cover, 2) sagebrush height and 3) cover, height, and species composition of forbs and perennial grasses (Stiver et al. 2010).

Sage-grouse habitat requirements vary seasonally and they often select different habitats during breeding, late brood-rearing and wintering seasons (Schroeder et al. 1999). Seasonal use habitats considered essential for maintaining healthy sage-grouse populations include: 1) breeding and early brood-rearing, 2) summer/late brood-rearing and 3) wintering habitats.

Breeding/Early Brood Rearing Habitat

The breeding and early brood-rearing season is considered the most sensitive time of year for sage-grouse. It is during this time that sage-grouse perform courtship and select mates, prepare for nesting, nest and raise chicks. Breeding habitats are roughly centered on leks. Leks are where males compete for mating opportunities by performing strutting displays and producing complex vocalizations. Trees or other tall structures are generally not within line of sight of leks and are uncommon within two miles (Connelly et al. 2000; Stiver et al. 2010).

After mating, females retreat from leks and seek out nest sites. Average distance from leks to nest sites varies among populations. Reported averages range from 0.7 to 3.6 miles, but this distance may exceed 12 miles. Cadwell et al. (1998) reported that female grouse in the JBLM YTC population nested an average of three miles from their capture lek. Early brood-rearing habitats occur close to nests but movements may exceed 1.9 miles as grouse move to areas that have an abundance and diversity of herbaceous plants and insects, but may have lower sagebrush cover. Breeding/early brood-rearing season generally occurs from March 1 to June 30 (Stiver et al. 2010).

Summer/Late Brood Rearing Habitat

Late brood-rearing occurs during approximately July 1 to September 30 (Connelly et al. 2000; Stiver et al. 2010). During summer as chicks grow and vegetation dries out, sage-grouse may shift habitats. These late brood-rearing habitats tend to be more mesic, forb-rich sites and may be dominated by sagebrush but may also include wet meadows, farm fields and irrigated areas adjacent to sagebrush habitats (Connelly et al. 2000). Within the JBLM YTC population, females, on average, spend the summer and fall approximately four miles from the lek, while males average seven to eight miles away from the lek during summer (Cadwell et al. 1998). By fall a slow shift toward winter range begins. Sage-grouse continue to supplement their diet with remaining succulent forbs but by early winter a transition to a sagebrush-dominant diet resumes.

Winter Habitat

Winter habitats are reached by December. Wintering habitat is typically similar throughout the species range and contains tall sagebrush or windswept areas with shallow snow accumulations. Sage-grouse feed exclusively on sagebrush during winter. Big sagebrush is dominant, but grouse will feed on a variety of other sagebrush species, depending on availability (Connelly et al. 2000).

Habitat Assessment

A sage-grouse habitat assessment in the NNR Alternative and MR Subroute ROW was conducted in 2013 using a combination of remote sensing data and field data collected during vegetation surveys and sage-grouse walking transect surveys. Detailed methods and results are included in Appendix B-2 (Sage-Grouse Habitat Assessment, New Northern Route and Manastash Ridge Subroute). Generally speaking, the central and eastern portions of the proposed NNR ROW contain the most suitable habitat, while the relatively disturbed, weedy southern portions contain less suitable habitat. The highest concentration of suitable habitat occurs near Badger Pocket in Route Segments NNR-4, NNR-5, and the western end of NNR-6, with another concentration of suitable habitat in NNR-7. Overall 23 percent of the NNR ROW was classified as suitable breeding habitat and 39 percent as marginal breeding habitat. For winter habitat, 44 percent was classified as suitable and 24 percent as marginal. During the summer (late brood-rearing) season, 35 percent provides suitable habitat and 32 percent provides marginal habitat. Specific habitat delineations are described for each route segment below and summarized in Appendix B-2 - Habitat Assessment.

While a detailed, fine-scale habitat assessment was conducted within the NNR ROW, it was not feasible to use the same fine-scale methodology for the entire eight-mile wide sage-grouse analysis area. To estimate habitat suitability within the analysis area, land cover data was used. A composite of USGS GAP data, JBLM YTC vegetation data, and vegetation data collected during POWER's field surveys was used to delineate 12 categories of land cover type. Each of these was in turn assigned a sage-grouse habitat suitability value (suitable, marginal, or unsuitable). The assigned values were as follows: 1) suitable habitat includes "sagebrush/perennial grassland", 2) marginal habitat includes "sagebrush/annual grassland", "riparian", "intermittent stream", and "bitterbrush/perennial grassland" and 3) unsuitable habitat includes "forb", "perennial grassland", "rabbitbrush/annual grassland", "annual grassland and noxious weeds", "basalt cliffs/rock", "tree", and "other" (includes agriculture, developed/disturbed areas, and open water). Overall, approximately 61 percent of the eight-mile wide sage-grouse analysis area was classified as suitable habitat, two percent as marginal, and 37 percent as unsuitable. It should be noted that this is only a coarse-scale approximation of true habitat suitability for sage-grouse, which is ultimately dependent on the condition of the vegetation community. In addition to the appropriate species composition within the vegetation community, an assessment of habitat conditions includes structural components such as canopy cover and height that provide additional information on the quality and habitat suitability for sage-grouse. For example, within the habitat classified as "sagebrush/perennial grassland" (and therefore considered as suitable sage-grouse habitat) some areas are likely to have insufficient sagebrush cover to provide truly suitable habitat.

Sage-Grouse Population Range Estimates

Based on location data provided by JBLM YTC, including telemetry data and incidental observations, it is apparent that sage-grouse use within the eight-mile wide sage-grouse analysis area occasionally occurs but is rare relative to the core area of sage-grouse use in the center of JBLM YTC, particularly in recent years (Figure 3.3-2). To generate a clearer picture of relative density of use by the JBLM YTC sage-grouse population, a fixed kernel density analysis was conducted using telemetry data. The methodology is explained in detail in Appendix B-5 Sage-grouse Technical Report.

The kernel density method is commonly used to compute probabilistic estimates of utilization distribution within individual animal home ranges, using random location data consisting of discrete points (Fuller et al. 2005). While most often used to estimate distribution of use for individuals, the method has also been used to estimate utilization distribution for populations (Coates et al. 2013). To yield easily interpretable metrics, 95 percent and 80 percent isopleths were generated in our analysis. Areas within the isopleths represent probabilities of utilization. The 95 percent isopleth encompasses 95 percent of the predicted distribution of all grouse habitat use for the JBLM YTC population; for the lay reader, this concept can be roughly approximated the following way: on an "average" day, 95 percent of the grouse would be expected to occur within the 95 percent isopleth, or alternatively the "average" grouse spends 95 percent of its time within the 95 percent isopleth. For the purposes of analysis, this will represent the "population range." Likewise, 80 percent of the sage-grouse usage can be expected to occur within the 80 percent isopleth, i.e. the "core population range." The estimated population range and core population range facilitate comparison of relative densities of sage-grouse use and aid in predicting the level of impact the proposed Project would have on the overall JBLM YTC sage-grouse population.

Available location data includes three telemetry studies from sage-grouse captured on JBLM YTC. These studies range from 25 years old to present, with specific years of study including 1989-1993, 1999-2001, and 2012-2014. Other available location data includes a telemetry study from sage-grouse translocated to JBLM YTC from Oregon and incidental observations collected from 1969 through 2012. All of these data are presented in Figure 3.3-2 to show documented sage-grouse use in and around the eight-mile wide sage-grouse analysis area. Data from translocated birds was not analyzed as it is unlikely that newly transplanted birds would provide an accurate picture of use by the local population. Incidental observations were not analyzed because the lack of standardized protocol and opportunistic nature of those observations would lead to biased results that would have as much or more to do with density of use by human observers as density of use by sage-grouse. Sage-grouse experts from BLM, JBLM YTC, and USFWS determined that data from the three telemetry studies of locally captured sage-grouse would be retained and used for the kernel analysis. In each study, sage-grouse were captured at a broad array of lekking areas throughout the population area and are assumed to provide a spatially representative sample of the overall population (Cadwell et al. 1998; Livingston and Nyland 2002; Stell Environmental Enterprises [SEE] 2013).

A comparison of utilization distribution generated separately for each of the three study periods (1989-1993, 1999-2001, and 2012-2014) revealed a substantial difference among study periods. Telemetry data from the 2012-2014 study was selected for the final analysis because impact of the proposed Project on sage-grouse can be most reliably assessed using the current distribution of sage-grouse (see Figure 3.3-4). A time series, displaying utilization distribution from each study period, is displayed in Figure 3.3-5.

Based on the kernel density model, the current population range (95 percent isopleth) does not overlap the proposed NNR ROW (Figure 3.3-4). This does not indicate that absolutely no sage-grouse use ever occurs in the proposed NNR ROW, but that use would be expected to be very rare relative to the area within the estimated population range; approximately five percent of all sage grouse use is expected to occur outside of the population range. Estimates beyond the 95 percent range are not typically attempted and would not be reliable (Fuller et al. 2005). During ground transect surveys conducted along the proposed NNR in May and July of 2013, no sage-grouse were observed; however, sage-grouse scat was observed in six locations adjacent to NNR-6, one location on NNR-5 and one location on NNR-4. These results indicate that some sage-grouse use of the ROW does occur, but that use is rare. The estimated 95 percent isopleth population range does overlap the eight-mile wide sage-grouse analysis area of the NNR and MR routes, but the core population range (80 percent isopleth) does not. Acreages of population range within the eight-mile wide analysis area are shown in Table 3.3-4 and described for each route segment (Section 3.3.4).

A time-series of the three study periods reveals a southeastward shift in the JBLM YTC sage-grouse population range and core population range since 1989. It is beyond the scope of this document to speculate at length on possible causes of the shift, but it should be noted that the existing 230 kV Pomona-Wanapum transmission line was built in the early 1970s, more than 15 years before the earliest available sage-grouse location data. An examination of fire history at JBLM YTC (see Figure 3.3-6) does not suggest a relationship between fire history and the shift in sage-grouse distribution. The formerly occupied area suffered minimal burns relative to areas within the current core population range. The shift in sage-grouse distribution may have been influenced by JBLM YTC training maneuvers. Most of the sage-grouse range shift occurred during the 1993 to 1999 period in JBLM YTC Training Areas TA-15 and TA-16. According to JBLM YTC (personal communication, 2014), there was a period of heavy training maneuvers during the mid-1990s, with particularly high activity levels in TA-16. It is also possible that the population shift was not a response to any change in habitat or disturbance levels, but merely a response to population declines, such that if the TA-15 and TA-16 areas held inherently lower quality habitat to begin with relative to the core area, they simply may have been the first areas to be abandoned as the population declined from over 300 birds during the 1989-1993 period to approximately 200 birds during the most recent period.

The population range during the most recent period (2012-2014) provides the most useful information for predicting Project impacts on the current grouse population. Nevertheless, the historic population ranges might be indicative of areas likely to be reoccupied in the future if the JBLM YTC sage-grouse population recovers and expands into currently unoccupied areas. Future occupancy is speculative in nature and would depend on a number of factors including wildfire occurrence, military training activities and future habitat condition.

<u>Sage-grouse Leks</u>

Active, inactive, and historical leks are shown in Table 3.3-5 and discussed in Section 3.3.4 for each NNR route segment. Leks are classified by JBLM YTC as: 1) active - a lek with at least two male grouse observed displaying on at least two different days during the previous year or during the last year checked; 2) inactive - has been active sometime during the previous 10 years, but was not active during the last year checked; or 3) historical - a formerly active lek site in which no activity has been observed for the previous 10 years (JBLM YTC 2014; SEE 2013).

Lek complexes are defined as active leks within 1.8 miles of each other and have been used to estimate the JBLM YTC sage-grouse population size and trends (SEE 2013; Schroeder et al. 2000). Fourteen lek complexes are known to occur within JBLM YTC, containing approximately 19 leks. Of the 14 lek complexes, two have not been attended by male sage-grouse since the early 1990s. Lek surveys are conducted on JBLM YTC on a yearly basis with priority given to areas with prior sage-grouse sightings during the breeding period and active, inactive and historic lek locations. No new leks were documented on JBLM YTC during the 2013 lek surveys and it is unlikely that an undocumented major lek exists on JBLM YTC in searchable areas. Additional leks may be present on JBLM YTC in unsearchable areas (i.e., Central Impact Area) and on adjacent private lands (SEE 2013).

In 2013, seven active leks, from seven lek complexes were documented within the JBLM YTC sage-grouse population with a total count of 85 lekking males. Two of the seven active leks are within four miles of the proposed NNR (Table 3.3-5). Both of these leks were greater than three miles from the proposed NNR and both are relatively small leks, accounting for a total of seven of the 85 lekking males on JBLM YTC (eight percent; SEE 2013).

The first active lek (hereafter lek #1) is located approximately 3.4 miles from Route Segment NNR-3. Lek #1 was considered an active lek starting in 2011. In 2013, four males were observed attending lek #1 which was down from 2011 and 2012 attendance numbers (seven and six male grouse, respectively). In 2011, a secondary (satellite) lek was used, located approximately 2,000 feet away from Lek #1. Use was not observed at the secondary lek in 2013 (SEE 2013).

The second active lek (hereafter lek #2) occurs approximately 3.5 miles from NNR-6. Lek #2 was discovered in 2007 and was considered an active lek beginning in 2008. Lek #2 had three males attending in 2013, with an average of two males attending during the past six years (SEE 2013). Table 3.3-6 shows lek counts from 1989 to 2013 for each lek complex within the entire JBLM YTC sage-grouse population, including leks greater than four miles from the proposed NNR segments.

Historical leks are known to have occurred within four miles of all route segments except Route Segment NNR-1 (Table 3.3-5).

In 2013, the sage-grouse population at JBLM YTC was estimated to be at 221 birds, the highest population estimate since the 2006 estimate of 229 sage-grouse (SEE 2013; Table 3.3-6; and Figure 3.3-7). The sage-grouse population at JBLM YTC is above the management goal of 200 for the second time in the last seven years (SEE 2013; JBLM YTC 2002). The 24 year average population estimate for JBLM YTC is 273 sage-grouse, although there has been an overall annual decline in the population. From 2007 through 2010 and again in 2012, population estimates were below 200. This may have been a result of habitat loss from fires (2006-2009); however, since 2009, little existing sage-grouse habitat has been lost to fire and areas that burned from 2006-2009 have experienced grass and shrub recovery due to restoration efforts (SEE 2013).

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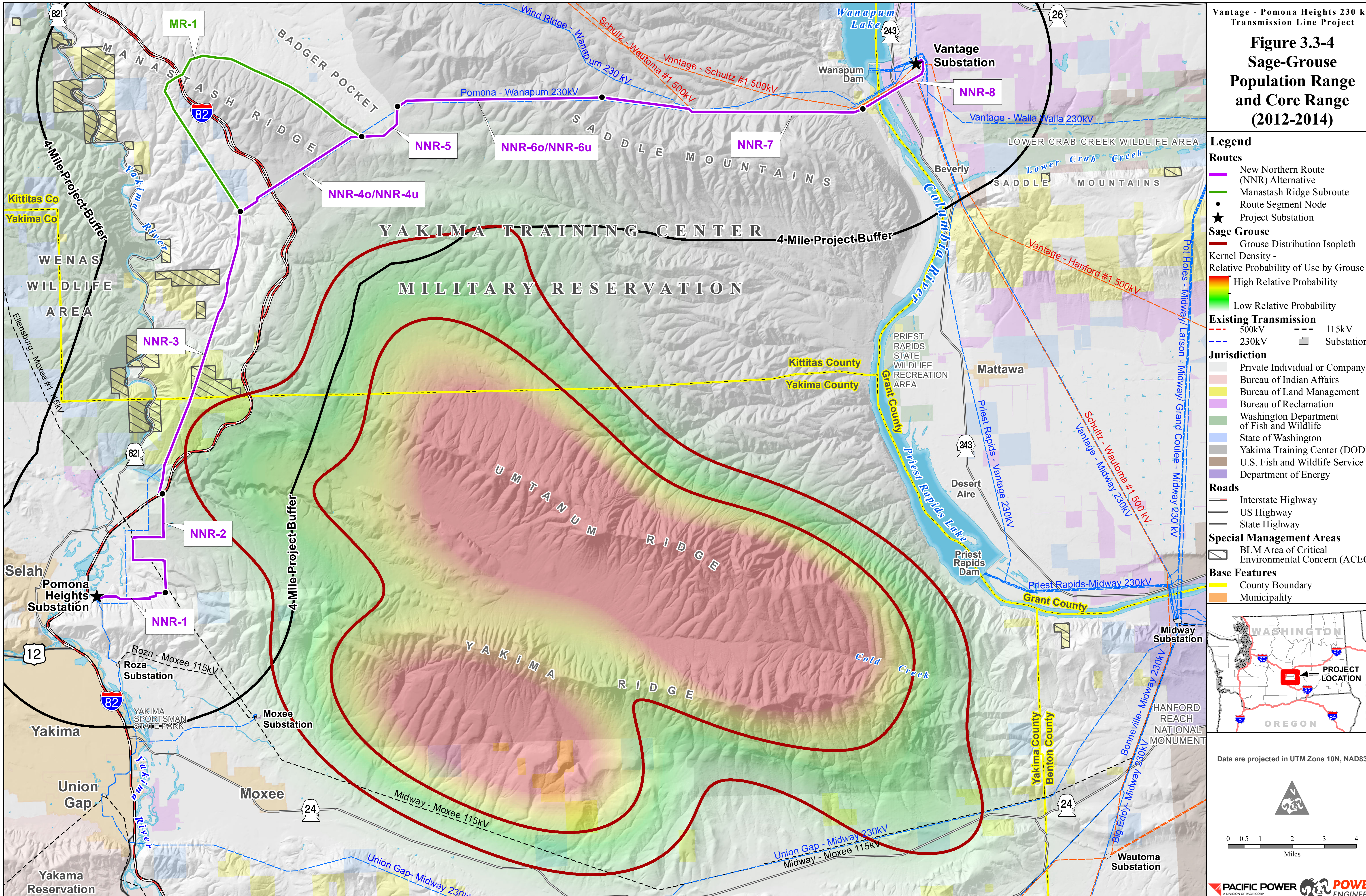
Vantage - Pomona Heights 230 kV Transmission Line Project
Figure 3.3-4 Sage-Grouse Population Range and Core Range (2012-2014)
Legend
Routes
New Northern Route (NNR) Alternative
Manastash Ridge Subroute
Route Segment Node
Project Substation
Sage Grouse
Grouse Distribution Isopleth
Kernel Density - Relative Probability of Use by Grouse
High Relative Probability
Low Relative Probability
Existing Transmission
500kV
230kV
115kV
Substation
Jurisdiction
Private Individual or Company
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Washington Department of Fish and Wildlife
State of Washington
Yakima Training Center (DOD)
U.S. Fish and Wildlife Service
Department of Energy
Roads
Interstate Highway
US Highway
State Highway
Special Management Areas
BLM Area of Critical Environmental Concern (ACEC)
Base Features
County Boundary
Municipality
WASHINGTON
PROJECT LOCATION
OREGON
IDAHO
Data are projected in UTM Zone 10N, NAD83
0 0.5 1 2 3 4
Miles
PACIFIC POWER
POWER ENGINEERS
MR-1
NNR-1
NNR-2
NNR-3
NNR-4o/NNR-4u
NNR-5
NNR-6o/NNR-6u
NNR-7
NNR-8
Vantage Substation
Pomona Heights Substation
Midway Substation
Wautoma Substation
Roza Substation
Moxee Substation
Priest Rapids Dam
Wanapum Dam
Wanapum Lake
4-Mile-Project-Buffer
YAKIMA TRAINING CENTER
MILITARY RESERVATION
UMTANUM RIDGE
YAKIMA RIDGE
MANASTASH RIDGE
BADGER POCKET
SADDLE MOUNTAINS
WENAS WILDLIFE AREA
LOWER CRAB CREEK WILDLIFE AREA
Lower Crab Creek
PRIEST RAPIDS STATE WILDLIFE RECREATION AREA
HANFORD REACH NATIONAL MONUMENT
YAKIMA SPORTSMAN STATE PARK
Kittitas Co
Yakima Co
Kittitas County
Yakima County
Grant County
Benton County
Columbia River
Yakima River
Priest Rapids Lake
Cold Creek
Selah
Yakima
Union Gap
Moxee
Mattawa
Beverly
Desert Aire
Yakama Reservation
Pomona - Wanapum 230kV
Wind Ridge - Wanapum 230 kV
Schultz - Wautoma #1 500kV
Vantage - Schultz #1 500kV
Vantage - Walla Walla 230kV
Vantage - Hanford #1 500kV
Priest Rapids - Vantage 230kV
Vantage - Midway 230kV
Pot Holes - Midway Larson - Midway Grand Coulee - Midway 230 kV
Priest Rapids-Midway 230kV
Ellensburg - Moxee #1 115kV
Roza - Moxee 115kV
Midway - Moxee 115kV
Union Gap - Midway 230kV
Bonneville - Midway 230kV
Big Eddy - Midway 230kV
821
82
12
24
243
26

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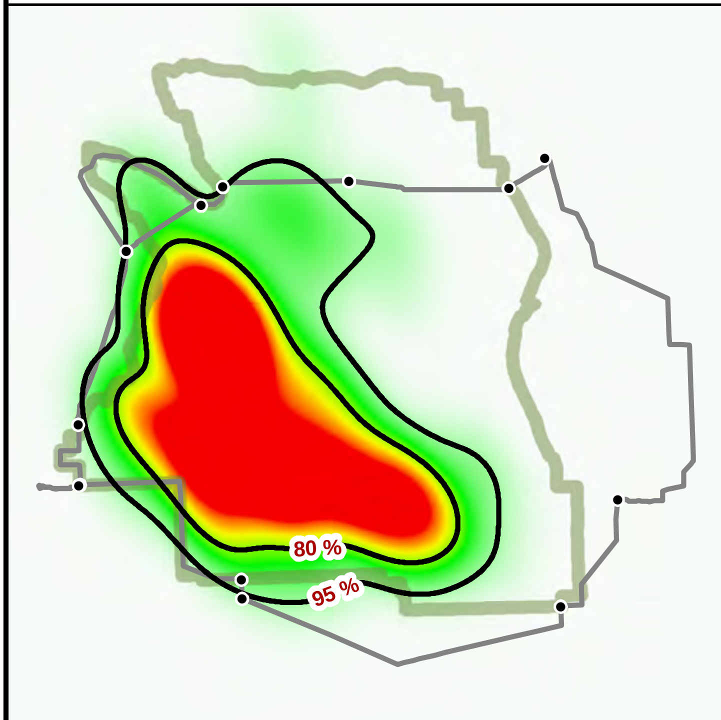
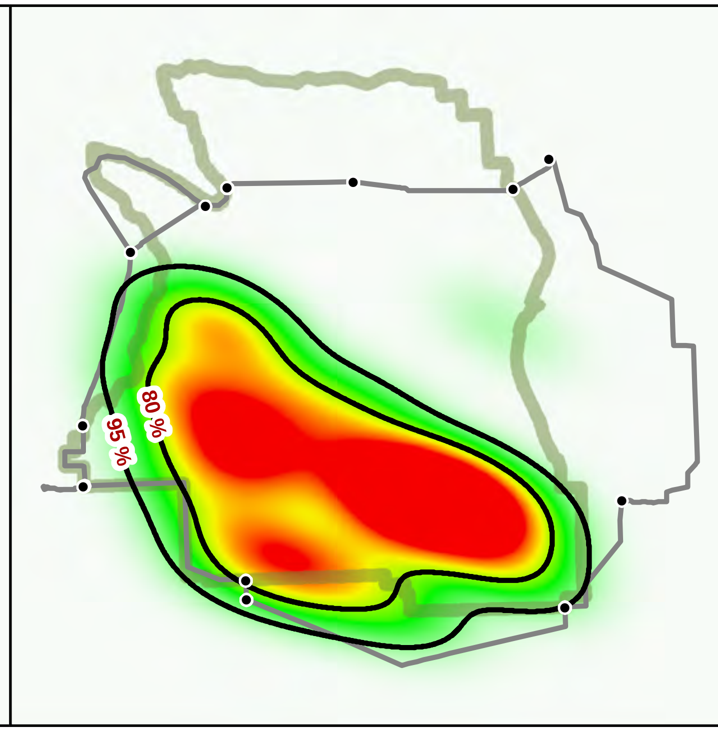
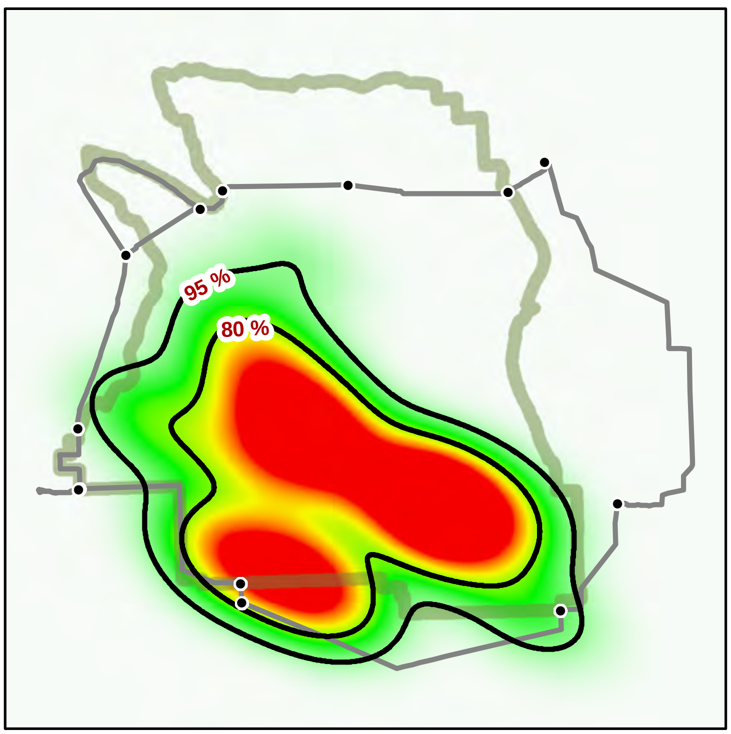
1989 - 1993



1999 - 2001



2012 - 2014



Vantage - Pomona Heights 230 kV
Transmission Line Project

Figure 3.3-5
Time series of
Sage-Grouse
Population Ranges

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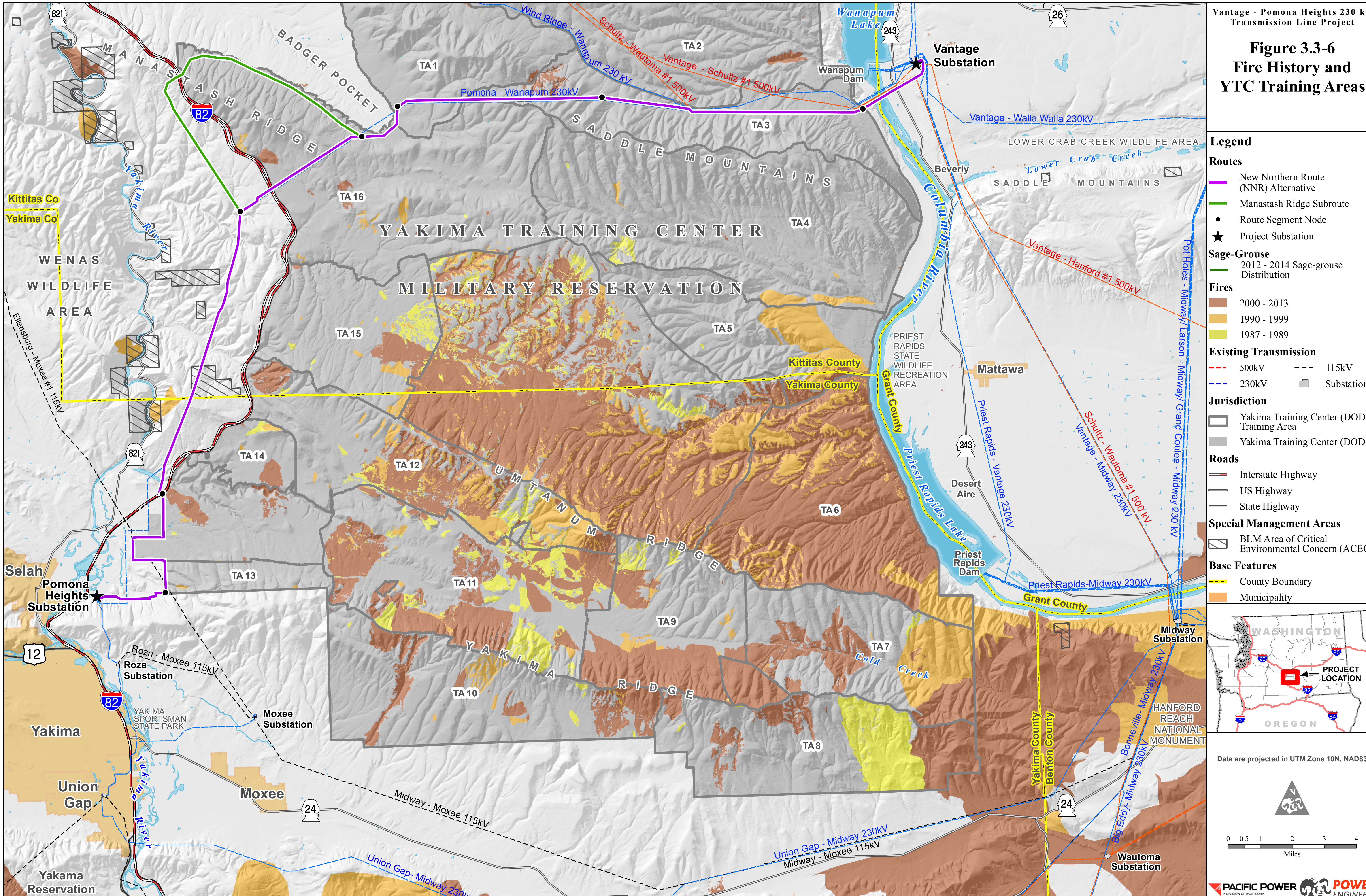

Figure 3.3-6 Fire History and YTC Training Areas

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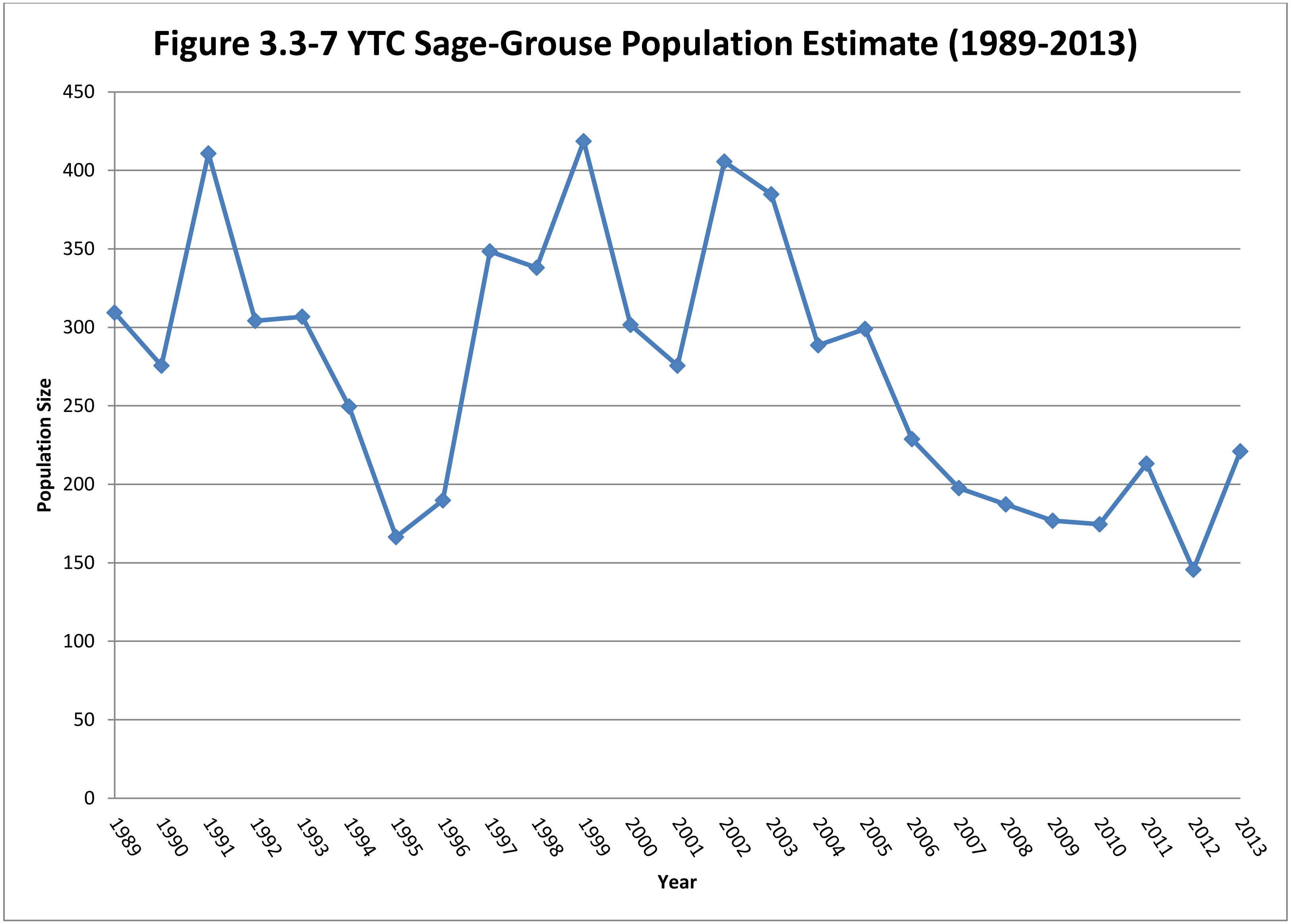
Figure 3.3-7 YTC Sage-Grouse Population Estimate (1989-2013)
Population Size
450
400
350
300
250
200
150
100
50
0
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year

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TABLE 3.3-4 FEDERALLY LISTED SPECIES THAT OCCUR OR POTENTIALLY OCCUR WITHIN THE PROJECT AREA

ROUTE SEGMENT	POPULATION RANGE[1]				CORE POPULATION RANGE[2]			
	ACRES WITHIN ROW	% OF ROW	ACRES WITHIN 4-MILE BUFFER	% OF 4-MILE BUFFER	ACRES WITHIN ROW	% OF ROW	ACRES WITHIN 4-MILE BUFFER	% OF 4-MILE BUFFER
NNR-1	0	0%	360	10%	0	0%	0	0%
NNR-2	0	0%	850	22%	0	0%	0	0%
NNR-3	0	0%	1184	19%	0	0%	0	0%
NNR-4o/NNR-4u	0	0%	136	3%	0	0%	0	0%
NNR-5	0	0%	103	3%	0	0%	0	0%
NNR-6o/NNR-6u	0	0%	1	0%	0	0%	0	0%
NNR-7	0	0%	0	0%	0	0%	0	0%
NNR-8	0	0%	0	0%	0	0%	0	0%
MR-1	0	0%	98	1%	0	0%	0	0%

Notes: [1] Population Range is based on 95% isopleth of fixed kernel analysis from 82 telemetry locations of 28 grouse in 2012-2014. [2] Core Population Range is based on 80% isopleth. The Isopleths define the area predicted to contain 95% and 80% of sage-grouse use.

TABLE 3.3-5 NUMBER OF GREATER SAGE-GROUSE LEKS WITHIN FOUR MILES OF THE PROPOSED NNR ROUTE SEGMENTS

ROUTE SEGMENT	ACTIVE OR INACTIVE LEKS (NUMBER)[1]				HISTORIC LEKS (NUMBER)[11]			
	WITHIN 0-0.6 MILE	WITHIN 0-2 MILES	WITHIN 0-3 MILES	WITHIN 0-4 MILES	WITHIN 0-0.6 MILE	WITHIN 0-2 MILES	WITHIN 0-3 MILES	WITHIN 0-4 MILES
NNR-1	0	0	0	0	0	0	0	0
NNR-2	0	0	0	1 (lek #1)	0	0	0	4
NNR-3	0	0	0	1 (lek #1)	0	0	3	9
NNR-4o/NNR-4u	0	0	0	0	3	4	5	6
NNR-5	0	0	0	0	1	3	6	6
NNR-6o/NNR-6u	0	0	0	1 (lek #2)	0	2	3	6
NNR-7	0	0	0	0	0	1	1	1
NNR-8	0	0	0	0	0	0	1	1
MR-1	0	0	0	0	1	3	5	6

Notes: [1] Leks are classified by JBLM YTC (2014; SEE 2013) as: Active - a lek with at least two male grouse observed displaying on at least two different days during the previous year or during the last year checked; Inactive - has been active sometime during the previous 10 years, but was not active during the last year checked; and Historical - a formerly active lek site in which no activity has been observed for the previous 10 years (JBLM YTC 2014; SEE 2013). [2]Includes documented sage-grouse species observations within the eight-mile wide corridor (JBLM YTC, and PHS data).

TABLE 3.3-6 MALE SAGE-GROUSE COUNTED AT LEK COMPLEXES AND JBLM YTC POPULATION ESTIMATES FROM 1989-2013

YEAR	LEK COMPLEX														POPULATION ESTIMATE
	#1[1]	#2[1]	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	
1989	6						53	22	27	7	4				309
1990	7						50	17	25	7	0				276
1991	14						62	33	44	5	0				411
1992	19						55	15	28	0					304
1993	22						47	18	31	0					307
1994	13					3	41	15	24						250
1995	8					0	33	12	11						166
1996	7			17		16	19	8	6						190
1997	5			18		32	34	32	13						348
1998	0		5	22	14	18	42	25	4						338
1999	0		5	28	21	11	41	39	16						419
2000			4	23	21	4	32	22	10						302
2001			4	15	20	9	31	18	9						275
2002			2	19	17	20	31	28	15			5	19		406
2003			0	14	20	25	30	17	23			7	12		385
2004			0	8	18	11	28	19	18			2	7		289
2005			0	7	20	12	33	17	17			0	9		299
2006			0	5	17	13	24	7	16			0	6		229
2007		1	0	3	15	16	22	6	8			0	4	1	198
2008		2	0	1	9	15	26	5	10			1	4	1	187
2009		2	0	0	7	14	30	5	4			0	6	0	177
2010		2	0	0	5	16	25	11	4			0	4	0	174
2011	7	3	0	0	9	22	24	8	9			0	0	0	213
2012	6	0	0	0	5	17	10	4	14			0	0	0	146
2013	4	3	0	0	3	22	24	5	24			0	0	0	221

Notes: Data from SEE 2013.
[1]Lek located within four miles of the proposed NNR or MR Subroute.

3.3.3.3 Species of Concern and State-Listed Species

Sixty-seven special status species occur or potentially occur within the Project area (Table 3.3-7). These include state of Washington listed (endangered, threatened, critical, and vulnerable) species, BLM Sensitive species, and USFWS Species of Concern. These species are described in more detail below.

Invertebrate Species

Four invertebrate species with special status designation occur or have the potential to occur within the Project area (Table 3.3-7).

With the exception of the butterfly, **Barry's hairstreak**, the other three invertebrate species are tied to surface waters and other aquatic environments associated with the Columbia River basin. Barry's hairstreak is found in juniper woodlands and forest openings that have juniper present. This butterfly will also utilize juniper (native and ornamental) in developed areas (Fleckenstein 2006). Limited suitable habitat is present within the Project area.

The **California floater** occurs in shallow muddy or sandy habitats in larger rivers, reservoirs, and lakes. The **western ridged mussel** occurs in creeks and rivers of all sizes, typically on firm mud to coarse particle substrates. Both mussel species have been documented in the Columbia River (Nedeau et al. 2009).

TABLE 3.3-7 SPECIES OF CONCERN AND STATE LISTED SPECIES THAT OCCUR OR POTENTIALLY OCCUR WITHIN THE PROJECT AREA

SPECIES	STATUS[1]	OCCURRENCE[2]	ROUTE SEGMENTS[3]	Shrub Steppe Cover Types[4]				Grassland and Forb Cover Types			Cliff Cover Type	Riparian, Wetland, and Aquatic Cover Types				Disturbed Cover Types		
				Bitterbrush/Perennial Grassland	Rabbitbrush/Annual Grassland	Sagebrush/Annual Grassland	Sagebrush/Perennial Grassland	Annual Grassland	Forb	Perennial Grassland	Rock/Basalt Cliffs	Intermittent Stream/Dry Gully	Open Water/Canal	Riparian/Wetland	Tree	Agriculture	Developed/Disturbed/ Firebreak	Noxious Weeds
Invertebrate Species																		
Barry's hairstreak *(Callophrys gryneus barryi)*	BLM-S	Possible	NNR-1, NNR-2														M	
California floater *(Anodonta californiensis)*	SOC	Likely	NNR-7, NNR-8										S					
Columbia clubtail *(Gomphus lynnae)*	SOC	Likely	NNR-1, NNR-3										S	S				
Western ridged mussel *(Gonidea angulata)*	BLM-S	Likely	NNR-7, NNR-8										S					
Fish Species																		
Coho salmon *(Oncorhynchus kisutch)*	WC	Present	NNR-1, NNR-3, NNR-7, NNR-8										S	S				
Leopard dace *(Rhinichthys falcatus)*	WC	Present	NNR-1, NNR-3, NNR-4, NNR-7, NNR-8, MR-1										S	S				
Mountain sucker *(Catostomus platyrhynchus)*	BLM-S, WC	Present	NNR-1, NNR-3, NNR-4, NNR-7, NNR-8, MR-1										S	S				
Pacific lamprey *(Entosphenus tridentatus* synonym-*Lampetra tridentata)*	SOC, WR	Present	NNR-1, NNR-3, NNR-4, NNR-7, NNR-8, MR-1										S	S				
Pygmy whitefish *(Prosopium coulteri)*	SOC, BLM-S, WS	Possible	NNR-1, NNR-3, NNR-4,										S	S				
River lamprey *(Lampetra ayresii)*	SOC, BLM-S, WC	Present	NNR-1, NNR-3										S	S				

SPECIES	STATUS[1]	OCCURRENCE[2]	ROUTE SEGMENTS[3]	Shrub Steppe Cover Types[4]				Grassland and Forb Cover Types			Cliff Cover Type	Riparian, Wetland, and Aquatic Cover Types				Disturbed Cover Types		
				Bitterbrush/Perennial Grassland	Rabbitbrush/Annual Grassland	Sagebrush/Annual Grassland	Sagebrush/Perennial Grassland	Annual Grassland	Forb	Perennial Grassland	Rock/Basalt Cliffs	Intermittent Stream/Dry Gully	Open Water/Canal	Riparian/Wetland	Tree	Agriculture	Developed/Disturbed/ Firebreak	Noxious Weeds
Sockeye salmon *(Oncorhynchus nerka)*	WC, WR	Present	NNR-7, NNR-8										S	S				
Amphibian and Reptile Species																		
Columbia spotted frog *(Rana luteiventris)*	WC	Possible	NNR-7, NNR-8										S	S				
Northern leopard frog *(Rana pipiens)*	SOC, WE	Possible	NNR-7, NNR-8										S	S				
Western toad *(Bufo boreas)*	WC	Possible	NNR-1, NNR-3, NNR-7, NNR-8										S	S				
Night snake *(Hypsiglena torquata)*	BLM-S	Present	NNR-1, NNR-3, NNR-7, NNR-8	S	S	S	S	S	S	S		S		S	S			
Northwestern pond turtle *(Actinemys marmorata marmorata)*	BLM-S	Possible	NNR-7, NNR-8										S	S				
Sagebrush lizard *(Sceloporus graciosus)*	SOC, BLM-S, WC	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S			S											
Sharptail snake *(Contia tenuis)*	SOC, BLM-S, WC	Possible	NNR-1, NNR-3									M		M				
Side-blotched lizard *(Uta stansburiana)*	BLM-S	Likely	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S			S											
Striped whipsnake *(Masticophis taeniatus)*	BLM-S, WC	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	S	S	S	S	S						

SPECIES	STATUS[1]	OCCURRENCE[2]	ROUTE SEGMENTS[3]	Shrub Steppe Cover Types[4]				Grassland and Forb Cover Types			Cliff Cover Type	Riparian, Wetland, and Aquatic Cover Types				Disturbed Cover Types		
				Bitterbrush/Perennial Grassland	Rabbitbrush/Annual Grassland	Sagebrush/Annual Grassland	Sagebrush/Perennial Grassland	Annual Grassland	Forb	Perennial Grassland	Rock/Basalt Cliffs	Intermittent Stream/Dry Gully	Open Water/Canal	Riparian/Wetland	Tree	Agriculture	Developed/Disturbed/ Firebreak	Noxious Weeds
Bird Species - Passerine and Other Birds																		
Black swift[5] *(Cypseloides niger)*	SOC	Possible	NNR-1, NNR-2, NNR-3, NNR-4											M	M			
Black-throated sparrow[5] *(Amphispiza bilineata)*	BLM-S	Likely	NNR-7, NNR-8	S	S	S	S											
Bobolink[5] *(Dolichonyx oryzivorus)*	BLM-S	Possible	NNR-1, NNR-2, NNR-4, NNR-5, NNR-6, MR-1													S		
Cedar waxwing[5] *(Bombycilla cedrorum)*	BLM-S	Likely	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1											S	S	M	S	
Gray flycatcher[5] *(Empidonax wrightii)*	BLM-S	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	M		M	M					M						
Lewis' woodpecker[5] *(Melanerpes lewis)*	WC	Possible	NNR-1, NNR-2, NNR-3, NNR-6, NNR-7, NNR-8,											M	M			
Lesser goldfinch[5] *(Carduelis psaltria)*	BLM-S	Very Unlikely																
Loggerhead shrike[5] *(Lanius ludovicianus)*	SOC, WC	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	M		M	M					S		S	S	S		
Oregon vesper sparrow[5] *(Pooecetes gramineus affinis)*	BLM-S	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	M	M	M	M					S		S	S	S	S	
Sage sparrow[5] *(Amphispiza belli)*	WC	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	M			S					M						

SPECIES	STATUS[1]	OCCURRENCE[2]	ROUTE SEGMENTS[3]	Shrub Steppe Cover Types[4]				Grassland and Forb Cover Types			Cliff Cover Type	Riparian, Wetland, and Aquatic Cover Types				Disturbed Cover Types		
				Bitterbrush/Perennial Grassland	Rabbitbrush/Annual Grassland	Sagebrush/Annual Grassland	Sagebrush/Perennial Grassland	Annual Grassland	Forb	Perennial Grassland	Rock/Basalt Cliffs	Intermittent Stream/Dry Gully	Open Water/Canal	Riparian/Wetland	Tree	Agriculture	Developed/Disturbed/ Firebreak	Noxious Weeds
Sage thrasher[5] *(Oreoscoptes montanus)*	WC	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	M	M	S					S						
Vaux's swift[5] *(Chaetura vauxi)*	WC	Likely	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1										M	M	M			
Yellow-billed cuckoo[5] *(Coccyzus americanus)*	C, WC	Very Unlikely																
Bird Species - Raptors																		
Bald eagle[5,6] *(Haliaeetus leucocephalus)*	SOC, BLM-S, WS	Present	NNR-1, NNR-2, NNR-7, NNR-8										S	S	S	M		
Burrowing owl[5] *(Athene cunicularia)*	SOC, BLM-S, WC	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	S	S	S		M				S	S	
Ferruginous hawk[5] *(Buteo regalis)*	SOC, BLM-S, WT	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	S	S	S		S		S	S	S		
Golden eagle[5,6] *(Aquila chrysaetos)*	WC	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	S	S	S	S	S		S	S	S		
Gyrfalcon[5] *(Falco rusticolus)*	BLM-S	Possible	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	S	S	S						S		
Peregrine falcon[5] *(Falco peregrinus)*	SOC, BLM-S, WS	Present	NNR-7, NNR-8								S		S	S				

SPECIES	STATUS[1]	OCCURRENCE[2]	ROUTE SEGMENTS[3]	Shrub Steppe Cover Types[4]				Grassland and Forb Cover Types			Cliff Cover Type	Riparian, Wetland, and Aquatic Cover Types				Disturbed Cover Types		
				Bitterbrush/Perennial Grassland	Rabbitbrush/Annual Grassland	Sagebrush/Annual Grassland	Sagebrush/Perennial Grassland	Annual Grassland	Forb	Perennial Grassland	Rock/Basalt Cliffs	Intermittent Stream/Dry Gully	Open Water/Canal	Riparian/Wetland	Tree	Agriculture	Developed/Disturbed/ Firebreak	Noxious Weeds
Bird Species - Upland Game Birds																		
Chukar *(Alectoris chukar)*	WR	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-6, NNR-7, NNR-8, MR-1	M	M	M	M	M	M	M	S	M						
Columbian sharp-tailed grouse *(Tympanuchus phasianellus columbianus)*	SOC	Possible	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	M	M	S	M	S	S		M						
Mountain Quail *(Oreortyx pictus)*	BLM-S	Very Unlikely																
Ring-necked pheasant *(Phasianus colchicus)*	WR	Likely	NNR-1, NNR-2, NNR-4, NNR-5, NNR-6, MR-1									M		M		S		
Bird Species – Waterfowl, Shorebirds and Other Water-birds																		
American white pelican[5] *(Pelecanus erythrorhynchos)*	BLM-S, WE	Present	NNR-1, NNR-3, NNR-7, NNR-8,										S	S				
Black-crowned night-heron[5] *(Nycticorax nycticorax)*	WR	Likely	NNR-7, NNR-8										S	S				
Clark's grebe[5] *(Aechmophorus clarkii)*	BLM-S, WC	Likely	NNR-7, NNR-8										S					
Common loon[5] *(Gavia immer)*	BLM-S	Present	NNR-7, NNR-8										S					
Eared grebe[5] *(Podiceps nigricollis)*	BLM-S	Likely	NNR-1, NNR-7, NNR-8,										S					
Great blue heron[5] *(Ardea herodias)*	WR	Likely	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1										S	S		M		
Long-billed curlew[5] *(Numenius americanus)*	BLM-S	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	S	S	S		M				S		

SPECIES	STATUS[1]	OCCURRENCE[2]	ROUTE SEGMENTS[3]	Shrub Steppe Cover Types[4]				Grassland and Forb Cover Types			Cliff Cover Type	Riparian, Wetland, and Aquatic Cover Types				Disturbed Cover Types		
				Bitterbrush/Perennial Grassland	Rabbitbrush/Annual Grassland	Sagebrush/Annual Grassland	Sagebrush/Perennial Grassland	Annual Grassland	Forb	Perennial Grassland	Rock/Basalt Cliffs	Intermittent Stream/Dry Gully	Open Water/Canal	Riparian/Wetland	Tree	Agriculture	Developed/Disturbed/ Firebreak	Noxious Weeds
Upland Sandpiper[5] *(Bartramia longicauda)*	WE,	Very Unlikely																
Sandhill crane[5] *(Grus canadensis)*	BLM-S, WE	Possible	NNR-1, NNR-2, NNR-4, NNR-5, NNR-6, MR-1											S		S		
Tundra swan[5] *(Cygnus columbianus)*	WR	Likely	NNR-1, NNR-2, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1										S	S		S		
Western grebe[5] *(Aechmophorus occidentalis)*	WC	Likely	NNR-7, NNR-8										S					
Mammal Species																		
Bighorn sheep *(Ovis canadensis)*	WR	Present	NNR-3, NNR-4, MR-1	M	M	M	M	M	M	M	S	M						
Black-tailed jackrabbit *(Lepus californicus)*	BLM-S, WC	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	M	S	M	S	S		S						
Columbian black-tailed deer *(Odocoileus hemionus columbianus)*	WR	Present	NNR-1, NNR-2, NNR-3, NNR-4, , MR-1	S	M	M	S	M	S	S		S		S	S	S	M	M
Elk *(Cervus canadensis)*	WR	Present	NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	M	M	S	M	S	S		S		S	S	S		
Merriam's shrew *(Sorex merriami)*	WC	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	M	M	M		S						
Northwest white-tailed deer *(Odocoileus virginianus ochrourus)*	WR	Possible	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	M	M	M	M	M	M	M		M		S	S	S	M	M

SPECIES	STATUS[1]	OCCURRENCE[2]	ROUTE SEGMENTS[3]	Shrub Steppe Cover Types[4]				Grassland and Forb Cover Types			Cliff Cover Type	Riparian, Wetland, and Aquatic Cover Types				Disturbed Cover Types		
				Bitterbrush/Perennial Grassland	Rabbitbrush/Annual Grassland	Sagebrush/Annual Grassland	Sagebrush/Perennial Grassland	Annual Grassland	Forb	Perennial Grassland	Rock/Basalt Cliffs	Intermittent Stream/Dry Gully	Open Water/Canal	Riparian/Wetland	Tree	Agriculture	Developed/Disturbed/ Firebreak	Noxious Weeds
Pallid bat *(Antrozous pallidus)*	BLM-S	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	M	M	M	S	S	M	S	S	S	M	
Preble's shrew *(Sorex preblei)*	WC	Very Unlikely																
Rocky mountain mule deer *(Odocoileus hemionus hemionus)*	WR	Present	NNR-1, NNR-2, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	M	M	S	M	S	S		S		S	S	S	M	M
Spotted bat *(Euderma maculatum)*	BLM-S	Possible	NNR-2, NNR-3, NNR-7, NNR-8	S	S	S	S	M	M	M	S	S	M	S	S	S	M	
Townsend's big-eared bat *(Corynorhinus townsendii)*	BLM-S, WC	Possible	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	M	M	M	S	S	M	S	S	S	S	
Townsend's ground squirrel *(Urocitellus townsendii)*	SOC, WC	Likely	NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	M	M	S	M	M	M						M		
White-tailed jackrabbit *(Lepus townsendii)*	BLM-S, WC	Present	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	M	S	M	S	S		S						

Sources: WDFW 2013a, BLM 2007, USFWS 2010a,b,c.

[1] Status: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; WE – Washington State Endangered; WT – Washington State Threatened; WC – Washington State Candidate, WS – Washington State Sensitive; and WR – Washington State Rare; CH – designated critical habitat.

[2]Occurence: Present – species documented within the Project area; Likely - species likely to occur based on presence of suitable habitat and local species abundance and nearby occurrences; Possible – species may occur based on presence of marginal or suitable habitat and/or occurrences within 25 to 50 miles, depending on species mobility; Very Unlikely – species is very unlikely to occur due to lack of habitat and/or Project area is well outside of species known range (at least 25 to 50 miles, depending on species mobility.

[3] Route Segments: Route segments with potential for species occurrence are listed.

[4]Cover Types: S – cover type provides suitable habitat for this species; M – cover type provides marginal habitat for this species.

[5]Species protected under the MBTA.

[6]Species protected under the Bald and Golden Eagle Protection Act.

Eggs of the **Columbia clubtail** are laid in the water, with the larvae burrowing into and overwintering in mud. This dragonfly is found in a variety of river habitats, ranging from sandy to muddy or rocky. Water flow tends to be slow-moving. Only five populations of Columbia clubtail are known, with the closest population occurring on the Yakima River (Abbot 2007). No known populations occur on the Columbia River.

Fish Species

Seven special status fish species occur or have the potential to occur in the Project area (Table 3.3-7).

Coho salmon spend the first half of their life cycle rearing and feeding in streams and small freshwater tributaries. Coho salmon spawning habitat is small streams with stable gravel substrates (NOAA 2012). Within the Project area, Coho salmon occur in the Columbia River and the Yakima River (SalmonScape 2013). The Coho salmon within the Project area are outside the lower Columbia River Coho ESU which is designated as Threatened under the ESA (NOAA 2012).

Sockeye salmon exhibit a wide variety of life history patterns that reflect varying dependency on the freshwater environment. The vast majority of sockeye salmon spawn in or near lakes, for this reason, the major distribution and abundance of large sockeye salmon stocks are closely related to the location of rivers that have accessible lakes in their watersheds for juvenile rearing (NOAA 2012). In addition to lakes, sockeye salmon appear to consistently spawn in four tributaries of the Columbia River – the Methow, Entiat, and Similkameen Rivers and Icicle Creek (NOAA 1997). These tributaries are located north of the Project area. Sockeye salmon occur in the Columbia River within the Project Area (SalmonScape 2013); however, the sockeye salmon within the Project area are outside the designated ESUs in Washington and are not listed under the ESA (NOAA 2012).

Pygmy whitefish are most commonly found in cool lakes and streams of mountainous regions. Streams inhabited typically have moderate to swift current and may be silty or clear (Hallock and Mongillo 1998). While they are known to occur within the Upper Yakima River Watershed (NatureServe 2013), limited habitat for pygmy whitefish is present within the Project area and it is unlikely that they occur (Hallock and Mongillo 1998).

The **pacific lamprey** and **river lamprey** are the only two parasitic and migratory lampreys in the Columbia River system (Close et al. 1995; USFWS 2009). River lamprey occur in the Upper Yakima River Watershed and pacific lamprey occur in the Upper Yakima River and Upper Columbia River-Entiat Watersheds, which overlap the Project area (NatureServe 2013). Near the Project area, adult pacific lamprey pass through the Priest Rapids Dam vary dramatically from year to year-from 2000 to 2010 counts ranged from 1,114 to 5,083 and averaged 2,935,-but there has been no apparent increase or decrease over time (r^2=0.01; Caudill et al. 2011; Anderson et al. 2011). Compared with historical estimates, adult pacific lamprey counts have decreased at all Columbia and Snake River dams (Anderson et al. 2011; Keefer et al. 2011).

The **leopard dace** and the **mountain sucker** inhabit flowing pools, gravel runs of creeks, small to medium rivers, and along the margins of lakes (Froese and Pauly 2011). Both occur in the Upper Columbia-Entiat and Upper Yakima River watersheds, which overlap the Project area (NatureServe 2013).

Amphibian and Reptile Species

Three amphibian and six reptile special status species occur or have the potential to occur in the Project area (Table 3.3-7). A map showing the locations of sensitive wildlife species is presented in Appendix A; however, due to the sensitive nature of location information, this map is presented at a small-scale (WDFW 2011b; Guggenmos 2012).

Amphibians

Most amphibian habitat is associated with the Columbia River Basin and related perennial surface waters. **Columbia spotted frogs** are highly aquatic during all life stages. They breed in standing or sluggish water including ponds, lake edges, marshes, slow-moving streams, backwaters, and floodwater pools (AmphibiaWeb 2011). Although common in other parts of Washington, only small, scattered populations occur in the Columbia Basin. The Project area is on the periphery of the expected distribution of Columbia spotted frogs and they have never been reported in the vicinity of the Project area (Army 2010; Grant County Public Utility District [PUD] 2003). Suitable habitat is very limited in the Project area.

Historical data indicate that **northern leopard frogs** were present along the Columbia River and its major tributaries (WDFW 2013b). Museum records indicate that northern leopard frogs were present within the Crab Creek drainage, located well outside of the Project area (McAllister et al. 1999; Grant County PUD 2003). Limited suitable habitat is available within the Project area and they are unlikely to occur.

Western toads occur in a wide variety of habitats including desert springs and streams, meadows and woodlands and mountain wetlands. Within the Washington portion of the Columbia Plateau, where the Project area is located, their distribution is limited (Hallock and McAllister 2005). Limited suitable habitat is available within the Project area and they are unlikely to occur.

Reptiles

Reptiles are not especially diverse in the Columbia Basin, particularly when compared to arid areas that experience warmer winters. Reptile habitat is generally distributed across the Project area. The **night snake** occurs in a variety of habitats, from coastal dunes, mountain meadows, grasslands, to oak woodland and ponderosa pine forests (Weaver 2008). Within the Project area, the night snake is known to occur near the Columbia River. Additional records indicate the night snake also occurs along the Yakima River, outside of the Project area (Weaver 2008).

The **sharptail snake** occurs in woodland, forests, grassland, and chaparral that are seasonally moist. Its range is limited to parts of California, Oregon, Washington, and extreme southwestern British Columbia (Hoyer et al. 2006). Within Washington, sharptail snake has been documented west of the Project area in the Yakima River Canyon and Umtanum Creek. Limited suitable habitat for the sharptail snake is present within the Project area.

The **striped whipsnake** is found in sagebrush flats, grasslands, and in basalt outcrops (Hallock and McAllister 2005). This species is rare throughout its range in Washington. According to WDFW, the striped whipsnake is known to occur in one location, near the Vantage Substation. This occupied habitat extends from Highway 26, located north of Vantage Substation, south to Lower Crab Creek. Historically occupied habitat in the Project area also extends to both sides of the Columbia River and continues south to the Hanford Site (WDFW 2013c; Appendix A - Sensitive Wildlife Species).

The **northwest pond turtle** is described as an aquatic turtle utilizing streams, ponds, lakes and ephemeral wetlands; however, it requires terrestrial habitats for nesting. The northwest pond turtle is reduced from much of its range in Washington, with only two documented populations remaining in the Columbia River Gorge. Additional turtles are believed to still occur in wetlands that have not been surveyed in western Washington and along the Columbia River (Brown 2011). In the Project area, potential suitable habitat is limited to along the Columbia River.

The **sagebrush lizard** is primarily associated with sand dunes and other sandy habitats that support shrubs and have large areas of bare ground (Hallock and McAllister 2005). This species is known to occur within the Project area near the Vantage Substation.

Side-blotched lizards occur in arid areas that support shrub-steppe habitat. They are most common in areas that have bare ground interspersed with shrubs and other vegetation. Side-blotched lizards are known to occur near the Columbia River, north of the Project area (Hallock and McAllister 2005). Side-blotched lizards have not been documented in the Project area, but suitable habitat exists.

Bird Species

Thirty-four avian special status species are known or likely to occur in the Project area; all but four are protected under the MBTA (Table 3.3-7). Avian species have potential habitat throughout the entire Project area. A map showing the locations of sensitive wildlife species is presented in Appendix A; however, due to the sensitive nature of location information, this map is presented at a small-scale (WDFW 2011b; Guggenmos 2012).

Passerines and Other Birds

The Project area lies within the critical breeding habitat of the **black swift**; however, nesting habitat for the black swift is highly specialized in forested areas near rivers. Nests are often located behind waterfalls or on damp cliffs (BirdWeb 2008). Suitable nesting habitat is unlikely to occur within the Project area; however, the Project area is on the eastern edge of their foraging, summer non-breeding range (Opperman et al. 2006).

The **black-throated sparrow** occurs in desert scrub, saltbush, greasewood, sagebrush, antelope bitterbrush and rabbitbrush shrublands (Paige and Ritter 1999). In Washington, they often favor degraded and dry, rocky areas along Columbia River (BirdWeb 2008; Opperman et al. 2006). The Project area is within the black-throated sparrow's core breeding habitat zone and suitable habitat is present within the Project area.

Bobolinks are generally found in tall-grass prairies, hay fields, and similar open areas (BirdWeb 2008). The Project area is not within the bobolinks breeding habitat zone. Limited suitable habitat exists in developed agricultural land within the Project area.

Cedar waxwings inhabit open, lowland woodlands with shrubs and small trees, especially when berry-producing trees and shrubs are present. They are often found in streamside woods, forest clearings, edges of wetlands, residential areas, orchards, and stands of Russian olive (BirdWeb 2008). Very little habitat is present and it is widely scattered throughout the Project area.

The **gray flycatcher** is associated with sagebrush and juniper habitats. The Project area is within the migration corridor for the gray flycatcher (BirdWeb 2008). Suitable habitat is present within the Project area, but the species is rare in the Project area; a single individual was observed singing a few hundred meters north of NNR-6 by POWER biologists during the 2013 field surveys.

Lewis's woodpecker is associated with open forests; primary habitats in Washington include ponderosa pine forests, Garry oak stands, and forested riversides with large cottonwoods and other hardwoods (Larsen et al. 2004). Limited suitable habitat is present within the Project area, primarily along the Yakima River and Burbank Creek, and possibly along Lmuma Creek, the Columbia River, Johnson Creek, and Foster Creek.

The **lesser goldfinch** is typically found in dry, open woodlands, pastures, steppe, forest openings and beside streams. In Washington, they are closely associated with Garry oak, especially at the brushy edges of Garry oak stands. The Project area is outside the known range of the lesser goldfinch (BirdWeb 2008). Potential suitable habitat exists within the Project area, but it is unlikely that lesser goldfinch is present.

In Washington, the **loggerhead shrike** breeds primarily in shrub-steppe habitats. The Project area is within the core breeding habitat zone for loggerhead shrikes (Larsen et al. 2004). Loggerhead shrikes have been documented in the Project area and large tracts of suitable shrub-steppe habitats occur throughout the Project area.

Oregon vesper sparrows are commonly found in dry grasslands, sagebrush steppe, and agricultural fields. They are uncommon in sagebrush-steppe areas that are heavily grazed or have little grass cover (BirdWeb 2008; Paige and Ritter 1999). Suitable habitat exists throughout the Project area and they were occasionally observed by POWER biologists during 2013 field surveys.

The **sage sparrow** and **sage thrasher** are sagebrush obligate avian species that are on the sensitive species list. The Project area is within the core breeding habitat for sage sparrows (Larsen et al. 2004). Sage sparrows are known to occur in the JBLM YTC (Duke Engineering and Services [DES] 2000) and the Project area and are abundant in NNR-6 and NNR-7. Suitable habitat is present throughout the Project area. The sage thrasher is common in sagebrush and bitterbrush habitats in the Columbia Basin, but was more widespread prior to the conversion of large tracts of sagebrush habitats to agricultural lands. The Project area is within the core breeding habitat zone for sage thrasher (Larsen et al. 2004). Sage thrashers occur in the JBLM YTC during the summer months (DES 2000), and were commonly observed along the Project area by POWER biologists. Suitable habitat is present throughout the Project area.

Vaux's swifts forage over woodlands, lakes and rivers, where flying insects are abundant. They typically nest in old growth coniferous forests. The Project area is within the known range of the Vaux’s swift, probably used only during migration (BirdWeb 2008; Larsen et al. 2004).

Yellow-billed cuckoo historically nested along wooded rivers in eastern Washington, but are officially considered extirpated in Washington (Birdweb 2008). Vagrants are rarely sighted in Washington.

Raptors

Breeding **bald eagles** need large trees near open water with a relatively low level of human activity. In general, bald eagles nest near coastlines, rivers, large lakes or streams that support an adequate food supply (USFWS 2007b). In the winter, the Columbia River’s reservoirs and major tributaries become important bald eagle habitat. Bald eagles have been documented wintering and foraging along the Columbia River including along the Priest Rapids and Wanapum Reservoirs and the Hanford Reach (JBLM YTC 2002; Federal Energy Regulatory Commission [FERC] 2006). Approximately 10 to 15 bald eagles winter along the Priest Rapids Reservoir. During surveys of the Priest Rapids Reservoir in 2001 and 2002 no bald eagles were observed during summer and no nesting behavior was observed (FERC 2006). A bald eagle nest is known to occur near the Yakima River.

Burrowing owls are found in open, shrub-steppe or grassland habitats that have burrowing mammals, especially ground squirrels present (Paige and Ritter 1999). Nesting burrowing owls have been documented in the Project area (DES 2000).

The **ferruginous hawk** is found in flat or rolling sagebrush steppe and other arid shrublands (Paige and Ritter 1999). The Project area is within the core breeding habitat zone for ferruginous hawks (Larsen et al. 2004). Small numbers of ferruginous hawks are known to occur in the JBLM YTC and in the Project area.

In Washington, **golden eagles** nest throughout much of the state and observations of golden eagles along the upper Columbia River suggest that they may remain within nesting territories throughout the winter (Larsen et al. 2004). Golden eagles are commonly associated with open areas, such as shrub-steppe, grasslands, open ponderosa pine forests and large clearcuts. They typically nest on cliff ledges and large trees (DeLong 2004). Golden eagles have been documented in the Project area.

In Washington, **peregrine falcons** typically nest in the San Juan Islands and the Puget Sound; however, nests have been found in the dry arid climate of eastern Washington where peregrines nest on cliffs at prominent points overlooking major lakes or rivers (Hayes and Buchanan 2001). In the Project area, peregrine falcons have been observed migrating along the Columbia River, but are rarely observed in the JBLM YTC (JBLM YTC 2002).

Gyrfalcons breed in arctic tundra. Within Washington, they winter in open habitats in very low numbers. While gyrfalcons are rare within Washington, they winter in small numbers every year; Audubon Society Christmas Bird Counts documented them in Washington every year from 1990 to 2011 (Audubon 2014). The Project area is considered to be within gyrfalcon winter range by the Seattle Audubon Society (BirdWeb 2013).

Upland Game Birds

Chukars are found in steep, rocky shrub-steppe habitats with perennial and annual grasses and forbs (Larsen et al. 2004). The Project area is within the primary management zone for chukar and they are documented to occur within the Project area.

Columbian sharp-tailed grouse are associated with prairie grasslands and sagebrush grasslands with an understory of perennial bunchgrasses and forbs (Paige and Ritter 1999). The sharp-tailed grouse decline in Washington is primarily a result of loss and degradation of habitat. The Project area is within the historical range of the Columbian sharp-tailed grouse, but they are now known from only four counties in northeastern Washington (Stinson and Schroeder 2010). Potential suitable habitat exists in the Project area, but it is unlikely that Columbian sharp-tailed grouse are present.

Ring-necked pheasants inhabit edges of open fields. Within Washington, they are often found in wet areas and rarely found in dry areas—prime habitat in Washington is cattail and willow patches near irrigated farmlands (BirdWeb 2013). The Project area is within the known range of the ring-necked pheasant, and suitable habitat occurs in agricultural pockets within the Project area. They have been documented on the JBLM YTC and near the Vantage Substation, just outside the Project area.

Mountain quail are known to occur in three separate populations within Washington; the nearest is about 45 miles south of the Project, in Klickitat County (Birdweb 2008). They inhabit dense thickets with scattered open areas on slopes; suitable habitat does not occur within the Project area.

Waterfowl, Shorebirds, and Other Water-birds

American white pelicans nest on isolated islands on lakes and rivers, and forage in shallow lakes and rivers. Non-breeding pelicans occur within the Project area on the Columbia and Yakima Rivers (BirdWeb2013). POWER biologists observed them within the Project area on the Columbia River.

Great blue herons use a wide variety of wet habitats, including lakes, streams, canals, and moist meadows. They nest colonially, usually in mature riparian forests. Within the Project area, suitable habitat exists along rivers, streams, and irrigated agricultural areas near canals (BirdWeb 2013).

Black-crowned night herons breed in wetlands along the Columbia River. In the Project vicinity, they have been documented in several locations on Priest Rapids Lake (BirdWeb 2013).

During the breeding season, **Clark's grebe** and **western grebe** nest in freshwater wetlands with a mix of open water and emergent vegetation (BirdWeb 2008); non-breeding birds frequent large lakes, rivers, and reservoirs. Clark's grebe and the western grebe are both known to occur within the Columbia National Wildlife Refuge and likely occur within the Project area on the Columbia River. Clark's grebe is also known to occur in the Saddle Mountain Wildlife Refuge. Both Refuges are outside the Project area. In eastern Washington, **eared grebes** breed in large freshwater lakes and reservoirs with open water and emergent vegetation (BirdWeb 2008), and likely occur within the Project area on the Columbia River and in backwater areas along the Yakima River.

Migrant **common loons** winter along Washington's coast, the Columbia and Snake Rivers, and on lakes in northeastern Washington (Larsen et al. 2004). Records indicate that common loons are present within the Project area, along the Columbia River.

Dry grasslands and shrub-steppe, generally near water, are the traditional breeding habitats of **long-billed curlews**. They will also nest in grain fields and pastures. The Project area is within the breeding range of the long-billed curlew (BirdWeb 2008; Paige and Ritter 1999). They have been documented on the JBLM YTC and within the Project area.

Sandhill cranes inhabit wet meadows, moist grasslands, and wetlands, and often feed in grain fields and pastures. During migration and in winter, they live in more open mesic prairie, agricultural fields, and river valleys (BirdWeb 2008; Larsen et al. 2004). The Project area is within the migration range of sandhill cranes but is not within a known migratory stopover or nesting area (Larsen et al. 2004).

Tundra swans occur in Washington during winter and migration, where they feed in open, moist and mesic habitats, including agricultural fields with stubble and in wetlands with emergent vegetation. The Project area is within the non-breeding and migration range of tundra swans and they have been observed near the Columbia and Yakima Rivers in the general vicinity of the Project (DES 2000; BirdWeb 2008).

Mammal Species

Thirteen mammal special status species are known or likely to occur in the Project area (Table 3.3-7). Mammal species have potential habitat throughout the entire Project area. A map showing the locations of sensitive wildlife species is presented in Appendix A; however, due to the sensitive nature of location information, this map is presented at a small-scale (WDFW 2011b; Guggenmos 2012).

Bighorn sheep typically occur in remote mountain terrain and in a variety of plant communities including alpine meadows, woodlands, mixed-grass prairie, shrub-steppe, and dry pinyon-juniper (American Society of Mammalogists [ASM] 2011). Bighorn sheep are observed infrequently on JBLM YTC (JBLM YTC 2002). Resident bighorns are found immediately west of the Project area within the Yakima Canyon and along bluffs within the Yakima River drainage (JBLM YTC 2002). The Project area overlaps the Mt. Baldy bighorn sheep winter range. Potential habitat exists within the Project area; however, suitable habitat may be limited to canyons outside the Project area.

Black-tailed jackrabbit occurs in sagebrush and grasslands within the Columbia Plateau (ASM 2011; WDFW 2013b). Black-tailed jackrabbits have been observed within the Project area and suitable habitat exists throughout the Project area. **White-tailed jackrabbit** occurs in the grasslands of Columbia Basin (ASM 2011). They are associated with bunchgrass grasslands, rabbitbrush, and relatively undisturbed sagebrush-steppe habitats (DES 2000; WDFW 2013b). White-tailed jackrabbits have been documented within the Project area and suitable habitat exists.

In Washington, WDFW identifies deer east of U.S. Route 97 (US-97) as **Rocky Mountain mule deer** and deer west of US-97 as **Columbian black-tailed deer**. Rocky Mountain mule and Columbian black-tailed deer occupy a wide variety of habitats in Washington, including canyon complexes along the major rivers, shrub-steppe, grasslands, and coniferous forests. Shrub steppe and grasslands provide important deer habitat, especially during winter months. Suitable habitat exists within the Project area. The Columbia Basin represents the periphery of the **northwest white-tailed deer** distribution in central Washington. The habitat in the Project area is generally more suitable for mule deer. In the Columbia Basin, white-tailed deer are associated with riparian areas along creeks and streams, grasslands and agricultural land (WDFW 2010). Suitable habitat in the Project area is limited, occurring primarily near Burbank, Foster, and Johnson Creeks.

Elk occur in open areas such as alpine pastures, marshy meadows, river flats, aspen parklands, and coniferous forests (Snyder 1991). Elk winter range generally consists of shrub-steppe habitats in relatively close proximity to denser forested cover areas. Elk are known to occur west of the Project area in Wenas Wildlife Area (DES 2000). Suitable habitat is present within the Project area and they were observed within the Project area by POWER biologists during 2013 field surveys.

Merriam's shrew is most commonly found in big sagebrush, rabbitbrush and bitterbrush shrublands (Azerrad 2004). Information about the range of Merriam's shrew is limited; however, it has been documented in the JBLM YTC and within the Project area (DES 2000; Azerrad 2004). The Project area occurs outside the known range of **Preble's shrew** and this species has not been documented in the Project area (NatureServe 2013). Recorded habitat for Preble's shrew includes arid and semiarid shrub-grass associations dominated by sagebrush (NatureServe 2013). Suitable habitat exists within the Project area.

The **pallid bat** is associated with rock cliffs in shrub-steppe or desert areas across the west. Typical shrubs in areas where pallid bats occur include antelope bitterbrush, sagebrush, rabbitbrush and forest cover types include ponderosa pine and riparian forests. They typically roost in cliff crevices, caves, mines, tree cavities, and occasionally buildings. The Project area is within the known range of the pallid bat and they have been observed in the JBLM YTC (DES 2000; Ferguson and Azerrad 2004). Suitable habitat is present within the Project area.

Spotted bats are found in vegetation types ranging from desert to sub-alpine meadows, including desert-scrub, pinyon-juniper woodland, ponderosa pine, mixed conifer forest, canyon bottoms, rims of cliffs, riparian areas, fields, and open pasture (Chambers and Herder 2005). Spotted bats are not known to occur within the Project area, but suitable habitat exists.

Townsend's big-eared bats have been documented in nearly every county in Washington. Townsend's big-eared bats are found in mixed conifer-hardwood forest, ponderosa pine forest, shrub-steppe, and riparian-wetlands with caves, lava tubes, mines, old buildings, bridges and concrete bunkers commonly used as day roosts in Washington (WDFW 2013b). There are no records of Townsend's bats occurring in or around the Project area and they have not been documented on JBLM YTC (DES 2000; Woodruff and Ferguson 2005); however, suitable habitat exists.

Townsend's ground squirrels are associated with shrub-steppe (especially big sagebrush - wheatgrass association) and sandy soils, but can occasionally be found in agricultural fields. Their distribution is limited to Kittitas, Yakima, Benton and Klickitat counties (WDFW 2013b). They have been documented on JBLM YTC and suitable habitat exists within the Project area (DES 2000; Howard 1996).

3.3.4 NNR Route Segment Considerations

3.3.4.1 Route Segment NNR-1

Route Segment NNR-1 is 2.4 miles long and follows Sage Trail Road for the majority of its length, following an existing distribution line and traversing through a rural residential area. This route segment is comprised primarily of disturbed shrub-steppe dominated by annual grasses such as cheatgrass (3,286.1 acres, 67.5 percent) and shrub-steppe that has been converted to agriculture (560.2 acres, 11.5 percent; Table 3.3-2). Approximately 7.4 percent (358.4 acres) of Route Segment NNR-1 consists of big sagebrush with an understory of native perennial bunchgrasses. Suitable habitat for shrub-steppe and grassland species is limited. Route Segment 1a crosses a concrete-lined irrigation canal and several intermittent or ephemeral drainages with no riparian habitat present. Riparian habitat is present along the Yakima River, west of the route segment.

Coho salmon, leopard dace, mountain sucker, pacific lamprey, bull trout and steelhead (Middle Columbia River) are known or likely to occur in the Yakima River, to the west of Route Segment NNR-1. Bald eagles are known to nest near the Selah Gravel Pit wetlands, located along the Yakima River and west of Route Segment NNR-1. The Selah Gravel Pit wetlands are also used by waterfowl.

The entire route segment ROW is within the Rattlesnake Hills Sage-grouse MU (Regularly Occupied Habitat; Table 3.3-8). The eight-mile wide sage-grouse analysis area also encompasses area set aside by JBLM YTC as a primary protection zone for sage-grouse.

Because this route segment passes through a suburban residential area with heavily fragmented shrub-steppe habitat and a prevalence of disturbed ground and cheatgrass, the entire route segment ROW (100 percent) was classified as unsuitable sage-grouse habitat in all seasons (Appendix B-2 - Habitat Assessment). The eight-mile wide sage-grouse analysis area for NNR-1 contains 6,904 acres of suitable sage-grouse habitat (16 percent of the analysis area) and 1,497 acres of marginal habitat (three percent; Table 3.3-9).

The estimated sage-grouse population range does not overlap the NNR-1 ROW. The route segment analysis area overlaps approximately one percent (3,871 acres) of the total JBLM YTC 95 percent population range. The core population range does not overlap the analysis area (Figure 3.3-4). NNR-1 was not surveyed during ground transect sage-grouse surveys in 2013 due to lack of suitable habitat within the ROW. No active, inactive or historical leks are known to occur within four miles of this proposed route segment (Table 3.3-5). Sage-grouse may occur in the area on an infrequent basis, but lack of habitat, estimated population range and lek data indicate that sage-grouse are unlikely to lek near Route Segment NNR-1.

Within Route Segment NNR-2, black-tailed jackrabbit have been documented near the JBLM YTC cantonment area. The Selah Creek cliffs contain a high concentration of raptors, including golden eagle and prairie falcon. The pallid bat has been detected along Selah Creek within one mile of Route Segment NNR-2. A burrowing owl nest, active in the 1990s, occurs approximately 0.7 mile east of Route Segment NNR-2 and near the JBLM YTC cantonment area.

The entire route segment ROW is within sage-grouse management units defined as Regularly Occupied Habitat (Table 3.3-8). Approximately one mile of the route segment is adjacent to the area set aside by JBLM YTC as a primary protection zone for sage-grouse. The eight-mile wide sage-grouse analysis area also includes additional JBLM YTC primary protection zones for sage-grouse.

The eight-mile wide NNR-2 analysis area contains 11,158 acres of suitable sage-grouse habitat (22 percent of the analysis area), 1,511 acres of marginal habitat (three percent), and 38,446 acres of unsuitable habitat (75 percent; Table 3.3-9). No suitable habitat was identified for any season within Route Segment NNR-2 ROW. The entire ROW was considered unsuitable during the breeding and summer seasons due to proximity to developed areas and the prevalence of a cheatgrass understory, as opposed to the native bunchgrasses and forbs that sage-grouse rely on for food and cover during the breeding and summer seasons.

TABLE 3.3-8 SUMMARIES OF GREATER SAGE-GROUSE MANAGEMENT UNITS (ACRES) WITHIN THE EIGHT-MILE WIDE ANALYSIS AREA BY ROUTE SEGMENT

ROUTE SEGMENT	WASHINGTON GREATER SAGE-GROUSE MANAGEMENT UNITS TOTAL ACRES PRESENT WITHIN ANALYSIS AREA[1]		
	REGULARLY OCCUPIED HABITAT PRESENT WITHIN ANALYSIS AREA (ACRES)[2] (416,031 ACRES TOTAL)	OCCASIONALLY OCCUPIED HABITAT PRESENT WITHIN ANALYSIS AREA (ACRES)[2] (558,301 ACRES TOTAL)	EXPANSION HABITAT PRESENT WITHIN ANALYSIS AREA (ACRES)[2] (411,345 ACRES TOTAL)
NNR-1	20,171	2,410	
NNR-2	29,202	7,563	
NNR-3	60,750	13,586	
NNR-4o*	52,361	1,608	
NNR-4u*	52,361	1,608	
NNR-5	39,630		
NNR-6o*	64,143		
NNR-6u*	64,143		
NNR-7	63,601	10,569	
NNR-8	22,590	19,358	804
MR-1	63,352	8,112	

[1]No designated Connectivity Habitat is present within the analysis area. [2]The Analysis Area is defined as an eight-mile wide corridor; four miles from either side of route segment centerlines. *o = overhead design option; u = underground design option. Numbers are rounded and may not sum exactly.

TABLE 3.3-9 SUMMARIES OF SAGE-GROUSE HABITAT WITHIN THE EIGHT-MILE WIDE ANALYSIS AREA (ACRES) BY ROUTE SEGMENT

ROUTE SEGMENT	SUITABLE HABITAT	MARGINAL HABITAT	UNSUITABLE HABITAT
NNR-1	6,904	1,497	35,172
NNR-2	11,158	1,511	38,446
NNR-3	42,085	2,262	35,238
NNR-4o*	35,433	926	18,854
NNR-4u*	35,433	926	18,854
NNR-5	28,459	76	12,178
NNR-6o*	53,145	197	11,780
NNR-6u*	53,145	197	11,780
NNR-7	63,349	316	10,502
NNR-8	28,603	1,465	15,176
MR-1	44,010	4,019	35,410

[1]Habitat Suitability within the eight-mile wide analysis area is derived from land cover types. Land cover types are a composite of GAP vegetation data, JBLM YTC vegetation data, and POWER field survey vegetation data. Suitable habitat includes sagebrush/perennial grassland. Marginal habitat includes sagebrush/annual grassland, riparian, intermittent stream, and bitterbrush/perennial grassland. Unsuitable habitat includes forb, perennial grassland, rabbitbrush/annual grassland, annual grassland and noxious weeds, basalt cliffs/rock, tree, and other (includes agriculture, developed/residential areas and open water).
*o = overhead design option; u = underground design option.

3.3.4.2 Route Segment NNR-2

Route Segment NNR-2 is 5.0 miles long and parallels an existing JBLM YTC fire break road, existing roads and an existing transmission line (BPA Ellensburg-Moxee No.1 115 kV). The majority of Route Segment NNR-2 is comprised of annual grasses (3,545.5 acres, 48 percent) and sagebrush/perennial grassland (1,793.0 acres, 24.3 percent; Table 3.3-2). Approximately 20 acres of rabbitbrush/annual grassland is present along the JBLM YTC firebreak. The shrublands provide suitable habitat for shrub-steppe and grassland species. Route Segment NNR-2 crosses an irrigation canal on JBLM YTC and several un-named intermittent or ephemeral drainages. This route segment also crosses one wetland which is bisected by JBLM YTC's 7th Avenue road. This wetland is highly disturbed but does contain some forested riparian habitat.

The estimated sage-grouse population range does not overlap the NNR-2 ROW. The route segment analysis area overlaps approximately two percent (9,146.1 acres) of the total 95 percent population range. The core population range does not overlap the analysis area (Figure 3.3-4). NNR-2 was not surveyed during ground transect sage-grouse surveys in 2013 due to lack of suitable habitat within the ROW. One active lek (lek #1) is known to occur within four miles of Route Segment NNR-2 (Table 3.3-5). Lek #1 is located approximately 3.7 miles northeast of Route Segment NNR-2. As it is slightly closer to Route Segment NNR-3, lek #1 is described in more detail for Route Segment NNR-3. Additionally, four historic leks occur between three and four miles east of NNR-2.

3.3.4.3 Route Segment NNR-3

Route Segment NNR-3 is 9.3 miles long and more or less parallels I-82. The interstate is within two miles of the route segment for its entire length and separates the segment from the core areas of the JBLM YTC sage-grouse population. Route Segment NNR-3 crosses Washington Department of Transportation (WSDOT), BLM and private land. The Selah Cliffs Natural Area Preserve (NAP), which provides opportunities for wildflower and wildlife watching, and scenic viewing, is located west of Route Segment NNR-3 along Selah Creek. Refer to Section 3-5 Recreation for more information on the Selah Cliffs NAP. Vegetation for Route Segment NNR-3 consists primarily of annual grasses (6,179.7 acres, 44.6 percent) and sagebrush with a perennial grass understory (6,912.0 acres, 49.9 percent; Table 3.3-2). Sagebrush shrublands provide suitable habitat for shrub-steppe and grassland species.

Basalt cliffs (3.7 acres, 0.1 percent) are also present where Route Segment NNR-3 crosses both Selah and Lmuma Creeks. These basalt cliffs contain a high concentration of raptors, including golden eagle, ferruginous hawk and prairie falcon. Pallid bat has been detected along Selah Creek, within one mile of Route Segment NNR-3. This route segment parallels an excavated pond associated with the Selah Creek Rest Area and contains no wetland vegetation. Route Segment NNR-3 also crosses several un-named intermittent or ephemeral drainages and three streams categorized as perennial: Burbank Creek, Lmuma Creek, and Selah Creek (Appendix A - Water Resources Map). Riparian habitat is present along Burbank and Lmuma Creeks. Selah Creek contains perennial flow for much of the season (JBLM YTC 2002); however the reach of Selah Creek within the Project area appears to be intermittent and contains little to no riparian habitat.

Resident bighorn sheep are found west of Route Segment NNR-3 within the Yakima Canyon and along bluffs within the Yakima River drainage. Approximately 5,155 acres of the Mt. Baldy winter range for bighorn sheep is present within one mile of Route Segment NNR-3 and continues west along the eastern side of the Yakima River Canyon. Elk are known to occur west of this route segment in Wenas Wildlife Area. Mule deer are known to occur in the Wenas/Umtanum Ridge area, west of Route Segment NNR-3.

The entire route segment ROW is within sage-grouse management units defined as Regularly Occupied Habitat and Occasionally Occupied Habitat (Table 3.3-8). The eight-mile wide sage-grouse analysis area also includes area set aside by JBLM YTC as a primary protection zone for sage-grouse.

Much of this route segment consists of annual grassland and perennial grassland, especially on south-facing slopes near the southern end of the route segment. The northern two-thirds of the route segment is dominated by sagebrush steppe with a perennial grass understory. Sage-grouse habitat suitability is influenced largely by varying densities of sagebrush. Overall, roughly one-third of the route segment ROW was considered unsuitable habitat for any season. Roughly one-third of the segment held suitable winter and summer habitat, and the remaining one-third provides marginal habitat during winter and summer. Due to a need for higher sagebrush cover during the breeding season, some of the suitable winter and summer habitat only provides marginal breeding habitat, overall 19 percent of the segment had enough sagebrush to be considered suitable for breeding and 47 percent was classified as marginal breeding habitat (Appendix B-2 - Habitat Assessment). The eight-mile wide NNR-3 analysis area contains 42,085 acres of suitable sage-grouse habitat (53 percent of the analysis area), 2,262 acres of marginal habitat (three percent) and 35,238 acres of unsuitable habitat (44 percent; Table 3.3-9).

The estimated sage-grouse population range does not overlap the NNR-3 ROW. The route segment analysis area overlaps approximately seven percent (12,740 acres) of the 95 percent population range. The core population range does not overlap the analysis area (Figure 3.3-4). The four mile long stretch of NNR-3 that occurs on BLM land was surveyed using ground transect sage-grouse surveys in 2013; no grouse or grouse sign were observed (Appendix B-1). One active lek (lek #1) is located approximately 3.3 miles east of the southern end of Route Segment NNR-3 (Table 3.3-5). Four males were observed attending this lek in 2013 which is down from 2011 and 2012 attendance numbers; however, a secondary lek may be being utilized (SEE 2013; Table 3.3-6). This lek is within JBLM YTC's Sage-grouse Protection Area, which has measures (see Section 3.3.2) that are enforced seasonally around leks (0.6 mile buffer) and within nesting and brood-rearing areas (limiting travel to existing roads and to specific ranges; JBLM YTC 2002). Additionally, nine historic leks are located between two and four miles southeast of this route segment.

3.3.4.4 Route Segment NNR-4

Route Segment NNR-4 is 4.5 miles long, crossing I-82 and passing through a JBLM YTC bivouac area with a very high density of dirt and gravel roads. This route segment parallels the existing Pacific Power Pomona-Wanapum 230 kV transmission line and crosses through a JBLM YTC bivouac area that has been dissected by roads. The majority (68 percent) of this route segment is comprised of sagebrush/perennial grassland (5,297.3 acres; Table 3.3-2). These sagebrush shrublands provide suitable habitat for shrub-steppe and grassland species. Approximately 17.3 percent of Route Segment NNR-4 consists of annual grassland (1,346.3 acres). Route Segment NNR-4 crosses several un-named intermittent or ephemeral drainages with little to no riparian habitat present.

Basalt cliffs (7.6 acres, 0.1 percent) are present within one mile of Route Segment NNR-4, where Route Segment NNR-3 crosses Lmuma Creek. Golden eagle, ferruginous hawk and prairie falcon are known to utilize the basalt cliffs in this area. Approximately 1,200 acres of the Mt. Baldy winter range for bighorn sheep is present within one mile of Route Segment NNR-4 along the eastern side of the Yakima River Canyon.

A burrowing owl nest has been documented within one mile of this route segment.

The route segment ROW is within sage-grouse management units defined as Regularly Occupied Habitat (Table 3.3-8). The eight-mile wide sage-grouse analysis area includes area set aside by JBLM YTC as a primary protection zone for sage-grouse.

The majority of this route segment ROW provides suitable or marginal sage-grouse habitat. Designations were driven largely by sagebrush cover. Suitable breeding and summer habitat occurs on 39 percent of this route segment ROW, all of it occurring east of I-82; an additional 53 percent is marginal breeding habitat; and 57 percent is marginal summer habitat. Suitable winter habitat occurs on 65 percent of this route segment, including the areas west of I-82 with a sagebrush overstory and cheatgrass understory. Marginal winter habitat composes 31 percent of this route segment (Appendix B-2A Habitat Assessment). The eight-mile wide NNR-4 analysis area contains 35,433 acres of suitable sage-grouse habitat (64 percent of the analysis area), 926 acres of marginal habitat (two percent), and 18,854 acres of unsuitable habitat (34 percent; Table 3.3-9).

The estimated sage-grouse population range does not overlap the NNR-4 ROW. This route segment analysis area overlaps approximately one percent (1,460 acres) of the total 95 percent population range. The core population range does not overlap the analysis area (Figure 3.3-4). Four walking transects surveyed during two visits in May and July of 2013 revealed just one sign of recent sage-grouse use of this route segment (Appendix B-1). No active leks are known to occur within the eight-mile wide NNR-4 analysis area (Table 3.3-5). Six historic leks are located within four miles to the southeast of the route segment.

3.3.4.5 Route Segment NNR-5

Route Segment NNR-5 is located at the southern end of Badger Pocket, primarily within the JBLM YTC boundary. This short route segment (1.8 miles) deviates slightly from the existing 230 kV transmission line to avoid private agricultural lands in the Badger Pocket area, but remains within 0.5 mile of the existing Pacific Power’s Pomona-Wanapum 230 kV transmission line for the entire route segment. Vegetation along this route segment consists of the following cover types: sagebrush/perennial grassland (2,852.2 acres, 67 percent), agriculture (833.4 acres, 19.6 percent), and forbs (486.9 acres, 11.4 percent; Table 3.3-2). The shrublands provide suitable habitat for shrub-steppe and grassland species. Route Segment NNR-5 crosses several intermittent or ephemeral drainages, including Badger Creek, with no riparian habitat present. A burrowing owl nest has been documented within one mile of this route segment.

The entire route segment ROW is within sage-grouse management units defined as Regularly Occupied Habitat (Table 3.3-8). The eight-mile wide sage-grouse analysis area contains areas set aside by JBLM YTC as a primary protection zone for sage-grouse.

Suitable year-round sage-grouse habitat covers 95 percent of the ROW. The remaining five percent of the segment contains marginal winter and summer habitat and unsuitable breeding habitat (Appendix B-2 - Habitat Assessment). The eight-mile wide NNR-5 analysis area contains 28,459 acres of suitable sage-grouse habitat (70 percent of the analysis area), 76 acres of marginal habitat (less than one percent) and 12,178 acres of unsuitable habitat (30 percent; Table 3.3-9).

The estimated sage-grouse population range does not overlap the NNR-5 ROW. The route segment analysis area overlaps approximately one percent (1,107 acres) of the 95 percent population range. The core population range does not overlap the analysis area (Figure 3.3-4). Four walking transects surveyed during two visits in May and July of 2013 revealed just one sign of recent grouse use of this route segment (Appendix B-1). No active leks are known to occur within four miles of Route Segment NNR-5 (Table 3.3-5). Six historic leks are located within four miles of the route segment.

3.3.4.6 Route Segment NNR-6

Route Segment NNR-6 is 6.4 miles long and continues to closely parallel the existing 230 kV transmission line, staying within approximately 200 feet for the entire route segment. This route segment consists primarily of sagebrush/perennial grassland cover type (7,996.0 acres, 78 percent; Table 3.3-2). These shrublands provide suitable habitat for shrub-steppe and grassland species. Route Segment NNR-6 crosses several un-named intermittent or ephemeral drainages. A section of this route segment parallels

Foster Creek and is within 0.4 mile at its closest location. Route Segment NNR-6 also parallels Johnson Creek. At its nearest point, Johnson Creek lies approximately one mile north of Route Segment NNR-6. Both Foster and Johnson Creeks are perennial streams and contain forested riparian habitat.

A burrowing owl nest has been documented within one mile of this route segment. A historical observation from 1952 of Merriam's shrew has been documented along Route Segment NNR-6. A concentration of mule deer is known to utilize this portion of JBLM YTC. Loggerhead shrikes are known to utilize McDonald Springs, located south and outside of the Project area.

The entire ROW for Route Segment NNR-6 is within sage-grouse management units defined as Regularly Occupied Habitat (Table 3.3-8). The eight-mile wide sage-grouse analysis area contains areas set aside by JBLM YTC as a primary protection zone for sage-grouse. Although NNR-6 consists almost entirely of relatively intact sagebrush steppe with a perennial grass understory, in most areas the sagebrush cover is relatively low. Pockets of dense sagebrush occur primarily in swales and drainages; the same areas that would be expected to collect deep deposits of windblown snow on the relatively high elevation north facing slopes, likely limiting winter suitability during typical-weather years, but these same areas contain relatively mesic pockets of sagebrush with a lush, forb-rich understory that likely stays relatively green during the summer months in typical years. Overall, the ROW for this route segment consists of suitable summer habitat for 33 percent of its length and marginal summer habitat for 28 percent, while breeding habitat is suitable for 14 percent of its length and marginal for 36 percent and winter habitat is suitable for 16 percent of the segment and marginal for 23 percent (Appendix B-2 - Habitat Assessment). The eight-mile wide NNR-6 analysis area contains 53,145 acres of suitable sage-grouse habitat (82 percent of the analysis area), 197 acres of marginal habitat (less than one percent), and 11,780 acres of unsuitable habitat (18 percent; Table 3.3-9). According to WHCWG analysis, Route Segments NNR-6 and NNR-7 cross the most promising zone for connectivity between the Moses Coulee sage-grouse population and the JBLM YTC grouse population (Robb and Schroeder 2012).

The estimated sage-grouse population range does not overlap the NNR-6 ROW. The route segment analysis area overlaps less than one percent (11.2 acres) of the 95 percent population range. The core population range does not overlap the analysis area (Figure 3.3-4). Ground based surveys of the preliminary NNR in May and July of 2013 revealed sage-grouse sign in six locations near this route segment. Each of these was located approximately 600 feet (200 hundred meters) north of the final location for Route Segment NNR-6, generally near Foster Creek (Appendix B-1). One active lek (lek #2) is known to occur 3.5 miles south of Route Segment NNR-6 (Table 3.3-5). Three males were observed attending this lek in 2013. After the lek's discovery in 2007, lek counts have ranged from zero to three males and averaged two males per year (Table 3.3-6). Additionally, six historic leks are located within four miles of this route segment.

3.3.4.7 Route Segment NNR-7

Route Segment NNR-7 is 8.2 miles long and continues to closely parallel the existing 230 kV transmission line, staying within approximately 200 feet for the entire segment. Three additional transmission lines are located within one mile of this proposed route segment, including one 230 kV transmission line and two 500 kV transmission lines. The majority (95.4 percent) of the route segment consists of the sagebrush/perennial grassland cover type (11,945.9 acres; Table 3.3-2). These shrublands provide suitable habitat for shrub-steppe and grassland species. Route Segment NNR-7 crosses several un-named intermittent or ephemeral drainages. Route Segment NNR-7 also parallels Johnson Creek. At its nearest point, Johnson Creek lies approximately one half mile south of Route Segment NNR-7. Johnson Creek is perennial and contains forested riparian habitat.

Regular concentrations of chukar and mule deer are known to utilize this portion of JBLM YTC. Within one mile of Route Segment NNR-7, common loon and other waterfowl are known to utilize pools present along the Columbia River. A historical observation from 1952 of Merriam's shrew has been documented within one mile of Route Segment NNR-7. Raptors, including prairie falcon are known to utilize the cliffs above the Columbia River. Historically occupied habitat for striped whipsnake is present within one mile of this route segment, located along the west side of the Columbia River.

This entire route segment ROW is within sage-grouse management units defined as Regularly Occupied Habitat (Table 3.3-8). The eight-mile wide sage-grouse analysis area contains areas set aside by JBLM YTC as a primary protection zone for sage-grouse.

The western three miles of the ROW for Route Segment NNR-7 have moderate cover of sagebrush, providing mainly marginal sage-grouse habitat. Much of the eastern five miles contains higher cover of sagebrush, which could potentially provide suitable grouse habitat, though relatively little use of the area has been documented. Overall, the ROW is composed of 43 percent suitable breeding habitat and 57 percent marginal breeding habitat. Winter and summer habitat is suitable for 67 percent of the segment and marginal for 32 percent of the segment (Appendix B-2 - Habitat Assessment). The eight-mile wide NNR-7 analysis area contains 63,349 acres of suitable sage-grouse habitat (85 percent of the analysis area), 316 acres of marginal habitat (less than one percent), and 10,502 acres of unsuitable habitat (14 percent; Table 3.3-9). According to WHCWG analysis, Route Segments NNR-6 and NNR-7 cross the most promising zone for connectivity between the Moses Coulee sage-grouse population and the JBLM YTC grouse population (Robb and Schroeder 2012). NNR-7 is separated from more heavily occupied sage-grouse areas by the steep terrain of the Saddle Mountains and, on JBLM YTC, sage-grouse are known to prefer flatter areas (less than 15 percent slope; Livingston 1998). WHCWG did not include slope in their models, asserting that slope is not likely a factor impeding movement (Robb and Schroeder 2012).

The estimated sage-grouse population range does not overlap the NNR-7 ROW or the route segment analysis area. Four walking transects surveyed during two visits in May and July of 2013 did not reveal any sign of sage-grouse use of this route segment (Appendix B-1). No active leks are known to occur within the eight-mile wide NNR-7 analysis area (Table 3.3-5). One historic lek is located approximately 0.75 mile north of the route segment.

3.3.4.8 Route Segment NNR-8

Route Segment NNR-8 starts on BLM administered land and crosses U.S. Bureau of Reclamation (Reclamation) land, Grant County PUD land, crosses over State Route (SR) 243 and WSDOT ROW. This short route segment crosses the Columbia River and is comprised primarily of sagebrush/perennial grassland (4,454.9 acres, 83.6 percent; Table 3.3-2). These shrublands provide suitable habitat for shrub-steppe and grassland species. Some riparian habitat is present along the margins of the Columbia River.

Regular concentrations of mule deer are known to utilize JBLM YTC and a location north of the Vantage Substation. Common loon and other waterfowl are known to occur in the pools present along the Columbia River. Raptors, including prairie falcon, are known to utilize the cliffs above the Columbia River. Habitat and known locations of striped whipsnake are known to occur along Route Segment NNR-8, located on both the west and east sides of the Columbia River. American white pelicans have been documented on islands below Wanapum Dam within the Columbia River. Sagebrush lizard is known to occur within the Project area near the Vantage Substation. Within the Project area, the night snake is known to occur near the Columbia River.

This route segment ROW passes from sage-grouse management units defined as Regularly Occupied Habitat into Occasionally Occupied Habitat as it crosses the Columbia River. The analysis area does not overlap any JBLM YTC protection zones for sage-grouse.

Patchy sagebrush with a perennial grass understory covers roughly half of the ROW; most of the remaining area is either rocks and open water or cheatgrass and other weeds. The habitat assessment classified breeding habitat as suitable for 26 percent of this route segment's ROW and marginal for 23 percent of the ROW. Winter and summer habitat is classified as suitable for 34 percent of the ROW and marginal for 15 percent of the ROW (Appendix B-2 - Habitat Assessment). The eight-mile wide NNR-8 analysis area contains 28,603 acres of suitable sage-grouse habitat (63 percent of the analysis area), 1,465 acres of marginal habitat (three percent) and 15,176 acres of unsuitable habitat (34 percent; Table 3.3-9).

The estimated sage-grouse population range does not overlap the NNR-5 ROW or the route segment analysis area. Four walking transects surveyed during two visits in May and July of 2013 did not reveal any sign of safe-grouse use of this route segment (Appendix B-1). No active leks are known to occur within the eight-mile wide NNR-8 analysis area (Table 3.3-5). One historic lek is located approximately 2.1 miles northwest of this route segment.

3.3.4.9 Route Segment MR-1

This 12 mile long subroute is a proposed alternative to the 4.5 mile NNR-4 route segment. Shaped like a horseshoe, it circumnavigates to the west, north, and east of Manastash Ridge. It crosses private, DNR and JBLM-YTC lands, and crosses over I-82 and WSDOT ROW. This route segment is comprised of a mixture of sagebrush/perennial grassland (6,372.1 acres, 37.3 percent), agriculture (3,868.3 acres. 22.6 percent), and annual grassland (5,727.6 acres, 33.5 percent; Table 3.3-2). Shrubland vegetation provides suitable habitat for shrub-steppe and grassland species. Route Segment MR-1 crosses several un-named intermittent and ephemeral drainages. This route segment also crosses Scorpion Coulee Creek, which appears to be intermittent and contains little to no riparian habitat.

Basalt cliffs (0.7 acre, less than 0.1 percent) are present within one mile of Route Segment MR-1 (Lmuma Creek). Golden eagle, ferruginous hawk and prairie falcon are known to utilize the basalt cliffs in this area. A white-tailed jackrabbit was confirmed near where MR-1 crosses I-82. Approximately 1,721 acres of the Mt. Baldy winter range for bighorn sheep is present within one mile of Route Segment MR-1 and continues west along the eastern side of the Yakima River Canyon. A historical observation from 1952 of Merriam's shrew has been documented within one mile of Route Segment MR-1.

This entire route segment ROW is within sage-grouse management units defined as Regularly Occupied Habitat (Table 3.3-8). The eight-mile wide sage-grouse analysis area contains areas set aside by JBLM YTC as a primary protection zone for sage-grouse.

Based on the sage-grouse habitat assessment, breeding habitat is classified as suitable along 15 percent of the ROW and marginal on 49 percent. Summer habitat is suitable for 26 percent of this route segment and marginal for 53 percent. Winter habitat is suitable for 62 percent and marginal for 16 percent. Most of the west arm of this route segment has adequate sagebrush cover for winter use (as determined with aerial imagery), but cover type data indicates an annual grass understory that would limit suitability for breeding and summer use. Weedy disturbed ground is prevalent along parts of the eastern stretch adjacent to private agricultural lands in Badger Pocket (Appendix B-2 - Habitat Assessment). The eight-mile wide MR-1 analysis area contains 44,010 acres of suitable sage-grouse habitat (53 percent of the analysis area), 4,019 acres of marginal habitat (five percent), and 35,410 acres of unsuitable habitat (42 percent; Table 3.3-9).

The estimated sage-grouse population range does not overlap the MR-1 ROW. This route segment analysis area overlaps approximately one percent (1,057 acres) of the 95 percent population range. The core population range does not overlap the analysis area (Figure 3.3-4). No active leks are known to occur within the eight-mile wide MR-1analysis area (Table 3.3-5). Six historic leks are located within the analysis area of this route segment.

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3.4 LAND JURISDICTION AND LAND USE

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to land jurisdiction and land use along the NNR and Manastash Ridge (MR) subroute, including those raised during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

This section characterizes the uses and jurisdiction of land in the Project area in south-central Washington. The purpose of the land use analysis is to inventory land uses and to assess the potential land use impacts of each of the alternative route segments. Data was compiled for land uses and jurisdiction within a two-mile wide study corridor (Project area), one mile on either side of the assumed centerline of each alternative route segment. The Project area includes the northwest part of Yakima County west of and adjacent to the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), the southwest corner of Grant County, and the southeast corner of Kittitas County. Appendix A - Jurisdiction, Recreation, and Special Management Areas Map of this SDEIS shows land jurisdiction in the Project area. Appendix A - Land Use Map shows existing land use.

3.4.1 Data Sources

Land use data were collected for each zone. Information for the inventory was obtained from various federal, state, and local agencies, including the following:

- U.S. Environmental Protection Agency (USEPA) National Priority List (NPL) website database
- U.S. Department of the Army (Army) – Final Environmental Impact Statement (EIS) for the Fort Lewis Army Growth and Force Structure Realignment (July 2010)
- BLM – Spokane Resource Management Plan (RMP) – Rangeland Program Summary Record of Decision (ROD) (1987)
- BLM – Proposed Spokane RMP Amendment Final ROD (1992)
- BLM – ROD for the Spokane RMP Amendment (1992)
- BLM – Analysis of the Management Situation for the Eastern Washington and San Juan RMP (BLM 2011)
- Washington State Department of Agriculture – Agricultural Land Use Database
- Washington State Department of Natural Resources (DNR) Map of Public Trust Lands (2010)
- Washington State Department of Ecology Toxic Cleanup program website database
- Kittitas County Comprehensive Plan (2013)
- Grant County Comprehensive Plan (2006, amended 2010)
- Yakima County “Plan 2015” Comprehensive Plan (2007)
- Grant County Public Utility District No. 2 Priest Rapids/Wanapum Land Use Plan (1992)
- Grant County Public Utility District Shoreline Management Plan (2010a,b)
- Public Land Information System (geographic information system [GIS] database)
- Field Reconnaissance of the Project area (June 2013)

3.4.2 Current Conditions and Trends, Regional Overview

3.4.2.1 Land Jurisdiction

Land jurisdiction refers to the limits of administrative authority maintained by a federal, state, or local governmental agency or organization. Jurisdiction does not necessarily imply land ownership. Three predominant categories of jurisdictions inventoried within the Project area (federal, state, and local) are described in this section and presented in Table 3.4-1. Also see Section 3.4.3 for a description of agency land management responsibilities.

Federal

Lands administered by the federal government in the Project area include:

- BLM
- Bureau of Reclamation (Reclamation)
- JBLM YTC

State

Lands administered by the state of Washington government in the Project area include:

- DNR
- Washington Department of Fish and Wildlife (WDFW)
- Washington Department of Transportation (WSDOT)

Local

Counties which administer lands in the Project area include:

- Yakima County
- Grant County
- Kittitas County

TABLE 3.4-1 LAND OWNERSHIP AND JURISDICTION IN PROJECT AREA

LAND JURISDICTION Total Area (two-mile Corridor)	AREA (ACRES)	% OF PROJECT AREA (TWO-MILE CORRIDOR)
Federal		
BLM	4,622	7.3
Reclamation	2,199	3.5
JBLM YTC	31,210	49.3
State		
WDFW	11	>0.1
DNR	1,803	2.8
WSDOT	275	0.4
Local		
Yakima County	6,833	10.8
Grant County	962	1.5
Kittitas County	15,421	24.3

3.4.2.2 Existing and Planned Land Use

The Project area contains portions of Yakima, Grant, and Kittitas Counties in Washington. Wanapum Village is an unincorporated community in the Project area. Selah is an incorporated community located just outside the Project area. The Grant County Public Utility District (PUD) is a nonprofit municipal corporation providing electric and communication services within its district. The Grant County PUD operates the Priest Rapids Project consisting of two hydroelectric facilities on the Columbia River in the Project area (Wanapum Dam, Priest Rapids Dam), other hydroelectric-related facilities, and recreation areas on or in proximity to the river. Federal and state agencies also manage land in the Project area and include:

Federal

- Army-JBLM YTC
- Department of the Interior
  - BLM-Yakima River Canyon Management Area and south of Wanapum Dam in Kittitas County
  - Reclamation-land parcels and irrigation canals in Grant County

State

- WSDOT (State Route [SR] 243 and Interstate [I] 82)
- DNR (State Trust lands)
- WDFW (Selah Cliffs Natural Area Preserve [NAP])

3.4.2.3 Residential

Residences are predominantly single-family detached housing units in the Project area. Communities with more densely populated areas include East Selah and the area around JBLM YTC. Wanapum Village and Badger Pocket, a rural farming area, are also in the Project area.

3.4.2.4 Commercial, Public, Industrial

The City of Yakima, just outside of the western part of the Project area, is the Yakima County seat, a regional business center with a number of commercial and industrial businesses as well as government service facilities. Commercial operations are very limited in the Project area along the routes. Public facilities are associated with the I-82 corridor (rest areas) and generally undeveloped state and federal lands.

3.4.2.5 Linear Facilities (Transmission/distribution lines, pipelines, canals, etc.)

Existing linear features within the study area include transmission lines, highways, abandoned railroads (Chicago, Milwaukee, St. Paul, and Pacific [C, M, SP, & P]), and irrigation canals.

The Yakima Subdivision of the Burlington Northern Santa Fe Railroad follows the Yakima River west of the Project area.

The BLM Spokane RMP (1985) and ROD (1987) and the 1992 RMP Amendment and ROD designated a minimum 200-foot wide utility corridor in the in the Yakima River Canyon Management Area for a PacifiCorp power line (Pomona-Wanapum 230 kilovolt [kV]).There are no other BLM designated utility corridors in the Project area.

The Bonneville Power Administration's (BPA) Vantage Substation is located on the north end of the Project. Corridors and major rights-of-way (ROWs) in the Project area include:

- Pomona-Wanapum 230 kV transmission line (PacifiCorp)
- Ellensburg-Moxee No.1 115 kV transmission line (BPA)
- Midway-Moxee No.1 115 kV transmission line (BPA)
- Midway- Vantage No.1 230 kV transmission line (BPA)
- Priest Rapids-Vantage 230 kV transmission line (Grant County PUD)
- Wanapum-Wind Ridge 230 kV transmission line (Puget Sound Energy)
- Schultz-Wautoma No.1 500 kV transmission line (BPA)
- Vantage-Hanford No.1 500 kV transmission line (BPA)
- Vantage-Walla Walla 230 kV transmission line (PacifiCorp)
- Vantage-Columbia No.1 230 kV transmission line corridor (BPA)
- Vantage-Schultz No.1 500 kV transmission line (BPA)
- I-82
- SR-243
- Abandoned C, M, SP, & P railroad ROW in proximity to the eastern and southern shorelines of the Columbia River (Yakima and Kittitas Counties)

3.4.2.6 Agriculture

Regionally, farming is a prominent way of life and land use activity. Fruit trees, vineyards, and row crops are cultivated in Kittitas, Grant, and Yakima Counties. A network of irrigation water conveyance structures traverse the Project area to connect to irrigation systems such as center pivots and wheel-line systems that provide water to these farms. In the area of the Project, farming activities occur in two isolated areas: 1) east of the Yakima River as it enters Selah from Yakima Canyon and 2) in Badger Pocket.

Specific crops grown in these areas include wine grapes, alfalfa, apples, cherries, sweet corn, mint, oats, pear, sudangrass, timothy, and wheat. Fallow areas and pasture are also included in the Project area. A total of 3,801.9 acres of cropland occur within the Project area.

According to the Washington Wine Commission, the Project area is located in the Columbia Gorge designated American Viticultural Area. Viticultural areas are a federally-recognized wine growing region and are codified in the Code of Federal Regulations (CFR), Title 27 Part 9.

Management of agricultural lands includes the use of global positioning system guided equipment, vehicles and equipment used for irrigation, aerial and ground based spraying, aerial drying of cherry orchards using helicopters, mechanical plowing, seeding, fertilizing, and harvesting. Some of the equipment may be between 15 feet and 40 feet in height and may not be compatible with the transmission line conductors or structures. Typical farm equipment that may be used in the Project area includes combines with antennae, combines with hopper extensions, and tractors with antennas. Other equipment, such as sprayers, augers and cultivators in transit on trailers, silage dump wagons, and end dump truck with inclined box may also be used in the Project area.

Irrigated Agricultural Systems
Specific irrigation methods typically utilized in the Project area include drip and flood. Sprinkler irrigation usually provides a more even distribution of water than other methods and can be used on rolling topography. Flood irrigation entails spreading water over a unit of land. Border dikes, cross-

ditches, or water spreading systems are used to control the water. A summary of crop types and irrigation methods in the area south of Yakima River Canyon is shown in Table 3.4-2 below.

Reclamation's Columbia Basin Project provides the vast majority of irrigation to agricultural areas in the Project area. Irrigation is also provided by groundwater or direct withdrawal from surface waters (e.g., Columbia River, Yakima River) in the Project area and is commonly delivered through a network of feeder canals, storage ponds, open ditches, and buried pipes. Excess water is drained through a system of wastewater ditches. Buried and surface main irrigation lines and laterals are prevalent in Grant County, but not in the Project area. Reclamation maintains a system of roads to access the irrigation infrastructure.

Prime and Unique Farmland and Farmland of Statewide Importance

In 1981, Congress passed the Agriculture and Food Act of 1981 (Public Law 97-98) containing the Farmland Protection Policy Act (FPPA). The FPPA is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. The assessment is completed on form AD-1006, Farmland Conversion Impact Rating. Lands may also be classified by the FPPA as Farmland of Statewide Importance, determined by Washington State, that are lands other than prime and unique that is used for the production of feed, food, fiber, forage or oilseed crops.

TABLE 3.4-2 CROP TYPES AND IRRIGATION METHODS IN PROJECT AREA

CROP TYPE	IRRIGATION METHOD	ACRES IN PROJECT AREA
Alfalfa Hay	Center Pivot	106.2
	Rill	186.6
	Sprinkler	31.2
	Wheel Line	52.3
	Alfalfa Hay Total	376.3
Alfalfa/Grass Hay	Rill	47.9
	Sprinkler	16.9
	Wheel Line	47.8
	Alfalfa/Grass Hay Total	112.6
Apple	Drip	96.0
	Sprinkler	316.3
	Apple Total	412.3
Corn, Sweet	Rill	45.5
Cherry	Drip	11.2
Fallow	None	12.3
	Drip	62.1
	Rill	48.8
	Sprinkler	9.5
	Wheel Line	28.0
	Fallow Total	160.8

CROP TYPE	IRRIGATION METHOD	ACRES IN PROJECT AREA
Grape, Wine	Sprinkler	3.8
Grass Hay	Rill	27.2
	Sprinkler	25.2
	Wheel Line	15.9
	Grass Hay Total	68.3
Mint	Center Pivot	70.8
Oat	Rill	50.8
	Wheel Line	29.8
	Oat Total	80.5
Pasture	Big Gun	34.3
	Flood	31.3
	Rill	292.1
	Rill/Sprinkler	118.5
	Sprinkler	81.1
	Wheel Line	24.8
	Pasture Total	582.1
Pear	Drip	37.3
	Sprinkler	1.6
	Pear Total	38.9
Sudangrass	Rill	58.2
Timothy	Rill	1,441.2
	Wheel Line	141.3
	Timothy Total	1,582.4
Wheat	Rill	185.8
	Wheel Line	12.2
	Wheat Total	198.0
	Total Cropland	*3,801.9*

Conservation Reserve Program

The U.S. Department of Agriculture (USDA) manages the Conservation Reserve Program (CRP), which provides technical and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. This voluntary program provides assistance to farmers and ranchers in complying with federal, state, and tribal environmental laws, and encourages environmental enhancement. The CRP reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices. The 2008 Farm Bill prohibits the release of CRP participation data specific to parcels unless specific written permission is granted from the landowners who are in the program. The USDA can then provide information. Data obtained from the Washington State Department of Agriculture provides information regarding CRP lands specific to Public Land Survey System (PLSS) sections (acres per section). There are three acres of CRP land potentially within the Project area in the Badger Pocket area; the exact location of these lands is unknown, but do not fall within JBLM YTC where the Project would be located.

3.4.2.7 Rangeland

Livestock grazing on rangelands is another land use occurring on public and private lands in Kittitas, Yakima, and Grant Counties in the Project area. BLM has authorized two grazing leases on public lands it manages in the Project area. The DNR has authorized one grazing lease on its public trust lands. WSDOT does not have any grazing leases or easements in the Project area. Tables 3.4-3 and 3.4-4 show the public lands grazing lease information in the Project area.

TABLE 3.4-3 DNR GRAZING LEASES

Lease Number and Type	Category of Lease Holder	Sections in Study Area (Parcel Number)
073755 Grazing	Company	T.16N, R.19E Sec. 16 (454533) T.16N, R.19E Sec. 14 (43587) T.16N, R.19E Sec. 36 (874533) T.16N, R.19E Sec. 26 (664533,684533, 584533)

TABLE 3.4-4 BLM GRAZING LEASES

Allotment #	Authorization #	Category of Lease Holder	Sections in Study Area	Total Allotment Acreage/AUMS*
20803	3600803	Individual	T14N, R19E S10 S3 T15N, R19E S34 S35 S26 S23	6,211 ac./644 AUMs (includes acreage and AMUs not in study area)
20804	3600804	Individual	T15N, R19E S14	2,680 ac./277 AUMs (includes acreage and AMUs not in study area)

3.4.2.8 Yakima Training Center

The Project area includes eastern and northern parts of the JBLM YTC. The JBLM YTC is a sub-installation of Joint Base Lewis-McChord (U.S. Army's Fort Lewis and U.S. Air Force's McChord Air Force Base, both near Tacoma). The JBLM YTC supports a diverse training mission to include conventional and tactical weapons delivery, armored maneuver and live-fire, artillery (and other large caliber weapons) fire, small arms capabilities, and rotary-winged and fighter aircraft maneuvers. The military installation includes numerous areas for training as well as a cantonment area where the majority of the installation's barracks (there are no family housing facilities or schools on JBLM YTC), shopping and recreation facilities, and military unit administrative and equipment storage areas are located. Major land uses at JBLM YTC include the cantonment area (approximately 1,700 acres), which includes residential, administrative, commercial, light industrial, and open space uses; training and impact areas (327,200 acres), which include maneuver, impact, range, and special uses; and the Selah Airstrip and Vagabond Army Heliport (291,951 acres).

3.4.2.9 Public and Private Airports/Airstrips

See JBLM YTC Vagabond Army Heliport described in Section 3.4.2.8 above. There are no other public or private airstrips within the Project area. The Take Five private airstrip is located outside the Project area in Yakima River Canyon.

3.4.2.10 Other Land Use Considerations

Other Leases on Public Lands
Public land management agencies lease land for a number of reasons such as oil and gas exploration, mining, grazing, and utility ROW. According to DNR, there are no oil and natural gas leases on state public trust lands. WSDOT does not have any leases within the Project area. All of the BLM lands crossed by the route segments are generally available for competitive oil and gas leasing and mineral sales, except those that cross the Yakima Cliffs/Umtanum Ridge Area of Critical Environmental Concern (ACEC). Because of the lack of locatable minerals on BLM lands in the Project area (those minerals that are uncommon because they possess a special and distinct value), these lands are rarely subject to mining claim filing. Although the BLM lands have potential for saleable minerals (those minerals that are some of our most basic natural resources, such as sand, gravel, dirt, and rock, used in every day building and other construction uses), there are no current mineral materials sales contracts or free use permits (issued to government entities) on these lands. Tables 3.4-5 and 3.4-6 show non-grazing public land leasing information in the Project area. In some locations, multiple leases exist for different purposes. Reclamation leases its lands in the Project area primarily for power line easements.

TABLE 3.4-5 DNR NON-GRAZING LEASES

Washington Department of Natural Resources		
Lease Number and Type	Lease Holders Name	Sections in Study Area (Parcel Number)
50-SR1087 – State Highway	WSDOT	T.16N, R.19E Sec. 14 (454533)
50-036625 - road	WSDOT	T.16N, R.19E Sec. 26
50-045118 - road	WSDOT	T.16N, R.19E Sec. 26

TABLE 3.4-6 BLM NON-GRAZING LEASES

Bureau of Reclamation	
Description	Sections in Study Area
Priest Rapids Transmission Line Hanford-Vantage Transmission Line	T. 16N, R.23E
RB5J Wasteway	Section 10
Substation Transferred to BPA	Section 15
Manage by Grant County PUD in conjunction with their Federal Energy Regulatory Commission (FERC) License	Section 16
Manage by Grant County PUD in conjunction with their FERC License	Section 21
License to Grant County for landfill expired in 1976. No evidence there is a landfill in the area.	Section 22
Road Easement W 30'of the E. 42', Grant County PUD Easement within the w. 42'	Section 23

Bureau of Reclamation	
Description	Sections in Study Area
Railroad Spur line – C.M. St. P. & P – removed, Grant County PUD Easement NW1/2NW1/4SW1/4	Section 27
Manage by Grant County PUD in conjunction with their FERC License	Section 28
Grant County PUD Easement NW1/4SE1/4	Section 35

Sand and Gravel Operations
There is a WSDOT sand and gravel site with a maintenance shed for winter operations located at I-82 Exit 11; however, sand and gravel is not mined there. WSDOT does have an approved, though not currently in use, borrow pit site located north of the Fred Redmon Bridge.

Superfund and Hazardous Waste Sites
Superfund is the federal government's program to clean up the nation's uncontrolled hazardous waste sites. The program, managed by the USEPA, identifies the sites and places them on the NPL for cleanup. A review of the NPL indicated that there are no NPL sites in the Project area. A review of the Washington Department of Ecology Toxics Cleanup Program indicated no sites within the Project area.

Bureau of Reclamation Planned Projects
The Congress directed the Secretary of the Interior, acting through Reclamation, to conduct a feasibility study of options for additional water storage in the Yakima River basin. Reclamation initiated the Yakima River Basin Water Storage Feasibility Study in May 2003 (Reclamation 2008). The purpose of the Storage Study is to identify and examine the viability and acceptability of water storage alternatives. In 2006, Reclamation prepared an appraisal assessment of three other alternatives, the Bumping Lake enlargement, Wymer dam and reservoir, and Keechelus-to-Kachess pipeline. The conclusions reached in these two appraisal assessments were that the Black Rock and Wymer Alternatives should be included in the Plan Formulation Phase of the Storage Study. The Wymer Dam Alternative is located within the Project area along Burbank Creek.

3.4.3 Current Management Considerations

This section describes the general land use management goals and objectives related to transmission lines and utility related infrastructure for the land/resource management agencies in the Project area.

3.4.3.1 Federal

Bureau of Land Management
In the Project area, the Spokane District of the BLM manages public land in Grant, Kittitas, Benton, and Yakima Counties with the Saddle Mountains Management Area in Grant County constituting one of the larger contiguous areas of BLM-managed land in the Project area. The Spokane District manages its land and resources in the Project area using the 1985 Spokane District RMP, 1987 ROD, and the 1992 RMP Amendment and ROD. The RMP designated utility corridors on BLM lands, one of which is partially occupied by the Saddle Mountains BPA transmission lines in the Project area (see Appendix A - Land Use Map). No other utility corridors are designated on BLM land in the Project area.

The BLM is in the process of updating the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD. The new RMP will be called the Eastern Washington and San Juan RMP. The BLM recently published the document *Analysis of the Management Situation for the Eastern Washington and San Juan Resource Management Plan* in March 2011 that summarizes existing conditions, trends and management guidance for the planning area. This report states that for utility corridors, additional ROWs will be considered on a case-by-case basis. Applicants would be encouraged to locate new facilities within existing corridors or group compatible facilities to the extent possible (BLM 2011).

Yakima Training Center

As defined in the *Final Environmental Impact Statement for the Fort Lewis Army Growth and Force Structure Realignment* (July 2010), to aid in resource management, JBLM YTC is divided into five land use zones. The zone designations identify allowable military training activities and acceptable levels of impact to the resources to maximize military training opportunities, while simultaneously safeguarding resources (Army 2010).

Most forms of training are prohibited in Zone 1 (Land Bank), which is managed for significant and sensitive natural and/or cultural resources. Zone 2 (Conservation) is managed as a sage grouse protection area; however, most forms for training are allowed with the exceptions of digging and bivouacking activities. Zone 3 (General use) comprises 75 percent of JBLM YTC and includes the cantonment area and the primary training ranges. Zone 4 (High Use) accommodates heavy use and high-impact activities such as Brigade Support Areas. Zone 5 (Impact Areas) includes impact and dud areas and the Selah Airstrip (Army 2010).

Land use zones 2, 3 and 4 would be crossed by Project alternatives. Zone 3 has no specific protection and management measures other than as described above. Zone 2 is managed in accordance with the Sage Grouse Management Plan (Army 2002) that identifies protection and management measures. As detailed in the plan, excavations in sage grouse protection areas are not permitted (see Section 4.2 of the plan: *Protection of Sage Grouse Habitat*). Zone 4 accommodates heavy use and high impact activities (Army 2010). Refer to Appendix A - Land Use Map for the location of land use zones areas.

Training facilities at JBLM YTC support gunnery and maneuver training, including maneuver corridors, impact areas, ranges, drop zones, and bivouac areas. Training exercises at JBLM YTC include foot, motorized, mechanized, and armory infantry maneuvers at the platoon level ($20^{\pm}$ troops) to brigade level (up to 5,000 troops). Live-fire gunnery training is also conducted that includes large caliber tank, Bradley fighting vehicle, and anti-tank missile firing, indirect mortar, and howitzer gunnery. JBLM YTC is also used for air assault, air drop, and special operations gunnery and maneuver.

Training Areas (TAs) on the JBLM YTC are delineated into maneuver, impact, range and special use areas. TAs are established to facilitate range management, and are numbered TA-1 through TA-16 according to their geographic location. The proposed Project route segments could potentially cross TA-1, TA-3, TA-13 and TA-16. Training activities are coordinated to preclude damage to sensitive species and habitats. Special use areas include airborne training sites (drop zones), ammunition storage, and equipment storage. Training activities related to land use on JBLM YTC include maneuver events, both on- and off-road vehicle movement, aerial maneuver and gunnery practice, gunnery practice, digging activities (tank ditches, vehicle positions, and foxholes), unit assembly areas, and river crossing exercises (Army 2010). TAs on the JBLM YTC are shown in Appendix A - Land Use Map.

Bureau of Reclamation

The mission of Reclamation is to manage, develop and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. Reclamation manages land and irrigation infrastructure in the Grant and Yakima County sections of the Project area.

Federal Aviation Administration

The Federal Aviation Administration (FAA) has the authority to regulate the safe and efficient use of navigable airspace. Structures that would support the conductors that would cross the Columbia River would be approximately 200 feet tall above ground level for the Project. In accordance with 14 CFR Part

77, Form 7460-1 *Notice of Proposed Construction or Alteration* would need to be filed with the FAA for review and include information about the height and configuration of conductors and structures.

3.4.3.2 State

Washington Department of Natural Resources
The DNR manages granted trust lands that are located in the Project area. According to the State Trust Lands map, the trust lands in the Project area are managed for the benefit of the state's public schools, universities, and other institutions. DNR, as trust manager, is mandated by common trust law, the State Constitution, and the Enabling Act to manage federally granted trust lands for the full and exclusive benefit of the designated trust.

Washington Department of Transportation
The WSDOT manages land within its ROW for the purposes of operating and maintaining transportation related facilities, primarily within the I-82 and SR-243 corridors. WSDOT manages a parcel north of the eastbound Selah Creek Rest Area as a non-regulatory environmental management buffer for the conservation of cultural, biological and scenic resources. In 1980, the basalt daisy was included on the Endangered Species Act species list, but it was de-listed in 2007. Even though it was federally de-listed, the basalt daisy is currently on the DNR Natural Heritage Program list as a state-listed threatened species. The basalt daisy is found exclusively in a 10-mile stretch of the Yakima River Canyon, growing in the Yakima Basalt formation along Selah Creek (which flows below the Selah Rest Area) and the Yakima River Canyon. In 1993, the Selah Cliffs Natural Area Preserve, an interpretive trail system located at Mile Marker 3 on SR 821, was established to protect the largest known basalt daisy population. In order to provide additional protection to potential basalt daisy habitat on WSDOT property, WSDOT established an approximately 102-acre "environmental management buffer" in 2008 (Inventory Control No. 5-39-08073). This parcel is located within the western half of Section 15 west of I-82 and north of the Selah Rest Area. The environmental management buffer is non-regulatory in nature and was created to alert WSDOT and others to the presence of the basalt daisy and, if feasible, to avoid impacts to this species from WSDOT or other projects.

WSDOT requires that any temporary and permanent impacts related to construction, operation, and maintenance of the Project be assessed prior to use of its property. Surveys to identify any biological or cultural resources on WSDOT property will be needed, and mitigation for any impacts to those resources is required. Potential impacts related to scenic views from the eastbound Selah Creek Rest Area and the Manastash Ridge viewpoints will need to need to be assessed and mitigation for any potential impacts is required before granting an easement across WSDOT-owned property.

Washington State Recreation and Conservation Office (RCO) Funded Project Sites
The RCO is a state agency that manages a number of boards and offices tasked with creating outdoor recreation opportunities, protecting wildlife habitat and farmland, and enhancing salmon populations and habitat. This collection of boards and offices provides leadership, funding, and technical assistance to local communities, state, and federal governments, and others. The RCO provides federal and/or state funded grants for the protection of resources, and sites are protected in perpetuity for the original grant purposes. Eligible grant recipients include local governments, special taxing districts, state agencies, federal agencies, tribes, nonprofits, businesses, and private landowners. General resource protection categories generally include parks, trails, shooting ranges, boating, salmon recovery, farmland preservation, and habitat conservation. The Land and Water Conservation Fund and the Washington Wildlife and Recreation Program are among the grant programs used to fund the protection of resources. Any conversion of a funded property to other uses would need to be approved by RCO in advance.

Within the Project area, there are sites that have been funded, or have had funding approved, for habitat conservation and recreation purposes. These sites include:

- Selah Cliffs NAP (RCO Grant # 06-1827) - This grant was funded to acquire 104 acres of private land. This acquisition would increase the area that is protected, improve the department's access to the site, and enhance the department's ability to manage the site. The current status of this grant is “Not Completed since 11/19/2010”. The private land owner rejected DNR’s offer. No restrictions with regard to RCO approval are in place for this property. The Project crosses the parcel under consideration for acquisition.
- Selah Cliffs (RCO Grant #93-838) - This grant was funded to acquire 120 acres of privately owned parcels within the conservation area to provide for the protection of endangered and threatened plant species. The current status of this grant is “Not Completed since 09/26/1996”. Acquisition was complete on 6/1/1993, and includes the Selah Cliffs NAP. Any conversion of this property to other uses would need to be approved by RCO in advance. Project routes do not cross this site.
- Wanapum S. P. Boat Launch Replacement (RCO Grant # 00-1519) - This development project was completed in the summer of 2005. Any conversion of this property to other uses would need to be approved by RCO in advance. Project routes do not cross this site.
- Wanapum Natural Area Preserve (RCO Grant # 08-1185, 10-1474, and 12-1182) - The DNR will use this grant to acquire private land in the vicinity of Vantage Substation, including approximately 34 acres of riparian and upland habitat, for inclusion in the Wanapum NAP. The grant will protect the most critical striped whipsnake habitat within the preserve, the dune system and shrub-steppe communities, as well as 13 other priority species and ecological systems. Private land has not currently been acquired. The Project crosses parcels under consideration for acquisition.

3.4.3.3 Local

The Washington State Growth Management Act (GMA) identifies five Critical Areas. Critical areas established in each Washington state county in accordance with Revised Code of Washington (RCW) 36.70A.170. "Critical areas" include the following areas and ecosystems: (a) wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas. Counties that are covered under the GMA are required to protect Critical Areas.

The GMA and the Planning Enabling Act (RCW 36.70) requires each planning agency to develop a comprehensive plan for the orderly physical development of the county and areas outside of the county that the planning agency considers important for planning. The three counties in the Project area each have a comprehensive plan. The following describes the key goals and/or objectives in the plans related to land use and utilities, and if specified, the location of transmission lines.

Yakima County
Yakima County is the second largest county in the state by area. The county is bordered by Benton County to the east, Klickitat County to the south, Skamania, Lewis, and Pierce Counties to the west, and Kittitas County to the north. The City of Yakima, located in proximity to the western part of the Project area, is the County Seat. The southern part of the Army’s JBLM YTC is located in the northeast part of the county. Route segments are generally located in the central part of the county north of the City of Yakima and west of JBLM YTC.

Yakima County's current comprehensive plan, "Plan 2015", describes a vision for Yakima County, including how it should grow, what services are anticipated to accommodate growth and the goals and objectives to achieve the community vision. Policies related to utilities include:

> **Policy UT 2.3:** Assist and facilitate the siting of utility-related infrastructure in a manner consistent with Plan 2015 through land use planning and development review policies and procedures
>
> **Policy UT 3.1:** Utility services should be provided in accordance with approved utility comprehensive plans that are consistent with future population projects and the preferred land use categories defined by Plan 2015

Yakima County Code (YCC), Chapter 15.18 "Permitted, Administrative and Conditional uses" under Title 15 "Zoning" does not specifically indicate whether transmission or power lines were a permitted or a conditional use within the county's zoning classifications. However, YCC 15.50 - Linear Transmission Facilities establishes the criteria and standards for the development and expansion of transmission lines. Review of applications for linear transmission facilities are in accordance with a Type II review. In addition to the required application contents specified for Type II applications, there are additional requirements necessary for the application detailed in YCC 15.50. A Type II or Class 2 use is generally permitted provided that development standards are met and compatibility with neighboring uses and consistency with the YCC can be met. After review by the Administrative Official, if it is determined that additional public input is necessary, the official may raise the review permit to a Type III. A Type III permit would require a public hearing before the Yakima County Hearing Examiner. Yakima County may require additional mitigation measures not identified during the NEPA process to meet the requirements of YCC 15.50 and other applicable county codes.

Zoning in Yakima County within the Project area is typically "Agriculture", "Remote/Extremely Limited Development Potential", and "Valley Rural". See Appendix A - Zoning Map for zoning designations in the Project area.

The GMA requires counties to develop policies and development regulations to protect the functions and values of critical areas. These are adopted in ordinance and are typically referred to as Critical Areas Ordinances (CAO). Critical areas identified by Yakima County in the study area include "Wetlands", "Critical Aquifer Recharge Areas", "Frequently Flooded Areas", "Geologically Hazardous Areas", and "Fish and Wildlife Habitat Conservation Areas". Crossing of these areas in Yakima County may require a Critical Areas Permit.

Kittitas County

Kittitas County is located at the geographic center of Washington State. Route segments are located in southeastern Kittitas County south of I-90 between the Yakima Training Center and Columbia River, and between the Yakima River Canyon and Yakima Training Center. The City of Ellensburg, located outside of the Project area in the central part of the Kittitas County, is the County Seat.

According to the Kittitas County Comprehensive Plan 2010, the County has a number of Goals, Policies and Objectives (GPO) related to transmission lines:

> **GPO 6.1** The County should promote the joint use of transportation ROWs and other utility corridors consistent with the underlying private property rights and easement limitations.
>
> **GPO 6.2** Appropriately place utility facilities within public ROWs.

GPO 6.6 Expansion and improvement of utility systems should be recognized primarily as the responsibility of the utility providing the corresponding service.

GPO 6.21 Avoid, where possible, routing major electric transmission lines above 55 kV through urban areas.

GPO 6.32 Electric and natural gas transmission and distribution facilities may be sited within and through areas of Kittitas County both inside and outside of municipal boundaries, Urban Growth Areas, Master Planned Resorts, limited area of more intensive rural development and Fully Contained Communities, including to and through rural areas of Kittitas County.

Zoning in Kittitas County within the Project area is typically “Commercial Agriculture”, “Agriculture-20” and “Forest and Range”. Kittitas County Code (KCC), Chapter 17.61 “Utilities” states that electrical transmission lines exceeding 115 kV are categorized as a “Special Utility” and may be authorized by the Board of Commissioners as a conditional use in all zoning districts. A conditional use is defined as a use which may be permitted in a zone classification following review under the provisions of KCC Chapter 17.60A. The conditional use permit (CUP) process involves a pre-application meeting, filing and application, staff comment on the application, public comment (15 days), recommendation from the Hearing Examiner, and final decision from the board on the CUP.

The GMA requires counties to develop policies and development regulations to protect the functions and values of critical areas. These are adopted in ordinance and are typically referred to as CAOs. Critical areas identified by the Kittitas County in the study area include “Wetlands”, “Erosion Hazard Areas”, Floodplains and Floodways”, “Riparian Habitat”, “Geologically Hazardous Areas”, “Landslide Areas”, “Mine Hazard Areas”, “Seismic Hazard Areas”, and “Streams and Rivers”. Crossing of these areas in Kittitas County may require a Critical Areas Permit.

Grant County
The fourth largest county in the state, Grant County is approximately 2,675 square miles in area and is bordered on the west by Douglas and Kittitas Counties, on the south by Yakima and Benton counties, on the north by Okanogan County, and on the east by Adams County. The Columbia River flows in a deep valley along the west and southwestern boundary of the County. The City of Ephrata located outside of the Project area in the central part of the County is the County Seat. A portion of the Project is located south and east of the Wanapum Dam in Grant County.

The Grant County Comprehensive Plan (2006, amended 2010) documents the following goals and policies related to utilities and in particular, transmission lines:

Goal U-1: Necessary energy and communication facilities and services should be available to support current and future development.

- Policy U-1.3: The County should encourage the location of necessary utility facilities within existing and planned transportation and utility corridors.

- Policy U-1.4: The County’s land use planning should be coordinated with the planning activities of electrical, telephone and cable providers to ensure that providers of public services and private utilities use the land use element of this plan when planning for future facilities.

Goal U-2: Negative impacts associated with the siting, development, and operation of utility services and facilities on adjacent properties, significant cultural resources, and the natural environment should be minimized.

- Policy U-2.5: Where possible, the joint use of transportation ROWs and utility corridors should be encouraged, provided that such joint use is consistent with limitations as may be prescribed by applicable law and prudent utility practice.

Goal U-5: Site utility facilities in conformance with the Land Use Element.

- Policy U-5.1: Utility providers should avoid placement of facilities in areas designated as environmentally sensitive or critical areas unless no feasible alternative exists and only after a site assessment and mitigation plan has been approved under the provisions of Grant County's Resource Lands and Critical Areas Ordinance.

- Policy U-5.2: Utility facilities should be permitted in all land use designations as necessary when and where utility franchises exist and if they are in compliance with the Comprehensive Plan.

"Decision Maker" is defined in Washington Administrative Code 197-11-730 and means the agency official or officials who make the agency's decision on a proposal.

Zoning in Grant County within the Project area is typically "Agriculture" and "Rural Remote". Grant County does not require a CUP for the construction of a transmission line in any of its designations. However, because the Proponent is considered a private utility, a building permit would be required for line construction.

The GMA requires counties to develop policies and development regulations to protect the functions and values of critical areas. These are adopted in ordinance and are typically referred to as CAO. Critical areas identified by the Grant County in the study area include "Wetlands", "Frequently flooded areas", "Critical aquifer recharge areas", "Geologically hazardous areas", "Fish and wildlife habitat conservation areas", and "Cultural resource areas". Crossing of these areas in Grant County may require a Critical Areas Permit.

3.4.3.4 Grant County Public Utility District

As a condition of the Federal Energy Regulatory Commission's (FERC's) re-licensing of the Priest Rapids Project in 2008, the Grant County PUD developed a Shoreline Management Plan (SMP) to assist in day-to-day management activities as well as to ensure activities occurring on Priest Rapids Project lands are compliant with all applicable laws and regulations. The Priest Rapids Project is located on the Columbia River and consists of the Wanapum and Priest Rapids hydroelectric facilities. Both developments consist of reservoirs, power generation facilities, primary transmission lines, and other facilities and resources necessary to support and maintain Project operations. Final SMP identifies three land use classifications: Project Facilities, Public Recreation Development, and Resources Management. The plan was approved by the Grant County PUD in March 2010 and submitted to FERC the same month for approval (Grant County PUD 2010a). The new SMP is subject to FERC approval before adoption by the Grant County PUD; however, the Grant County PUD has been and is managing Grant County PUD lands under the 2010 plan (Larimer 2011). Grant County PUD lands are crosses by the proposed Project.

The new Final SMP establishes three Land Use Classifications, and is the current plan in effect for Grant County PUD lands: Project Facilities (PF), Public Recreation Development, and Resources Management

(RM) (Larimer 2011). PF and RM are located in the Project area and are crossed by route segment NNR-8, and are described as follows in the Final SMP (Grant County PUD 2010b):

- PF Classification allows for higher intensity uses that are primarily related to electrical power generation, transmission and associated project-related facilities, as well as lands potential for such uses in the future, which may include education and/or interpretation facilities and public recreation facilities located within or immediately adjacent to project facilities related to power. PF Classification controls public use of lands to protect public health and safety. Historical or cultural resources and wildlife restoration and/or enhancement activities may also occur in this classification. Non-Project uses such as roads, motorized vehicles and utilities require Grant County PUD approval.

- Area with RM Classification will be managed to preserve and enhance conservation and protection of fish, wildlife scenic, historic, archeological, and cultural resources. Protection of historical or cultural resources, as well as wildlife restoration and/or habitat enhancement activities are the primary functions of this classification. RM Classification will generally include those areas for which there are no specific FERC-approved project facilities and/or public recreation improvements, identified within the license. Non-project uses such as roads, motorized vehicles, and utilities require Grant County PUD approval.

3.4.4 NNR Route Segment Specific Considerations

3.4.4.1 Route Segment NNR-1

The existing land use along this Route Segment is low-density residential. The Route Segment crosses 2.3 miles of residential use areas. A total of 27 residences are within 500 feet of this Route Segment, but 79 are within 1,000 feet. This Route Segment crosses only private land. A total of 29 parcels owned by 20 private land owners are crossed. The Route Segment is located entirely in Yakima County. The Route Segment crosses and parallels Sage Trail Road near the Pomona Heights Substation on the south side, and crosses the road just south of the substation. The route segment parallels the north side of Sage Trail Road in a residential area, and crosses the Selah-Moxie irrigation canal, and Pomona-Wanapum 230 kV transmission line at Shotgun Lane. An existing Pacific Power electrical distribution line is located generally on the south side of Sage Trail Road, and 1.6 miles of this route segment would follow this line.

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment NNR-1, but farmland of statewide importance is crossed for 0.1 mile and unique farmland is crossed for 1.8 miles. Refer to Table 3.4-7 for a summary of Land Use and Jurisdiction by Route Segment.

This Route Segment is located adjacent to land zoned as “Remote Rural/Extremely Limited Development” and “Valley Rural”. This route would cross the Pacific Power Pomona-Wanapum 230 kV transmission line. Refer to Table 3.4-7 for a summary of Land Use and Jurisdiction by Route Segment.

3.4.4.2 Route Segment NNR-2

The existing land use along this Route Segment is centered around military activities within TA 13 and the cantonment area of JBLM YTC. A total of 21 residences are within 500 feet of this Route Segment and 47 are within 1,000 feet. This Route Segment crosses only federal (Army) jurisdiction land. A total of one parcel owned by one public land owner is crossed. The route segment is located entirely in Yakima County.

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment NNR-2, but farmland of statewide importance is crossed for 1.4 miles and prime if irrigated land is crossed for 2.4 miles.

3.4.4.3 Route Segment NNR-3

The existing land use along this Route Segment of the Project area is related to transportation facilities (I-82, eastbound Selah Creek Rest Area), agriculture, BLM recreation and special management areas (Selah Cliffs NAP, Yakima Cliffs/Umtanum Ridge ACEC, Selah Butte Wildflower Watching Area), and the Pomona-Wanapum 230 kV utility corridor. This segment also crosses undeveloped grazing and vacant land. There are no residences within 500 feet of this Route Segment, but two are within 1,000 feet. This Route Segment crosses BLM, private, and WSDOT ROW land. A total of 26 parcels owned by 11 private land owners are crossed. The Route Segment is located in Yakima County and Kittitas County. Zoning along this Route Segment in Yakima County is "Remote Rural/Extremely Limited Development"; zoning in Kittitas County is Forest and Range.

There are two RCO funded projects within the Project area of this Route Segment: Selah Cliffs NAP Grant # 06-1827 and Selah Cliffs Grant #93-838. The Selah Cliffs Grant #93-838 RCO site is not encumbered by development restrictions because no land has been acquired with grant money. Selah Cliffs NAP Grant # 06-1827 is not crossed by the Project. This Route Segment would also cross the Reclamation proposed Wymer Dam Reservoir. Land use for WSDOT parcels crossed by the Project is associated with conservation. See description of WSDOT environmental buffer in Section 3.4.3.2.

Agricultural areas occur west of the Route Segment just south of Selah Cliffs and no PLSS sections containing CRP lands are crossed. Farmland of statewide importance is crossed for 0.8 mile and prime if irrigated land is crossed for 0.2 mile.

3.4.4.4 Route Segment NNR-4

The existing land use along this Route Segment is related to undeveloped/grazing, military activities, transportation, and the existing Pomona-Wanapum 230 kV utility corridor. There are no residences within 500 or 1,000 feet of this Route Segment. This Route Segment crosses private land and those managed by JBLM YTC and WSDOT. A total of 10 parcels owned by two private land owners are crossed. The Route Segment is located entirely in Kittitas County. Zoning in Kittitas County is Forest and Range. No county zoning or land use regulations are applicable on JBLM YTC. The route crosses the Pomona-Wanapum 230 kV transmission line twice.

The JBLM YTC training designation crossed by this route segment is TA-16 and it crosses the land use Zone 4 - Bivouac Location.

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment NNR-4. Farmland of statewide importance is crossed for 0.2 mile and prime if irrigated land is crossed for 0.9 mile.

3.4.4.5 Route Segment NNR-5

The existing land use along this Route Segment is related to military activities. The JBLM YTC training designation crossed by this route segment is TA-16. There are no residences within 500 or 1,000 feet of this Route Segment. This Route Segment crosses only JBLM YTC administered land. The Route Segment is located entirely in Kittitas County and no county zoning or land use regulations are applicable. The Route Segment crosses the Pomona-Wanapum 230 kV transmission line once.

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment NNR-5. Farmland of statewide importance is crossed for 0.6 mile and prime if irrigated land is crossed for 0.1 mile.

3.4.4.6 Route Segment NNR-6

The existing land use along this Route Segment is related to military activities and the existing Pomona-Wanapum 230 kV utility corridor. The JBLM YTC training designations crossed by this Route Segment includes TA-1 and TA-3. There are no residences within 500 or 1,000 feet of this Route Segment. This Route Segment crosses only JBLM YTC administered land. The Route Segment is located entirely in Kittitas County and no county zoning or land use regulations are applicable. The Route Segment crosses the Pomona-Wanapum 230 kV transmission line once.

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment NNR-6. Farmland of statewide importance is crossed for 0.6 mile.

3.4.4.7 Route Segment NNR-7

The existing land use along this Route Segment is related to military activities and the existing Pomona-Wanapum 230 kV utility corridor. The JBLM YTC training designation crossed by this Route Segment is TA-3. There are no residences within 500 or 1,000 feet of this Route Segment. This Route Segment crosses only JBLM YTC managed land. The Route Segment is located entirely in Kittitas County and no county zoning or land use regulations are applicable.

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment NNR-7. Farmland of statewide importance is crossed for 1.8 miles.

3.4.4.8 Route Segment NNR-8

The existing land use along this Route Segment is related to recreation (John Wayne Pioneer Trail), utility land uses, and transportation. There are no residences within 500 or 1,000 feet of this Route Segment. Jurisdiction crossed by this Route Segment is private, BLM, Grant County PUD, WSDOT, and Reclamation. The Route Segment is located in Kittitas and Grant Counties. Zoning in Kittitas County is Forest and Range, zoning in Grant County is Rural Remote. The Route Segment parallels the existing BPA/PacifiCorp utility corridor across the Columbia River south of the Wanapum Dam. Approximately two miles of this Route Segment is located in Grant County (south of Wanapum Dam on the east side of the Columbia River).

There are two RCO funded projects within the Project area of this Route Segment: Wanapum S. P. Boat Launch Replacement Grant # 00-1519and Wanapum Natural Area Preserve Grant # 08-1185, 10-1474, and 12-1182. These RCO sites are not encumbered by development restrictions because no land has been acquired with grant money.

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment NNR-8.

3.4.4.9 Route Segment MR-1

The existing land use along this Route Segment is related to undeveloped/grazing, military activities, and transportation. A total of one residence is within 500 feet of this Route Segment and two are within 1,000 feet. This Route Segment crosses private land and those managed by JBLM YTC, DNR, and WSDOT. A total of 23 parcels owned by one private land owner are crossed. The Route Segment is located entirely in Kittitas County. Zoning in Kittitas County is Forest and Range and Agriculture-20. No county zoning or land use regulations are applicable on JBLM YTC. The JBLM YTC training designation crossed by this route segment is TA-16. The route crosses the Pomona-Wanapum 230 kV transmission line twice.

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment MR-1. Farmland of statewide importance is crossed for 4.6 miles.

TABLE 3.4-7 LAND USE AND JURISDICTION SUMMARY BY ROUTE SEGMENT

LAND USE	NNR-1	NNR-2	NNR-3	NNR-4	NNR-5	NNR-6	NNR-7	NNR-8	MR-1
Agriculture (Total)	0	0	0	0	0	0	0	0	0
Residential Area Crossing (miles)	0	2.4	0.5	0	0	0	0	0	0
Residences (Number)									
within 500 feet	27	21	0	0	0	0	0	0	1
within 1,000 feet	79	48	2	0	0	0	0	0	3
Military (miles)	0	4.5	0	3.3	1.8	6.4	8.2	0	6.6
Transportation (miles)			0.1						0.2
Undeveloped/Vacant (miles)	0	0	8.9	1.3	0	0	0	2.3	4.9
Open Water (miles)	0	0	0	0	0	0	0	0.4	0
Leases (Federal and State Land; Number)									
Oil and Gas	0	0	0	0	0	0	0	0	0
Grazing	0	0	0	0	0	0	0	0	1
Other (miles)									
Farmland of Statewide Importance	0.1	1.4	0.8	0.2	0.6	0.6	1.8	0	4.6
Unique Farmland	1.8	0	0	0	0	0	0	0	0
Prime Farmland if Irrigated	0	2.4	0.2	0.9	0.1	0	0	0	0
Ownership (miles)									
Federal									
BLM	0	0	3.6	0	0	0	0	0.4	
JBLM YTC	0	5.0	0	3.2	1.8	6.4	8.2	0	6.6
Reclamation	0.2	0	0	0	0	0	0	1.4	0
Total Federal Land	*0.2*	*5.0*	*3.6*	*3.2*	*1.8*	*6.4*	*8.2*	*1.8*	*6.6*
State									
WSDOT	0	0	0.7	0.1	0	0	0	0	0.2
DNR	0	0	0	0	0	0	0	0	1.7
Total State Land	*0*	*0*	*0.7*	*0.1*	*0*	*0*	*0*	*0*	*1.9*
County									
Grant County	0	0	0	0	0	0	0	2.2	0
Kittitas County	0	0	6.1	4.6	1.8	6.4	8.2	0.6	11.9
Yakima County	2.4	5.0	3.2	0	0	0	0	0	0
Total County Land	*2.4*	*5.0*	*9.3*	*4.6*	*1.8*	*6.4*	*8.2*	*2.8*	*11.9*
Private Land	2.1	0	5.0	1.2	0	0	0	0.5	3.3
Parcels and Landowners									
Number of Parcels Crossed	29	7	26	10	3	9	10	5	23
Number of Private Landowners	20	1	11	2	0	0	0	0	1
Miles of PacifiCorp Existing Distribution Rights	1.6	0	0	0	0	0	0	0	0
Miles Paralleling Existing Transmission	0.1	1.3	8.3	4.2	0	0	6.4	8.2	2.5

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3.5 RECREATION

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to recreation along the NNR and subroute, including those raised during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

3.5.1 Data Sources

This section describes existing recreation resources in the Project area. The Project area includes the developed and dispersed recreational activities and lands used or dedicated for recreational activities within one mile of the Project centerlines. Developed recreational activities usually occur at developed recreation sites or areas where physical improvements such as structures, equipment, trails or other infrastructure have been installed or constructed to support specific activities such as sporting events, camping, off-highway vehicle (OHV) riding, and mountain biking. Developed recreation sites require facility development and maintenance. Dispersed recreational activities are not geographically specific to one location and may include activities that do not require intensive facility development. Examples of these may include activities such as hunting, fishing, snow-shoeing, wildlife viewing, photography, hiking, horse-back riding, and biking.

Data sources came from various readily available secondary sources and field reviews conducted in June of 2013. Data layers were obtained from federal and state agencies; input from agency staff; county and federal land use and recreation planning documents; communications with various agency staff; BLM Public Lands Information System; geographic information system (GIS) databases; county Chamber of Commerce websites; and other online data. Existing recreational resources in the Project area were verified in the field.

3.5.2 Current Conditions and Trends, Regional Overview

3.5.2.1 Federally Administered Recreation Areas

Joint Base Lewis-McChord Yakima Training Center
The United States Army's Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) is dedicated for military maneuver training and weapons testing, and also serves as a nature preserve and recreation area. Portions of the JBLM YTC are open for public use for a variety of non-motorized activities. Access to the JBLM YTC is limited and controlled at the operations center. JBLM YTC recreational uses include activities such as hunting, hiking and horseback riding in non-restricted areas at times when scheduled training exercises are not being conducted and when the activities are approved by the JBLM YTC commander. A portion of John Wayne Trail is located within the JBLM YTC (see below). The trail is used for hiking, trail rides, bicycling, and horseback riding (U.S. Department of the Army [Army] 2010).

Yakima River Canyon Management Area
The BLM manages land in the Yakima River Canyon Management Area (MA) for multiple uses, including recreation opportunities and wildlife habitat. The Yakima River Canyon MA contains four developed BLM recreation sites used for river access and camping, as well as land used for dispersed recreation activities. The MA also includes the Yakima River, a Blue Ribbon trout stream. One area within the Yakima River Canyon MA is a recognized area for wildflower viewing, the Selah Butte Watchable Wildflower Area. Only a small section of the Yakima River and the Selah Butte Watchable

Wildflower Area is located within the two-mile study corridor (see Section 3.8 - Visual Resources for other recreation sites located along the Yakima River Canyon).

The Selah Butte Watchable Wildflower Area is recognized as an area of dispersed wildflower (e.g., balsamroot) viewing activity covering about 10 acres during April and May. The site is accessed by the communication facility service road leading from Selah Creek Drive that intersects with State Route (SR) 821. The site provides views of the Yakima River Canyon (see Section 3.8 - Visual Resources).

Recreational use data has been collected in the BLM Spokane District since the middle 1980s, and is stored in the Recreation Management Information System. Visitation estimates were compiled as part of the Eastern Washington Resource Management Plan Analysis of the Management Situation (AMS) (BLM 2011). Visits and visitor days were estimated for the Yakima River Canyon MA. Planning area total recreation visits/visitor days were estimated for 2001 through 2009. A visit represents one person's trip or visit, and a visitor day represents one person engaging in an activity for any part of the day. In 2009, the latest visitation estimate dates listed in the AMS, there were 174,100 visits and 441,111 visitor days in the Yakima River Canyon MA (for all recreation sites and dispersed users).

3.5.2.2 State Administered Recreation Areas

John Wayne Pioneer Trail-Iron Horse State Park/Milwaukee Road Corridor

The John Wayne Pioneer Trail, also known as the Milwaukee Road Corridor in the Project area, includes 100 miles of trail and is part of the Iron Horse State Park. The Washington State Parks and Recreation Commission owns an abandoned railroad (referred to by the state as the "Milwaukee Road Corridor", the old Chicago, Milwaukee, St. Paul, and Pacific (C, M, SP, & P Railroad) through the Lower Crab Creek area, Beverly, and across the Columbia River to the JBLM YTC. Twenty-two miles of the trail are located within, owned, and managed by JBLM YTC (Army 2010). The eastern-most portion of the trail crosses the Project area on the north side. The trail follows the C, M, SP, & P Railroad corridor through Beverly and crosses the river along the Beverly Trestle Railroad Bridge (a National Register of Historic Places site, see Section 3.11 - Cultural Resources), extending into the JBLM YTC just west of Wanapum Dam. Hikers, bicyclists, equestrians, waggoners, cross-country skiers, snowshoers, and dog-sledders all use the trail. A parking area, "Army East Trailhead", is located south of the Wanapum Dam on the west side of the river. There are segments of the John Wayne Pioneer Trail that are not managed by State Parks, the largest such segment being under the management of the Army on the JBLM YTC. The other portion of the trail not managed by State Parks is the Milwaukee Road Corridor, which is managed by Washington Department of Natural Resources (DNR). Access to the Milwaukee Road Corridor is provided by permit only (pursuant to WAC 332-52-500) on all portions of the trail other than those portions on the JBLM YTC in the Project area. Permits are obtained through DNR. On the JBLM YTC, permits are required for camping and after dark use on the John Wayne Trail and can be obtained from the JBLM YTC Operations Center. No hunting or motorized use is allowed in the corridor. The corridor is open for use year-round.

Selah Cliffs Natural Area Preserve (NAP)

This state preserve is managed by the Southeast Region of DNR, and was established to protect the known population of basalt daisy and prairie falcon. It is located between SR-821 and Interstate (I) 82 near the Fred G. Redmon Memorial Bridge. The area may be viewed from the Washington State Department of Transportation (WSDOT) rest area, and public access within the site is provided from SR-821 along Selah Creek. Selah Cliffs NAP has an interpretive trail system including an Americans with Disabilities Act-accessible crushed gravel half-mile loop and several interpretive signs. Parking can accommodate five vehicles.

3.5.2.3 County Administered Recreation Areas

Yakima County
There are no Yakima County administered recreation sites in the Project area. A northern extension of the Yakima River Greenway is proposed along the west bank of the river in the Project area (Yakima County 2008).

Kittitas County
There are no Kittitas County administered recreation sites in the Project area.

Grant County
Grant County does not own or administer any parks or recreation sites in the Project area. Parks and recreation sites are owned and administered by Grant County Public Utility District (PUD) which manages parks and recreation facilities under the Shoreline Management Plan (SMP; Grant County PUD 2010a) and the Recreation Resource Management Plan (RMP). The Recreation RMP identifies recreation enhancement projects to be implemented by Grant County PUD that will ensure improved public recreation opportunities while also meeting FERC license requirements and project operations (Grant County PUD 2010b).

Wanapum Heritage Center/Picnic Area (Grant County PUD)
The Wanapum Heritage Center presents, maintains and continues the Wanapum Tribe's history and way of life. Visitors to the museum can view numerous displays of Wanapum historical artifacts or watch videos of the Wanapum history and the Columbia River. The Heritage Center is located next to Wanapum Dam on the Columbia River west of SR-243. The Wanapum Heritage Center's activities are focused towards interior displays and activities, but there is an outdoor picnic area located just south of the facility containing picnic tables and parking. Grant County PUD has plans for signage and toilet expansion of the site. The facility is open throughout the year.

Wanapum Dam Overlook (Grant County PUD)
Wanapum Dam Overlook is located just east of SR-243 northeast of Wanapum Dam. The overlook is currently unmarked from SR-243 and provides views to Wanapum Lake and the Columbia River corridor.

Wanapum Lake (Grant County PUD)
Wanapum Lake is also part of the Priest Rapids Hydroelectric Project, administered by the Grant County PUD No. 2 under a license agreement with the Federal Energy Regulatory Commission (FERC). Access to the lake near the Project area is from the Upper Wanapum Dam Boat Launch and Getty's Cove Boat launch located on the south end of the lake off of Huntzinger Road south of Wanapum State Park. Recreational activities include fishing, boating and sightseeing. The Upper Wanapum Dam Boat Launch (Grant County PUD) is located on the east side of the lake west of SR-243.

Approximately 12.5 percent of the shoreline of the Wanapum Dam Development Project is accessible to the general public by land travel without trespass. There were a total of 31,140 total annual daytime recreation day visits to the Wanapum Dam Development Project and 32,028 total annual nighttime recreation day visits in 2008. Peak weekend day visits totaled 3,860 and total nighttime peak weekend visits totaled 974 (Grant County PUD 2008).

3.5.2.4 Municipal Administered Recreation Areas

There are no municipal administered recreation areas located within one mile of the NNR route segments.

3.5.2.5 Private Recreation Areas and Activities and Other Areas

Hunting

Big game, small game, waterfowl, upland bird, and other game species are hunted throughout the Project area. Big game hunting occurs in the four Washington Department of Fish and Wildlife (WDFW) Game Management Units (GMU) that are located in the study area. Rattlesnake Hills (GMU 372) includes most of Yakima County exclusive of JBLM YTC in the study area; Manastash (GMU 340) is located north and west of I-82 in the Project area. Alkali (GMU 371) includes all of JBLM YTC, and Wahluke (GMU 278) includes all of Grant County in the Project area.

TABLE 3.5-1 COMBINED BIG GAME GENERAL AND SPECIAL PERMIT 2011 HARVEST IN GMU CROSSED BY THE PROJECT

SPECIES	NUMBER OF PERMITS BY GAME MANAGEMENT UNIT NAME AND ROUTE SEGMENT			
	Wahlike-278 (NNR-8)	*Manastash -340 (NNR-3,NNr-4, MR-1)*	*Alkali-371 (NNR-2, NNR-4 through NNR-7, MR-1)*	*Rattlesnake Hills-372 (NNR-1)*
Elk	4	175	9	20
Deer	49	90	3	46

Source: WDFW 2013.

TABLE 3.5-2 SMALL GAME HARVEST BY COUNTY (2011)

SPECIES	*YAKIMA (HARVEST #)*	*GRANT (HARVEST #)*	*KITTITAS (HARVEST #)*
Canada Goose	2,175	14,992	538
Chukar Partridge	2,583	685	1,090
Cottontail Rabbit	2,737	955	79
Duck	30,820	63,572	5,407
Forest Grouse	1,838	0	2,012
Gray Partridge	453	404	397
Mourning Dove	14,229	17,689	543
Pheasant	5,155	10,658	720
Quail	20,716	13,725	2,142
Snipe	80	262	48
Snowshoe Hare	12	0	0

Source: WDFW 2013.

Total combined 2011 General and Special Permit Harvests for elk and deer in the Project area GMUs are shown in Table 3.5-1. Small game harvests are tracked by counties in Washington. Small game harvests for Yakima, Kittitas, and Grant Counties are shown in Table 3.5-2.

Hunting opportunities on private land are primarily for the purposes of elk, deer, game bird (pheasant, upland game bird), and migratory waterfowl hunting. Owners either allow free access (“Feel Free to Hunt”) to their property for the purposes of hunting or are enrolled in “Landowner Hunting Permit” Program, where hunting is permitted based on a drawing selection held by WDFW or the owner. Other hunting on private lands may be allowed by on-site registration or by written permission by the landowner. Private hunting also occurs on land along Burbank Creek. These hunting areas are used by professional hunting guides as part of their 15,000 acre hunting grounds.

Columbia River
River recreation occurs along the upper stretch of Priest Rapids Lake and Wanapum Lake along the Columbia River in the Project area. Boating, fishing, and other water resource related recreational activities occur.

3.5.3 Current Management Considerations

BLM manages the Yakima River Canyon MA under the current Spokane District RMP (1985) and Record of Decision (ROD; BLM 1987) and the 1992 RMP (BLM 1992) Amendment and ROD, and the Yakima River Canyon Management Plan (1988).

The 2008, Yakima County Trails Plan (Yakima County 2008) focuses on unincorporated areas of the county and addresses current activities, trends, and opportunities for trail expansion. Relevant programs policies and regulations were evaluated and recommendations made with regard to recreation facility types, service levels, design guidelines, trail standards safety, education, and enforcement. Transportation linkage opportunities with consideration of bicycle and pedestrian friendliness and recognition of off-street travel corridor benefits were considered. Plan implementation strategies were developed addressing capital improvement, right-of-way (ROW) acquisition, development, maintenances and administration. Goals, policies, and statements identified in the plan address the trail system establishment, design standards, public safety, alternative transportation, regional development, and adjacent ownership.

The Yakima County Comprehensive Plan (Yakima County 2007) identifies goals, objectives, and policies to guide resource protection and development within the county. The Parks and Open Space Element serves two purposes. The first is to determine the type and level of park and recreational services the county should provide. The second purpose is to clarify the broader functions and benefits of the County's open spaces. The goals, objectives, and policies pertaining to parks and open space considered are not relevant to the Project.

Open space and recreation resources are also covered in the Land Use Element and Rural Lands Sub-Element of the Grant County Comprehensive Plan (Grant County 2006). The following goals and policies pertinent to the Project identified in the plan includes:

> **Goal LU-5:** The County should conserve or enhance important natural, cultural, and scenic resources.
>
> - Policy LU-5.1: Open space land use designations should:
>   - Enhance recreational opportunities and public access to open spaces.
>
> **Goal RU-1:** Rural areas should take into consideration both human uses and the natural environment. Encourage rural development that maintains the rural character of the land and protects the land and water environments required by outdoor recreation, and other open spaces.
>
> - Policy RU-1.1: Land uses in rural areas that are related to tourism, outdoor recreation, and other open space activities shall be preferred.
>
> **Goal NS-9:** The County should recognize and protect the functions and values of the shoreline environments of statewide and local significance. For shorelines of state-wide significance, protection and management priorities are to:

- Increase recreational opportunities for the public in shoreline areas. (Lower Crab Creek and the east/north side of the Columbia River in the Project area; see Section 3.4 - Land Use).

Grant County PUD recreational lands are currently managed under the new Final Priest Rapids Hydroelectric Project SMP (2010a). Grant County PUD manages the lands and waters of the Priest Rapids Project (Priest Rapids Dam, Wanapum Dam, and their associated reservoirs and transmission lines). A new SMP, submitted to FERC for approval on March 2, 2010, is subject to FERC approval before adoption by Grant County PUD, although Grant County PUD manages its lands in accordance with this plan (see Section 3.4 - Land Use). One of the purposes of the SMP is to consider what uses should occur on Grant County PUD lands, and it designates classifications and uses which are intended, in part, to preserve and protect lands for future development by the Grant County PUD, government agencies, or individuals.

3.5.4 NNR Route Segment Specific Considerations

3.5.4.1 NNR-1

Route Segment NNR-1 is located in a low density residential area. There are no recreation areas or significant recreational activities occurring along Route Segment NNR-1. Refer to Table 3.5-3 for a summary of recreation activities occurring in the Project area.

3.5.4.2 NNR-2

Route Segment NNR-2 is located on JBLM YTC managed land, primarily in an area of intensive administrative and operational activity (cantonment area). There are no recreation areas or significant recreational activities occurring along this Route Segment.

3.5.4.3 NNR-3

Recreational activities associated with this route segment include those related to the Selah Cliffs NAP (wildflower and wildlife watching, scenic viewing) and those associated with the Selah Butte Watchable Wildflower Area on BLM lands, and other dispersed hunting and recreational activities occurring on BLM and private lands.

3.5.4.4 NNR-4

Recreational activities associated with this route segment include those related to dispersed hunting activity occurring on private lands on the west end of the route. Most of the route segment is located on JBLM YTC-managed land for training activities, with no recreational activities allowed.

3.5.4.5 NNR-5

Route Segment NNR-5 is located on entirely JBLM YTC-managed land for training activities, with no recreational activities allowed.

3.5.4.6 NNR-6

Route Segment NNR-6 is located entirely on JBLM YTC-managed land for training activities, with no recreational activities allowed.

3.5.4.7 NNR-7

Route Segment NNR-7 is located entirely on JBLM YTC-managed land for training activities. Nearby recreational activities (within one mile of the route) are associated with and confined within the John Wayne Pioneer Trail corridor located north of the route segment.

3.5.4.8 NNR-8

Route Segment NNR-8 is located on entirely JBLM YTC-managed land for some training activities. Recreational activities are associated and confined within the John Wayne Pioneer Trail located north of the route segment. Recreational activities within the vicinity of NNR-8 include those associated with the Columbia River/Priest Rapids Reservoir/Wanapum Reservoir, Wanapum Heritage Center, and Wanapum Dam Overlook.

3.5.4.9 MR-1

Recreational activities associated with this route segment include those related to dispersed hunting activity occurring on private land and DNR land west of I-82. East of I-82, JBLM YTC land is open to recreational use on a limited basis in the Manastash Ridge area.

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3.6 SPECIAL MANAGEMENT AREAS

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to special management areas (SMAs) along the NNR and subroute, including those raised during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

3.6.1 Data Sources

Data sources for special management areas come from a number of state and federal sources. Geographic information system (GIS) shapefiles of current designations were obtained from the BLM, federal and state agencies. SMAs typically include designations and allocations such as designated wilderness, Special Recreation Management Areas (SRMAs), Areas of Critical Environmental Concern (ACEC), and other areas such as Important Bird Areas (IBAs) intended to enhance or protect specific qualities over time, and to foster recreation opportunities, ecosystem protection, or historic preservation. Special designations are made by Congress or by agencies administratively during the resource planning process.

3.6.2 Current Conditions and Trends, Regional Overview

Yakima Hills Important Bird Area
The Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) has been identified as an IBA. The National Audubon Society administers the IBA Program in the United States. JBLM YTC has “Recognized” status under the program. Recognized IBAs are identified IBAs that have been announced to the public. Recognition may mean that a landowner has been notified and has approved of the fact that the property has been identified as an IBA. JBLM YTC is recognized as an IBA based on the greater sage-grouse status as a Global and State Species of Conservation Concern, sage-grouse presence in rare/unique habitat, and as defined by the National Audubon Society, an area having “greater than 1% of the state population” (National Audubon Society 2012).

Yakima River Cliffs and Umtanum Ridge ACEC
The Yakima River Cliffs and Umtanum Ridge ACEC consists of 320 acres of BLM-managed land located on the eastern slopes of the Yakima River Canyon. The ACEC was designated for the preservation of basalt daisy (*Erigeron basalticus*; State Threatened, BLM Sensitive) and Hoover’s desert-parsley (*Lomatium tuberosum*; State Sensitive, Federal Species of Concern, BLM Sensitive) under federal candidate plant species values in the Spokane District Resource Management Plan (RMP) and Record of Decision (ROD) and the 1992 RMP Amendment (BLM 1992) and ROD (Spokane District 1985/1987 RMP [BLM 1987] and 1992 RMP Amendment/ROD; see BLM 2011).

Yakima River Canyon ACEC
Yakima River Canyon ACEC consists of 4,200 acres of BLM-managed land located along and above the Yakima River Canyon slopes. The ACEC was designated for the protection of Hoover’s tauschia (*Tauschia hooveri*; Federal Species of Concern, State Threatened, and BLM Sensitive), basalt daisy (State Threatened, BLM Sensitive), Hoover’s desert-parsley (State Sensitive, Federal Species of Concern, BLM Sensitive), the high density of nesting raptors and big horn sheep, and for protection of the travel corridor of Native Americans and fur trappers (BLM 1992 and 2011).

Proposed ACECs
The BLM Spokane District is currently revising the Spokane RMP. The new RMP will be called the Eastern Washington RMP. As part of this process, the Spokane District is currently developing and

analyzing alternatives for the RMP/Environmental Impact Statement (EIS). Some of the current alternatives identify new or consolidated ACECs.

Yakima River Canyon and Umtanum Ridge ACEC
The consolidation and expansion of the ACEC parcels in the Yakima River Canyon is being considered in the revised RMP/EIS. The combined and expanded ACEC would be called the Yakima River Canyon and Umtanum Ridge ACEC. The values for designating this ACEC include regionally important cultural values, big horn sheep, golden eagle, basalt daisy, Hoover's desert-parsley, Hoover's tauschia, and Pauper's milkvetch (*Astragalus misellus* var. *pauper*). The entire area being considered for the Yakima River Canyon and Umtanum Ridge ACEC consists of 4,720 acres (Boyter 2013).

Huntzinger Road ACEC
The BLM Spokane District is also considering the designation of a new ACEC. The Huntzinger Road ACEC is located near Wanapum Dam on the Columbia River. This ACEC consists of 135 acres and is being considered for botanical values (Columbia milkvetch [*Astragalus columbianus*], naked-stemmed evening-primrose [*Camissonia scapoidea* ssp. *scapoidea*]; Boyter 2013).

Washington State Department of Transportation Environmental Buffer
In 1993, the Selah Cliffs Natural Area Preserve was established to protect the largest known basalt daisy population. The basalt daisy is found exclusively in a 10-mile stretch of the Yakima River Canyon, growing in the Yakima Basalt formation along Selah Creek (which flows below the Selah Rest Area on Washington State Department of Transportation [WSDOT] managed property) and the Yakima River Canyon. In order to provide additional protection to potential basalt daisy habitat on WSDOT-managed property, WSDOT established an approximately 102-acre "environmental management buffer" in 2008. This parcel is located within the west half of Section 15 west of Interstate (I) 82 and north of the Selah Rest Area. The environmental management buffer is non-regulatory in nature, and was created to alert WSDOT and others to the presence of the basalt daisy and, if feasible, to avoid impacts to this species from WSDOT or other projects (WSDOT 2014).

3.6.3 Current Management Considerations

BLM
Lands under the jurisdiction of the BLM in the Project area are managed in accordance with the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD. The Planning Area consists of two field offices: the Wenatchee Field Office and the Border Field Office (see Section 3.4 Land Use and Jurisdiction). The RMP is currently in the process of being updated (Eastern Washington RMP).

JBLM YTC IBA
The goal of the IBA program is to identify the most essential areas for birds, monitor those sites for changes to birds and habitat, and work with land owners and managers to conserve these areas for long term protection. Recognition of JBLM YTC as an important sage grouse area does not require landowner approval and does not compel land owners to manage or preserve property in any specific manner.

Yakima River Eligible National Wild and Scenic River
The Yakima River is not currently designated as a wild and scenic river; however in 1988, during the comment period for the Yakima River Canyon Recreation Management Plan, multiple recommendations were made from the general public to conduct a study to include the Yakima River in the National Wild and Scenic River System. The eligibility study that was conducted identified that the Yakima River does meet the Eligibility Criteria #3 for a Recreational River Area due to outstanding recreational values associated with fishery, recreation, and wildlife. A suitability determination has not been conducted for the segment of the Yakima River that is within the Project area. The eligible section of the Yakima River

within the Project area would not be affected by the Project due to distance. Appendix A: Jurisdiction, Recreation, and Special Management Areas shows the eligible segment of the Yakima River relative to the Project area.

3.6.4 NNR Route Segment Specific Considerations

3.6.4.1 NNR-1

There are no SMAs associated with Route Segment NNR-1.

3.6.4.2 NNR-2

Route Segment NNR-2 is located within the JBLM YTC, which has been identified as an IBA.

3.6.4.3 NNR-3

Route Segment NNR-3 crosses the Yakima River Cliffs and Umtanum Ridge ACEC. Route Segment NNR-3 also crosses additional land that is proposed in the BLM Eastern Washington RMP (update) to be included in the Yakima River Canyon and Umtanum Ridge ACEC.

3.6.4.4 NNR-4

The portion of Route Segment NNR-3 that is located within the JBLM YTC has been identified as an IBA.

3.6.4.5 NNR-5

Route Segment NNR-5 is located within the JBLM YTC, which has been identified as an IBA.

3.6.4.6 NNR-6

Route Segment NNR-6 is located within the JBLM YTC, which has been identified as an IBA.

3.6.4.7 NNR-7

Route Segment NNR-2 is located within the JBLM YTC, which has been identified as an IBA.

3.6.4.8 NNR-8

Route Segment NNR-3 crosses land that is proposed in the BLM Eastern Washington RMP (update) to be designated as the Huntzinger Road ACEC.

3.6.4.9 MR-1

The portion of Route Segment MR-1 that is located within the JBLM YTC has been identified as an IBA.

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3.7 TRANSPORTATION

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to transportation along the NNR and subroute, including those raised during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

This section primarily considers highways, local roads and access within the study area; aviation facilities are described in Section 3.4 Land Jurisdiction and Land Use. The regional roadway network in and around the Project area is managed by Grant County, Kittitas County, Yakima County, Washington Department of Transportation (WSDOT), and the Federal Highways Administration (FHWA). There is also a network of improved, but unpaved roads managed by the BLM, Joint-Base Lewis McChord Yakima Training Center (JBLM YTC) and the Bureau of Reclamation (Reclamation) that provide access to and within their lands for various purposes.

3.7.1 Data Sources

This section was prepared using information from a variety of federal, state, and local planning documents, including:

- WSDOT State Transportation Improvement Program 2013-2016
- Grant County Public Works website, Current Construction 2013
- Grant County Comprehensive Plan 2006
- Grant County Comprehensive Six-Year Transportation Improvement Program 2013-2018
- Kittitas County Long-Range Transportation Plan 2008
- Kittitas County Six-Year Transportation Improvement Program 2014-2019
- Kittitas County Road Atlas 2012
- Yakima County Six-Year Transportation Improvement Program 2014 – 2019
- Yakima County Plan 2015 Volume I
- Analysis of the Management Situation for the Eastern Washington and San Juan Resource Management Plan (BLM 2011a)
- BLM 9113 Roads Manual (BLM 2011b)

Additional policy and procedural guidance was obtained from the following sources:

- BLM Land Use Planning Handbook (H-1601-1)
- Bureau of Reclamation, Reclamation Project Act of 1939 (53 United States Code [U.S.C.] §1187).
- Bureau of Reclamation, Reclamation Manual
- Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403)
- WSDOT Engineering, Environmental and Permitting Staff

The information from these sources was used to determine the existing transportation conditions within the Project area.

3.7.2 Current Conditions and Trends, Regional Overview

The Project area includes the transportation infrastructure located within a two-mile corridor; one mile either side of alternative route segment center lines. To provide additional context, regional highways outside of the Project area are also described.

3.7.2.1 Federal Highways and State Routes

The state highway “state routes” system forms the primary road network within the Project area. In the region, including all three counties, the state highway system serves statewide, regional, and local traffic demands. The main roadways in Grant, Kittitas, and Yakima Counties in the Project area include Interstate (I) 82, Washington State Route (SR) 821 and Washington SR 243. Highways just outside the Project area include I-90 to the north, U.S. Highway 12 to the west, Washington SR 24 to the south, and Washington SR 26 to the northeast.

I-82 is a major east-west freeway which connects I-90 to the north and I-84 to the south (in Oregon). Within the Project area, I-82 is oriented in a generally north-south direction. The interstate allows direct connectivity to major urban areas of Seattle, Washington and Boise, Idaho. Locally, the interstate serves the City of Yakima. The interstate is a four-lane facility with a divided median. The shoulder width is four feet on the inside and 10 feet on the outside. Traffic operations along this major interstate highway are characterized by relatively free flowing traffic with no controlled intersections; speed limits are 70 miles per hour (mph) through the Project area.

Three rest areas and designated viewpoints are located within the Project area on I-82: 1) East-bound Selah Creek Rest Area; 2) West-bound Manastash Ridge Viewpoint; and 3) East-bound Manastash Ridge Viewpoint (see Appendix A – Project Maps: Land Use).

SR 243 is a north-south collector highway with managed access. The highway connects SR 24 at the south terminus and SR 26 at its north terminus, as well as connecting travelers in southern Grant County to I-90. The route travels through southern Grant County and within proximity of the population centers of Desert Aire, Mattawa, Beverly, Schawana, and Vantage. The highway is two-lanes with a speed limit varying between 35 and 55 mph, depending on proximity to population areas. Roadway shoulders on both sides are typically four to six feet wide and partially paved. The highway is relatively free flowing except in more densely-populated areas with more frequent slow-down areas at signalized or stop sign controlled intersections.

SR 821 begins at the I-82 exit 26/Harrison Road intersection north of East Selah and extends north, following Yakima Canyon. SR 821 is on the western fringe of the Project area, and is a designated Washington State Scenic Byway (see Section 3.8 – Visual Resources).

3.7.2.2 County Roads

County roads are an important part of local travel system. Grant, Kittitas and Yakima Counties use the nine different federal functional classifications (FFCs) – four urban and five rural classifications, as follows:

- *Urban Principal Arterials (FFC 14):* provide a network of streets and highways that can be identified as unusually significant. They are important both because they provide routes for traffic passing through the area and because they provide routes for movements within the urbanized area. Access to these routes is usually limited to intersections.

- *Urban Minor Arterials (FFC 16):* connect with and augment principal arterials, serving trips of moderate length. They place more emphasis on access than principal arterials, but still emphasize mobility over access. These streets provide continuity within communities.
- *Urban Collector Arterials (FFC 17):* provide both access service and traffic circulation within neighborhoods. These streets also collect traffic from local streets in neighborhoods and channel it to arterials.
- *Urban Local Access (FFC 19):* provide direct access to abutting properties and to the higher classification facilities. Service to through traffic is usually discouraged.
- *Rural Major Arterials (FFC 02):* connect rural communities to each other and to urban areas.
- *Rural Minor Arterials (FFC 06):* in conjunction with Rural Major Arterials, the rural minor arterials form a rural network that links cities together with other major traffic generators. Minor arterials should be expected to provide for relatively high overall travel speeds with minimum interference to through movement.
- *Rural Major Collectors (FFC 07):* provide service to larger towns and traffic generators of importance. They link population centers and serve important travel corridors within the County.
- *Rural Minor Collectors (FFC 08):* collect traffic from local access roads and provide access to major collectors. They link smaller communities and locally important traffic generators.
- *Rural Local Access (FFC 09):* provide access to adjacent land. They are used to travel relatively short distances.

According to the 2006 Grant County Comprehensive Plan, the Grant County roadway system is comprised of 2,507 miles of roadways. Of the total road miles, 98.5 percent are classified as Rural Roads and the remaining 1.5 percent are classified as Urban Roads. In terms of surface types, 1,277 miles are hard-surfaced with asphalt concrete pavement (ACP), bituminous surface treatment (BST), chip seal, or Portland cement concrete pavement (PCCP). The remaining 1,231 miles, are gravel surfaced.

According to the 2008 Kittitas County Long Range Transportation Plan, the Kittitas County roadway system is comprised of 565 miles of roadways. Of the total road miles, all (100 percent) are classified as Rural Roads. In terms of surface types, 512 miles are hard-surfaced with ACP, BST, or chip seal. The remaining 53 miles, are gravel surfaced.

According to the Yakima County Six-Year Transportation Improvement Program, the Yakima County roadway system is comprised of 1,655 miles of roadways, a total of 514 miles are within the Yakama Indian Reservation. Of the total road miles, including those in the Yakama Indian Reservation, 1,488 (89.9 percent) are classified as Rural Roads, and the remaining 167 miles (11 percent) are classified as Urban Roads. In terms of surface types; three miles are PCCP, 106 miles are ACP, 990.93 miles are BST, and the remaining 556 miles are gravel surfaced.

Most county roads are two lanes wide. Paved roads are generally 24 feet wide with two-foot gravel shoulders on both sides. Gravel roads are generally 24 feet wide with no shoulder and dirt roads, if any, are generally 20 feet wide with no shoulders. The majority of roads in the three counties exist in a 60-foot right-of-way (ROW), although in some cases that may be wider. The counties maintain paved roads, which are comprised of a BST surface, by chip-sealing on either a regular schedule or as-needed. Gravel and dirt roads are “bladed” throughout non-winter months to provide a smoother surface for vehicle travel.

Much of the traffic on the county roads is primarily for local use. Local use traffic in all three counties consists of residents traveling into the largest city center or to the interstate or state highway. Additionally, during planting and harvesting seasons there is much agricultural-related traffic between fields. The traffic generated is often from farm-implements or tractor-trailers which may be considered oversized loads and requires precaution by both the operator and other drivers.

In Grant County, the major roads in the Project area generally run along the section lines to provide a grid-like pattern. The only county road in the Project area is the Beverly-Burke Road.

In Kittitas County, the major roads in the Project area include:

- Huntzinger Road, a Rural Road running along the eastern boundary of the JBLM YTC in a north-south direction. The road provides access to residences and agricultural operations which also border the western shore of the Columbia River, as well as providing access to the Wanapum Reservoir and the Columbia River/Priest Rapids Reservoir. The road travels from the north, out of the Project area and into the town of Vantage. To the south, the road changes surfaces from paved to gravel adjacent to the Auvil Fruit Company agricultural area.
- Burbank Creek Road is a private road, and intersects with SR 821 on its east side south of the Roza Recreation Site.

In Yakima County, the major roads followed by and adjacent to the Project area include:

- Sage Trail Road, a Rural Road extending east from its western access point at East Selah Road. Sage Trail Road is a county maintained, paved road to Pomona Heights Substation. East of the substation as the road crosses Selah-Moxee Canal, the road is private and becomes gravel.
- East Selah Road accesses I-82, as well as the Pomona Heights Substation. The road serves residences in the Yakima Ridge foothills. The road is primarily chip-sealed, but becomes gravel layered further west as it turns into John Street and a network of gravel and dirt meandering roads mainly used to access homes or the JBLM YTC.
- Temple Lane is an Urban Local road located south of the JBLM YTC boundary between Sage Trail Road and Firing Center Road.
- Shotgun Lane is a private road extending between Firing Center Road and Temple Road.
- Pomona Heights Road is an Urban Local Road that is the northern extension of Shotgun Lane north of Firing Center Road.
- Firing Center Road is an Urban Collector Road connecting I-82 with JBLM YTC.
- Selah Creek Drive is a local road used by residences that is located east of SR 821 and just north of the Selah Creek crossing. This road also provides access to BLM lands located around Selah Butte.

Average annual daily traffic (AADT) data was obtained where available for roads in the Project area. Table 3.7-1 below shows AADT volumes in 2012 for roads in the Project area.

TABLE 3.7-1 ROAD AADT IN PROJECT AREA

ROAD AND LOCATION	TRAFFIC VOLUME (AADT)
I-82	
After Milepost 24.86 A: Right entrance from (Selah Creek) Rest Area	16,000
After Milepost 12.18 A: Right on ramp Military Road (Exit 11)	16,000
SR 243	
After Junction Beverly-Burke Road	2,500

Source: WSDOT 2012.

3.7.2.3 Roads on BLM, Reclamation and JBLM YTC Administered Lands

The BLM has jurisdiction over 98,383 acres within Grant, Kittitas, and Yakima Counties. All of the BLM roads are gravel or native material. The primary function of these roads is to provide access for ranching and recreational use activities occurring on BLM lands.

BLM roads are categorized into four primary “Maintenance Intensity” levels that allow for removal, low, medium and high maintenance intensities, irrespective of the type of route (road, primitive road or trail) The Maintenance Intensity Levels are set forth in BLM Road Manual 9113 (BLM 2011b).

The BLM changed from “Maintenance Levels” to “Maintenance Intensity” and simplified the standards for consistency across linear features in 2011. The old “Maintenance Levels” definitions addressed both the type of road (road geometry or construction materials) and the level of use; however they did not provide a clear standard for the actual maintenance level.

Maintenance Intensities provide consistent objectives and standards for the care and maintenance of BLM routes based on identified management objectives. Maintenance Intensities are consistent with land-use planning management objectives (e.g., natural, cultural, recreation setting, and visual).
Maintenance Intensities provide operational guidance to field personnel on the appropriate intensity, frequency, and type of maintenance activities that should be undertaken to keep the route in acceptable condition and provide guidance for the minimum standards of care for the annual maintenance of a route.

Maintenance Intensities do not describe route geometry, route types, types of use or other physical or managerial characteristics of the route. The Maintenance Intensity Levels are described below.

Level 0

- **Maintenance Description -** Existing routes that will no longer be maintained, and that will no longer be declared a route.
- **Maintenance Objectives -**
    - No planned annual maintenance
    - Meet identified environmental needs
    - No preventative maintenance or planned annual maintenance activities

Level 1

- **Maintenance Description -** Routes where minimum (low intensity) maintenance is required in order to protect adjacent lands and resource values. These roads may be impassable for extended periods of time.
- **Maintenance Objectives -**
    - Low (minimal) maintenance intensity
    - Emphasis is given to maintaining drainage and runoff patterns, as needed, in order to protect adjacent lands; grading, brushing or slide removal is not performed unless route bed drainage is being adversely affected, resulting in erosion
    - Meet identified resource management objectives
    - Perform maintenance as necessary to protect adjacent lands and resource values
    - No preventative maintenance
    - Planned maintenance activities limited to environmental and resource protection
    - Route surface and other physical features are not maintained for regular traffic

Level 2

The BLM has reserved this level for possible future use; no current description or objective.

Level 3

- **Maintenance Description -** Routes requiring moderate maintenance due to low volume use (such as seasonally or year-round for commercial, recreational, or administrative access). Maintenance intensities may not provide year-round access; however they are intended to provide resources appropriate to keep the route in use for the majority of the year.
- **Maintenance Objectives -**
  - Medium (Moderate) maintenance intensity
  - Drainage structures will be maintained as needed. Surface maintenance will be conducted in order to provide a reasonable level of riding comfort at prudent speeds for the route conditions and intended use. Brushing is conducted as needed to improve sight distance when appropriate for management uses. Landslides adversely affecting drainage receive high priority for removal; otherwise they will be removed on a scheduled basis.
  - Meet identified environmental needs
  - Generally maintained for year-round traffic
  - Perform annual maintenance necessary to protect adjacent lands and resource values
  - Planned maintenance activities should include environmental and resource protection efforts, and annual route surfacing
  - Route surface and other physical features are maintained for regular traffic

Level 4

The BLM has reserved this level for possible future use; no current description or objective.

Level 5

- **Maintenance Description -** Route for high (maximum) maintenance due to year- round needs, high volume of traffic, or significant use. Also, may include route identified through management objectives are requiring high intensities or maintenance or to be maintained open on a year round basis.
- **Maintenance Objectives -**
  - High (Maximum) maintenance intensity
  - Entire route will be maintained at least annually. Problems will be repaired as discovered. Routes may be closed or have limited access due to weather conditions; however, they are generally intended for year-round use.
  - Meet identified environmental needs
  - Generally maintained for year-round traffic
  - Perform annual maintenance necessary to protect adjacent lands and resource values
  - Perform preventative maintenance as required to generally keep the route in acceptable condition
  - Planned maintenance activities should include environmental and resource protection efforts, annual route surface
  - Route surface and other physical features are maintained for regular traffic

Most of the roads that function to provide access for ranching and recreational users are designated Maintenance Level 3 or 5.

Land under the jurisdiction of the BLM is concentrated in the Yakima River Canyon Management Area in Yakima and Kittitas counties. One other group of BLM parcels is located in Kittitas County along the Columbia River. Level 3 or Level 5 roads provide access to the Selah Butte area and the Columbia River BLM parcels.

Reclamation also regulates roads for public or private use on Reclamation land, and the Reclamation's focus in the Project area is water-related projects such as dams, reservoirs, and irrigation. Roads are primarily used for accessing those facilities. Reclamation does not have maintenance levels or classifications for their road system, roads are either paved or gravel and maintained on an as-needed basis. Reclamation roads are limited to the vicinity of Vantage Substation.

Roads servicing JBLM YTC are maintained by the U.S. Department of the Army (Army). Within recent years, JBLM YTC has completed improvements in road network and structure, road closures and realignments, and channel crossings. Nearly 300 miles of existing roads have been resurfaced with crushed rock. Approximately 14 miles of roads were re-routed away from stream channels and areas with a high potential for erosion. Approximately 14 miles of deteriorated or poorly located roads were closed to vehicle traffic and rehabilitated. In addition, 390 stream channel crossings have been improved with culverts and fords. The JBLM YTC has perimeter roads for access which also serve as a fire break (Army 2010).

3.7.2.4 Navigable Waterways

The U.S. Army Corps of Engineers (USACE) has jurisdiction authorizing certain structures or working in or affecting navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act of 11899. Navigable waters of the United States are defined in the Code of Federal Regulations (33 Code of Federal Regulations [CFR] Part 329.4).

Navigable waterways within the Project area consist of the Columbia River. The Columbia River is a designated navigable waterway for its entire length in the United States. The River has been and continues to be a major source of transportation, electricity, irrigation, and fishing. The Wanapum Dam and Priest Rapids Dam have essentially created two lakes along the River in the Project area, the Wanapum Lake and Priest Rapids Lake.

According to 33 CFR Part 322 "Permits for Structures or Work in or Affecting Navigable Waters of the United States", Section 322.5(i)(1) (Special Policies/Power Transmission Lines), a Section 10 permit would be required for power transmission lines crossing navigable waters of the United States. The proposed Project requires a Section 10 permit. The USACE also authorizes the acceptable clearances for conductors crossing navigable waters.

3.7.3 Current Management Considerations

3.7.3.1 Federal and State Highway Management

FHWA

FHWA review and concurrence is required by WSDOT for approving Pacific Power's application to cross I-82 land owned by WSDOT. The FHWA works with WSDOT to permit third parties to use interstate property for non-highway uses that do not impact safety and operations on the interstate and the proposed use shall not expose the facility's users to other hazards.

For the proposed Project, WSDOT is responsible for processing Pacific Power's utility permit or franchise application(s) to cross the I-82 and SR 243. I-82 is potentially crossed in three locations and SR 243 is crossed in one location. WSDOT would also be responsible for coordinating FHWA's review and concurrence of a permanent access break for a utility installation across I-82, providing an easement through WSDOT property, and providing any additional documentation for compliance with National Environmental Policy Act, State Environmental Policy Act, the Endangered Species Act, and the National Historic Preservation Act.

<u>Section 4(f) Applicability</u>
Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966 which established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. In a letter to the BLM (dated August 30, 2013), the FHWA has determined that Section 4(f) does not apply to the Project because it is not a transportation project as defined by case law and because the FHWA is not providing any funding for the Project (FHWA 2013).

WSDOT
State roads in the Project area are managed by the South-Central and North-Central WSDOT regions. Management considerations and decisions made by WSDOT are based on a multi-year plan, which is updated every year by WSDOT and approved by the FHWA. This plan, the Statewide Transportation Improvement Program (STIP; WSDOT 2012) is for the years 2013-2016. The WSDOT STIP provides planning guidance, necessity, and cost to programs such as road improvements, new road projects, and future transportation-related studies. There are no projects within the STIP within Grant, Kittitas, and Yakima Counties which occur in the Project area. WSDOT is planning improvements to SR 243 at the Mattawa intersection south of the Project area.

All state highways are identified as limited access or managed access. Limited Access Highways are highways in which the abutting property owner's right of access to the state highway has been purchased, with the result being that the abutting property owner may, or in most cases may not, have access to the state highway. Limited access highways are further defined as Full, Partial, or Modified limited access control.

> <u>Full limited</u> access control highways, the most restrictive, allow no direct private property access at all; for example, the interstate system, in which public access is only allowed at interchanges. I-82 is considered a full limited access highway.
>
> <u>Partial limited</u> access control highways may allow access, but only in specified locations and only for the specified use, such as single family residential or farm use, as defined in the Limited Access Plans. Partial limited access control highways allow no commercial usage of the access, such as retail or industrial.
>
> <u>Modified limited</u> access control, the least restrictive of the three, allows residential and commercial usage, but only in the specified locations and only for the specified uses as defined in the Limited Access Plans.

Managed Access Highways are all remaining state highways that are not already limited access highways. Managed Access Highways are highways in which access is regulated by the governmental entity having jurisdiction over the highway. SR 243 is considered a managed access highway in the Project area. Direct access for short term construction would require a temporary access permit. Long term access would require an access connection permit and the access point would need to be gated (Gould 2013).

The WSDOT has access-permitting jurisdiction over all state highways outside incorporated towns and cities, while incorporated towns and cities have access-permitting jurisdiction for those Managed Access State Highways within their boundaries. Access Connection Permits are issued on Managed Access Highways.

Washington State law, Revised Code of Washington 47.44 and Washington Administrative Code 468-34, grants the WSDOT the authority to issue Permits and Franchises for the occupancy of state-owned highway right of way to the persons, associations, private or municipal corporations, the U.S. Government, or any agency for the purpose of construction and maintenance of lines for water, gas, electricity, telephone, telecommunications, etc. WSDOT uses Utility Permits for the installations of crossings or longitudinal runs no greater than 300 feet and Utility Franchises for the installations of longitudinal runs greater than 300 feet or for several crossings on the same highway. A temporary access break approval will be required by WSDOT for construction activities in the I-82 ROW. This approval is part of the utility crossing permit. A utility crossing permit would cover all temporary (construction) related activities occurring within a WSDOT highway. The Project proponent does not currently have access to the JBLM YTC and private farm land. A permanent access break, authorizing their use, would be required should the NNR Alternative be constructed. A permanent access break permit is also required for ongoing maintenance and operation actives. For any type of need (permanent or temporary) that crosses over, under, or physically through WSDOT limited access, including trails, pedestrian structures, utility installations, etc., an access break request and approval are required. Any permanent access requires WSDOT and FHWA approval.

A utility permit is a secondary utility document used to define a utility installation that crosses the operating highway ROW normal to centerline or at a skew angle no greater than 45 degrees offset from normal or is longitudinal to the ROW and is no greater than 300 feet in length as measured along the highway centerline. A utility permit defines utility ownership, type, size, location, construction methods, maintenance frequency and duration, and other information considered necessary by WSDOT. Utility permits have no expiration date. Utilities must obtain written approval from WSDOT prior to occupation by any materials, equipment, or personnel within the operating highway ROW. WSDOT may grant approval only after appropriate review of the proposed work. Review and approval would also be required by the FHWA.

Easements must be obtained from adjoining properties prior to obtaining access break in access authorization from WSDOT for construction, operation and maintenance. The process may take up to five months. Even if the landowner agrees to permit the proponent the right to access their land, the landowner doesn’t have the right to grant access through a gated approach. Approval must be granted by WSDOT. This is a ministerial permit.

All applications must be submitted on forms provided by WSDOT. Construction plans and details must show the location of the proposed utility in relation to highway features in the vicinity of the proposed installation, including the centerline, fog line, top and bottom of ditch or toe of slope, existing structures, and other highway features. Other documents, such as a Traffic Control Plan, will also be required with an approved application package.

3.7.3.2 County Roads

County roads are under the jurisdiction of each respective county’s road or public works department. Each County has a management plan, similar to a STIP, which provides planning guidance, necessity, and cost to programs such as road improvements, new road projects, and future transportation-related studies.

Grant County utilizes a Transportation Improvement Program (TIP) known as the Grant County Comprehensive Six-Year TIP for 2013-2018. Within the Project area, there are no roads receiving rehabilitation or improvements per the 2013-2018.

Kittitas County utilizes a TIP known as the Kittitas County Six-Year TIP for 2014-2019. The County also publishes a document of on-going projects every two years, currently known as the Kittitas County Roadway Improvement Projects of 2014-2019. Within the Project area, there are no roads receiving rehabilitation or improvements per the 2014-2019 TIP. However, it should be noted that all roads receive a new layer of BST, which is a thin layer of liquid asphalt covered with an aggregate, every seven years.

Yakima County utilizes a TIP known as the Yakima County Comprehensive Six-Year TIP for 2014-2019 for roadway system management. Within the Project area, there are no roads which will be receiving rehabilitation or improvements per the 2011-2016 TIP. However, it should be noted that all arterial roads receive a new layer of BST per determination through the Pavement Management System. Due to the number of gravel or dirt roads within the Project area, blading is likely to be ongoing as part of the maintenance and erosion prevention of those roads.

3.7.3.3 Roads on BLM, Reclamation and JBLM YTC Administered Lands

Roads on BLM and Reclamation managed lands are often maintained and improved on an as-needed basis. Improvements or rehabilitation may require blading and grading to prevent further erosion and laying down additional gravel to make a more passable and safer traveling route.

JBLM YTC maintains a system of roads for maintenance and operations of the facility and for fire breaks. JBLM YTC conducts annual maintenance of more than 200 miles of firebreaks to ensure fuel breaks are strategically located to compartmentalize fires, particularly in areas where fire hazards are high and along the installation boundary. Firebreaks also provide access to remote areas of the installation for suppression teams. In addition, enhancement of the installation’s road network has added more than 300 miles of roads that act as firebreaks (Army 2010).

Traffic volume studies were done within JBLM YTC in 2007. According to these data, Firing Center Road has the highest volume of vehicles (2,533 vehicles) during an average weekday. All of the other roads experience relatively low traffic volumes. JBLM YTC’s Main ACP (gate) is located on Firing Center Road just east of Pomona Heights Road. YTC’s Main ACP has one lane operating in each direction (one entering/one exiting). Because there is only one entering lane, queues and wait times are sometimes relatively long when entering the installation. It has been reported that this is primarily due to large military convoys or if there are several commercial trucks entering the post. The study showed that just east of Pomona Heights Road, there was an average of 135 vehicles entering and exiting the post during the 7 a.m. to 8 a.m. peak hour in June 2007. Thirty-nine vehicles were counted during the afternoon peak hour, which is shown to be from 3 p.m. to 4 p.m. During an average weekday, 810 vehicles in total were counted at this location (Army 2010).

3.7.4 NNR Route Segment Specific Considerations

3.7.4.1 NNR-1

This Route Segment parallels the existing Pomona-Wanapum 230 kV transmission line out of the Pomona Heights Substation for about 750 feet, and turns west, adjoining and paralleling within the existing PacifiCorp electrical distribution line easement for the private section of Sage Trail Road for about two miles.

3.7.4.2 NNR-2

This Route Segment parallels the perimeter fire break road on JBLM YTC north of Sage Trail Road. This route parallels Temple Lane, Shotgun Lane and Firing Center Road, but is located within JBLM YTC along the perimeter fire break. Along Firing Center Road, the Route Segment would be located within the electrical distribution easement on the south side of the road. The Route Segment follows Evergreen State Street within JBLM YTC in a north-south direction for about 1,200 feet.

3.7.4.3 NNR-3

This Route Segment begins south of I-82, and crosses the interstate south of Selah Creek eastbound Rest Area. BLM roads accessing the Selah Butte area and existing access roads to the Pomona-Wanapum transmission line are paralleled. Burbank Creek Road, a private road, is crossed twice. Permission to span I-82 would be determined by WSDOT and FHWA. The rest area is not available for staging of equipment or use for the proposed Project. All staging must be outside WSDOT ROW at this location.

3.7.4.4 NNR-4

This Route Segment crosses I-82 south of Exit 11 (Military Road) and existing access roads to the Pomona-Wanapum transmission line are paralleled on private land and within JBLM-YTC. A secondary access road servicing the north part of JBLM YTC from I-82 Exit 11 is crossed by this Route Segment. Permission to span I-82 would be determined by WSDOT and FHWA. See access break requirements that would be necessary for crossing I-82 as described in Section 3.7.3.1. Materials staging at Exit 11 would not occur.

3.7.4.5 NNR-5

This short Route Segment generally parallels the perimeter JBLM-YTC fire break access road.

3.7.4.6 NNR-6

This Route Segment parallels the existing Pomona-Wanapum transmission line and access roads through the north end of JBLM YTC.

3.7.4.7 NNR-7

This Route Segment also parallels the existing Pomona-Wanapum transmission line and access roads through the north end of JBLM YTC, as well as those roads servicing the Schultz-Wautoma and Schultz-Vantage 500 kV transmission line corridor.

3.7.4.8 NNR-8

This Route Segment crosses Huntzinger Road, and a secondary access road servicing the northeastern portion of JBLM YTC and shared by the John Wayne Pioneer Trail. Also, SR 243 is crossed in Grant County south of the Vantage Substation and the Columbia River is crossed. Authorization to span the Columbia River would be required from the USACE through the Section 10 Rivers and Harbors Act permitting process. Temporary and permanent access and permission to span SR 243 would be determined by WSDOT.

3.7.4.9 MR-1

This Route Segment does not follow existing roads, but crosses several roads accessing communication facilities, private and public lands owned by Washington Department of Natural Resources and the BLM on the west side of I-82. The route segment crosses I-82 south of the Manastash Ridge I-82 Viewpoint and is southwest of the irrigation canal located at the boundary of Badger Pocket and JBLM YTC. Permission to span I-82 would be determined by WSDOT and FHWA.

3.8 VISUAL RESOURCES

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to visual resources along the NNR and subroute, including those raised during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

This section documents existing visual resources in the Project area. Visual resources were inventoried and characterized in a six-mile wide study corridor (three miles on either side of the route segment centerlines).

3.8.1 Data Sources

The visual resource inventory consisted of a scenic quality and existing development character evaluation, a viewer sensitivity analysis, and an inventory of the regulatory framework for jurisdictions crossed by the Project. A site reconnaissance was conducted during June 2013 for the purposes of evaluating and confirming scenic quality and development character, visibility and visual sensitivity analysis, and identifying Inventory Observation Points (IOPs) and Key Observation Points (KOPs).

Data sources included secondary sources from planning documents, online resources, U.S. Geological Survey (USGS) and aerial mapping, agency sources and studies conducted by the BLM and the Washington State Department of Transportation (WSDOT). A 2010 Visual Resources Inventory (VRI) study developed for the BLM Spokane District as part of the planning effort in support of the BLM Eastern Washington Resource Management Plan (RMP) update was utilized for this study. This inventory analyzed portions of Eastern Washington where BLM-managed land was present, and established baseline visual resource values. Data obtained from the study included Scenic Quality Rating Units (SQRUs), Sensitivity Level Rating Units, Distance Zones, and other data used in the development of the planning area VRI Classes.

The data incorporated into this assessment from the BLM VRI was limited to Scenic Quality Classes (A, B, and C) and sensitivity levels. Scenic quality and sensitivity levels were incorporated and expanded upon in areas that were not inventoried in the 2010 BLM VRI (due to there being no BLM-managed lands present).

3.8.2 Current Conditions and Trends, Regional Overview

3.8.2.1 Overview of Study Methodology and Analysis Area

The study approach follows the procedures identified in the BLM's Visual Resource Management (VRM) system as detailed in the Inventory Manual H8410-1 (BLM 1986a), Management Manual 8400 and Contrast Rating Manual 8431-1 (for impact assessment) (BLM 1986b), with modifications appropriate to the proposed Project and lands not under the jurisdiction of the BLM.

The methodology for the inventory approach was identical to the approach done for the DEIS (see Section 3.8.2.1 and Appendix C of the DEIS). The inventory approach generally consisted of the following tasks:

1) Identification of potentially sensitive viewpoints and KOPs (representative views from potentially sensitive areas) and an assessment of the potential project visibility from these viewpoints;

2) Classification of existing scenic quality in natural, undeveloped landscapes; or the evaluation of existing development characteristics for potential project compatibility in developed landscapes; and
3) Identification of federal and local agency visual resource management goals and objectives with jurisdiction over the project.

Additional secondary data sources, viewer sensitivity, scenic quality classification overview, and a discussion of BLM VRM Classes are discussed in Section 3.8.2.1 and Appendix C of the DEIS.

Sensitivity Analysis

A sensitivity analysis on lands not managed by BLM was conducted based on existing land use, types of users (agricultural workers, commuters, recreationists), use levels (intensive, high volume use, occasional), viewing duration (long duration of stationary viewers, short duration of highway travelers), public interest, users attitudes toward change in the landscape, adjacent land uses, and special designation status (e.g., areas of critical environmental concern [ACECs] with scenic values). Initial data collection was followed by ground reconnaissance and a supplemental data collection effort conducted in June 2013 to verify potentially sensitive areas and document any additional potentially sensitive areas. Final sensitivity levels (high, moderate, low) were assigned to points or corridors to be used in the viewshed and impact modeling. Visual sensitivity on BLM lands were obtained from the VRI conducted in 2010 for the Spokane District Eastern Washington RMP update.

Scenic Quality Determination

Scenic quality is a measure of the visual appeal of a natural landscape (landscapes that are not dominated by development). Scenic Quality Classes are defined as follows:

Class A - Outstanding areas where characteristic features of landform, rock, water, and vegetation are distinctive or unique in the context of the surrounding region. These features exhibit considerable variety in form, line, color, and texture.

Class B - Above average areas in which features provide variety in form, line, color, and texture and, although the combinations are not rare in the surrounding region, they provide sufficient visual diversity to be considered moderately distinctive.

Class C - Common areas where characteristic features have little variation in form, line, color, or texture in relation to the surrounding region.

Existing scenic quality classes established by the BLM were used for the scenic quality analysis and data gap areas were identified. The analysis of scenic quality in undeveloped areas not previously inventoried by the BLM during the 2010 VRI began with a review of existing topographic maps, aerial photographs, and other environmental data (vegetation, water features, etc.). Preliminary rating units were developed based on similar landform, vegetation and water features, and mapped at 1:24,000 scale. These maps were used in the field to verify, and adjust if necessary, unit boundaries, and to rate scenic quality using BLM Form 8400-1. Final scenic quality was documented and mapped as Class A, B, or C.

Scenic Classifications based on the Federal Highway Administration (FHWA) Visual Impact Assessment for Highway Projects (FHWA 1981) were provided by WSDOT, and were utilized in areas adjacent to I-82 and SR 243. The Utilities Accommodation Policy Technical Manual M 22-86.03 summarizes scenic classes along WSDOT managed highways, and is based on a 1989 Scenic Classification inventory. Classes that have been recently revised from the 1989 evaluation in the Project area were provided by WSDOT to evaluate impacts based on the FHWA methodology utilized by WSDOT.

BLM VRM Classes establish specific values on the management of visual values. VRM Classes are typically assigned through the RMP process. Interim visual management classes are established where a project is proposed and there are no RMP approved VRM objectives. BLM Interim VRM Management Classes were developed by the Spokane District Office for the NNR Alternative.

As established by BLM Manual H-8410 (BLM 1986a), VRM Classes Objectives are as follows:

Class I: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II: The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III: The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV: The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Distance zones, also based on BLM Manual H-8410, were also used in the analysis. For an explanation of the rational for the determination of distance zones, please see Section 3.8.2.5 of the DEIS. Distance zones for this Project are: *Immediate Foreground:* Viewpoint location to 1,000 feet; *Foreground:* 1,000 feet to 0.33 mile; *Middleground:* 0.33 mile to 1.0 mile; *Background:* 1.0 mile to 2.0 miles; and *Seldom Seen:* Beyond 2.0 miles (also see Section 3.8.2.5 below).

3.8.2.2 Regional Setting and Landscape Character

The Project area is located in south-central Washington generally between the Columbia River and Yakima River in the Walla Walla Plateau Section of the Columbia Plateau Physiographic Province (Fenneman 1931). The Project area contains two general ecosystem types: the Columbia Plateau Yakima Folds and Columbia Plateau Pleistocene Lake Basins Level IV regions (U.S. Environmental Protection Agency 2011). The Walla Walla physiographic section is generally characterized by a rolling plateau with young, incised valleys. East-west trending anticlinal ridges, including the Yakima Ridge, Umtanum Ridge and Saddle Mountains are generally parallel, enclosing structural basins that are both topographic features and drainage basins. The ridges generally rise about 2,000 feet above the valleys, are even-crested, smooth sided, and not forested. The streams draining the ridges are formed by dense network of smaller tributaries forming a dendritic pattern, typically with associated riparian vegetation. The major drainages (e.g., Columbia River, Yakima River) are dominant water features in the region. Sagebrush and native warm season grasses dominate the ridge landscapes along with other low growing vegetation such as cheatgrass. In the valleys, irrigated agricultural development covers large areas. There are pockets of special landforms that deviate from the predominant landscape. Sand dunes, vernal pools, canyons occur throughout the Columbia Plateau province.

3.8.2.3 Natural and Developed Settings

The Project is located in Yakima, Grant and Kittitas Counties in a mix of private and public owned lands. The Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), Bureau of Reclamation (Reclamation), BLM, and state (Washington Department of Natural Resources and WSDOT) lands comprise most of the publicly owned lands (see Section 3.4 – Land Jurisdiction and Land Use).

The relatively undeveloped natural settings occur along much of the Project area within or adjacent to the JBLM YTC and on BLM, state and private land between the Yakima canyon and Interstate (I) 82. Major geographical features in the Project area include the rivers and river valleys of the Saddle and Boylston Mountains, Yakima River and Columbia River, Selah Valley and Burbank Valley, Selah Butte, Umtanum Ridge and Manastash Ridge, Selah Canyon, and Badger Pocket.

The uplands of the JBLM YTC, Yakima Ridge, Umtanum Ridge, Saddle Mountains and other higher elevation "steppe" areas are dominated by sagebrush, dryland grasses, and rocky basalt rock outcroppings.

Agricultural development occurs in two primary areas: on the south side of the Project around Selah and within Badger Pocket. Grazing occurs across much of the public and private land outside of JBLM YTC. Most of the developed area in the vicinity of the Project is characterized by transportation corridors, moderate density residential lots and the developed areas of JBLM YTC cantonment area. The Project area is also industrialized with hydroelectric dams, high voltage transmission line corridors, and associated infrastructure (e.g., Vantage Substation, Pomona Heights Substation, Bonneville Power Administration and Pacific Power transmission corridors). Major travel routes include I-82, State Route (SR) 243, and SR 821. Views of the distant Cascade Mountains (i.e., Mt. Rainier and Mt. Adams) often occur from residences, recreation areas, and travel corridors.

The basalt cliffs along Yakima and Columbia River corridors, Selah Cliffs area, and elsewhere provide visual interest in the Project area. The riparian valleys of Selah Creek, Burbank Creek, Lmuma Creek, and drainages within JBLM YTC contain more landform and vegetation variety.

The open water areas of Wanapum Lake and the Columbia River, coupled with the surrounding basalt cliffs near the Columbia River-Saddle Mountain area on the west side of the river, as well as the Yakima River Canyon corridor, provide the most visually diverse and scenic landscapes in the Project area.

Scenic quality was identified in BLM's 2010 VRI and data gaps were filled as part of the visual resources analysis for this SDEIS. Table 3.8-1 summarizes the SQRU BLM 2010 VRI unit within the Project area; three units are located within the Project area (SQRU 024, 026, and 030). Rating units identified as part of this analysis that are shown in Table 3.8-2.

Landscapes that were not evaluated in BLM's 2010 VRI were identified and evaluated in the Project analysis area for scenic quality. These areas were assigned rating units, evaluated for similarity with the inventory units developed in the BLM 2010 study, and assessed using Form 8400-1. All of these units were located on non-BLM lands, primarily JBLM YTC land. In some instances, scenic quality was inferred from existing VRI data and similar landscapes in the region due to remoteness and access difficulty. A summary of the SQRUs developed during the evaluation of the Vantage-Pomona Heights Transmission Line Project is shown in Table 3.8-2. Figures C-2.1-1 and C-2.2 in Appendix C-2 show the scenic quality from the IOPs in the Project area. IOPs G and H are new and are based on the current Project area. IOPs A, B, C and F from the DEIS are also applicable to the current Project area.

TABLE 3.8-1 SQRUS IDENTIFIED IN 2010 BLM VRI STUDY IN PROJECT AREA

BLM SQRU ID NUMBER	DESCRIPTION	SQ RATING
024	Distinctive river canyon with many interesting features. Unit includes the distinctive Yakima River Canyon, which is characterized by prominent rock outcrops, formations, and boulder fields along with an interesting variety of vegetation. Scale of canyon provides a more intimate landscape experience (when compared to larger river canyons in region). Road, railroad, and developed recreation sites are the primary landscape modifications and are designed to fit the contours of the canyon, introducing slightly discordant elements at certain locations. Some residential/ranch and industrial facilities also add some discordant elements to the canyon. Tourism and recreation-related use is high given scenic quality and recreation opportunities in the canyon.	A
026	Large, distinct river corridor, but with a high level of modification; Rating unit includes lands along the mid-Columbia River. The Columbia River dominates views from throughout the unit, though there are highly developed areas that introduce discordant elements to the landscape in multiple locations. Landforms include gently rolling hills to striking rock faces, bands, outcrops, and formations, as well as prominent vertical relief. Use in the river corridor is high given the importance of the Columbia River to commerce, travel, tourism, and recreation. Modifications include several dams, transmission lines, roads, rural development, and railroads, among other elements.	B
030	Interesting as a remnant of undeveloped land, but landform is common in region; interesting elements, some contrast, but in highly modified area and common to region. Unit includes BLM lands in the vicinity of Yakima, primarily on undeveloped to lightly developed ridges and slopes, which are interspersed with residential and agricultural development. Undeveloped areas contrast with the urban/suburban development and agricultural fields (orchards) in and around Yakima. Ridges and slopes contain many interesting features (rock outcrops and formations, edaphic plant communities), but tend to be common to the region and surrounded by highly modified landscapes.	C

Source: BLM 2010.

TABLE 3.8-2 PROPOSED PROJECT SQRUs IN PROJECT AREA

SQRU ID NUMBER	DESCRIPTION	SQ RATING [1]	IOP
01_22v (DEIS)	Extension of BLM Unit 22 occupying the area south of and along the southern border of JBLM YTC of the Yakima Ridge. Largely undeveloped, but some low density residential development and isolated communication structure installations and roads. Moderate to steeply sloping hillsides and ridges often exhibiting dark, sparsely vegetated volcanic domes of rock adding interest to the generally uniform slopes, but the landscape is common to the region and bordered on the south by agricultural or urban development.	C	A (DEIS)
02_24v (DEIS)	Extension of BLM Unit 24 along the Yakima River Valley through the city of Yakima, this unit is a riparian corridor with urban development occupying the border areas and parkland development interspersed within the unit. Open, flowing water and diversity in vegetation forms define the narrow, natural ribbon through the highly modified urban area. The developed parkland modifying the dominant natural riparian corridor only slightly detracts from the setting, but influence of the urbanized areas of adjacent scenery negatively influences the scenic quality of the unit.	B	B (DEIS)
03_30v (DEIS)	Extension of BLM Unit 30 in the north of Yakima, typically undeveloped, but includes some communication structures and roads. Adjacent to the Yakima River, the moderate to steeply sloping hillsides and ridge of the western-most section of the Yakima Ridge in the Project area contains rock outcrops and formations adding interest to the generally uniform slopes, but it is common to the region and surrounded by agricultural or urban development.	C	C (DEIS)
09_26v (DEIS)	Landscape is bounded by BLM Unit 64 and the Saddle Mountains to the south, and includes the Lower Crab Creek corridor. The variable vegetation forms and colors of the corridor coupled with the dramatic slopes of the Saddle Mountains provide visual interest. Cultural modifications, such as the transmission lines, radio towers, canals, roads and other engineered features somewhat detract from the dominant natural features provided by Nulley Lake/Lower Crab Creek Wildlife Area and the riparian corridor. The slopes of the adjacent mountain reinforce and contribute to the overall visual quality of the landscape.	B	F (DEIS)
01_27v	This unit is associated with BLM Unit 27 located to the north (not in Project area), and is located along the Manastash Ridge. It is characterized by undulating, rolling hills, and contains some rock outcrops and formations adding interest to the generally uniform slopes, but it is common to the region. Developed features that detract from the natural landscape are linear features associated with the I-82 corridor, JBLM YTC roads, and existing transmission lines.	C	G
02_27v	This unit is associated with BLM Unit 27 located to the north (not in Project area), and includes the western part of the Saddle Mountains. It is also characterized by undulating, rolling hills, with interesting erosional patterns and ephemeral drainages and draws, and contains rock outcrops and formations adding interest to the generally uniform slopes, but it is common to the region. Developed features that detract from the natural landscape are linear features associated with JBLM YTC roads and existing transmission lines.	C	H

[1] See Appendix C - Visual Resources Supporting Data

Class A scenery is limited to areas adjacent to the Yakima River corridor where the undulating and flowing river, rock outcropping, and a variety of riparian vegetation combine to create the highest level of scenic quality in the Project area. BLM inventory data shows this unit (024) as extending well beyond the river corridor to areas that do not have the contributing landscape elements (i.e., landform, vegetation, adjacent scenery) to warrant a Scenic Quality Class A. Observations of scenic quality occurring in the Project area indicate that Class A scenery extends from the river channel to the tops of the adjacent bluffs along the Yakima Canyon, and do not include landscapes where the river, adjacent cliffs, and associated vegetation are not present to combine for a higher Class A rating. This includes much of the easterly oriented landscape slopes near Selah Butte between the butte and I-82. The scenery in this location is influenced by the presence of the existing transmission line and communication towers on Selah Butte.

Class C scenery dominates the rest of the undeveloped landscape on private lands, the Manastash Ridge on the northwest side of the Project area, and JBLM YTC land on the north. Examples of Scenic Quality Rating Units are shown in Appendix C2 – Development Character and Scenic Quality Supporting Data

Developed landscapes were not evaluated for scenic quality because scenic quality evaluations focus on natural landscape features which are often subordinate or absent from developed landscapes. In order to characterize heavily modified landscapes, “Development Character Areas” were identified. The dominating features of form, line, color, and texture of the human dominated landscape is characterized to compare with the Project activities to determine compatibility or contrast with the architectural or development patterns that exist in the developed landscape. Development Character Areas typically fall into land use/land cover categories with similar visual attributes, each with similar visual patterns (e.g., architectural form, building arrangement, visual density, and complexity) that dominate or supplant the natural landscape. The general Development Character Areas identified for the Vantage-Pomona Heights Project fall into the following categories:

- Residential
- Transportation Corridor and Facilities
- Agricultural
- Industrial/Utility

As with scenic quality, compatibility with Development Character Areas is assessed separately from “visibility”, and forms the baseline visual condition of the landscape independent from viewers. Examples of four Development Character Areas are shown in Appendix C2 – Development Character and Scenic Quality Supporting Data.

3.8.2.4 Sensitive Viewers and Viewpoints

Residential

All occupied residences were confirmed in the field within one mile on either side of assumed route segment centerlines (the land use analysis area). Other residences were selectively confirmed based on potential visibility of the Project within the visual resources analysis area (three miles on either side of the assumed centerlines of route segments). Concentrations of residential development with potential visibility of the Project were documented. Dispersed residences occur throughout the visual analysis area. Viewing conditions were noted from representative locations of residential areas (see KOPs, Table 3.8-4).

Parks, Recreation and Special Management Areas

See Section 3.5 for a detailed description of recreation areas and Section 3.6 for a detailed description of Special Management Areas within one mile on either side of route segment centerlines. These and other parks, recreation, and special management areas not identified in Sections 3.5 or 3.6 (greater than one mile from the assumed route segment centerlines) with potential views of the Project are summarized below. Refer to Table 3.8-3 for a summary of sensitive viewers and Appendix C-1 for detailed data on sensitive viewers in the Project area.

Federal

Areas with potential visibility of the Project are associated with BLM lands within the Yakima River Canyon Management Area, and include:

- Yakima River Cliffs/Umtanum Ridge ACEC (BLM) – This 320-acre ACEC is designated for Federal Candidate plant species. There is no public access or recreational aspects to these areas, and therefore there would be no views of the Project from these areas. Scenic quality as identified in the 2010 VRI (BLM 2010) is Class A.
- Yakima River Canyon - This canyon has been designated as a Washington State Scenic Byway (WSDOT Tourism Route) and offers excellent wildlife viewing, fishing in a Blue Ribbon trout stream, family river rafting, and camping. Several developed BLM recreation sites are located along the river corridor:
  - *Roza Recreational Site (BLM) -* Roza is the main take-out for all river floaters, as it is located 0.5 mile above Roza Dam. Motorized vessels are permitted from the Roza boat launch down to Roza dam. Upstream of the Roza boat launch the river is limited to non-motorized boats only. There is a concrete boat launch at the site to accommodate motorized boat users.
  - *Big Pines Recreation Site (BLM)* - At 20 acres, Big Pines is BLM’s largest recreation site in the Yakima River Canyon. The northern edge of the recreation site is adjacent to undeveloped hiking trails on lands managed by the Washington Department of Fish and Wildlife.
  - *Lmuma Creek Recreation Site* - Lmuma Creek is the smallest river access site the BLM manages in the Yakima River Canyon.
  - *Umtanum Creek Recreation Site (BLM)* - A wooden footbridge crosses the Yakima River at this site, providing the only access to the west side of the river in the Yakima River Canyon. The west side of the river consists mainly of BLM and Washington Department of Fish and Wildlife-managed lands.

- Selah Butte Watchable Wildflower Area – Located in the vicinity of Selah Butte on BLM managed land and covering about 10 acres, the Selah Butte Watchable Wildflower Area is recognized as an area of dispersed wildflower (e.g., balsamroot) viewing activity during April and May. The site is accessed by the communication facility service road leading from Roza Creek Drive that intersects with SR 821. Overlook views to Yakima Canyon are an important part of the landscape setting in this area.
- Umtanum Ridge Water Gap National Natural Landmark (NNL) - Established in 1980, this site illustrates the geological processes of tectonic folding and antecedent stream cutting, and contains a portions of the Yakima River Cliffs/Umtanum Ridge ACEC and Wenas Wildlife Area (WDFW), as well as private lands. Access to this NNL is from SR 821 either directly from the highway (south of Wymer) on the east side of the Yakima River, or from a wooden footbridge crossing the Yakima River at the BLM Umtanum Ridge Recreation Site, which provides the only access to the west side of the river in the Yakima River Canyon.
- Ginkgo Petrified Forest NNL – Established in 1965, this site contains fossilized trees preserved in lava flows. The site encompasses the entirety of the Ginkgo Petrified Forest and Wanapum State Parks on the west side of Wanapum Reservoir, as well as county and private lands. Public Access to the site is provided from Huntzinger Road in the vicinity of the Project (via Wanapum State Park).

State
State-managed parks, recreation, and special management areas are detailed in Sections 3.5 and 3.6. Areas with potential visibility of the Project include:

- John Wayne Pioneer Trail (Iron Horse State Park) – Administered by the Washington State Parks and Recreation Commission as part of the Iron Horse State Park, users of the trail traverse the Project area through the JBLM YTC. A variety of non-motorized activities from horseback riding to snowshoeing are allowed on the trail. Access to the trail is by permit only, and a trailhead is located southwest of Wanapum Dam on Huntzinger Road.
- Selah Cliffs Natural Area Preserve (NAP) – This state preserve was established to protect the largest known population of basalt daisy. It is located between SR 821 and I-82 near the Fred G. Redmon Memorial Bridge. The area may be viewed from the WSDOT eastbound Selah Creek rest area, and public access within the site is provided from SR 821 along Selah Creek from a trailhead and parking area.

Yakima County
Yakima County facilities in the Project area include the Yakima Loop Trail and Greenway. The Yakima River Greenway is proposed to be extended to the north through Selah Gap and the Yakima Elks Golf and Country Club.

The Yakima Elks Golf and Country Club is a private course located on the west side of the Yakima River northeast of Selah.

Kittitas County
There are no Kittitas County recreation sites in the Project area.

Baldy Butte – Baldy Butte, located east of the Yakima River Canyon north of Burbank Creek, is located on private land in Kittitas County and is used as a launching site for hang gliders.

Grant County/Grant County Public Utility District (PUD)
The following Grant County and Grant County PUD recreation sites are in the Project area.

- Wanapum Heritage Center/Picnic Area (Grant County PUD) - The Heritage Center is located next to Wanapum Dam on the Columbia River west of SR-243. The Wanapum Heritage Center's activities focused towards interior displays and activities, but there an outdoor picnic area located just south of the facility containing picnic tables and parking.
- Wanapum Dam Overlook (Grant County PUD) - Wanapum Dam Overlook is located just east of SR 243 northeast of Wanapum Dam. The overlook is currently unmarked from SR 243, and provides views to Wanapum Lake and the Columbia River corridor.
- Wanapum Lake - Dispersed views also occur from Wanapum Lake. Access to the lake near the Project area is from the Upper Wanapum Dam Boat Launch and Getty's Cove Boat launch located on the south end of the lake off of Huntzinger Road south of Wanapum State Park. As with Priest Rapids Lake, recreational activities include fishing, boating and sightseeing. The Upper Wanapum Dam Boat Launch (Grant County PUD) is located on the east side of the lake west of SR 243. Future plans include the installation of an Americans with Disabilities Act accessible float at the site, surface improvements to the parking area, and the construction of toilet facilities.

Yakima City
Yakima City Parks and recreation site within the three mile study corridor are associated with the Yakima Greenway. The 16th Avenue Parking Lot; Harlan Landing Boat Launch and picnic area; and Rotary Lake fishing, parking, and picnic area all occur along the Yakima River Greenway.

Travel Corridors

Federal
I-82 extends along and parallels the west side of the Project. There are four separate rest areas and designated viewpoints associated with I-82 within the Project area:

- East-bound Selah Creek Rest Area – This is the southern-most rest area along the interstate within the Project area, and is located just south of the Fred G. Redmon Memorial Bridge and Selah Cliffs NAP. The site contains restrooms, picnic facilities and an interpretative overlook dedicated to natural features of the cliffs and the NAP. The overlook is generally oriented to the north (northeast-northwest) toward the cliffs and provides views of the Selah Cliffs NAP and WSDOT and BLM-managed lands. An existing Pomona-Wanapum 230 kilovolt (kV) transmission line, vineyards, Selah Butte communication towers, the interstate corridor, and the Redmon Memorial Bridge are also within the viewshed of the overlook.
- West-bound Selah Creek Rest Area – Located approximately 1.5 miles to the northeast of the east-bound rest area at interstate milepost 24, this rest area contains restrooms and picnic facilities. From the picnic area, views are oriented generally to the south and southwest across JBLM YTC and toward Selah and the city of Yakima. Views of Mt. Adams and Mt. Rainier can also be seen from this area.
- West-bound Manastash Ridge Viewpoint – Located on the northwest side of the Project area at about interstate milepost 7, the West-bound designated viewpoint contains no restroom or picnic facilities. An area adjacent to the travel lane provides a panoramic view the Wenatchee Mountains and developed areas of Kittitas Valley/Badger Pocket to the north and northeast.
- East-bound Manastash Ridge Viewpoint – This designated viewpoint is located immediately south of the west-bound viewpoint and also contains no restroom or picnic facilities. View orientation and content are similar to the westbound viewpoint, but are not as extensive due to foreground hills within JBLM YTC blocking views of Badger Pocket.

State
Yakima River Canyon Scenic Byway is a Washington State Scenic Byway (WSDOT Tourism Route) following the Yakima River along SR 821 from its intersection with I-82. The byway would potentially have background views of the Project on its' south end in a developed setting south of the canyon. Views within the canyon of the Project corridor are screened by topography.

SR 243 is located in Grant County and connects Hanford National Monument on the east with Desert Aire, Beverly, and Wanapum Dam on the north in the Project area. Travelers would have immediate foreground views of the Project from this highway.

County/Local
Travelers on local roads have views within the Project area primarily in Yakima County. In Yakima County, travelers using East Selah Road near the Pomona Heights Substation would potentially view the Project. Travelers using collector and minor roads would potentially view the Project along Sage Trail Road, Painted Horse Road, Temple Lane, Shotgun Lane, Firing Center Road, East Pomona Road, O'Brian Vista Lane, Tipp Road, and Roza Creek Drive.

In Kittitas County, travelers using Huntzinger Road would potentially view the Project in the immediate foreground. Burbank Creek Road, Thrall Road, 4th Parallel Road, and Upper Badger Pocket Road would also have views of the Project.

In Grant County, travelers using Beverly Berke Road would also potentially have views of the Project.

Key Observation Points

Visual sensitivity of all residences, parks and recreation areas, and travel corridors are summarized below in Table 3.8-4 and shown in Appendix C-3. Appendix A-Visual Resources map illustrates visual sensitivity, KOP locations, IOP locations, scenic quality, and Development Character Areas for the Project area.

Based on the identification of potentially sensitive viewpoints and the sensitivity analysis, KOPs were selected based on representative views from highly or moderately sensitive viewing locations, such residential concentrations, roadways, or important recreation area. A total of 10 KOPs were selected that represent typical views from sensitive areas. Two KOPs, KOP 1s-Sage Trail Road and KOP 10s-Wanapum Village, were also utilized in the DEIS for NNR and DEIS shared route segments. KOPs were used for contrast analysis and for the identification of potential photo simulations. A total of three were selected for the development of visual simulations (see Appendix C-4); one of these, KOP 1 - Sage Trail Road was also used in the DEIS. The KOPs identified for the Project are summarized in Table 3.8-4 below.

TABLE 3.8-3 SENSITIVE VIEWPOINTS IDENTIFIED IN PROJECT AREA

VIEWPOINT	SENSITIVITY
Baldy Butte Hang Gliding Launch Area	M
Interstate 82	L/M
Interstate 82 Rest Areas/Viewpoints- Selah Creek Rest Area-East-bound (Overlook), Selah Creek Rest Area-West-bound, Manastash Ridge (East-bound and West-bound Viewpoints)	H
John Wayne Pioneer Trail/Milwaukee Corridor/Beverly Railroad Bridge National Register of Historic Places (National Register) Site	H/M
Lower Wanapum Dam Boat Launch and Picnic Area	M
Residences – All Occupied	H
Roads – Collector Rural Roads (Huntzinger Rd. E. Selah Rd., Beverly Berke Rd., E. Pomona Rd., Thrall Rd.)	M
Roads – Other Local Roads (Sage Trail Road, Firing Center Rd., Tipp Rd., Burbank Creek Road, 4th Parallel Rd.)	M
Selah Butte Recreation Destination Route (Selah Creek Drive)	M
Selah Butte Watchable Wildflower Area	H
Selah Cliffs Natural Area Preserve Trail	H
SR 243	M
Umtanum Ridge Water Gap NNL	H
Upper Wanapum Dam Boat Launch	M
Wanapum Dam Overlook	M
Wanapum State Park/Boat Launch (and Ginkgo Petrified Forest NNL)	H
Wanapum Heritage Center Picnic Area	M
Wanapum Lake	M
Yakima Elks Golf & Country Club	M
Yakima River Canyon Washington Tourism Route (SR 821)	H
Yakima Greenway Trail-Yakima River	H

Key: H=High
M=Moderate
L=Low

TABLE 3.8-4 KEY OBSERVATION POINT SUMMARY

KOP NAME	LOCATION	VISUAL SENSITIVITY (LAND USE TYPE)	SEGMENT
KOP 1s - Sage Trail Road*	Sage Trail Road north of Koch Rd	High (Residential)	NNR-1
KOP 2s – Temple Lane	East Selah- East of Shotgun Ln. and south of YTC	High (Residential)	NNR-2
KOP 3s – YTC: Firing Center Road*	Main entry road of YTC	Moderate (Military/travel)	NNR-2
KOP 4s – E. Pomona Rd.	East end of road at YTC boundary	High (Residential)	NNR-2
KOP 5s – WSDOT Selah Cliffs Eastbound Rest Area Overlook*	At interpretative area of overlook	High (Travel/Interpretative) BLM Interim VRM Class III	NNR-3
KOP 6s - Selah Butte Wildflower Area	At 2-track road pull-off south of the butte	High (Dispersed Recreational) BLM Interim VRM Class III	NNR-3
KOP 7s- Badger Pocket: Silika Rd.	1/2 –mile south of Upper Badger Pocket Rd.	High (Residential)	MR-1 & NNR-4
KOP 8s – Upper Badger Pocket Rd.	675-feet east of Buffalo Lane	High (Residential)	NNR-5
KOP 9s – John Wayne Trail	South of Wanapum Dam and existing transmission lines	High/Moderate (Recreation) BLM Interim VRM Class III	NNR-8
KOP 10s – Wanapum Village	West Side of Wanapum	High (Residential)	NNR-8

* KOP used for Visual Simulation; see Chapter 4.8 and Appendix C.

3.8.2.5 Distance Zones

The BLM has utilized distance thresholds as identified in the VRM methodology. These Distance Zones are as follows:

Foreground – The limit of a viewed area in which details are perceived and obvious. Textural and other aesthetic qualities of vegetation are normally perceived within this zone (0 to 0.25 - 0.5 mile).

Middleground – The zone in which details of foliage and fine textures cease to be perceptible. Vegetative patterns begin to appear as outlines or patterns (0.25 - 0.5 to 3.0 – 5.0 miles).

Background – That portion of the landscape where texture and color are weak and landforms become the most dominant element (3.0 – 5.0 to 15 miles).

Seldom Seen – Those areas of the landscape where topographic relief or vegetation screen viewpoints or when viewing distances are beyond 15 miles.

For an explanation of the rational for the determination of distance zones, please see Section 3.8.2.5 of the DEIS. Distance zones are identical to those used in the DEIS, follows:

Immediate Foreground: Viewpoint location to 1,000 feet – This very high visibility distance zone is where the Project (primarily, the 65 to 95+ foot H-frame and monopole transmission structures) would be dominant and where high and moderate sensitivity viewers would likely be significantly impacted.

Foreground: 1,000 feet to 0.33 mile - This high visibility distance zone is where the Project would potentially be dominant depending on the viewing conditions and where high and moderate sensitivity viewers could be significantly impacted.

Middleground: 0.33 mile to 1.0 mile – This is the distance zone where the potential Project impacts on high sensitivity viewers begins to diminish and the Project will become co-dominant or sub-dominant in the landscape, depending on the viewing conditions and setting.

Background: 1.0 mile to 2.0 miles – This is the distance zone where the Project is not likely to be perceived by the moderately sensitive casual viewer and where high sensitivity viewers would be impacted only where the strongest contrasts would occur, such as in skylining conditions where no transmission lines currently exist.

Seldom Seen: Beyond 2.0 miles – Beyond two miles, typical Project elements would not be noticeable to viewers even where strong contrasts occur and typically would not be seen due to intervening vegetation, topography, atmospheric conditions, or other factors.

Note that these distance zones apply only to alternative route segments and not to the (200+ feet high) Columbia River crossing towers. For the Columbia River crossing structures, the distance zones are as follows:

Immediate Foreground: Viewpoint location to 0.75 mile

Foreground: 0.75 mile to 1.5 miles

Middleground: 1.5 miles to 3.0 miles

Background: 3.0 miles to 4.0 miles

Seldom Seen: Beyond 4.0 miles

3.8.3 Current Management Considerations

3.8.3.1 Federal

BLM

The BLM Spokane District currently manages lands under its jurisdiction in the proposed Project area in accordance with the Spokane District RMP (1985) and ROD (BLM 1987) and the 1992 RMP Amendment and ROD (Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD) (BLM 1992). The Spokane District has begun the process of revising the RMP (BLM 2011). VRM classes were not designated in the 1987 RMP, although Appendix D of the RMP details District special stipulations applicable to the Project and identifies specific areas of VRM Class Management (Yakima River Canyon: Class 3; Badger Slope: Class 2). The Spokane District RMP (1985) and ROD (BLM 1987) and the 1992 RMP Amendment and ROD (Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD) also state that:

> "Recreational activities and visual resources will be evaluated as part of the specific activity plans and will be evaluated to determine their appropriateness in relation to the land use allocations made by the Resource Management Plan"; and
>
> "The evaluation of visual resources will consider the significance of proposed projects and the visual/scenic sensitivity of the affected area. Stipulations will be attached as appropriate to assure compatibility of projects with management objectives for visual resources."

In preparation for the plan update, a VRI was conducted during 2010 and VRI Classes were established. VRI Classes, however, only establish baseline visual resource values. The inventory classes represent the relative value of visual resources, and provide the basis for considering visual values in the RMP planning process. VRM Classes are established though the RMP process, which may or may not reflect the VRI. Resource allocations decisions made in the RMP will determine final VRM Classes.

Interim VRI Classes were developed by the BLM based on the VRI and desired management direction pending the development of the forthcoming revised RMP. The Interim VRM Classes were established in the Project area as detailed in BLM Memo 285003-OR WAOR 65753 developed for the this SDEIS. The

Interim VRM Classes established by the BLM (Interim Class III) in the Project area are shown in Appendix A - Visual Resources Map.

As established by BLM Manual H-8410 (BLM 1986a), VRM Class Objectives are as follows:

Class I: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II: The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III: The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV: The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

3.8.3.2 State

WSDOT is required to consider the following federal and state statutes and regulations when analyzing impacts to visual quality and aesthetics:

- **42 U.S.C. §4321 National Environmental Policy Act (NEPA):** NEPA and the State Environmental Policy Act (SEPA) require that all major actions sponsored, funded, permitted, or approved by federal agencies undergo planning to ensure environmental considerations such as impacts related to aesthetics and visual quality are given due weight in decision making. NEPA Section 101(b)(2) states that it is the “continuous responsibility” of the federal government to “use all practicable means” to “assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.”
- **40 CFR Parts 1500-1508:** Council on Environmental Quality (CEQ) implementing regulations require that environmental analyses are to consider impacts on the design of the built environment.
- **23 CFR Part 750:** The Highway Beautification Act of 1965 was enacted to provide effective control of outdoor advertising and junkyards, protect public investment, promote the safety and recreational value of public travel and preserve natural beauty, and provide landscapes and roadside development reasonably necessary to accommodate the traveling public.
- **RCW 43.21c State Environmental Policy Act:** SEPA requires that all major actions sponsored, funded, permitted, or approved by state and/or local agencies undergo planning to ensure

environmental considerations such as impacts related to aesthetics and visual quality are given due weight in decision making.

- **RCW 47.39 Scenic and Recreational Highway Act of 1967:** Establishes the Scenic and Recreational (S&R) Highways Program and designates more than 1,900 miles of scenic highways.
- **RCW 47.40 Roadside Improvement and Beautification:** Outlines permit process for persons wishing to use highway right-of-way (ROW) for improvement and beautification. Establishes penalty for destroying native flora on state lands. Mandates litter removal, and authorizes state and local Adopt-a-Highway programs.
- **RCW 47.39 Amended Scenic and Recreational Highway Act of 1967 (1990):** Directs WSDOT to develop criteria and a threshold methodology to evaluate highways for possible inclusion in the S&R system. States that S&R highways are designated because of a need to develop management plans that will protect and preserve the S&R resources from loss through inappropriate development. States that protection of these resources includes managing land use outside normal highway ROWs, and adds additional routes to the S&R System.
- **RCW 47.39 Amended Scenic and Recreational Highway Act of 1967 (1993):** Includes 45 percent of state highways in the S&R system. Directs the department to consider the use of the designated system by bicycles and pedestrians. Delegates authority for establishment of planning and design standards for S&R highways.
- **WAC 468-34-330 Scenic Enhancement for Utilities Accommodation on State Highway ROWs:** Describes a scenic classification system for utilities accommodation on state highway ROWs as developed through cooperation of WSDOT and the Aerial Utility Industry.

3.8.3.3 Yakima County

The Yakima County Comprehensive Plan was adopted May 20, 1997 and was updated in 2007 to include the Washington State Growth Management Act Update (Yakima County 2007). The visual Natural Setting is covered under section NS 6. Section NS 6 has goals and policies related to the protection of visual resources in Yakima County. Those goals and policies pertinent to the Project are as follows:

Goal NS 6: *Protect property values by improving the appearance of Yakima Valley.*

- *Policies:*
  - *NS 6.1* - *Protect the natural, historic, and visual quality of remote areas.*

Visual resources are also covered in the Shorelines Environments Section (Public Access – Physical and Visual subsection). Pertinent Policies include:

- *NS 7.39* - *Development standards should be established to assure preservation of unique, fragile, and scenic elements and to protect existing views from public property or large numbers of residences. Where aesthetic impacts are not avoidable, provide mitigation.*
- *NS 7.41* - *Proper design, location, and construction of road and railroad facilities should be exercised to provide to the degree practical, scenic corridors, rest areas, view points, and other public oriented facilities in public shoreline areas.*
- *NS 7.42* - *Wherever feasible, utility facilities should be placed underground.*

3.8.3.4 Kittitas County

Visual resource goals and objectives pertinent to the Project were identified in the Kittitas County Comprehensive Plan (Kittitas County 2010) as follows:

> Shoreline Use Activity
>
> ***GPO 2.53:*** *Utilities; Utilities should be designed and installed in a manner which would result in minimal damage to the normal qualities of the shoreline area.*
>
> *Utilities should be planned to avoid destroying scenic views.*

3.8.3.5 Grant County Public Utilities District

The Grant County PUD is currently managing Project lands under the policies and procedures of the Shoreline Management Plan (SMP) (see Section 3.4 Land Use). The 2010 Final SMP submitted to Federal Energy Regulatory Commission in March of 2010, identifies goals for scenic and aesthetic resource protection.

3.6 Goal 6: Protect Scenic Quality and Aesthetic Resources
The following objectives describe the commitment by Grant County PUD to protect the scenic quality of the river and its surrounding landscape.

- *Preserve the natural aesthetic qualities of the Project lands and waters through successful implementation of the SMP. This is achieved primarily through Land Classifications (see Land Use and Recreation Sections 3.4 and 3.5).*
- *Coordinate with property owners and resource managers within and adjacent to the Project Boundary to promote protection and enhancement of scenic quality and aesthetic resources.*
- *Ensure resource management and monitoring measures are successfully implemented.*

Resources Management classification will be managed to preserve and enhance conservation and protection of fish, wildlife scenic, historic, archeological, and cultural resources.

3.8.3.6 Grant County

The Grant County Comprehensive Plan identifies Goals and Policies to guide development activities within unincorporated Grant County (Grant County 1999). The following Goals and Policies regarding visual resource management that are pertinent to the Project include:

> ***Goal NS-9:*** *The County should recognize and protect the functions of the shoreline environments of statewide and local significance. For shorelines of state-wide significance, protection and priorities are to:*
>
> *b. Preserve the natural character of the shoreline;*
>
> - *Policies*
> - *NS-9.4 Conservation*
>   *2. Reclaim and restore areas that are biologically and aesthetically degraded to the greatest extent feasible.*
>   *3. Preserve scenic vistas, aesthetics, and vital estuarine areas for fisheries and wildlife protection.*
> - *NS-9.9 Utilities*

3. Design utility facilities and ROWs to preserve the natural landscape and to minimize conflicts with present and planned land uses.
6. Locate and design facilities in a manner that preserves the natural landscape and shoreline ecology, and minimizes conflicts with present and planned land uses.

3.8.4 NNR Route Segment Specific Considerations

3.8.4.1 NNR-1

This Route Segment is identical to Route Segment 1a analyzed in the DEIS, except for the area directly adjacent to the Pomona Heights Substation. The landscape character along this route segment is low density residential, with adjacent undeveloped lands being Scenic Quality Class C. Route Segment NNR-1 is in the immediate foreground of high sensitivity residential viewers located primarily along Sage Trail Road, including the County Squire Mobile Manor community and adjacent streets. Views to the urbanized Selah Valley and Mt. Rainier occur from most of the residences located along Sage Trail Road (see KOP 1s). The route would potentially be viewed from the moderately sensitive East Selah Road and I-82.

Other existing development along this route includes a 230 kV wood single pole and H-frame transmission line (Pomona-Wanapum) crossing Sage Trail Road and various electrical distribution lines as well as various gravel roads and driveways.

3.8.4.2 NNR-2

This route segment is located in a developed landscape setting dominated by military land uses and low to moderate density residential. The south end of the route segment is less developed in a lower density residential interface, having a Scenic Quality Class C.

Residences located adjacent or near the JBLM YTC border would potentially have immediate foreground views of the project from the vicinity of Temple Lane Shotgun Lane (see KOP 2s), Firing Center Road (see KOP 3s), and East Pomona Road. The north end of this route segment would be seen in the immediate foreground from the moderate sensitivity I-82 corridor.

The proposed Project parallels or is co-located with existing transmission and distribution lines along about 2.4 miles of the route. Developed features within the viewshed of this route include two story, detached residential structures and associated landscapes, a water tower, JBLM YTC cantonment area complex structures, aircraft and airfield facilities associated with the Vagabond Army Heliport, military yarding and storage facilities, and other single-story, large scale military facilities.

3.8.4.3 NNR-3

The landscape character along this route segment is generally expressed as transportation (I-82 corridor and Selah Rest Area) and agricultural on the extreme south end and relatively undeveloped, rolling sagebrush steppe along most of the northern portion across BLM and private land. Several stream corridors are crossed that provide some rocky outcropping and riparian vegetation adding to visual interest. BLM VRI data indicates that this segment crosses Class A scenery and interim VRM Class III land. NNR 3 also crosses BLM VRI Class II lands as identified by the 2010 study.

Sensitive viewers are concentrated at the south end of the segment, where residences and the travelers using the I-82 corridor and east-bound Selah Creek Rest Area (and overlook; see KOP 5s) will view the project in the immediate foreground. This segment crosses over the Selah Cliffs NAP and trail below the overlook. Once the project crosses the Selah Cliffs area, it diverges from the highway, and motorists travelling the interstate would view the project crossing south of the rest area in the background as it parallels the highway to the west. Recreationists using the Selah Butte Recreation Destination Route would have prolonged views of the Project in the immediate foreground and foreground to the east as the Route Segment is generally paralleled. Viewers using the BLM Selah Butte Watchable Wildflower Area may have views of the Project, depending on the location of viewing activities; views of the Project are screened over much of the Selah Butte dispersed use area. The Yakima River Canyon Scenic Byway, Umtanum Ridge Water Gap NNL (access road on the east side of SR 821) and associated recreation areas are located in the middleground and background within the Project area, but views are screened by topography. NNR 3 also crosses a high sensitivity BLM Sensitivity Level Rating Unit (SLRU) as identified by the 2010 study.

The proposed Project parallels the existing Pomona-Wanapum 230 kV transmission line along about 8.3 miles of the route. Developed features within the viewshed of this route also include the I-82 travel corridor and associated facilities and agricultural development. Communication towers also occur along the existing transmission line at Selah Butte.

3.8.4.4 NNR-4

The landscape character along most of NNR-4 is similar to that of NNR-03: relatively undeveloped, rolling sagebrush steppe. The developed character is expressed by the linear I-82 corridor and road networks and bivouac area of JBLM YTC that deviates from the natural landscape. Natural landscapes are Scenic Quality Class C along this route.

Visual sensitivity is associated with NNR-4 is associated primarily with I-82 corridor travelers who would have perpendicular views of the Project as it crosses the highway. Visual sensitivity is moderate and viewing duration would be fairly brief. On the east end of the Route Segment, high sensitivity residences of Badger Pocket would have views of the Project in the immediate foreground and foreground and local road travelers would potentially view the Project in the middleground and background.

The Project parallels the existing Pomona-Wanapum 230 kV transmission line and would be viewed within the developed context of the highway corridor and existing line. The existing structure, road network, and bivouac area does not substantially influence the viewing context from the highway due to low angle of view, topography, and intervening vegetation that screens these developed features in the landscape.

3.8.4.5 NNR-5

NNR-5 is a short Route Segment that is located on JBLM YTC on the southern boundary with Badger Pocket. The landscape character in the vicinity of this Route Segment is expressed as an interface between the largely undeveloped, rolling, sagebrush dominated landscape of the army base and the rural, agricultural landscape of Badger Pocket. Natural landscapes are Scenic Quality Class C.

Visual sensitivity associated with this link is associated with residences and local roads in the Badger Pocket area. Potential views would be in the middleground and background.

The Project deviates from the existing Pomona-Wanapum 230 kV transmission line as it follows the JBLM YTC boarder, but is within the visual influence of the existing line and road network of JBLM YTC. The Project would be viewed by sensitive viewers behind the existing line.

3.8.4.6 NNR-6

This Route Segment parallels the Pomona-Wanapum 230 kV transmission line its entire length and crosses uniformly sloped and more extreme and variable sagebrush dominated steppe mountainous landscapes with a Scenic Quality Class C. The developed character is limited to the vertical linear features of the existing line and winding JBLM YTC road network. Steep drainages within the Saddle Mountains that have eroded cliffs and ribbons of more variable vegetation that deviates from the dominant sagebrush commonly occurs along this Route Segment.

Sensitivity along this Route Segment is related primarily with landscape scenery, not with sensitive viewers. The nearest high sensitivity viewers are located in the Badger Pocket area on the route segment's west end, who would view the Project in the middleground and background. On the east end of the route, the John Wayne Pioneer Trail (Iron Horse Trail) is located adjacent to the Wind Ridge-Wanapum 230 kV transmission line and would potentially view the Project in the middleground.

The existing Pomona-Wanapum and Wind Ridge-Wanapum 230 kV transmission lines are the primary influences on the visual context within the Project area.

3.8.4.7 NNR-7

This Route Segment also parallels existing transmission lines along its entire length. The natural landscape character of this segment is similar to NNR-6, with uniformly sloped and more extreme and variable sagebrush dominated steppe mountainous landscapes with a Scenic Quality Class C. Steep drainages within the Saddle Mountains that have eroded cliffs and ribbons of more variable vegetation deviates from the dominant sagebrush slopes. The development character is dominated by vertical, industrial structures expressed by the existing lattice and H-frame structures of Wind Ridge-Wanapum 230 kV, Schultz-Wautoma 500 kV, and Schultz-Vantage 500 kV transmission line corridor.

Sensitive viewers are limited to the John Wayne Pioneer (Iron Horse) Trail, which parallels the route within the immediate foreground and foreground on the west and the middleground on the east, generally. Ginkgo Petrified Forest NNL (Wanapum SP boat launch) is located in the in the seldom seen distance zone within the Project area, and views are typically screened by topography.

The existing transmission line dominates the visual context of NNR-7. Two-track trails and transmission line service roads are the most significant modifiers of the landscape in this area.

3.8.4.8 NNR-8

NNR-8 shares the same alignment with the DEIS Route Segment 3b where the line crosses the Columbia River on its extreme north end. This route crosses the Columbia River just south of the Wanapum Dam in an Industrial/Utility Development Character Area adjacent to four other transmission lines of various voltages (230 to 500 kV). The Route Segment also crosses BLM land and Huntington Road on the west side of the Columbia River in a largely undeveloped Class B Scenic Quality landscape. Interim VRM Class III land is crossed by this route segment. NNR 8 also crosses BLM VRI Class IV lands as identified by the 2010 study.

Sensitive viewers associated with this Route Segment include recreationists using the John Wayne Pioneer Trail and associated facilities who would view the Project in the immediate foreground, as well as Huntzinger Road travelers and residences associated with Wanapum Village. The Route Segment would also be potentially viewed in the background by recreationists using the Huntzinger Boat Launch, Priest Rapids Recreation Trail, Desert Air Dock, Priest Rapids Dock, and dispersed users of Priest Rapids Lake-Columbia River. Travelers using SR 243 would also potentially view the Project in the immediate foreground distance zone where the line would cross the highway. Ginkgo Petrified Forest NNL (Wanapum SP boat launch) is located in the seldom seen distance zone within the Project area. NNR 8 also crosses a moderate sensitivity BLM SLRU as identified by the 2010 study.

The visual context of this NNR-8 is dominated by the industrial features of the Wanapum Dam, existing transmission lines, and Vantage Substation along its entire route.

3.8.4.9 MR-1

Landscape character along this Route Segment is similar to NNR-3 and NNR-4, with relatively undeveloped, rolling sagebrush steppe, and the I-82 transportation corridor and associated Manastash Ridge Viewpoints. Several stream corridors that are crossed have some rocky outcropping and riparian vegetation which adds to visual interest. As with Route Segment NNR-5, the landscape character in the vicinity of the Project is expressed as an interface between the largely undeveloped, rolling, sagebrush dominated landscape of the army base, and the rural, agricultural landscape of Badger Pocket. Scenic Quality is Class C along this Route Segment.

Visual sensitivity is associated with MR-1 is associated primarily with the Manastash Ridge Viewpoints (east-bound and west-bound) that would have immediate foreground, foreground, and middleground views of the Project as it crosses the interstate. As with NNR-3, the Project would potentially be intermittently viewed at a distance in the middleground and background, primarily, as it parallels I-82. As the line follows the boundary of the army base, the Route Segment would be within the immediate foreground and foreground view of residences located on the southwest side of Badger Pocket. The Umtanum Ridge Water Gap NNL (access road on the east side of SR 821) is located in the background within the Project area, and views are typically screened by topography.

The visual influence of developed features is limited to the I-82 corridor, including the parking areas of the Manastash Ridge Viewpoints. No existing transmission lines occur in the vicinity of the route except at each end of the segment where it diverges or converges with the existing Pomona-Wanapum 230 kV transmission line. However, a distribution line that services communication facilities west of the Manastash Ridge Viewpoint and a cell tower are located west of I-82 within the viewshed of the I-82 corridor.

3.9 SOCIOECONOMICS

3.9.1 Data Sources

The analysis considered issues related to socioeconomics. As was done with alternative routes analyzed in the Draft Environmental Impact Statement (DEIS), the analysis in this section of the Supplemental Draft Environmental Impact Statement (SDEIS) will consider issues related to socioeconomics along the New Northern Route (NNR) and Manastash Ridge (MR) subroute, including those raised during scoping. This SDEIS section describes the existing conditions (affected environment) of the new northern route and subroute. This SDEIS section builds on the work done in the January 2013 DEIS and includes references to that document throughout the text of this SDEIS where appropriate for socioeconomics. This section of the SDEIS focuses the analysis on the NNR and socioeconomics, as well as analysis on any significant new circumstances or information that has become available since the January 2013 publication of the DEIS. This SDEIS also relies, where appropriate, on the data presented and analyses done in the DEIS for socioeconomics.

The socioeconomic analysis relies primarily on standard secondary data sources such as census data from the U.S. Bureau of the Census (primarily from decennial censuses covering population, income, and housing characteristics), employment and income data from the U.S. Bureau of Economic Analysis and U.S. Department of Labor, and state-level data from the Washington Office of Financial Management (OFM) and Washington Department of Employment Security (WDES). Data from local counties (county budgets) and cities were frequently used. Personal contacts were also made, particularly for information on tax revenues and transient housing.

3.9.2 Current Conditions and Trends, Regional Overview (Analysis Area)

The Study Region

The *Study Region* and *Local Area* for this analysis are defined based on the geographic extent of potential NNR alternative route impacts. The impacts of the NNR alternative route would arise from employment and income generated by their construction and operation. In response to job opportunities, workers would be hired (1) from the local labor force, who would commute to the site or to local businesses that increase hiring due to the proposed Project, and (2) from areas outside the local labor market area, who would relocate to the area either long-term or for only the term of their employment on the Project (likely occupying transient housing such as hotel/motels and RV parks). Populations would increase due to this in-migration, as would demand for housing and public services. Tax revenues would accrue to local taxing jurisdictions, such as counties.

The NNR alternative route is located in three counties: Yakima, Kittitas and Grant. Impacts of the NNR alternative in Benton County would be negligible because none of the SDEIS alternatives would be located in the County, and Benton County is over 16 miles from the Project; thus, Benton County is not included in the *Study Region*. Figure 3.9-1 depicts the Study Region, including its primary communities.

Socioeconomic data, such as from the U.S. Department of Commerce (Bureau of the Census and Regional Economic Information System), WDES, and Washington OFM are often tabulated at the county level, making the county level of analysis convenient for most statistical tabulations. Thus, the Study Region is defined as Yakima, Kittitas, and Grant counties. The county seats of the three counties could experience some impacts, and thus Ephrata (Grant County), Yakima (Yakima County), and Ellensburg (Kittitas County) are at times included.

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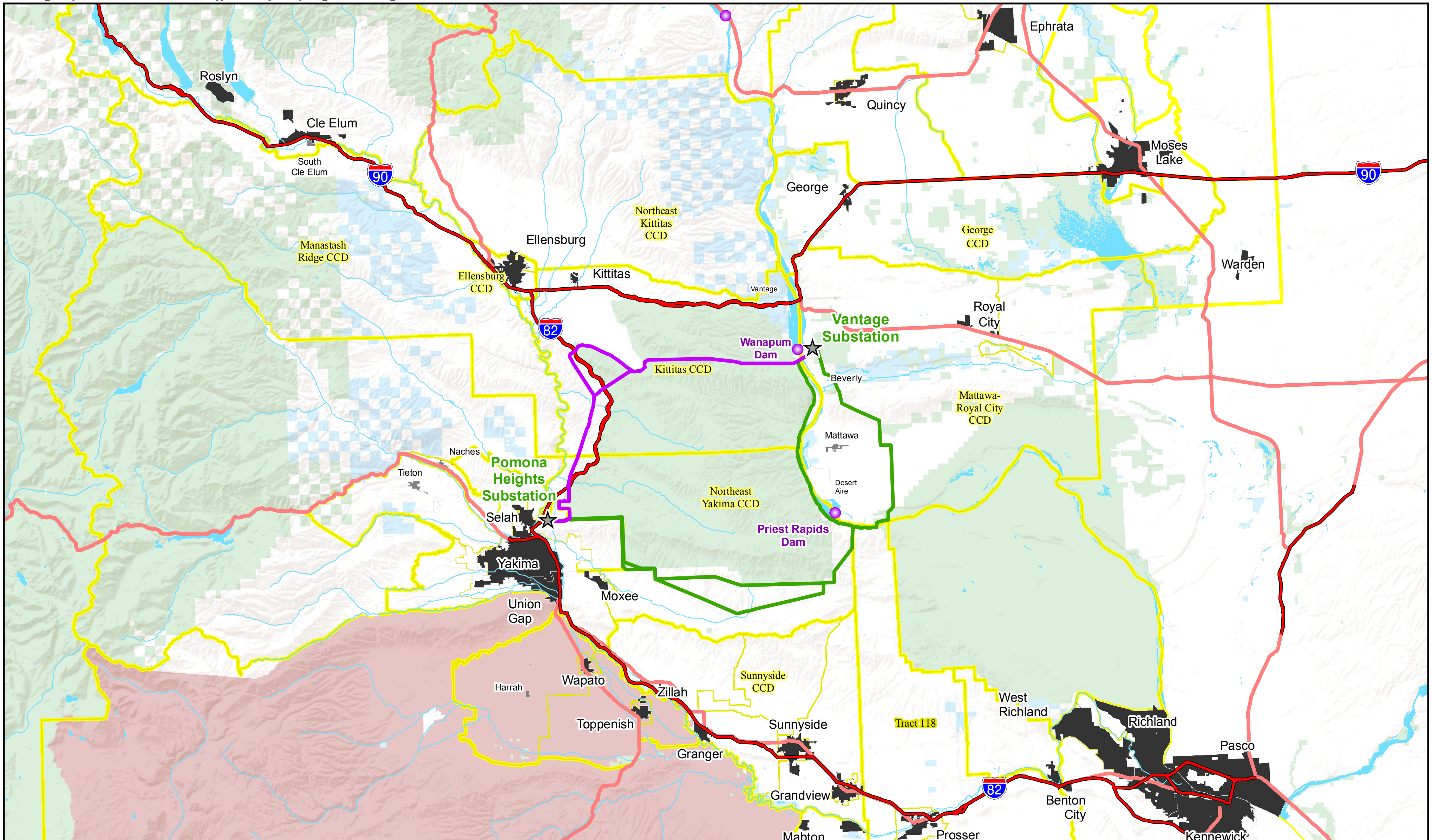

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 3.9-1 Socioeconomics Study Region

Project Components
- SDEIS Route
- DEIS Preferred Route
- Project Substation

Transportation
- Interstate Highway
- US or State Highway

Boundaries
- County Boundary
- Census County Division
- Census Tract
- City
- Town
- Census Designated Place

Land Ownership
- Federal
- State
- Bureau of Indian Affairs

Water
- Dam
- River or Stream
- Water Body

0 5 10 15 20 25
Miles
1 inch = 13 miles

PACIFIC POWER
A DIVISION OF PACIFICORP

POWER ENGINEERS

The *Local Area* is defined to better reflect the fact that much of the area in the Study Region will not be appreciably affected due to distance from the NNR route. Communities that could experience the most noticeable temporary or long-term population increases will be those nearest the SDEIS route segments in which housing for in-migrating workers is expected to be available. These include the Census County Divisions (CCDs) of: Northeast Yakima County (Yakima County), Mattawa-Royal City (Grant County), and Kittitas (Kittitas County). In these CCDs are the incorporated communities of Moxee, in Yakima County, and George and Mattawa in Grant County; and unincorporated communities such as Vantage in Kittitas County, and Beverly in Grant County.

3.9.2.1 Population

The three-county Study Region is mixed urban-rural, with an average population density of 41.1 persons per square mile, compared to a statewide average of 14.6. Much of the Study Region lands are unoccupied and reserved for federal government use, such as the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC).

The three primary cities in the Study Region are Yakima, Ellensburg (Kittitas County), and Moses Lake (Grant County). Each city is the county seat of its respective county.

The population of the three-county Study Region has increased steadily over the past two decades, from 270,346 in 1990, to 380,950 in 2013. This represented a 1.4 percent average annual growth rate, slightly above the statewide average of 1.3 percent. Population data are shown in Table 3.9-1.

Population is extremely sparse in the vicinity of the NNR alternative route. The three CCDs traversed by the SDEIS route segments had a combined population of only 28,231 persons in 2010. The alternative route is not located in close proximity to populated areas, except at the southwestern end, at the Pomona Heights Substation (Figure 3.9-1). The nearest communities to the SDEIS route segments are: Unincorporated Vantage (2010 population of 74) in Kittitas County; the small settlement of Beverly (Beverly is not defined as a Census area, but about 50 residences are located there), in Grant County; and, the municipalities of Moxee (2013 population of 3,655), Yakima (2013 population of 92,620) Union Gap (2013 population of 6,110), and Selah (2013 population of 7,340) in Yakima County.

TABLE 3.9-1 HISTORICAL POPULATION IN STUDY REGION, 1990-2013

JURISDICTION	CENSUS 1990	CENSUS 2000	CENSUS 2010	CENSUS 2013	LAND AREA (SQ. MILES)	POPULATION DENSITY 2013 (PERSONS PER SQ. MILE)	AVERAGE ANNUAL GROWTH RATE, 2000-2013
Grant County	54,798	73,605	89,120	91,800	2,679.5	34.3	1.7%
Unincorporated Grant County	26,406	35,370	40,134	40,956	2,625.5	15.6	1.1%
Incorporated Grant County	28,392	38,235	48,986	50,844	54.0	941.7	2.2%
George city	324	528	501	720	2.0	361.3	2.4%
Mattawa town	941	2,609	4,437	4,540	0.7	6,622.8	4.4%
Moses Lake city (Grant County seat)	11,235	14,690	20,366	21,250	17.8	1,193.9	2.9%
Royal City	1,104	1,822	2,140	2,190	1.0	2,234.9	1.4%
Desert Aire CDP	na	1,124	1,626	na			na
George CCD	1,963	2,925	2,755	na			na
Mattawa-Royal City CCD[1]	6,101	11,121	14,870	na			na
Kittitas County	26,725	31,199	40,915	41,900	2,297.3	18.2	2.3%

JURISDICTION	CENSUS 1990	CENSUS 2000	CENSUS 2010	CENSUS 2013	LAND AREA (SQ. MILES)	POPULATION DENSITY 2013 (PERSONS PER SQ. MILE)	AVERAGE ANNUAL GROWTH RATE, 2000-2013
Unincorporated Kittitas County	10,418	13,588	18,063	18,785	2,281.6	8.2	2.5%
Incorporated Kittitas County	16,307	17,611	22,852	23,115	15.6	1,477.8	2.1%
Ellensburg city (Kittitas County seat)	12,360	13,277	18,174	18,370	7.1	2,578.7	2.5%
Kittitas city	843	1,105	1,381	1,450	0.6	2,336.4	2.1%
Vantage CDP	na	70	74	na			na
Kittitas CCD	2,694	3,361	4,255	na			na
Yakima County	188,823	218,844	243,231	247,250	4,295.4	57.6	0.9%
Unincorporated Yakima County	88,214	92,414	83,755	84,910	4,234.4	20.1	-0.6%
Incorporated Yakima County	100,609	126,430	159,476	162,340	61.0	2,660.3	1.9%
Grandview city	7,169	8,270	10,862	11,010	6.8	1,630.9	2.2%
Moxee city	825	819	3,308	3,655	1.7	2,196.5	12.2%
Selah city	5,113	6,164	7,147	7,340	4.4	1,656.2	1.4%
Sunnyside city	11,238	13,700	15,858	16,200	6.2	2,599.3	1.3%
Union Gap city	3,120	5,517	6,047	6,110	4.9	1,237.8	0.8%
Yakima city (Yakima County seat)	54,843	69,706	91,196	92,620	27.0	3,433.0	2.2%
Northeast Yakima CCD	5,717	6,544	9,106	na			na
Sunnyside CCD	38,217	45,291	51,665	na			na
Total population, Yakima, Kittitas, and Grant counties	270,346	323,648	373,266	380,950	9,272	41.1	1.3%
Total population, CCDs in which NNR is located	14,512	21,026	28,231	na			na
State of Washington	4,866,692	5,894,121	6,724,540	6,767,900	66,544.1	101.7	1.1%

Notes: A blank means data is unavailable; na = not applicable; CDP = Census Designated Place (a geographic entity that serves as the statistical counterpart of an incorporated place for the purpose of presenting census data for an area with a concentration of population, housing, and commercial structures that is identifiable by name, but is not within an incorporated place); CCD = Census County Division (county subareas larger than CDPs).

[1]Southern Slopes CCD was renamed Mattawa-Royal City CCD for the 2010 Census.

Source: OFM 2013.

Projected Population

Population projections for the Study Region, like those for the state as a whole, generally predict a slowing rate of growth in 2010 to 2040, relative to the rates of growth since 1990. The mid-range projection by OFM (2012) calls for the Study Region to grow by 1.1 percent annually through 2040 (Table 3.9-2), compared to 1.4 percent from 1990 to 2013. Yakima County would grow by a slightly slower rate and Grant County by a faster rate, than the regional average under all three growth scenarios. Population projections are shown in Table 3.9-2.

TABLE 3.9-2 POPULATION PROJECTIONS FOR STUDY REGION, THROUGH 2040

JURISDICTION	2010	2015	2020	2025	2030	2035	2040	AVERAGE ANNUAL GROWTH RATE, 2010-2040
Grant	89,120	95,822	104,078	112,525	121,204	129,779	138,337	1.5%
Kittitas	40,915	42,592	45,255	47,949	50,567	53,032	55,436	1.0%
Yakima	243,231	256,341	269,347	282,057	294,445	306,636	318,494	0.9%
3-County Region	373,266	394,755	418,680	442,531	466,216	489,447	512,267	1.1%
Statewide	6,724,540	7,022,200	7,411,977	7,793,173	8,154,193	8,483,628	8,790,981	0.9%

Source: OFM 2012.

3.9.2.2 Demographics

Age and Sex
The Study Region population had a younger median age than the state of Washington in 2010. The statewide median age was 37.2, compared to 32.2 in Grant County, 32.6 in Kittitas County, and 32.3 in Yakima County. In all areas, the female median age was slightly higher than the male median age.

Education
The proportions of the population 25 years of age and above who are graduates of both high school and college in Kittitas County are similar to the state of Washington (which itself has higher rates than the national average). In Grant and Yakima counties, the proportion of high school and college graduates are noticeably lower than statewide, reflecting their predominantly farm economies. This is particularly the case in Yakima County, which had the lowest graduation rates in the region in 2010. Male high school graduation rates were noticeably lower than those of females in Grant and Yakima counties, but male college graduation rates were slightly higher.

Racial and Ethnic Characteristics
Race and ethnicity data are presented in this section for the Study Region. In 2010, this three-county area had, on average, substantially higher persons of Latino heritage than was the case for the state of Washington as a whole (39.3 versus 11.2 percent). Yakima County in particular had a high concentration of Latinos, at 45 percent of its population. However, Kittitas County was an exception, with only 7.6 percent of its population being of Latino heritage.

Persons of minority status other than Latino were less-represented in each of the counties in the three-county area than statewide, with only one exception. Indian/Native Alaskans represented 3.7 percent of the total population in Yakima County, compared to 1.3 percent statewide. Race and ethnicity data are displayed in Table 3.9-3.

TABLE 3.9-3 RACIAL AND ETHNIC CHARACTERISTICS 2010, WASHINGTON, STUDY REGION

RACE/ETHNICITY	WASHINGTON STATE	GRANT COUNTY	KITTITAS COUNTY	YAKIMA COUNTY	TOTAL, THREE-COUNTY REGION
Total Population	6,724,540	89,120	40,915	243,231	373,266
Hispanic or Latino	755,790	34,163	3,121	109,470	146,754
% of Total Population	11.2%	38.3%	7.6%	45.0%	39.3%
Not Hispanic or Latino:					
White alone	4,876,804	51,066	35,214	116,024	202,304
% of Total Population	72.5%	57.3%	86.1%	47.7%	54.2%
Black or African American alone	229,603	710	339	1,743	2,792
% of Total Population	3.4%	0.8%	0.8%	0.7%	0.7%
American Indian and Alaska Native alone	88,735	779	353	9,072	10,204
% of Total Population	1.3%	0.9%	0.9%	3.7%	2.7%
Asian alone	475,634	783	795	2,359	3,937
% of Total Population	7.1%	0.9%	1.9%	1.0%	1.1%
Native Hawaiian and Other Pacific Islander alone	38,783	54	56	142	252
% of Total Population	0.6%	0.1%	0.1%	0.1%	>0.1%
Some Other Race alone	11,838	95	52	331	478
% of Total Population	0.2%	0.1%	0.1%	0.1%	0.1%
Two or More Races:	247,353	1,470	985	4,090	6,545
% of Total Population	3.7%	1.6%	2.4%	1.7%	1.8%

Source: 2010 U.S. Census Bureau.

3.9.2.3 Housing

Housing availability in the three-county Study Region was somewhat low in 2010, with a for-sale vacancy rate of 1.8 percent, and a rental vacancy rate of 5.3 percent. Rental vacancy rates below 5.0 percent are typically considered to signal a tight housing market. There were a total of 2,686 vacant units for rent in the Study Region. Housing data are shown in Table 3.9-4.

In the Local Area CCDs, the housing market is even tighter, with owner and rental vacancy rates of 1.4 and 3.7 percent, respectively, in 2010. The George CCD rental market was an exception, with a rental vacancy rate of 15.4 percent. There were 327 unoccupied housing units for rent in the Local Area CCDs. There were only three vacant, for rent units available in Moxee, with most of the rental availability in communities nearest the southern routes being in Yakima, Selah, and Union Gap cities.

The George and Mattawa-Royal City CCDs had a total of 72 vacant units for rent in 2010. The City of George itself had 35 of these units, with only six in Desert Aire and three in Mattawa; Vantage had no vacant, available rental units. Additional housing was available somewhat farther away from the NNR route, in Ellensburg (303 vacant units for rent) and City of Kittitas (nine vacant units for rent).

Transient housing (e.g., hotels, motels, and RV parks) is likely to be of most importance to Project construction workers. These facilities are plentiful in the Study Regions primary cities of Yakima, Ellensburg, and Moses Lake. However, closer to the NNR route, very little transient housing is available.

There are approximately 2,000 hotel rooms in the vicinity of the City of Yakima. Occupancy rates over a month's period recently have varied from about 30 percent to 60 percent. However, for several weeks during the year, hotels are essentially fully booked due to high school athletic tournaments at the Yakima Valley Sun Dome, or Yakima Convention Center events. During some of these times, such as during the state high school basketball tournament in March, hotel availability is very low as far as Ellensburg and Prosser in Benton County.

There are also numerous RV parks in the Yakima area, including Yakima Sportsman State Park, Circle H RV Park, Trailers Inn RV Park, and the KOA Campgrounds. East of Yakima near SR 24, however, there are no hotels or RV parks. During the summer and fall peak season, vacancies are fairly low.

Ellensburg has a total of approximately 750 hotel rooms, with several of the major U.S. chain hotels such as Best Western and Comfort Inn having facilities, as well as smaller locally-owned hotels and motels. There are three RV parks in the vicinity. When these facilities are full at peak times, often the state fairgrounds are opened for RV use. Typically in the late spring to early autumn there are few or no vacancies, especially when there are concerts at the Gorge Amphitheatre, and the main annual rodeo on Labor Day weekend.

Hotel and RV availability in southwest Grant County is very low. The Desert Aire River Campground at Mattawa has only 10 spaces with hookups, which are typically fully occupied in summer and fall, but occupancy is low in winter (Skinner 2011).

Beyond the immediate Project vicinity in Grant County, one public RV facility, the Shady Tree RV Park with 49 hookups, is located in Quincy (near George). The Sun Basin RV Park is located east of George, and the Post Road Trailer Park is located in George (about 20 minutes drive from Vantage, and 35 minutes from Mattawa). Cave B Inn at Sagecliff is a higher-priced (approximately $200 per night) hotel with 55 rooms, located about 10 miles north of Vantage. The MarDon and O'Sullivan RV facilities are east of Royal City, but cater to hunting and fishing persons, with limits on availability for transient workers. Ample hotel and RV spaces are available in the Moses Lake area, about an hour from the Grant County NNR route.

Just north of the Vantage Substation terminus, the Vantage Riverstone Resort in Kittitas County has 15 hotel rooms and six houses (holding up to five to six people apiece) available for rent. The Vantage Riverstone Resort also has a campground and RV park, with approximately 50 full hookups for RVs. Vacancies are limited in summer, and to a lesser degree, in fall. However, some availability is likely even in summer, but advance reservations are suggested. There is ample availability in late fall to late spring (Kwiatkowski 2011). Somewhat farther away from the NNR route are the cities of Kittitas and Ellensburg (about a 30-minute drive to Vantage, and 50 minutes to Moxee), which also have substantial hotel and RV availability.

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TABLE 3.9-4 HOUSING DATA FOR THE STUDY REGION, ITS CCDS, AND COMMUNITIES

HOUSING UNITS	COUNTIES				CCDs IN PROJECT VICINITY						COMMUNITIES IN PROJECT VICINITY									
	GRANT COUNTY	KITTITAS COUNTY	YAKIMA COUNTY	STUDY REGION COUNTY TOTALS	GEORGE CCD	MATTAWA-ROYAL CITY CCD	KITTITAS CCD	NORTHEAST YAKIMA CCD	SUNNYSIDE CCD	LOCAL AREA CCD TOTALS	DESERT AIRE CDP	ELLENSBURG CITY	GEORGE CITY	KITTITAS CITY	MATTAWA TOWN	MOXEE CITY	SELAH CITY	UNION GAP CITY	YAKIMA CITY	VANTAGE CDP
Total housing units	35,083	21,900	85,474	42,457	1499	4,524	1,782	3,145	15,379	26,329	973	7,867	168	579	843	1,032	2,759	2,173	34,829	39
Owner occupied	18,831	9,637	50,944	79,412	665	1,806	1,231	2,372	9,282	15,356	407	2,441	68	364	285	774	1,418	1,264	17,907	24
Percent of total occupied	62.7	58.1	63.2	62.4	70.7	49.5	75.4	78.2	63.5	58.3	72.9	33.4	51.9	67.0	36	76.3	53.3	61.3	54.1	80.0
Renter occupied	11,210	6,958	29,648	47,816	275	1,839	402	662	5,342	8,520	151	4,860	63	179	506	240	1,240	797	15,167	6
Percent of total occupied	37	42	37	38	29.3	50.5	24.6	22	26.5	41.7	27	66.6	48.1	33.0	64	23.7	46.7	38.7	46	20.0
Vacant housing units	5,042	5,305	4,882	15,229	559	879	149	111	755	2,453	415	566	37	36	52	18	101	112	1,755	9
Percent	14.4	24.2	5.7	10.7	37.3	19.4	8.4	3.5	4.9	9.3	42.7	7.2	22.0	6.2	6.2	1.7	3.7	5.2	5.0	23.1
For rent	948	475	1,263	2,686	50	22	21	20	214	327	6	303	35	9	3	3	55	20	691	0
Rented, not occupied	28	38	110	176	0	5	2	1	13	21	4	12	0	0	0	0	2	6	69	0
Rental vacancy rate, percent	3.0	8.0	8.7	5.3	15.4	1.2	4.9	2.9	3.8	3.7	1.4	5.9	35.7	4.8	5.8	0	4.2	2.4	4.3	0
For sale only	401	315	747	1,463	15	38	21	26	113	213	25	87	2	8	0	8	55	19	322	0
Sold, not occupied	52	34	163	249	4	5	0	3	33	45	4	9	0	0	0	0	2	12	57	0
For-sale vacancy rate	2.1	3.2	1.4	1.8	2.2	2.1	1.7	1.1	1.2	1.4	16	3.4	2.9	2.2	0	0	3.6	1.5	1.8	0
Vacant for seasonal, recreational, or occasional use	2,688	3,860	869	7,417	460	627	50	13	66	1,216	365	46	0	0	4	1	6	2	124	4
Percent of vacant units	53.3	72.8	17.8	48.7	82.3	71.3	33.6	11.7	8.7	49.6	1.0	8.1	0	0.0	7.7	22.2	4.0	3.6		44.4
Vacant for migratory workers	133	1	46	180	1	108	1	2	8	120	0	0	0	0	42	0	0	0	3	0
Other vacant	792	582	1,684	3,058	29	74	54	46	308	511	11	109	0	19	3	6	15	53	28	5
Percent of vacant units	15.7	11.0	34.5	20.1	5.2	8.4	36.2	41.4	40.8	20.8	2.7	19.3	0	52.8	5.8	33.3	14.9	47.3	1.6	5.8
Average household size, all occupied units (persons)	2.93	2.32	2.97	2.88	2.93	4.06	2.6	3.33	3.51	3.44	2.91	2.16	3.82	2.54	5.61	3.26	2.64	2.90	2.68	2.47
Population in housing units	87,875	38,498	239,746	366,119	2,751	14,781	4,249	9,076	51,277	82,134	1,626	15,784	501	1,381	4,437	3,308	7,022	5,985	88,619	74
Group quarters population	1,245	2,417	3,485	7,147	4	89	6	30	388	517	0	2,390	0	0	0	1	125	62	2,448	0

Source: U.S. Department of Commerce 2011a.

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3.9.2.4 Economy

Labor Force, Employment, and Unemployment

As was the case statewide and nationwide, the Study Region economy suffered greatly from the 2008-2009 recession, experiencing declines in employment from the peak year of 2008, accompanied by rapid rises in unemployment rates. This rapid economic deterioration was followed by a weak recovery, with job growth being spotty and slow, and unemployment rates continuing to rise in 2010. A slight lowering of unemployment rates occurred in 2011 and has continued through 2013. However, the unemployment rate remains high, at a 9.0 percent average for the first ten months of 2013 in the Study Region, compared to a statewide average of 7.0 percent. Kittitas County has fared slightly better than Grant or Yakima counties with a 2013 partial-year unemployment rate of 7.5 percent. Labor force data are shown in Table 3.9-5.

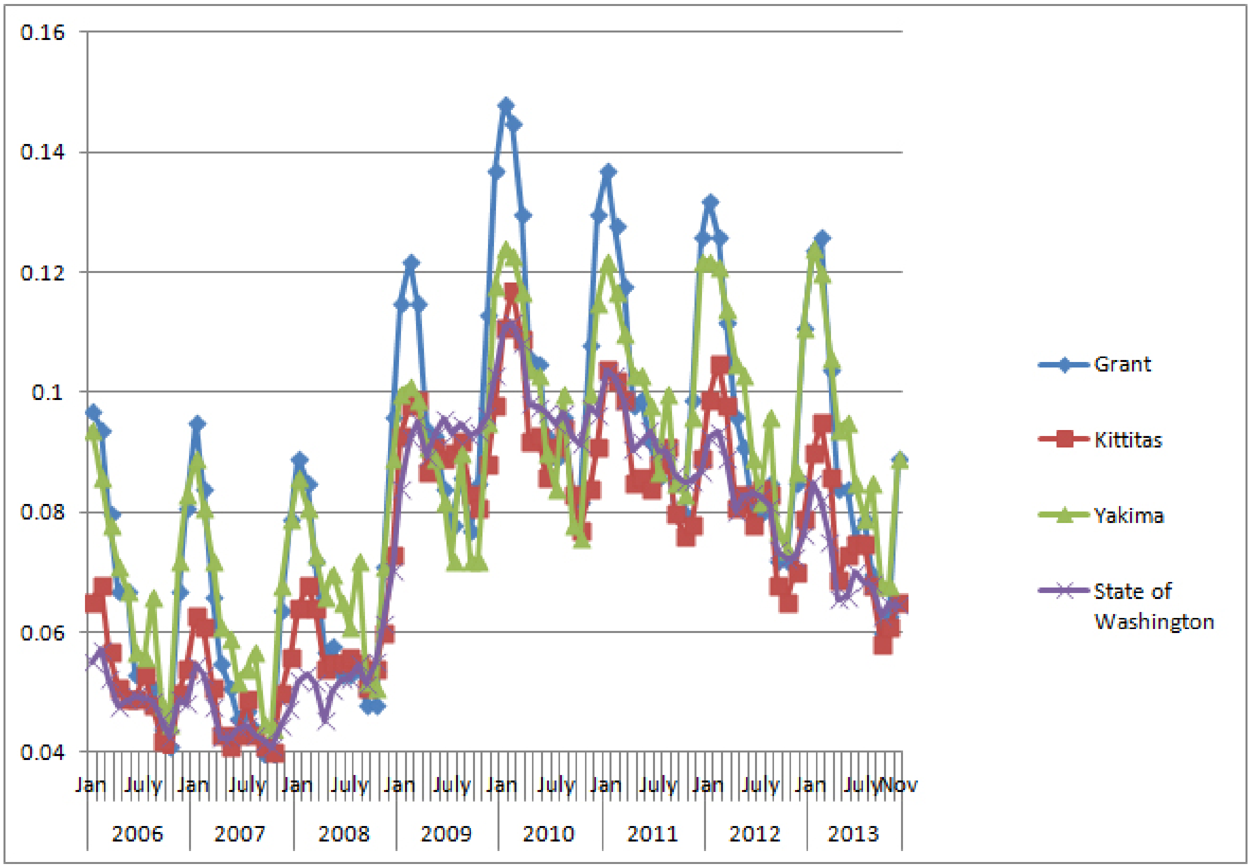
TABLE 3.9-5 EMPLOYMENT AND UNEMPLOYMENT IN THE STUDY REGION, 2007-2013

LABOR FORCE	2009	2010	2011	2012	2013 (Jan-Oct)
Grant					
Civilian Labor Force	42,280	42,250	41,121	42,369	43,258
Total Employment	38,100	37,810	36,936	38,376	39,548
Total Unemployment	4,170	4,450	4,185	3,993	3,710
Percent unemployed	9.9	10.5	10.2	9.4	8.6
Kittitas					
Civilian Labor Force	20,890	21,220	20,898	20,819	20,689
Total Employment	18,990	19,270	19,050	19,097	19,137
Total Unemployment	1,900	1,950	1,848	1,722	1,553
Percent unemployed	9.1	9.2	8.8	8.3	7.5
Yakima					
Civilian Labor Force	125,770	127,030	123,090	125,140	124,900
Total Employment	114,520	114,710	110,570	112,890	113,240
Total Unemployment	11,250	12,310	12,520	12,250	11,660
Percent unemployed	8.9	9.7	10.2	9.8	9.3
Yakima, Kittitas, and Grant					
Civilian Labor Force	188,940	190,500	185,109	188,328	188,847
Total Employment	171,610	171,790	166,556	170,363	171,925
Total Unemployment	17,320	18,710	18,553	17,965	16,923
Percent unemployed	9.2	9.8	10.0	9.5	9.0
State of Washington					
Civilian Labor Force	3,534,390	3,531,630	3,482,430	3,481,820	3,479,600
Total Employment	3,205,640	3,192,120	3,161,860	3,197,640	3,234,730
Total Unemployment	328750	339,510	320,570	284,180	244,870
Percent unemployed	9.3	9.6	9.2	8.2	7.0

Source: U.S. Department of Labor 2013.

Employment fluctuates seasonally in the Study Region, particularly in the more farming-dependent Grant and Yakima counties. This creates substantial seasonal changes in the unemployment rates in the Study Region, with Grant and Yakima counties typically experiencing swings of 4.0 percent in their unemployment rates over the course of a year - to highs of about 12 percent in the last year. Monthly unemployment rates are depicted in Figure 3.9-2.

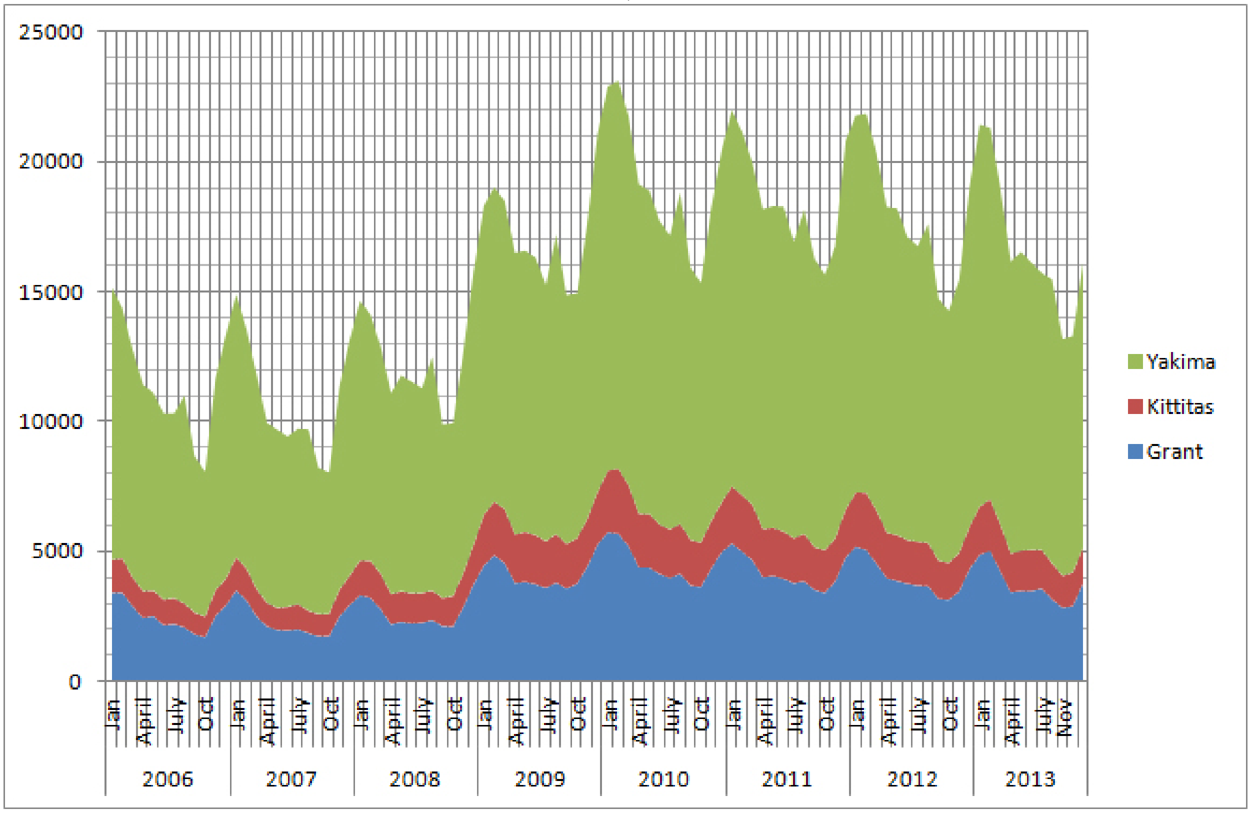
FIGURE 3.9-2 HISTORICAL UNEMPLOYMENT RATES, STUDY REGION COUNTIES AND THE STATE OF WASHINGTON, 2007-NOVEMBER 2013



Source: WDES 2013a.

The Study Region unemployed labor force reached a high of 23,050 in the winter of 2009-2010. As the local economy came out of the recession, in summer months, the number of unemployed was about 13,000 in 2013. With the historical unemployed labor force being around 10,000 in the relatively full-employment years of 2006-2007, this indicates that even in the relatively busy summer months, there is substantial excess capacity in the local labor supply. Data on the historical unemployed labor force are shown in Figure 3.9-3.

FIGURE 3.9-3 HISTORICAL UNEMPLOYED LABOR FORCE, STUDY REGION COUNTIES AND THE STATE OF WASHINGTON, 2007-NOVEMBER 2013



Source: WDES 2013a.

Employment by Industry

Data in this section are shown up to the year 2009; the Bureau of Economic Analysis eliminated release of subsequent years' employment data for counties as a result of Congressional sequestration cuts.

As shown in Table 3.9-6, the Study Region economy, particularly Grant and Yakima counties, relies on agriculture to a much greater extent than the State as a whole; aside from the much smaller forestry, fisheries, and related sectors, farming is the only economic sector with substantial exports in any of the Study Region counties. The proportions of wage and salary employment represented by the farming sector were 18.1, 7.1, and 13.7 percent, respectively, for Grant, Kittitas, and Yakima counties in 2009, compared to the statewide average of 2.2 percent.

The Grant County economy is reliant for export income almost solely on agriculture, with some contribution by tourism-related sectors. The sectors with the largest wage and salary employment in 2009 were government (8,039 jobs), farming (7,603 jobs), manufacturing (4,145 jobs), retail (3,969 jobs), and accommodations (2,435 jobs). A location quotient analysis[1] showed that mining, construction, and manufacturing employment was only slightly more concentrated in Grant County than statewide; farming employment was substantially more concentrated in the County than statewide. All other sectors had location quotients lower than one. Construction, utilities, and real estate rental and leasing were the three fastest-growing sectors from 2001 to 2009. Employment data are shown in Table 3.9-6.

[1] Location quotients measure the concentration of employment (or income, or other industry characteristic) in a local area such as a county, relative to a larger area, such as a state. In general, if the location quotient for an industry is noticeably above 1.0, the industry is indicated to have substantive export employment; location quotients under 1.0 indicate little or no export employment.

Total employment in Yakima County grew the most slowly of the three Study Region counties from 2001 to 2009 (0.9 percent annually, compared to 1.6 percent in Kittitas County and 1.1 percent in Grant County), and was the only of them to have lower employment growth than the 1.0 percent statewide growth rate. Yakima County employment is nearly as concentrated in the farming sector as in Grant County, although health care and social assistance, transportation and warehousing, and utilities employment are also somewhat high, compared to the state of Washington as a whole. The County's largest-employment sectors in 2009 were government (18,387 jobs), farming (16,662 jobs), health care and social services (15,470 jobs), and retail trade (12,627 jobs).

The Kittitas County economy is more connected to the Seattle region economy than are Grant or Yakima Counties. Employment in Kittitas County is more diversified, and grew the most rapidly of the three Study Region counties from 2001 to 2009, by 1.6 percent annually. Utility, finance and insurance, real estate rental and leasing, and educational services grew most rapidly. As of 2009, the largest-employing sectors were government (5,003 jobs), accommodations and food services (2,259 jobs), retail trade (2,204 jobs), and construction (1,216 jobs). In terms of industry concentration relative to statewide (indicating importance as exporting sectors), the leading industries were state government, farming, accommodations, and utilities.

Income

The economy of Yakima County dominates the Study Region economy, in terms of personal income, accounting for about two-thirds of total personal income. While having the largest amount of personal income comprised by farm wage and salary income in 2012 ($733 million), Yakima County's economy was less reliant on farming as a proportion of total personal income (12.2 percent) than was the Grant County economy (21.0 percent).

Farm proprietors, wage and salary income in the more diversified Kittitas County economy was much less prominent, at 0.8 percent of total personal income, compared to the statewide average of 1.2 percent in 2012. Personal transfer payments were also much higher for the three Study Region counties than statewide. Personal income data are shown in Table 3.9-7 and 3.9-8.

TABLE 3.9-6 NUMBER EMPLOYED BY INDUSTRY IN THE STUDY REGION, 2009 AND CHANGE SINCE 2001

INDUSTRY SECTOR	WASHINGTON			YAKIMA COUNTY			GRANT COUNTY			KITTITAS COUNTY		
	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09
Employment by place of work (number of jobs)												
Total employment	3,826,315	100.0	1.0	121,270	100.0	0.9	41,975	100.0	1.1	19,962	100.0	1.6
Proprietors employment	772,865	20.2	2.8	20,838	17.2	1.3	7,391	17.6	1.2	5,178	25.9	2.2
Farm employment	85,042	2.2	0.8	16,662	13.7	0.9	7,603	18.1	2.2	1,414	7.1	-0.1
Forestry, fishing, and related activities	37,867	1.0	0.2	7,297	6.0	5.4	1,724	4.1	na	(D)	na	na
Mining	7,962	0.2	3.9	145	0.1	16.1	114	0.3	na	(D)	na	na
Utilities	5,699	0.1	1.4	213	0.2	-0.2	33	0.1	4.1	46	0.2	7.4
Construction	223,603	5.8	0.5	4,671	3.9	0.8	2,010	4.8	4.9	1,216	6.1	2.8
Manufacturing	280,888	7.3	-2.0	8,057	6.6	-4.1	4,145	9.9	-2.0	802	4.0	0.8
Wholesale trade	136,087	3.6	0.4	4,759	3.9	0.2	1,376	3.3	1.1	575	2.9	0.7
Retail trade	382,284	10.0	-0.2	12,267	10.1	0.5	3,969	9.5	0.2	2,204	11.0	-0.4
Transportation and warehousing	109,355	2.9	0.4	3,855	3.2	2.3	1,305	3.1	3.1	403	2.0	-1.6
Information	114,740	3.0	0.7	986	0.8	-2.7	251	0.6	-1.0	230	1.2	-0.2
Finance and insurance	163,586	4.3	1.9	3,327	2.7	2.8	868	2.1	3.3	470	2.4	6.0
Real estate and rental and leasing	179,197	4.7	3.5	3,379	2.8	3.2	1,289	3.1	4.2	782	3.9	5.6
Professional, scientific, and technical services	274,503	7.2	2.4	3,485	2.9	0.9	925	2.2	na	742	3.7	na
Management of companies and enterprises	33,644	0.9	1.0	542	0.4	-1.1	34	0.1	na	(D)	na	na
Administrative and waste management services	179,429	4.7	1.3	2,747	2.3	-1.0	1,010	2.4	0.1	(D)	na	na
Educational services	67,569	1.8	3.1	1,666	1.4	2.5	209	0.5	0.8	265	1.3	4.4

INDUSTRY SECTOR	WASHINGTON			YAKIMA COUNTY			GRANT COUNTY			KITTITAS COUNTY		
	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09
Health care and social assistance	383,507	10.0	2.7	15,470	12.8	2.6	2,483	5.9	-1.0	1,188	6.0	-0.6
Arts, entertainment, and recreation	91,311	2.4	2.6	1,741	1.4	2.5	460	1.1	1.7	388	1.9	1.1
Accommodation and food services	242,668	6.3	1.1	6,336	5.2	1.4	2,435	5.8	3.4	2,259	11.3	3.3
Other services, except public administration	197,094	5.2	0.8	5,278	4.4	-0.8	1,693	4.0	0.3	1,066	5.3	0.8
Government and government enterprises	630,280	16.5	1.3	18,387	15.2	1.2	8,039	19.2	1.5	5,003	25.1	2.1
Federal, civilian	72,866	1.9	1.2	1,291	1.1	-0.8	656	1.6	1.0	160	0.8	-0.8
Military	81,107	2.1	1.3	843	0.7	-0.4	272	0.6	-0.2	132	0.7	-0.1
State and local	476,307	12.4	1.3	16,253	13.4	1.4	7,111	16.9	1.6	4,711	23.6	2.2
State government	151,380	4.0	1.2	3,054	2.5	0.6	844	2.0	1.2	2,602	13.0	na
Local government	324,927	8.5	1.3	13,199	10.9	1.6	6,267	14.9	1.7	2,109	10.6	na

Source: U.S. Department of Commerce 2011b.
Note: D = Data suppressed due to confidentiality regulations. Suppressed sectors are typically very small.

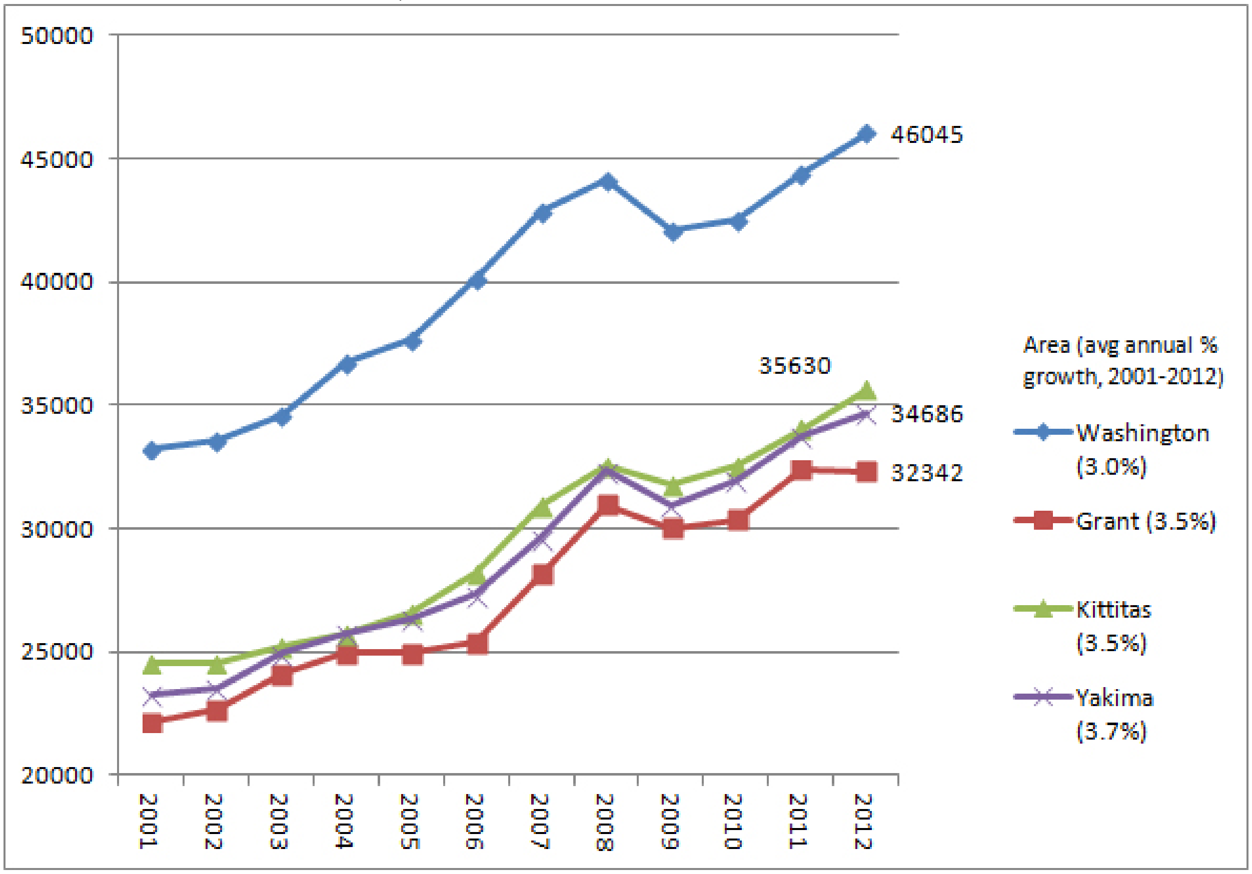
TABLE 3.9-7 INCOME BY SOURCE IN THE STUDY AREA, 2012 AND CHANGE SINCE 2001

DESCRIPTION	WASHINGTON			GRANT COUNTY			KITTITAS COUNTY			YAKIMA COUNTY		
	TOTAL 2012	PERCENT OF TOTAL 2012	ANNUAL PERCENT CHANGE 2001-20012	TOTAL 2012	PERCENT OF TOTAL 2012	ANNUAL PERCENT CHANGE 2001-20012	TOTAL 2012	PERCENT OF TOTAL 2012	ANNUAL PERCENT CHANGE 2001-20012	TOTAL 2012	PERCENT OF TOTAL 2012	ANNUAL PERCENT CHANGE 2001-20012
Personal income (thousands of dollars, by place of work)												
Nonfarm personal income	$223,854,402	75.5%	3.7%	$1,593,248	58.2%	4.5%	$766,261	54.6%	4.9%	$4,657,639	61.2%	3.5%
Farm income	$2,741,480	0.8%	5.2%	$408,140	10.6%	7.8%	$15,796	2.4%	-1.9%	$733,004	6.6%	7.2%
Net earnings by place of residence	$317,574,707	100%	4.3%	$2,966,473	100%	5.3%	$1,484,764	100%	5.4%	$8,566,751	100%	4.7%
Components of earnings (thousands of dollars)												
Wage and salary disbursements	$163,585,839	55.1%	3.7%	$1,305,333	47.1%	4.6%	$503,536	37.2%	4.5%	$3,572,908	47.6%	3.4%
Supplements to wages and salaries	$39,457,851	12.4%	4.4%	$365,143	11.8%	5.7%	$154,043	10.0%	5.7%	$939,783	11.2%	4.5%
Proprietors' income												
Farm proprietors' income	$1,207,982	0.2%	10.6%	$214,540	3.5%	12.5%	$-3,235	0.8%	-193.2%	$311,375	1.0%	17.8%
Nonfarm proprietors' income	$22,344,210	8.5%	2.5%	$116,372	6.5%	0.5%	$127,713	8.8%	5.1%	$ 566,577	8.0%	2.8%

Source: U.S. Department of Commerce 2013.

Reflecting its reliance on farm wage and salary employment, the Study Region has historically had lower per capita incomes than the state of Washington as a whole. However, those incomes have grown more slowly than statewide. Kittitas County, with its more diversified economy, has the highest per capita incomes of the three Study Area counties ($35,360) in 2012, with the corresponding statewide figure being $46.045. All three counties' per capita personal income grew at faster rates than the state of Washington, 3.0 percent, from 2001 to 2012. Per capita income trends are depicted in Figure 3.9-4.

FIGURE 3.9-4 PER CAPITA PERSONAL INCOME, STUDY REGION COUNTIES AND STATEWIDE, 2001-2012.



Source: U.S. Department of Commerce 2013.

Farming Sector

For the Study Region as well as Statewide, agriculture has held up as a backbone of the local economies. Table 3.9-8 shows that farm income declined as a proportion of total income in Kittitas County from 2001 to 2012, (in part due to losses by farm proprietors) but increased in Grant and Yakima counties; Statewide, the proportion of total income earned in farming increased from 1.0 to 1.2 percent over the same period of time.

TABLE 3.9-8 COMPARISON OF PERCENT OF TOTAL PERSONAL INCOME EARNED IN FARM SECTOR, STUDY REGION COUNTIES AND STATEWIDE, 2012 AND 2001

AREA/REGION	PERCENT OF TOTAL PERSONAL INCOME 2012	PERCENT OF TOTAL PERSONAL INCOME 2001
State of Washington	1.2%	1.0%
3-County Area	12.9%	8.6%
Grant County	21.0%	14.1%
Kittitas County	0.8%	3.2%
Yakima County	12.2%	7.6%

Source: U.S. Department of Commerce 2013a.

Yakima County agricultural sales of $1.2 billion in 2007 ranked it the number one producer in the state, while Grant County production ranks it at number two; Kittitas County ranked 19 out of a total of 39 counties in the state. Between 2002 and 2007, acreage in farms in Yakima County declined slightly, while farm acreage in Grant County actually increased, contrary to the statewide trend of declining farm acreage; in Kittitas County, farm acreage declined noticeably, by about 15 percent. The primary agricultural product in the Study Region is apples, which dominate the farm products category of “fruits, tree nuts, and berries.” Milk and other dairy products from “cattle” and “cattle and calves” are next most important. Agricultural sales data are summarized in Table 3.9-9.

TABLE 3.9-9 SUMMARY OF FARM SECTOR CHARACTERISTICS, STUDY REGION COUNTIES, 2007 (DOLLAR FIGURES IN THOUSANDS)

FARM SECTOR CHARACTERISTIC	YAKIMA	KITTITAS	GRANT
Land in farms 2007 (acres)	1,649,281	191,087	1,087,952
Land in farms 2002 (acres)	1,678,984	230,646	1,074,074
Market value of products sold 2007	$1,203,806	$60,949	$1,190,191
State rank	1	20	2
Value of crops including nursery and greenhouse 2007	$787,459	$38,735	$846,945
State rank	2	19	1
Value of livestock, poultry, and their products 2007	$416,347	$22,214	$343,246
State rank	1	18	2
Market value of products sold 2002	$843,871	$56,364	$881,756
Leading value of sales by type, 2007			
Fruits, tree nuts, and berries	$577,526	(D)	$358,487
Milk and other dairy products from cows	$324,685	(D)	(D)
Other crops and hay	$129,987	$29,634	(D)
Cattle and calves	$81,962	$18,921	$251,337
Vegetables, melons, potatoes, and sweet potatoes	(D)	(D)	$205,070
Nursery, greenhouse, floriculture, and sod	(D)	437	(D)

Source: U.S. Department of Agriculture 2008.
Note: D = Data suppressed due to confidentiality regulations. Suppressed sectors are typically very small.

Poverty Status

The Study Region has generally higher incidences of poverty than the statewide average. As shown in Table 3.9-10, data from the American Community Survey for 2009 income show that Yakima County, in particular, had a relatively high incidence of poverty. Compared to the statewide average of 8.2 percent of persons living in poverty, Yakima County had 22 percent, Grant County had 20.3 percent, and Kittitas County had 19.4 percent. The Washington Statewide average was 12.5 percent.

TABLE 3.9-10 2009 POVERTY STATISTICS, STUDY REGION AND STATEWIDE

RATIO OF INCOME TO POVERTY LEVEL	WASHINGTON STATE		GRANT COUNTY		KITTITAS COUNTY		YAKIMA COUNTY	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Under .50	362,784	5.6	6,256	7.3	4,129	10.6	19,546	8.3
Under 1.0	814,499	12.5	17,462	20.3	7,559	19.4	51,924	22.0
Under 1.5	1,338,412	20.5	27,238	31.6	11,298	29.1	89,683	38.0
Under 2.0	1,870,741	28.7	37,929	44.1	14,824	38.1	116,471	49.4
2.0 or more	4,657,623	71.3	48,173	55.9	24,044	61.9	119,508	50.6
Total:	6,528,364	100.0	86,102	100.0	38,868	100.0	235,979	100.0

Source: U.S. Department of Commerce 2011c.

Economic Projections

No published quantitative economic projections are available specifically for any of the Study Region counties. However, the WDES (2011b) produces employment projections for sub-regions of the state that may be indicative of likely conditions in the Study Region over the next several years.

Kittitas, Klickitat, Skamania, and Yakima Counties are grouped in the South Central Workforce Development Area (WDA). This region is projected to experience employment growth averaging 1.2 percent annually from 2009 to 2014, then 1.2 percent growth, again, from 2014 to 2019. The agriculture, forestry, fishery, and hunting sector is projected to decline very slightly through 2014, and grow only by 0.8 percent annually through 2019. All growth projection rates are less than the projected statewide average annual growth projection of 1.4 percent. Employment related to construction and some manufacturing is projected to grow somewhat faster in the South Central WDA than the average rate of growth.

Adams, Chelan, Douglas, Grant, and Okanogan counties comprise the North Central WDA. This region is projected to experience employment growth averaging 1.3 percent annually from 2009 to 2014, then 1.4 percent growth, again, from 2014 to 2019. The agriculture, forestry, fishery, and hunting sector is projected to decline by 0.2 percent annually slightly through 2014, and grow by only 0.7 percent annually through 2019. Employment related to construction, some manufacturing, warehousing, and most retail activities is expected to grow at above-average rates.

3.9.2.5 Government Fiscal Conditions

Overall County Budgets

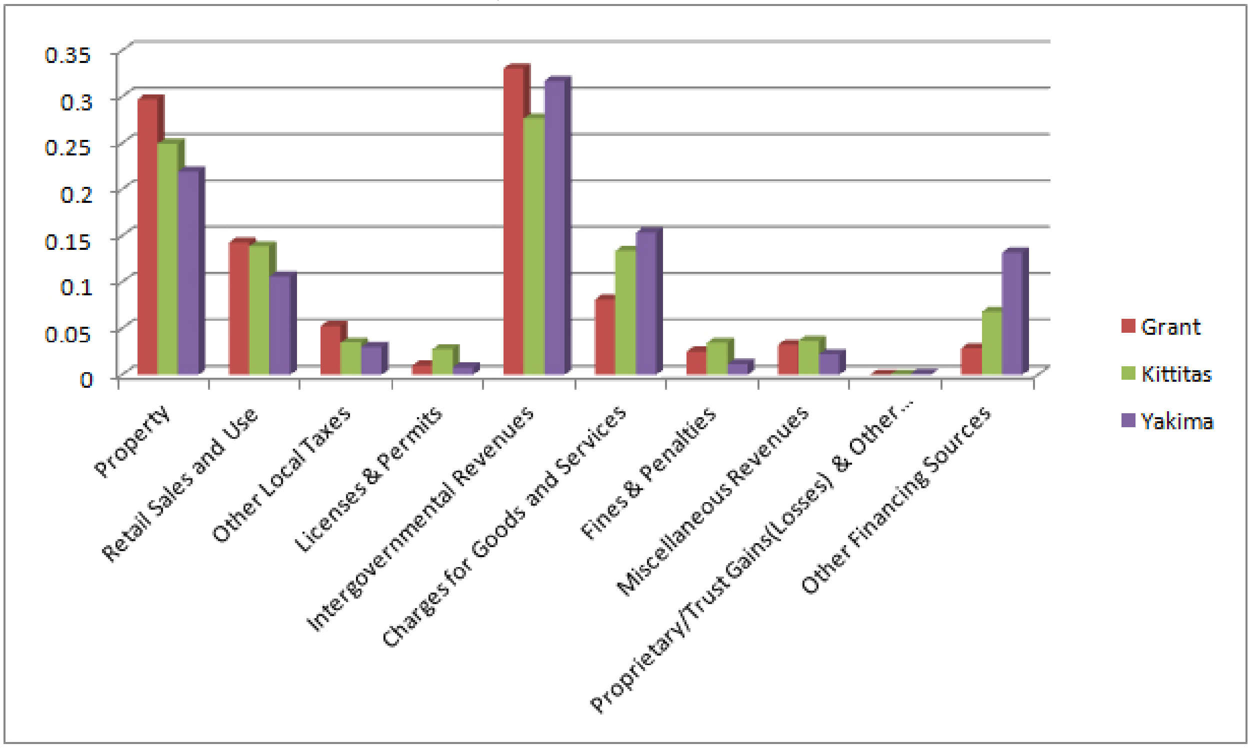
The Local Government Financial Reporting System (LGFRS) compiles revenue and expenditure data for Washington cities and counties and presents those data in a consistent format on an annual basis (Washington State Auditor 2013). Because the NNR route does not pass through any incorporated communities, county and special taxing district budgets would be the only ones directly affected by the proposed Project. The LGFRS data are summarized below for Grant, Kittitas, and Yakima counties and shown in Figure 3.9.5.

Property, sales, and use taxes would be the primary tax payments generated by the alternatives. These two tax categories are also two of the four most prominent portions of revenue for the counties, with the third and fourth most important being intergovernmental revenues (mostly federal and state shared revenues) and charges and fees for services.

In the wake of the national recession of 2008-2009, counties in the Study Region reduced their expenditures; Yakima County, in total, is an exception, but if health and human services expenditure increases, which are accompanied by large new service charges, are excluded, the remaining expenditures would have declined from 2008 to 2010. Property taxes in all three counties increased from 2008 to 2010, and only in Grant County did sales and use taxes decline significantly, and declined only slightly in Yakima and Kittitas Counties. In general, the primary fiscal problem for the three counties was declining intergovernmental revenues.

The economic recovery since 2010 has been slower in the three-county area than statewide or nationally, but has progressed. This has slightly eased pressure on jurisdictions to collect tax revenues adequate to cover services.

FIGURE 3.9-5 PERCENTAGE SOURCES OF COUNTY REVENUES, GRANT, KITTITAS, AND YAKIMA COUNTIES, 2012



Source: Washington State Auditor 2013.

Property Valuation and Taxation

Property tax receipts are the backbone of most cities' and counties' abilities to fund services. In the Study Region, these receipts are the number one stable revenue source (intergovernmental revenues were higher in 2012, but tend to vary, and are generally outside the control of counties).

All real and personal property in Washington is subject to property tax based on 100 percent of its fair market value, unless a specific exemption is provided by law. Property is assessed on January 1 of the assessment year. The Washington Department of Revenue (WDOR) is responsible for levying the state property tax for common schools, and the remainder of property tax is levied at the county level.

Property tax levies are subject to several statutory and constitutional limits. The "101% levy lid" restricts individual taxing districts to collect a maximum one per cent increase over the highest amount collected since 1985 for their regular levy, plus an amount attributable to new construction within, or annexations to, the district. This law applies to a taxing district-wide budget and not too individual properties (RCW 84.55.010).

Yakima County Property Valuation and Taxation

Yakima County is the state's second largest county in land area, but in excess of 70 percent of the county land is within the JBLM YTC, BLM, or the Yakima Indian Reservation, and therefore not subject to ad valorem taxation.

Yakima County property values did not substantially decline in the recent recession, unlike most of the United States. In 2009, the average price of a single family residence was $164,112. In 2010, the average was $164,508, a 0.2 percent increase. Thus, county property tax receipts, shown in Table 3.9-12, increased during the recession from 2008 to 2010 (Yakima County 2013a) and continued to increase from 2010 to 2012.

Ad valorem tax rates generally remained consistent between 2010 and 2011, with most taxing districts increasing their tax amounts by the one percent limit on the legally allowed increase from the previous highest levy. The 2012 total county assessment subject to property taxes was $14,843,676,188.

There are 52 taxing districts in the county, including the state school levy and 14 cities (the NNR Alternative is not in cities). County-wide tax rates set in 2012 for taxes paid in 2013 are shown in Table 3.9-11.

TABLE 3.9-11 YAKIMA COUNTY-WIDE AD VALOREM PROPERTY TAX RATES, 2012 FOR TAXES PAYABLE 2013 (DOLLARS PER THOUSAND DOLLARS OF VALUATION)

TAXING DISTRICT	RATE
County emergency medical services	0. 225889
County flood control	0. 09033478
State school levy	2. 51161076
Yakima County	1.74928416
Yakima County road	1.698792826
Yakima Valley regional library	0. 47632533
Total county-wide rate	12.43809368

Source: Yakima County 2013a.

Yakima County property tax levies as reported by the County Treasurer (Yakima County 2013b) have increased gradually over the past three years. These levies are shown in Table 3.9-12. Property taxes are also collected by such entities as individual school districts, port districts, fire districts, special taxing districts (irrigation, conservation, mosquito, diking, drainage, weed, stormwater, horticulture, State Game and State Forest Patrol Assessments), depending on the location of the subject property.

TABLE 3.9-12 YAKIMA COUNTY PROPERTY TAX LEVIES

ENTITIES	2012	2011	2010
State School	$35,071,913	$33,158,974	$30,213,928
Local School	$63,513,155	$60,922,528	$59,127,437
Yakima County	$23,257,240	$22,909,674	$22,429,326
County Road	$13,021,298	$12,796,335	$12,533,931
County Flood	$1,313,692	$1,286,860	$1,264,337
Fire Districts	$7,241,185	$7,082,541	$6,950,092
Cities and towns	$26,117,359	$25,791,999	$25,078,523
EMS	$3,292,085	$3,234,428	$3,161,362
Other Districts*	$7,360,141	$7,240,834	$7,079,785

ENTITIES	2012	2011	2010
Special Assessments**	$7,049,123	$6,898,209	$6,384,871
Total	$187,237,191	$181,322,382	$174,223,592

*Includes Library, Port, and Park Districts
**Includes Irrigation, Conservation, Mosquito, Diking, Drainage, Weed, Stormwater, Horticulture, State Game, and State Forest Patrol Assessments.
Source: Yakima County 2013b.

Grant County Property Valuation and Taxation

Including state school taxes, total Grant County property tax levies were $49.7 million (for 2012). Property taxes are also collected by such entities as individual school districts, port districts, fire districts, special taxing districts (e.g., hospitals, water and sewer, mosquito), depending on the location of the subject property. The total county-wide property tax rate was $7.284160 per $1,000 of assessed value. The state school property tax rate was $2.855378 per $1,000 of assessed valuation.

Kittitas County Property Valuation and Taxation

Including state school taxes, total Kittitas property tax levies in 2012 (for payment in 2013) were $38.4 million. The county-wide rate was $1.27956352. The state schools property tax rate was $2.337409 per $1,000 of assessed valuation.

Property taxes are also collected by such entities as individual school districts, port districts, fire districts, special taxing districts (hospitals, water and sewer, mosquito, etc.), depending on the location of the subject property. Kittitas County property tax rates and 2012 levies for county-wide property taxes are shown in Table 3.9-13 and 3.9-14.

TABLE 3.9-13 KITTITAS COUNTY PROPERTY TAXES, RATES, AND TOTAL YIELDS, TAX YEAR 2012 (FOR PAYMENT 2013) (DOLLARS PER THOUSAND DOLLARS OF VALUATION)

TAXING DISTRICT	RATE
COUNTY GENERAL	
Current Expense	1.117439
Community Service	0.025
Veterans' Assistance	0.012732
Total County General Taxes	*1.27956352*
COUNTY FLOOD CONTROL ZONE DISTRICT	
Flood Control Regular Levy	0.069946
COUNTY ROAD	
Road District #1	1.071687
Co. Road Diverted (RCW 36.33.220)	0.046940
Total county-wide rate	1.118627

Source: Kittitas County 2013.

TABLE 3.9-14 KITTITAS COUNTY PROPERTY TAX LEVIES

TAXING DISTRICT	2012
COUNTY GENERAL	
Current Expense	$6,581,954
Community Service	$147,255
Veterans' Assistance	$74,994
Total County General Taxes	*$19,600,133*
COUNTY FLOOD CONTROL ZONE DISTRICT	
Flood Control Regular Levy	$411,997
COUNTY ROAD	
Road District #1	$4,566,123
Co. Road Diverted (RCW 36.33.220)	$199,997

Source: Kittitas County 2013.

Retail Sales and Use Tax

The statewide retail sales and use tax rate is 6.5 percent of all retail purchases. Cities, counties, and Public Transportation Benefit Areas in the Study Region levy their own additional sales and use taxes. These are shown in Table 3.9-15. These data show that the combined state and local tax rate in the Study Region ranges from 7.9 to 8.0.

TABLE 3.9-15 SALES AND USE TAX RATES IN THE STUDY REGION AND BENTON COUNTY, PERCENT (LOCAL RATES ARE IN ADDITION TO THE STATE RATE)

GEOGRAPHIC AREA	RATE
Statewide	6.5
Grant County unincorporated	1.4
Grant County cities	1.4
Kittitas County unincorporated	1.5
Kittitas County cities	1.5
Yakima County unincorporated	1.4
Yakima County cities	1.4

Source: WDOR 2011.

Business and Occupation Tax and Public Utilities Tax

The Washington State Business and Occupation (B&O) tax is a gross receipts tax. It is measured on the value of products, gross proceeds of sale, or gross income of the business. Washington does not have an income tax. Washington’s B&O tax is calculated on the gross income from activities. This means there are no deductions from the B&O tax for labor, materials, taxes, or other costs of doing business.

The Public Utilities Tax is in lieu of the B&O tax. For the generation and distribution of electric power, the rate is 0.03873 of the value of electric sales. Nearly all of the funds (98.6 percent in 2009 [WDOR 2010]) are distributed into the state general fund. The remainder are earmarked for the state public works assistance fund, to assist local governments in maintaining public works facilities.

Exemptions from the Public Utility Tax specific to electricity providers include (WDOR 2010):

- credit for income of electric/gas utilities from sales of power to direct service industries;
- credit for electric and natural gas utilities that provide billing discounts to low-income customers;
- credit for payments for self-generated energy (expires 6/30/2020); and
- credit for investment cost recovery payments (expires 6/30/2016).

Exemptions from the Public Utilities Tax are provided for by Washington State Law for exchanges and re-sales among electricity providers under RCW-82.04-310. These exemptions are for:

"(11) **Exchanges by light and power businesses.** There is no specific exemption which applies to an "exchange" of electrical energy or the rights thereto. However, exchanges of electrical energy between light and power businesses do qualify for deduction in computing the Public Utility Tax as being sales of power to another light and power business for resale. An exchange is a transaction which is considered to be a sale and involves a delivery or transfer of energy or the rights thereto by one party to another for which the second party agrees, subject to the terms and conditions of the agreement, to deliver electrical energy at the same or another time. Examples of deductible exchange transactions include, but are not limited to, the following:

(a) The exchange of electric power for electric power between one light and power business and another light and power business;
(b) The transmission or transfer of electric power by one light and power business to another light and power business pursuant to the agreement for coordination of operations among power systems of the pacific northwest executed as of September 15, 1964;
(c) The Bonneville Power Administration's (BPAs) acquisition of electric power for resale to its Washington customers in the light and power business;
(d) The residential exchange of electric power entered into between a light and power business and the administrator of the BPA pursuant to the Pacific Northwest Electric Power Planning and Conservation Act, P.L. 96-501, Sec. 5(c), 16 U.S.C. §839(c) (Supp. 1982). In some cases, power is not physically transferred, but the purpose of the residential exchange is for BPA to pay a "subsidy" to the exchanging utilities. For public utility tax reporting purposes, these subsidies will be treated as a nontaxable adjustment (rebate or discount) for purchases of power from BPA." (Washington State Legislature n.d.)

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3.10 ENVIRONMENTAL JUSTICE

The Bureau of Land Management has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to environmental justice (EJ) along the NNR and subroute, including those raise during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

3.10.1 Regulatory Framework

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations (Federal Register 1994) was enacted to reinforce Title VI of the Civil Rights Act of 1964. In the Civil Rights Act, it is stated that “No person in the United States shall, on the grounds of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance” (United States Code [U.S.C.] §1964). Executive Order 12898 states, “Each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations” (Federal Register 1994). Additional guidance from the President’s Council on Environmental Quality (CEQ) clarified that EJ concerns could arise from effects on the natural and physical environment that produce human health or ecological outcomes or from adverse social or economic changes.

The Executive Order requires that impacts on minority or low-income populations be analyzed for the geographical area in which the Project would be located to determine if there would be a disproportionately high and adverse impact on minority and/or low-income populations. If the demographic analysis reveals that disproportionately high and adverse impacts would occur, mitigation then needs to be proposed to address the effects. Standard approved methods for evaluation of EJ impacts are included within the CEQ document, “Environmental Justice Guidance under the National Environmental Policy Act” (NEPA; CEQ 1997). These methods were used for the evaluation of the proposed Project that is described in this section.

The U.S. Environmental Protection Agency (USEPA) defines “environmental justice” as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative environmental consequences of industrial, governmental, and commercial operations or programs and policies. Meaningful involvement means that: 1) potentially affected community members have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; 2) the public’s contribution can influence the regulatory agency’s decision; 3) the concerns of all participants involved will be considered in the decision-making process; and 4) the decision-makers seek out and facilitate the involvement of those potentially affected. An action may involve an EJ concern if it could:

- Create new disproportionate impacts on minority, low-income, or indigenous populations.
- Exacerbate existing disproportionate impacts on minority, low-income, or indigenous populations.
- Present opportunities to address existing disproportionate impacts on minority, low income, or indigenous populations that are addressable through the action under development.

- "... it is important to assess whether minority, low-income, or indigenous populations are experiencing existing disproportionate impacts that you can address through your action" (USEPA 2010).

3.10.2 Methodology

According to CEQ (1997) and USEPA (2010) guidelines established to assist federal and state agencies for developing strategies to examine EJ impacts, the first step in conducting an EJ analysis is to define minority and low-income populations. Based on these guidelines, a minority population is present in a project study area if: (a) the minority population of the affected area exceeds 50 percent; or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

The second step of an EJ analysis requires a finding of a high and adverse impact. The CEQ guidance indicates that when determining whether the effects are high and adverse, agencies are to consider whether the risks or rates of impact "are significant (as employed by NEPA) or above generally accepted norms."

The final step requires a finding that the impact on the minority or low-income population be disproportionately high and adverse. Although none of the published guidelines define the term "disproportionately high and adverse," CEQ states that an effect is disproportionate if it appreciably exceeds the risk or rate to the general population.

For a minority population, the specific thresholds recommended by the CEQ (1997) are as follows: 50 percent minority population (absolute threshold); the national average minority population – 25 percent (absolute threshold); and the state average plus 20 percent (i.e., state average times 1.2) (relative threshold) (CEQ 1997). These are guidelines rather than requirements.

The CEQ recommended threshold for determining a low-income population is based on "very low-income" and/or "low-income" characteristics. The very low-income characteristic is defined as persons in households below the U.S. Census Bureau's poverty threshold. The low-income characteristic is defined as below two times the poverty threshold (CEQ 1997). The poverty thresholds are designated by the Census Bureau for the nation. The 2010 Census poverty data are not yet available for Census Block Groups. Thus, the Census 2000 data, which reflect incomes for 1999, were used in this analysis.

The EJ Study Area is an approximately three-mile radius surrounding the transmission centerline. All census block groups, whole or in part, in this three-mile radius were included in the analysis. The reason for the choice of a three-mile radius was that the effects of transmission lines (construction noise and dust, potential electromagnetic field impacts, potential land value impacts, and visual impacts) that could be relevant for EJ analysis are likely to occur within about a two-mile distance; a three-mile distance was used to ensure geographic comprehensiveness.

3.10.3 Data Sources

The data source for the EJ analysis of race and ethnicity used the 2010 Census National Summary File of Redistricting Data. Specifically, the dataset from Table P2, Hispanic or Latino, and Not Hispanic or Latino by Race, was used. The low-income analysis used Census 2000 Summary File 3 (SF 3) - Sample Data, Table P88, Ratio of Income to Poverty Level in 1999. For both analyses, data for all Census Block Groups that are within three miles of the NNR and Manastash Ridge (MR) subroute (in full or in part) were extracted, tabulated, and analyzed.

3.10.4 Current Conditions and Trends, Regional Overview (Analysis Area/ Counties)

Current regional conditions in the EJ Study Area (Grant, Kittitas, and Yakima counties) for race and ethnicity were described in Section 3.9.2.2. Current regional conditions for low-income populations were discussed in Section 3.9.2.4.

3.10.5 Minority Population

In the three-mile radius EJ Study Area, there are generally greater concentrations of the minority population of Latinos than in the state as a whole. Other minority groups are present to a lower degree than statewide or in the EJ Study Area.

The Latino population represented 39.3 percent of the total population in the three-county EJ Study Area, compared to 11.2 percent statewide. All other minority populations defined as minority (those other than White, consisting of Black or African American, American Indian or Native Alaskan, Asian, Native Hawaiian or Pacific Islander, some other race, or two or more races) are under-represented in the EJ Study Area relative to statewide. These results are tabulated in Table 3.10-1.

TABLE 3.10-1 SUMMARY OF RACE AND ETHNICITY OF CENSUS BLOCK GROUPS WITHIN THREE MILES OF NNR AND MR CENTERLINES, THREE-COUNTY AREA, AND STATE OF WASHINGTON

RACE/ETHNICITY	CENSUS BLOCK GROUPS		THREE-COUNTY AREA		STATE OF WASHINGTON	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Hispanic or Latino	15,310	30.4	146,754	39.3	755,790	11.2
Not Hispanic or Latino						
Total Not Hispanic or Latino	35,036	69.6	226,512	60.7	5,968,750	88.8
White alone	32,510	64.6	202,304	54.2	4,876,804	72.5
Black or African American alone	434	0.9	2,792	0.8	229,603	3.4
American Indian and Alaska Native alone	701	1.4	10,204	2.7	88,735	1.3
Asian alone	364	0.7	3,937	1.1	475,634	7.1
Native Hawaiian and Other Pacific Islander alone	43	0.1	252	0.1	38,783	0.6
Some Other Race alone	56	0.1	478	0.1	11,838	0.2
Two or More Races	928	1.8	6,545	1.8	247,353	3.7

Numbers are rounded and may not sum exactly.

3.10.6 Low-Income Population

Census poverty data for the three-county region and for the state of Washington were described in Section 3.9.2.4. These data indicated higher proportions of persons living in poverty in the three-county region (Grant, Kittitas, and Yakima counties) as a whole than statewide in 2009.

Comparison of the poverty status of the population in the area within three miles of the NNR and statewide conditions relies on 1999 data from the Census Bureau 2000 Census because poverty data at the Census Block Group level were not collected in the 2010 census of population.

In 1999, persons with incomes below the poverty level (established by the U.S. Census Bureau [no date]) represented 19.2 percent of the total population in the three-county region, compared to 10.6 percent statewide.[1] The corresponding ratio of persons with incomes under twice the poverty level was 39 and 15 percent.

In the EJ Study Area, there were generally greater concentrations of low-income persons than in the state as a whole in 1999. For all Census Blocks within three miles of any alternative route, the ratios were 18.2 percent under the Poverty Level and 38.9 percent under twice the Poverty Level. These results are summarized in Table 3.10-2.

TABLE 3.10-2 SUMMARY OF LOW INCOME POPULATIONS OF CENSUS BLOCK GROUPS WITHIN THREE MILES OF ROUTE ALTERNATIVES NNR AND MR

AREA/REGION	BELOW POVERTY LEVEL		BELOW TWICE THE POVERTY LEVEL		BELOW GREATER THAN TWICE THE POVERTY LEVEL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
NNR/MR	7,964	18.2	17,031	38.9	26,732	61.1
Three-County Region	62,001	19.2	78,481	24.2	183,252	56.6
State of Washington	612,370	10.6	880,418	15.3	4,272,413	74.1

[1] It should be noted that differences in the poverty rate in the three-county region and statewide averages are probably at least partly offset by much lower costs of living in the local area. However, no cost of living figures are available for small areas such as the three-county region.

3.11 CULTURAL RESOURCES AND NATIVE AMERICAN CONCERNS

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to cultural resources and Native American concerns along the NNR and MR subroute, including those raise during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

Cultural resources are prehistoric or historic archaeological sites, districts, buildings, structures, or objects considered to be important to a culture, subculture, or community for scientific, traditional, religious or any other reason. A cultural resource is a definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological and architectural sites, structures, or places with important public and scientific uses, and may include definite locations of traditional cultural or religious importance to specified social or cultural groups. Cultural resources may be, but are not necessarily, eligible for listing in the National Register of Historic Places (National Register), the nation's list of historic places worthy of preservation. For the DEIS and this SDEIS, cultural resources have been divided into archaeological resources, architectural resources, and traditional cultural properties (TCP).

Archaeological resources are locations where human activity has measurably altered the earth (e.g., ditches, mounds, earthworks) or left deposits of physical remains (e.g., stone tools, building foundations, cairns, bottles, cans). Archaeological resources are often classified as either sites or isolated finds based on the quantity, density, and type of material present. Generally, isolated finds are one or a few objects (e.g., an arrowhead, a bottle). Sites are larger than isolated finds and may contain several artifacts to many thousands of artifacts or features within a clearly defined area.

Architectural resources are standing buildings or structures. Buildings are used for shelter, for example, houses, churches, stores, schools, and barns. Structures are architectural or engineering features not used for shelter, such as dams, canals, bridges, and transmission lines.

A TCP is a property that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that are rooted in that community's history, and are important in maintaining the continuing cultural identity of the community. TCPs may include petroglyphs, pictographs, graves, and ceremonial features.

3.11.1 Data Sources

A cultural resource record search for the proposed Project was initially conducted in 2010 and 2011 by collecting information on previously recorded cultural resources and past cultural resource investigations within one mile either side of the centerlines for each of the alternative route segments. The principal source of data was the Washington Department of Archaeology and Historic Preservation (DAHP) on-line Washington Information System for Architectural and Archaeological Records Data (WISAARD) database. For the NNR, a record search was performed in December 2013 using the WISAARD database.

Additionally, the following government agencies were contacted between 2011 and 2013 regarding cultural resource information that had not yet been submitted to the DAHP:

- U.S. Bureau of Reclamation (Reclamation)
- Bonneville Power Administration (BPA)

- Bureau of Land Management (BLM)
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC)
- Grant County Public Utility District (PUD)

Other data sources were examined to determine whether certain classes of specially designated cultural resources existed within or near the Project area. These included:

- National Historic Landmarks. National Historic Landmarks (NHL) are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. The nearest NHL to the Project area is the B Reactor at the Department of Energy's Hanford Site near Richland in Benton County.
- National Register of Historic Places. The National Register is the National Park Service's official list of the nation's historic places worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.
- Washington Heritage Register. The Washington Heritage Register is an official listing of historically significant sites and properties found throughout the state. The list is maintained by the DAHP.

The Yakama Nation Cultural Resources Program (YNCRP) conducted cultural resource surveys on federal land along some route segments. Updated survey results for segments 1b, 3a and 3c along Alternative D and segments NNR-3, NNR-4, NNR-6, and NNR-7 along the New Northern Route (Camuso and Lally 2014) have been incorporated into Section 3.11 where appropriate.

The Cultural Resources Program of the Confederated Tribes and Bands of the Yakama Nation (under contract with Pacific Power) collected oral histories and conducted a TCP study for the Project area (Lally and Camuso 2013) and conducted a second study for the NNR and portions of Alternative D (Camuso and Lally 2014). Also, because the NNR lies within the traditional territory of the Moses Columbia Tribe, the Confederated Tribes of the Colville Reservation History and Archaeology Program (under contract with Pacific Power) will conduct further TCP studies in the area and prepare a report.

Locations of all recorded prehistoric and historic resources, including isolated finds, and of previously conducted cultural resource investigations within one mile of one or more of the alternative route segment centerlines were entered into a geographic information system (GIS) database. Over 2,750 cultural resources have been recorded within one mile of the centerline of each alternative including the NNR (Camuso and Lally 2014). Only 190 of these are located within 250 feet of the centerlines. It is acknowledged that:

- Site boundaries are sometimes not well defined; and
- Site data may change as nearby projects increase the number of known sites in the Project vicinity.

Also, the record search identified 31 cultural resource surveys that have been conducted within 75 feet of either side of the alternative centerlines, including the NNR. As a result of previous and recent surveys of federal land along some segments by the YNCRP (Camuso and Lally 2014), the proportion of surveyed land is 67 percent within the 150-foot corridor and 65 percent within the 500-foot corridor (see Figure 3.11-1).

3.11.2 Cultural History / Regional Overview

Prehistoric Period

The following summary of the prehistoric occupation of the Columbia Plateau cultural region is based on a chronology developed by Ames (2000). Ames identifies three major occupation periods (I, II, and III), each containing several phases. This summary is intended to reflect the general cultural trends that occurred during the three periods over the last 13,000 years.

Period I (13,000 to 6,500 years ago)

Ames (2000) divides the earliest period in the chronological sequence into two phases: Windust and Vantage. The Windust phase extended from approximately 13,000 to 9,000 years ago and is characterized primarily by the presence of stemmed or shouldered projectile points, large knives, edge-ground cobbles, and simple, generalized stone tools. Upland environments were heavily relied upon by early Native Americans with a secondary focus on river habitats, where seasonally available resources were exploited. The Windust phase is characterized by a subsistence strategy that included hunting large mammals, such as bison, elk, and deer; salmon fishing; and the gathering of plants and aquatic foods (Cressman 1960; Chatters 1986). Caves, rockshelters, and open areas were all used for habitation.

During the Vantage phase (9,000 to 6,500 years ago) foraging similar subsistence pattern continued across the Columbia Plateau. The addition of certain projectile point types and an increase in the frequency of grinding and pounding tools in the later Vantage phase suggest there may have been subtle adaptive changes to the diet (Galm et al. 1981). Subsistence adaptations included hunting both large and small mammals such as elk, deer, antelope, rabbit, beaver, and perhaps bison. Salmon fishing may have increased in importance over time during this phase, as indicated by net weights and salmon bones (DePuydt 1990). Tool assemblages of the Vantage phase include lanceolate and other projectile points, scrapers, atlatl weights, needles, cobble tools, leaf-shaped and ovate knives, manos, mortars, bone awls and needles, and *Olivella* beads (Nelson 1969; Galm et al. 1981).

Period II (circa 6,500 to 3,900 years ago)

The transition from Period I to Period II is not clear-cut in the archaeological record. Ames (2000) suggests that in some portions of the southern Plateau, Period II sites differ little from Period I sites, but in other areas, there are marked differences. Artifact assemblages and settlement patterns show a marked transition during the Period II Frenchman Springs phase (Rice 1968). The Frenchman Springs phase is characterized by a variety of projectile points, knives, scrapers, and bone and antler tools, and also includes pithouses. About 5,200 years ago, the early appearance of pithouses indicates a less nomadic lifestyle and the repeated re-occupation of specific locations for salmon harvesting (Ames et al. 1998; Chatters and Pokotylo 1998). Hunting of deer, antelope, elk, mountain sheep, and small mammals was common. Storage pits within structures and rockshelters often contain remains of fish, deer, sheep, antelope, roots, and freshwater mussels (Swanson 1962; Nelson 1969). An increase of groundstone and cobble tools suggests that upland plant resources may have taken on higher priority than in Period I.

Period III (3,900 to 300 years ago)

Period III, also called the Cayuse phase, dates from around 3,900 years ago until the first documented appearance of the horse in 1720 A.D. The Cayuse phase is divided into early and late sub-phases based in part on the adoption of the bow and arrow and an increase in the Native American population (Leonhardy and Rice 1970; Nelson 1969; Galm et al. 1981). Nelson (1969) notes a marked increase in the size and density of archaeological sites. More permanent villages and a riverine-oriented subsistence economy became increasingly apparent at the beginning of Period III. By 1000 A.D., ethnographically-documented lifeways that included large winter villages and seasonal rounds established to exploit salmon runs and plants were in place in the south-central Columbia Plateau (Adams and Ozbun 2007; Aikens 1993; Ames et al. 1998). Subsistence is linked to intensive fishing, upland root gathering and hunting (Ray 1933;

Nelson 1969; Galm et al. 1981; Schalk 1982). In the winter, people inhabited pithouse or longhouse clusters in riverine or canyon environments, dispersing into small foraging groups in the spring to access root grounds, hunting areas, and fishing camps. Semi-subterranean pithouses and larger longhouses were the precursors to the surface communal longhouses later documented by European observers. Fishing was the primary summer and early fall activity with berry gathering and hunting also conducted in the fall. Fish, large game, and root crops were stored for consumption during the winter (Ray 1933, 1939; Nelson 1969).This was a time of increased social complexity that involved expanded trade and interaction networks (Galm 1994) as indicated by the presence at archaeological sites of marine shell beads and other ornaments. Small arrow points dominate stone tool assemblages (Adams and Ozbun 2007; Aikens 1993; Ames et al. 1998).

Historic Period

The historic period in the Pacific Northwest begins with the first regular contact between Euro-Americans and the Native American population. Within the general Project area, a number of historic themes occur including: exploration, settlement, irrigation, agriculture, the modern military presence, and hydropower development.

Exploration

The first widely recognized contact between the native Indian groups and Euro-Americans occurred when the Lewis and Clark Expedition passed through the region in 1805 and 1806, officially opening the Pacific Northwest to wide-spread fur trading. During the next 20 years, both Canadian and American fur companies established trading forts and posts from what is now the Canadian-United States border south to the Columbia River. In 1818, a treaty between Canada and the United States declared that neither country owned true title to the land on which the trading forts were built, but rather each country had the right of entry and occupation. This held true until the Treaty of 1846 established the 49th parallel defining the boundary between Canada and the United States. After the boundary was drawn, significant Euro-American settlement began to occur in the Columbia Basin, first encouraged by the continuing fur trade and later by opportunities for agricultural development (Bennett 1979).

Ethnography

Numerous Indian groups have inhabited the study area, including the Yakama, Wanapum, Kittitas, and other Mid-Columbian groups. The Yakama and neighboring groups were originally made up of small, politically autonomous, yet closely related, bands. These bands lived in permanent winter villages located on major water courses and streams and in upland village sites during spring and summer while gathering seasonally available resources. The villages were essentially autonomous, although each group as a whole shared a common culture, maintained inter-village kinship ties, shared subsistence resources, and were engaged in frequent social interaction with one another (Ray 1939; Schuster 1998).

During the early nineteenth century, as Euro-American settlement expanded, conflicts became more frequent with Native Americans. Demand for land continued to increase and in 1855 the Washington Territorial Governor, Isaac Stevens organized a council in Walla Walla with the primary purpose of extinguishing Native American rights to lands in eastern Washington.

Native Americans in attendance, presumed to be representatives for their respective tribes, signed treaties under pressure effectively ceding half of eastern Washington to the federal government in exchange for reservation lands and retention of rights for fishing, hunting, and gathering. The study area is within lands ceded in the 1855 Treaty with the Yakama.

The modern-day descendants of the tribes whose traditional territory spans the study area are the Yakama, Kittitas and Wanapum peoples. The Yakama and Kittitas bands are members of the federally recognized Confederated Tribes and Bands of the Yakama Nation. The Wanapum Band of Indians, although not a federally recognized group, continues to live and work in the study area. A portion of the study area is also within the traditional use area of the Sinkiuse or Moses Columbia, members of the Confederated Tribes of the Colville Reservation.

Settlement, Irrigation, and Agriculture

Although settlement was occurring on the eastern side of the Project area during the nineteenth century, it was somewhat slower than to the west, largely due to environmental constraints. A few ranchers claimed bunchgrass rangelands north of the Columbia River and some farmers settled in the fertile river bottoms; however, most of Grant County remained sparsely populated from the late 1850s until around the turn of the twentieth century. The area was characterized by a dry climate and a shrub-steppe ecosystem suitable for cattle ranching and little else. Lacking a substantial irrigation system, the Columbia River bottom was the only area that could be farmed with success.

It was not until the inception of the Columbia Basin Reclamation Project that significant strides were made to irrigate Grant County. The cornerstone of the Project was the Grand Coulee Dam, constructed between 1933 and 1942. Hydropower produced by the dam was used to pump water from the reservoir into a complex network of irrigation canals. By the 1960s, almost 20 percent of all of the irrigated land in Washington was located in Grant County and a full 60 percent of its land was used for farming (Flom 2006).

On the western side of the Project area, in what would become Yakima County, settlement was largely dictated by the arrival of the Northern Pacific Railroad and the subsequent development of irrigation throughout the Yakima Valley. One of these early irrigation projects was engineered by Walter Granger in 1889. Hired by the Northern Pacific Railroad, Granger organized and managed the Washington Irrigation Company and the Yakima Canal and Land Company. Granger was tasked with building the Sunnyside Canal to divert the waters of the Yakima River. This was the largest canal in the Northwest when water was turned into the first 25 miles in 1892 (Becker 2006; Owens 2005).

In 1905, Reclamation authorized the development of the Yakima Project, took over the operation of the Sunnyside Project and purchased many of the smaller canals associated with it. Reclamation also began construction on new canals and three divisions, the Roza, the Tieton, and the Storage Units, a year later. The Yakima Project was one of the first and largest efforts undertaken by Reclamation and today nearly 2,100 miles of its irrigation canals supply the Yakima Valley (Becker 2006; Owens 2005; Reclamation 2011).

The extensive irrigation system jump-started the agricultural industry in the western part of the Project area. Although small-scale family farms and orchards were producing some fruit and vegetables for market during the late nineteenth century, it was the Yakima Project that allowed farming to evolve into a full-blown agricultural industry. Crops included grain and hay, potatoes, onions, beets, and several types of fruit. Early orchards consisted of a variety of fruit trees including apples, cherries, peaches, pears, and plums, but by 1910 apple orchards dominated the Yakima and Kittitas Valley landscapes (Miller and Highsmith 1949).

Military Presence

The most significant modern military buildup in the region occurred during and just after World War II with the construction of the Yakima Anti-Aircraft Artillery Range and Hanford Works Atomic Energy Commission (AEC) Reservation. In 1951, the U.S. Department of the Army (Army) purchased 261,000 acres that would become the home of the Yakima Firing Center (YFC). The mission of the YFC included both reserve training and testing of field artillery throughout the 1950s and 1960s. In 1992, the military expanded the boundaries of the YFC again when it acquired an additional 62,000 acres to the north bringing the total acreage to 327,000 acres, or approximately 511 square miles (Morey 2008). Today the range is known as the JBLM YTC and is used for weapons delivery training including, tank, artillery, and infantry gunnery training (GlobalSecurity.org 2011).

The Hanford Works AEC Reservation was built in stages between 1943 and 1982. In 1943, the Army acquired a 670-square mile area upstream from the confluence of the Columbia and Yakima Rivers to construct a large nuclear reactor complex. DuPont was contracted to construct the reactors and the first plutonium was delivered to Los Alamos, New Mexico in 1945, providing the fuel for the Trinity Test and the atomic bombing of Nagasaki, Japan. During the Korean War and the Cold War, Hanford continued to develop its nuclear capabilities. Increased plutonium production resulted in increased radioactive waste stored in million-gallon underground tanks at the reservation. The last operating Hanford reactor, N Reactor, was closed in 2009 and clean up of radioactive waste continues today (U.S. Department of Energy 2009).

Hydropower Development
In October 1954, the Federal Power Commission, now the Federal Energy Regulatory Commission, issued a permit to the Grant County PUD to begin construction on the Priest Rapids Project. The project was to include the construction of two dams on the Columbia River within the project area, Priest Rapids Dam and Wanapum Dam.

Priest Rapids Dam was the first to be constructed and is the slightly larger of the two. Construction on the dam began in July 1956. It is 24 miles south of Vantage, Washington and 200 miles downstream from Grand Coulee Dam, the largest hydropower producer in the United States (Reclamation 2010; Grant County PUD n.d.[a]). Power generation from the dam began in October 1959.

Construction on Wanapum Dam began in 1959. Wanapum Dam is six miles south of Vantage. Commercial power generation began in July 1963 (Grant County PUD n.d.[b]).

3.11.3 Section 106 Compliance

To ensure compliance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800, Pacific Power will implement stipulations of a Programmatic Agreement (PA) prepared and signed by the BLM, the lead federal agency for Section 106 compliance, JBLM YTC, Reclamation, BPA, Washington State Historic Preservation Officer (SHPO), and other parties. The PA will define the Area of Potential Effects (APE) and will stipulate procedures for:

- Identifying cultural resources within the APE.
- Evaluating their significance.
- Assessing effects.
- Avoiding or mitigating adverse effects.
- Emergency discoveries.
- Reporting.
- Native American consultation.

Before construction, Pacific Power would arrange for an intensive pedestrian cultural resource survey on all federal and state lands and on private lands where permission of the land owner has been granted prior to survey. Survey would be conducted within all areas of possible physical disturbance within the APE of the selected alternative following BLM manual guidelines. The APE for the undertaking includes all involved federal, state, and private lands and will include:

- The transmission line right-of-way (ROW) along the centerline;
- Any existing unpaved access roads/existing roads that may require improvement and new roads;
- Staging areas, laydown areas, pulling and tensioning areas, and any other temporary use areas; and
- Geotechnical drilling boring locations and new or improved access roads to the drill sites.

APE dimensions will be determined by the BLM and appropriate land managing agencies. The APE for assessing visual effects on cultural resources will be land within a specific distance of the transmission line as determined by the parties to the PA.

The BLM, in consultation with other parties to the PA, will develop and implement specific measures to mitigate adverse effects. These may include Project modifications to avoid adverse impacts, monitoring of construction activities and data recovery studies.

3.11.4 NNR Route Segment Specific Considerations

For the purpose of this SDEIS, the study area for the cultural resource analysis included both a 150-foot wide corridor (75 feet to each side of the alternative route segment centerlines) and a 500-foot wide corridor (250 feet to either side of the alternative route segment centerlines). It is anticipated that physical impacts to cultural resources would be limited primarily to the 150-foot corridor because this corridor would include the structures and most access roads. Because of the limited number of recorded cultural resources and limited amount of survey within the narrower corridors of some segments, the 500-foot corridor is used to provide a better picture of the range and density of cultural resources that could exist within the unsurveyed portions of the 150-foot corridor. However, the majority of the NNR has been previously surveyed for cultural resources and portions of some route segments have been surveyed recently by the YNCRP.

The number and types of cultural resources were documented and the surveyed acreage within the corridors was calculated for each of the route segments (Table 3.11-1).

The nine NNR Segments comprise a total of 956 acres within the 150-foot corridor and 3,223 acres within the 500-foot corridor. According to DAHP records, 614 acres (64 percent) within the 150-foot corridor and 2,073 acres (64 percent) within the 500-foot corridor have been previously surveyed for cultural resources. The YNCRP has completed survey of an additional 200 acres of federal land along the NNR segments. Some of the YNCRP survey was on land that had been previously surveyed but not to modern standards. It is estimated that 67 percent of the land within the 150-foot corridor and 65 percent of the land within the 500-foot corridor of the NNR has now been surveyed for cultural resources.

Excluding TCPs, there are 53 documented cultural resources within the 150-foot corridor and 73 cultural resources within the 500-foot corridor of Route Segments NNR-1-8 and MR-1 (Tables 3.11-2 and 3.11-3), including those in DAHP records and sites recently recorded by the YNCRP. Also, four TCPs and one culturally sensitive area have been reported within the 150-foot or 500-foot corridors of the nine route segments. An ongoing TCP study for the Project may reveal additional TCPs along the NNR.

3.11.4.1 NNR-1

A total of 44 acres are within the 150-foot corridor and 148 acres are within the 500-foot corridor of Route Segment NNR-1. None of the land within either corridor has been surveyed for cultural resources (Table 3.11-1).

One prehistoric archaeological site with talus pits and hunting blinds is the only cultural resource recorded within both the 150-foot and 500-foot corridors (Tables 3.11-2 and 3.11-3). This site has not been evaluated for National Register eligibility. No TCPs have been reported within either corridor in Route Segment NNR-1. However, TCP studies are on-going.

3.11.4.2 NNR-2

There are a total of 92 acres within the 150-foot corridor and 317 acres within the 500-foot corridor of Route Segment NNR-2. Of these totals, all 92 acres (100 percent) within the 150-foot corridor and all 317 acres (100 percent) within the 500-foot corridor have been surveyed for cultural resources (Table 3.11-1).

Despite the previous surveys, no archaeological resources have been documented. One TCP is located within the 150-foot and 500-foot Route Segment NNR-2 corridors (Tables 3.11-2 and 3.11-3). TCP studies for the NNR are not complete; therefore, the data may change.

3.11.4.3 NNR-3

A total of 169 acres are within the 150-foot corridor and 52 acres (31 percent) have been surveyed for cultural resources (including lands recently surveyed by the YNCRP). The 500-foot corridor totals 567 acres, with 121 acres (21 percent) that have been surveyed for cultural resources (Table 3.11-1).

Nine archaeological resources have been recorded within Route Segment NNR-3. There are four prehistoric archaeological sites (two with talus pits, one with a cairn, and the other with a lithic scatter and talus pits) and five prehistoric isolated finds located within the 150-foot corridor. The 500-foot corridor has in addition to the two sites with talus pits, one site with a cairn, and site with a lithic scatter with talus pits mentioned above, one prehistoric lithic quarry and six prehistoric isolated finds. None of the sites have had determinations of National Register eligibility by the DAHP (Tables 3.11-2 and 3.11-3).

Two TCPs are reported within the 150-foot and 500-foot Route Segment NNR-3 corridors. TCP studies for the NNR are on-going; therefore, the data may change.

3.11.4.4 NNR-4

Along Route Segment NNR-4 it is estimated that there have been a total of 84 acres within the 150-foot corridor and 288 acres within the 500-foot corridor surveyed (Table 3.11-1). Lands recently surveyed by the YNCRP are not included in these totals.

A total of seven archaeological resources have been recorded within both the 150-foot and 500-foot corridors along Route Segment NNR-4. These include two prehistoric lithic scatters and five prehistoric isolated finds. None of these resources have had determinations of National Register eligibility by the DAHP.

One TCP has been identified within the 150-foot and 500-foot Route Segment NNR-4 corridors. TCP studies for the NNR are on-going; therefore, the data may change.

3.11.4.5 NNR-5

There are a total of 33 acres within the 150-foot corridor and 112 acres within the 500-foot corridor of Route Segment NNR-5. In both the 150-foot and 500-foot corridors, 100 percent of the land (33 acres and 112 acres, respectively) has been previously surveyed for cultural resources (Table 3.11-1).

No archaeological or architectural resources have been documented and one TCP has been reported within the 150-foot and 500-foot Route Segment NNR-5 corridors (Tables 3.11-2 and 3.11-3). TCP studies for the NNR are on-going; therefore, the data may change.

3.11.4.6 NNR-6

A total of 118 acres are within the 150-foot corridor and 395 acres are within the 500-foot corridor of Route Segment NNR-6. According to DAHP records, in both the 150-foot and 500-foot corridors, 100 percent of the land (118 acres and 395 acres, respectively) has been previously surveyed for cultural resources (Table 3.11-1). Some of the land within this reroute segment was recently re-surveyed by the YNCRP (Camuso and Lally 2014).

There are 11 recorded archaeological resources and one reported TCP within the 150-foot corridor and the 500-foot corridor of Route Segment NNR-6 (Tables 3.11-2 and 3.11-3). The archaeological resources include five prehistoric lithic scatters, two historic debris scatters, and four isolated finds, two prehistoric and two historic. The TCP studies for the NNR are on-going; therefore, the data may change.

3.11.4.7 NNR-7

Along Route Segment NNR-7, there are a total of 150 acres within the 150-foot corridor and 503 acres within the 500-foot corridor. A total of 150 acres (100 percent) have been previously surveyed for cultural resources within the 150-foot corridor and 503 acres (100 percent) within the 500-foot corridor has been surveyed for cultural resources (Table 3.11-1). Some of the land within this reroute segment was recently re-surveyed by the YNCRP (Camuso and Lally 2014).

Thirteen archaeological resources have been recorded within Route Segment NNR-7. Seven prehistoric lithic scatters, one prehistoric lithic quarry and scatter, two multi-component sites (sites include lithic debitage and historic artifacts including sanitary and hole in top cans), and three prehistoric isolated finds are located within the 150-foot corridor. The 500-foot corridor has the eight prehistoric sites (seven prehistoric lithic scatters, one prehistoric lithic quarry and scatter), two multi-component sites, and three prehistoric isolated finds mentioned above and another very small lithic scatter (Tables 3.11-2 and 3.11-3). None of the resources have had determinations of National Register eligibility by the DAHP.

One TCP is located within the 150-foot and 500-foot Route Segment NNR-7 corridors.TCP studies for the NNR are on-going and the data may change.

3.11.4.8 NNR-8

There are a total of 50 acres within the 150-foot corridor and 170 total acres within the 500-foot corridor. Only 13 acres (26 percent) within the 150-foot corridor and 42 acres (25 percent) within the 500-foot corridor have been previously surveyed for cultural resources (Table 3.11-1).

Sixteen archaeological resources have been documented within the 150-foot corridor of Route Segment NNR-8. These include two historic sites (segments of the Chicago, Milwaukee, St. Paul, and Pacific Railroad and one historic can scatter); 10 prehistoric sites (eight lithic scatters, one lithic scatter with a rock feature, and one linear rock feature); one site with both prehistoric and historic artifacts (lithics, a rock feature, and historic debris); and three prehistoric isolated finds (two flakes and one piece of chipped stone shatter). One architectural resource exists within the APE of NNR-8, the National Register eligible Vantage Substation.

The 500-foot corridor has 32 cultural resources, including the 16 resources mentioned above for the 150-foot corridor. The segment include two historic sites (segments of the Chicago, Milwaukee, St. Paul, and

Pacific railroad, and one historic can scatter); 17 prehistoric sites (15 lithic scatters, one lithic scatter with a rock feature, and one linear rock features); three sites that have both prehistoric and historic artifacts (one with prehistoric lithics, a rock feature, and historic debris; one with lithics and a can scatter; and one lithic scatter with a stone enclosure containing metal forging area, horseshoes, and bottles), seven prehistoric isolated finds; one historic isolated find; and one site with rock cairns that could be either prehistoric or historic. The historic segments of the railroad have been determined not eligible to the National Register and the remaining 31 sites have not been evaluated for National Register eligibility (Tables 3.11-2 and 3.11-3).

One TCP and one culturally sensitive area have been reported within the 150-foot and 500-foot Route Segment NNR-8 corridors. TCP studies for the NNR are on-going; therefore, the data may change.

3.11.4.9 MR-1

A total of 216 acres are within the 150-foot corridor and 723 acres are within the 500-foot corridor of Route Segment MR-1. In all, 120 acres (56 percent) within the 150-foot corridor and 403 acres (56 percent) within the 500-foot corridor have been previously surveyed for cultural resources (Table 3.11-1).

Three historic archaeological resources have been previously recorded within Route Segment MR-1. Two historic sites (a debris scatter and a group of stacked rock features) are located within the 150-foot corridor and three historic archaeological resources (the debris scatter, the stacked rock features, and a rock alignment) are located within the 500-foot corridor. The three sites have not been evaluated for National Register eligibility (Tables 3.11-2 and 3.11-3). One TCP has been reported within the 150-foot or 500-foot Route Segment MR-1 corridors. TCP studies for the NNR are on-going and data may change.

TABLE 3.11-1 CULTURAL RESOURCE SURVEY COVERAGE BY ALTERNATIVE ROUTE SEGMENT

ROUTE SEGMENT	LENGTH (MILES)	150-FOOT CORRIDOR			500-FOOT CORRIDOR		
		TOTAL ACRES	SURVEYED ACRES	PERCENTAGE OF LAND SURVEYED	TOTAL ACRES	SURVEYED ACRES	PERCENTAGE OF LAND SURVEYED
NNR-1	2.38	44	0	0	148	0	0
NNR-2	5.02	92	92	100	317	317	100
NNR-3	9.28	169	51	31	567	121	21
NNR-4	4.54	84	61	73	288	205	71
NNR-5	1.78	33	33	100	112	112	100
NNR-6	6.44	118	118	100	395	395	100
NNR-7	8.23	150	150	100	503	503	100
NNR-8	2.74	50	13	26	170	42	25
MR-1	11.85	216	120	56	723	403	56

3.11.5 Agency Preferred Alternative Update

Alternative D (Segments 1a, 1b, 2a, 2c, 3a, and 3c) is the Agency Preferred Alternative in the DEIS. Recently, the YNCRP, under contract with Pacific Power, completed cultural resource surveys of the portions of the 150-foot corridor for this alternative that crossed federal land. Preliminary results of the YNCRP survey added to previously recorded cultural resources. A total of 44 cultural resources have been identified. These include 27 archaeological sites (17 prehistoric, five historic, four with both prehistoric and historic components, and one of unknown age); 15 isolated finds (seven prehistoric, seven historic, and one unknown); and two historic structures. The two historic structures (a transmission line and the Vantage substation) have been determined eligible to the National Register. The other cultural resources have not been evaluated, but in this SDEIS it is assumed that the 15 isolated finds are not eligible and that the 27 archaeological sites will be determined eligible.

3.11.6 Native American Concerns

Traditional Cultural Properties

The YNCRP, under contract with Pacific Power, conducted a TCP study for the Project area (Lally and Camuso 2013) and another study for the NNR and Alternative D (Camuso and Lally 2014). A TCP study by the Confederated Tribes of the Colville Reservation is ongoing. After all TCP reports are finalized, additional information will be provided, as appropriate, for use in the Final Environmental Impact Statement. The current findings indicate the NNR crosses four TCPs and a culturally sensitive area and is located near a fifth TCP. The TCPs include ceremonial sites, traditional use sites, legendary sites, and other culturally sensitive properties.

YNCRP recently conducted intensive cultural resource surveys of targeted segments of the APE. Additional communication with tribal Cultural Specialists will be undertaken to determine the humanistic value of sites and to assist with site evaluations.

In addition, the Confederated Tribes of the Colville Reservation have been contracted by Pacific Power to provide a TCP report for the Project area. Previous studies indicate several TCPs specific to members of the Confederated Tribes of the Colville Reservation occur within the APE of the NNR.

TABLE 3.11-2 CULTURAL RESOURCES WITHIN 150-FOOT CORRIDORS BY ROUTE SEGMENT

ROUTE SEGMENT	TOTAL CULTURAL RESOURCES	RESOURCE TYPE				NATIONAL REGISTER STATUS*		
		TCPS	ARCHAEOLOGICAL SITES	ISOLATED FINDS	ARCHITECTURAL RESOURCE	DETERMINED ELIGIBLE	NOT ELIGIBLE	UNEVALUATED
NNR-1	1		1					1
NNR-2	1	1						1
NNR-3	11	2	4	5				11
NNR-4	8	1	2	5				8
NNR-5	1	1						1
NNR-6	12	1	7	4				12
NNR-7	14	1	10	3				14
NNR-8	19	2	13	3	1	1	1	17
MR-1	2		2					2

*National Register status determined by Washington DAHP.

TABLE 3.11-3 CULTURAL RESOURCES WITHIN 500-FOOT CORRIDOR BY ROUTE SEGMENT

ROUTE SEGMENT	TOTAL CULTURAL RESOURCES	RESOURCE TYPE				NATIONAL REGISTER STATUS*		
		TCPS	ARCHAEOLOGICAL SITES	ISOLATED FINDS	ARCHITECTURAL RESOURCE	DETERMINED ELIGIBLE	NOT ELIGIBLE	UNEVALUATED
NNR-1	1		1					1
NNR-2	1	1						1
NNR-3	18	2	5	11				18
NNR-4	8	1	2	5				8
NNR-5	1	1						1
NNR-6	12	1	7	4				12
NNR-7	15	1	11	3				15
NNR-8	34	2	23	8	1	1	1	32
MR-1	3		3					3

*National Register status determined by Washington DAHP.

Native American Rights and Interests

Native American people have occupied the region for thousands of years utilizing lands in the area for hunting, fishing, plant gathering, trade and exchange, and other cultural, social and religious activities. Descendants of the first inhabitants continue to utilize the public lands and resources in their traditional use areas.

Federally recognized tribes retain rights and/or interests in public lands through treaties, Executive Orders, and/or federal statutes. Treaty rights are pre-existing rights specifically retained by tribes in the treaty or agreement between the tribe and the federal government. Hunting, fishing, and gathering of roots and berries in usual and accustomed places and grazing on open and unclaimed lands are examples of specific rights reserved by treaty or other legal authority. The federal agency has a trust obligation to consult with tribes to identify and consider potential impacts of plans, projects, activities, or other actions that may adversely affect reserved tribal rights, resources, and other tribal interests.

The BLM, as the lead federal agency for the proposed right-of-way, is responsible for ensuring meaningful consultation and coordination is conducted with tribes on a government to government basis. The proposed Project is located within the lands ceded by the Treaty of 1855 with the Yakama Nation and is within the traditional use areas of the Yakama, Kittitas, Wanapum, and the Columbia Salish bands. Issues and concerns to be considered include treaty rights and resources, sacred sites, traditional uses including areas of traditional cultural and religious importance and any other areas that may affect tribal interests.

The NNR is located within areas known to be important to the Confederated Tribes and Bands of the Yakama Nation, Wanapum Band of Indians, and the Confederated Tribes of the Colville Reservation for plant gathering and processing, hunting, and other traditional uses. Maintaining healthy habitats for fish and wildlife and access to locations of traditional procurement activities are essential to the exercise of reserved rights and tribal interests. Opportunities to exercise reserved rights and the availability of resources have been impacted by a number of factors including increased settlement and changes in land use practices including agriculture, irrigation, ranching, and resource extractive practices that continue to alter the landscape and natural habitats. The changes contribute to reductions in resource availability and access to the locations of traditional use. Decreased availability of culturally and economically important resources such as native fish, game, or plant species and loss of access to areas of traditional use affect the traditional socio-cultural activities and practices essential to the exercise of reserved rights and tribal interests.

Confidential reports by the YNCRP (Lally and Camuso 2013; Camuso and Lally 2014) prepared for the Project are in draft. The CCT is preparing another TCP report for the NNR. Once reports are finalized, additional information can be provided to decision-makers. The current findings indicate the NNR crosses three TCPs and a culturally sensitive area and is located near a fourth TCP. The TCPs include ceremonial sites, traditional use sites, legendary sites, and other culturally sensitive properties.

3.12 WILDLAND FIRE ECOLOGY AND MANAGEMENT

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to wildland fire ecology and management along the NNR and MR subroute, including those raise during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

This section describes the wildland fire ecology and management issues for the Project area. For the purposes of this analysis, the Project area was defined as a two-mile corridor, one mile from either side of alternative route segment centerlines.

3.12.1 Data Sources

The evaluation was conducted using planning documents, digital data sources and previously conducted studies. Sources reviewed included:

- Digital 2013 Fire History 1987-2012 from the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC).
- Digital Fire Data from the BLM and GeoMAC (2013), Wildland Fire Support.
- Digital Fire Return Interval and Fire Regime Condition Class data from LANDFIRE.
- Final Environmental Impact Statement for Fort Lewis Army Growth and Force Structure Realignment, July 2010 (U.S. Department of the Army [Army] 2010).
- Spokane District 1985 Resource Management Plan (RMP) and 1987 Record of Decision (ROD) and the 1992 RMP amendment and ROD. Sage Grouse Habitat Assessment Survey Report, August 2011.
- Noxious Weed Survey Report, August 2013.
- JBLM YTC, Integrated Wildland Fire Management Plan, June 2004.
- Federal Wildland Fire Management Policy, December 1995.
- Review and Update of the 1995 Federal Wildland Fire Management Policy, January 2001.
- Guidance for Implementation of Federal Wildland Fire Management Policy, February 2009.
- Pacific Power Fire Outage History Data 1995-present for the Union Gap-Midway 230 kilovolt (kV) and Wanapum-Pomona Heights 230 kV lines, July 2011.
- JBLM YTC, Cultural and Natural Resource Management Plan 2002-2006. January 2002.

3.12.2 Current Conditions and Trends, Regional Overview

3.12.2.1 Fire History

Fire is a natural disturbance in big sagebrush communities; however the invasion of exotic annual grasses, such as cheatgrass (*Bromus tectorum*), has shortened fire cycles and decreased cover of fire sensitive shrubs. In drier Wyoming big sagebrush communities, mean fire return intervals have been estimated to span 50 to 240 years (Whisenant 1990; Baker 2006). Cheatgrass is common in the Project area, producing a fuel type that was not previously present and creating conditions that cause many areas to now burn at intervals of five years or less (Brooks 2008). After fires occur, cheatgrass recovers rapidly, typically before native species in the area. Cheatgrass is adapted to a wide range of germination temperatures and this adaptation allows it to germinate during the winter when temperatures are too cold for the germination of most native plants (Pyke and Novak 1994). Thus, the quick recovery and fuel source formed by cheatgrass perpetuates an invasive plant/fire cycle (Brooks 2008). This increase in fire frequency quickly removes non-sprouting shrubs such as big sagebrush. Sagebrush is extremely susceptible to the effects of fire. Shrubs will die if they are partially burned or come in contact with the heat generated by wildfires for as little as 30 seconds (Britton and Clark 1985). Although rabbitbrush may initially increase with fire, it is killed when the fire-return interval decreases to five years or less (Whisenant 1990; Mosley et al. 1999). Continued increases in fire frequency eventually remove and exclude all perennial shrubs, grasses and forbs from the landscape, and competition from cheatgrass prevents their reestablishment. Fire History in the Project area is shown in Appendix A - Vegetation and Fire History.

Wildfires have occurred within and near the Project area, the majority of which were concentrated within the JBLM YTC boundary. Over 60 percent of the NNR Route is located within the boundary of the JBLM YTC. Due to the type and intensity of training that occurs at the JBLM YTC, the incidence and risk of fire is higher compared with adjacent lands and naturally occurring fire cycles. Training activities such as live fire exercises, use of tracer rounds, explosive ordnance, and some aspects of maneuver training can cause fire. However, the incidence of fire ignition and spread at the JBLM YTC has been declining since 1996 due to improvements to their fire management policy and increased support. Improvements include annual Prescribed Burn Plans, implementation of the Fire Risk Assessment, pyrotechnic restrictions during periods of high fire danger, wildland fire fighting training, and remote sensing and fire history monitoring (Nissen and Melcher 2004). In addition, JBLM YTC annually maintains over 240 miles of firebreaks to serve as a barrier to limit the potential spread of wildland fires and provide access for fire suppression crews. The JBLM YTC has also enhanced their existing road network, with approximately 300 miles of roads acting as fire breaks (JBLM YTC 2002).

3.12.2.2 Fuel Factors

Fire risk associated with vegetation depends on the amount of fuel present and fuel continuity. Fuel continuity is important because it in part determines where a fire can go and how fast it travels. In shrublands with bunchgrasses and widely spaced shrubs, fire spread is limited by the patchiness of the fuel source (Brown 2000; Paysen et al. 2000). In these communities, fires tend to burn small areas and need conditions that are hotter and drier (Whisenant 1990).

Increased fire frequencies are associated with the introduction of cheatgrass. Cheatgrass has a very fine structure, tends to accumulate litter, and dries completely in early summer, thus becoming a highly flammable fuel. Cheatgrass changes the fire regime of the sagebrush-steppe by filling in the spaces between shrubs, thereby creating a more continuous fuel source that carries wildfires to the widely spaced shrubs. As cheatgrass spreads in sagebrush communities, community structure shifts from a complex, shrub-dominated canopy with low fuel loads in the shrub interspaces, to one with continuous fine fuels in the shrub interspaces, thus increasing the probability of fire ignition and spread (Rice et al. 2008).

3.12.2.3 Fire Regime Groups and Fire Regime Condition Classes

Fire regimes, fuel loads, and the composition and structure of vegetation have been altered by fire exclusion, livestock grazing, logging, and widespread establishment of exotic plants (Schmidt et al. 2002). Fire Regime Groups and Fire Regime Condition Classes (FRCC) have been developed as tools that land managers can use to assess the impacts that these alterations have on ecosystems.

A natural, or historical, fire regime is a general classification describing the role fire would play across a landscape in the absence of modern human intervention, but includes the possible influence of burning by Native American groups. Fire Regime Groups are based on the average number of years between fires (also known as fire frequency or mean fire-return interval) combined with the severity (i.e., the amount of vegetation replacement) of the fire and its effect on the dominant overstory vegetation (Menakis et al. 2004; National Interagency Fuels, Fire, and Vegetation Technology Transfer [NIFTT] 2010). The five Fire Regime Groups are described in Table 3.12-1.

TABLE 3.12-1 FIRE REGIME GROUPS AND DESCRIPTIONS

GROUP	FREQUENCY	SEVERITY	SEVERITY DESCRIPTION
I	0 - 35 years	Low/mixed	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory.
II	0 - 35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation.
III	35 - 200 years	Mixed/low	Generally mixed severity; can also include low-severity fires.
IV	35 - 200 years	Replacement	High-severity fires.
V	200+ years	Replacement/any severity	Generally replacement-severity; can include any severity type in this frequency range.

Source: NIFTT 2010.

The majority of the Project area is within Fire Regime Group III (60 percent) and Fire Regime Group IV (39 percent replacement). Fires that fall into Group III are typically mixed-low severity fires that occur approximately every 35 to 200 years and fires within Group IV are typically high severity fires that occur approximately every 35 to 200 years. The remaining one percent of the Project area is within the category barren or water and was not assigned to a Fire Regime Group. Fire return intervals for Wyoming big sagebrush shrub steppe communities have been estimated to span 50 to 240 years, falling into Fire Regime Groups III, IV, and V (Whisenant 1990; Baker 2006).

The FRCC is an interagency, standardized tool to measure the degree of departure between historical and current fire regimes and vegetation structural conditions across differing vegetation types (Table 3.12-2). FRCC is an index that compares current with historical fire regimes and vegetation composition and structure to assess degree of departure on a scale from one (least departed) to three (most departed). It is important to note that FRCC is not a fire hazard metric, but instead measures ecological trends (Menakis et al. 2004; NIFTT 2010). The FRCC dataset was developed at a landscape scale by LANDFIRE using field-referenced data and Landsat imagery.

TABLE 3.12-2 FIRE REGIME CONDITION CLASSES

FIRE REGIME CONDITION CLASS	DESCRIPTION
FRCC 1	Ecosystems with low (<33%) departure from reference conditions and that are still within the estimated historical range of variation of a specifically defined reference period. Fire regimes are within a historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within a historical range.
FRCC 2	Ecosystems with moderate (33-66%) departure. Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.
FRCC 3	Ecosystems with high (>66%) departure from reference conditions. Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.

Sources: NIFTT 2010; Menakis et al. 2004.

Forty-eight percent of the Project area is within FRCC 2 (moderate departure from reference conditions), 27 percent is within FRCC 3 (high departure), and 16 percent is within FRCC 1 (low departure). The remaining nine percent of the Project area is within the category agriculture, barren, urban, and water and were not assigned a FRCC.

In summary, the entire Project area historically experienced fire return intervals of 35 to 200 years with a fairly balanced mixture of low to high severity fires (Fire Regime Groups III and IV), but according to FRCC classifications, only 16 percent of the Project area has current fire regime conditions within the historic range of variability (FRCC 1); 75 percent of the Project area has a moderate or high departure from historic conditions (FRCC 2 and 3). The FRCC data does not specify whether fire frequency (and/or intensity) have increased or decreased.

3.12.2.4 Fire Risk Factors

Wildland fire ignitions in the Project area could occur through natural causes (i.e., lightning) and human activities (e.g., transmission line operation and maintenance activities, recreation, military training). The wildland fire ignition risk associated with vegetation depends on the amount of fuel present and fuel continuity. The wildland fire ignition risk would be higher in areas with established populations of cheatgrass and other non-native annual species. Annual grasslands and noxious weeds are present in the Project area, primarily associated with private and BLM-managed land in Route Segments NNR-1, NNR-2, NNR-3, NNR-4 and MR-1.

Operation and maintenance activities on the existing transmission lines within the Project area have the potential to ignite wildland fires through the generation of sparks or heat from maintenance activities (e.g., welding) and maintenance vehicles and equipment coming into contact with flammable fuels. In addition, wildland fires have the potential to affect the operation of the Project facilities and, consequently the reliability of the transmission system in the region. Smoke and hot gases from a large fire under or near a power line can create a conducting path between conductors and the ground, initiating arcing resulting in flashovers. Fires can also damage steel support structures and overhead conductors and can destroy wood pole support structures. The NNR Alternative parallels Pacific Power's existing Pomona-Wanapum 230 kV transmission line for 31.1 miles. From 1995 to present, the Pomona-Wanapum 230 kV transmission line has not experienced any instances of line outage due to smoke or fire damage (DeNuccio 2011).

Recreational use of existing access roads and transmission line rights-of-way has the potential to increase the risk of wildland fire ignition. Recreational use in the Project area includes off-highway vehicles, firearm shooting, hunting, camping, hiking and horseback riding. The most probable sources of human-cause ignition include vehicle use in areas with available fuels (e.g., catalytic converters, mufflers) and smoking (BLM 1992).

Wildland fire risk in the Project area is also associated with military training activities. Training activities such as live fire exercises, use of tracer rounds, explosive ordnance, and some aspects of maneuver training can cause fire. A decline in fire ignition and spread on JBLM YTC occurred between 1996 and 2003, largely attributable to the implementation of annual Prescribed Burn Plans, use of enhanced weather data, monitoring efforts, implementation of the Fire Risk Assessment, and pyrotechnic restrictions during periods of high fire danger. In addition, they also improved wildland fire fighting training and enhanced fire suppression support teams, upgrade of firebreak and road system to contain fires, development of fire bucket dip ponds and fire fighting wells, enhanced troop education, remote sensing and fire history monitoring, and related GIS data layer maintenance (Nissen and Melcher 2004).

3.12.3 Current Management Considerations

Federal, state, and county policy, management, and guidance documents applicable to wildland fire ecology and management in the Project area includes the following:

- Federal Wildland Fire Management Policy (December 1995; Review and Update 2001) addresses the role of fire as a natural disturbance and directs federal agencies to ensure that policies are uniform and programs are cooperative and cohesive.
- JBLM YTC Integrated Wildland Fire Management Plan establishes wildland fire risks, management goals, and strategies that will be used to reduce the risk and improve JBLM YTC's ability to reduce fire losses (Nissen and Melcher 2004).
- JBLM YTC Cultural and Natural Resource Management Plan 2002-2006 provides management direction for cultural and natural resources on JBLM YTC and discusses fire in the context of resource (JBLM YTC 2002).
- Industrial Fire Precaution Levels (IFPL) – the Washington Department of Natural Resources (DNR), U.S. Forest Service, BLM and Bureau of Indian Affairs use the IFPL system to help prevent fires with seasonal closures and restrictions for work activities and identifies fire tools required during closed fire seasons. DNR also administers Public Use Restrictions which limits activities on forest lands during periods of high fire danger.
- Chapter 76.04 Revised Code of Washington and Chapter 332-24 Washington Administrative Code Forest Protection address the role of the DNR with regard to fire protection powers and duties, including declarations of forest protection zones, burning permits, closure of forest operations or forest lands, and the regulation of spark emitting equipment.
- DNR Strategic Plan for Wildfire Protection (Phases I and II) creates a series of goals, objectives and strategies that are designed to identify legislative, budget and operational actions necessary to respond to changes in climate, population and forest health. The Strategic Plan defines broad steps necessary to achieve a preferred future for fire protection in the State of Washington (DNR 2006).
- Washington Best Management Practices Guidelines for Motorized Carriages (Fire Precaution Level III).
- DNR Forest Fire Protection, Requirements for Operations on or Near Forest Land details Washington State's forest fire protection requirements to help reduce the risk of wildfires caused by spark-emitting equipment and silvicultural burning on our near forest land (DNR 2013).
- Washington Statewide Implementation Strategy was adopted by the State of Washington to provide a framework for an organized and coordinated approach to the implementation of the National Fire Plan, specifically the national "10-Year Comprehensive Strategy Implementation Plan". Counties within Washington, with the assistance of state and federal agencies, will develop a risk assessment and mitigation plan to identify local vulnerabilities to wildland fire.
- Kittitas County Comprehensive Emergency Management Plan (CEMP) provides a framework for mitigation efforts in response to large scale incidents or a combination of incidents in Kittitas County. The CEMP describes functions and activities necessary to implement the four phases of emergency management: mitigation, preparedness, response and recovery (Kittitas County 2012).
- Kittitas County Wildfire Protection Plan identifies wildfire response capability, educates homeowners to reduce the ignitability of structures, and evaluates critical infrastructure throughout the county. This plan also identifies areas prioritized for hazardous fuel reduction treatments on federal, state, and private land, and builds on existing efforts to restore healthy forest conditions within the county (Kittitas County 2009).

3.12.4 NNR Route Segment Considerations

This section summarizes recent fire history (1987 through 2013), Fire Regime Groups (reference conditions), FRCC (departure from reference conditions), and vegetation class (Gap Analysis Program, JBLM YTC, and POWER vegetation data) within the Project area. The study area for this SDEIS is one mile on either side of each route segment.

3.12.4.1 Route Segment NNR-1

No recent fires have occurred along Route Segment NNR-1. Cheatgrass-dominated annual grassland is the most common vegetation type (67 percent) for Route Segment NNR-1 Project area, with intact bunchgrass-dominated sagebrush and perennial grassland types composing only about 10 percent of the segment. The majority of Route Segment NNR-1 is classified as FRCC 2 (85 percent) and is within Fire Regime Group III (87 percent).

3.12.4.2 Route Segment NNR-2

Vegetation along Route Segment NNR-2 is composed primarily of annual grassland (48 percent), sagebrush/perennial grassland (24 percent), and agriculture (22 percent). Approximately two miles of Route Segment NNR-2 parallels an existing JBLM YTC fire break road, existing roads and an existing transmission line. Vegetation along the fire break is disturbed and dominated by non-native species including cheatgrass. Small fires occurred east of Route Segment NNR-2 within JBLM YTC in 1989, 1990, and 2003. The majority of the Route Segment NNR-2 Project area is classified as FRCC 2 (48 percent) and FRCC 3 (13 percent). Eighty-eight percent of Route Segment NNR-2 Project area is within Fire Regime Group III.

3.12.4.3 Route Segment NNR-3

Route Segment NNR-3 is a roughly even split of annual grassland (45 percent) and intact sagebrush/perennial grassland (50 percent). Route Segment NNR-3 crosses within 0.5 mile of the eastern edge of the Canyon #1 fire that burned on BLM land in 1997. This route segment Project area is classified as FRCC 2 (48 percent) and FRCC 3 (31 percent). The Route Segment NNR-3 Project area is within Fire Regime Groups III (48 percent) and IV (50 percent).

3.12.4.4 Route Segment NNR-4

Route Segment NNR-4 is comprised primarily of sagebrush/perennial grassland (68 percent); annual grassland covers 17 percent of this segment. Fire history records indicate that two fires occurred within the Project area of Route Segment NNR-4, both within JBLM YTC. The first fire was located just north of Route Segment NNR-4 and occurred in 2002. The second fire occurred south of Route Segment NNR-4 in 2010. The Route Segment NNR-4 Project area is classified as FRCC 1 (18 percent), FRCC 2 (30 percent), and FRCC 3 (42 percent), with the remainder classified as agriculture and urban. This route segment Project area is within Fire Regime Group III (36 percent) and IV (64 percent).

3.12.4.5 Route Segment NNR-5

Vegetation along this short route segment consists primarily of intact sagebrush/perennial grassland; annual grassland contributes less than one percent. Fire history records indicate that no recent fires have occurred along Route Segment NNR-5. The majority of the Route Segment NNR-5 Project area is classified as FRCC 2 (30 percent) and FRCC 3 (51 percent). This route segment Project area is within Fire Regime Group III (71 percent) and IV (29 percent).

3.12.4.6 Route Segment NNR-6

Route Segment NNR-6 consists primarily of intact sagebrush/perennial grassland (78 percent); annual grassland contributes less than one percent. Two fires have occurred within JBLM YTC along Route Segment NNR-6. A large fire occurred north of Route Segment NNR-6 in 2008 and a second, smaller fire, also occurred north of the route segment in 2001. The Route Segment NNR-6 Project area is classified as FRCC 1 (23 percent), FRCC 2 (60 percent), and FRCC 3 (17 percent). This route segment Project area is within Fire Regime Group III (56 percent) and IV (44 percent).

3.12.4.7 Route Segment NNR-7

The majority of the route segment consists primarily of intact sagebrush/perennial grassland (95 percent); annual grassland contributes less than one percent. Fire history data indicates that three small fires occurred within JBLM YTC north of Route Segment NNR-7 in 2010. The majority of the Route Segment NNR-7 Project area is classified as FRCC 2 (82 percent). This route segment Project area is within Fire Regime Group III (78 percent) and Fire Regime Group IV (22 percent).

3.12.4.8 Route Segment NNR-8

This short route segment is comprised primarily of intact sagebrush/perennial grassland (83 percent); annual grassland contributes only four percent. Fire history records indicate that no fires have occurred within or near Route Segment NNR-8. The Route Segment NNR-8 Project area is classified as FRCC 2 (16 percent) and FRCC 3 (58 percent). This route segment Project area is within Fire Regime Groups III (43 percent) and IV (41 percent).

3.12.4.9 Route Segment MR-1

This route segment is comprised primarily of a mixture of sagebrush/perennial grassland (37 percent), annual grassland (34 percent), and agriculture (23 percent). Fire data indicates that 3 fires have occurred near Route Segment MR-1. One fire occurred within one mile of Route Segment MR-1 in 2010 on private land. This route segment Project area is classified as FRCC 1 (23 percent), FRCC 2 (50 percent), and FRCC 3 (25 percent). The Route Segment MR-1 Project area is within Fire Regime Groups III (50 percent) and IV (50 percent).

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3.13 CLIMATE AND AIR QUALITY

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to climate and air quality along the NNR and subroute, including those raise during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

3.13.1 Data Sources

Information regarding existing air quality in the Project area was obtained from various federal, state and local databases and websites. These sources include U.S. Environmental Protection Agency (USEPA) AirExplorer Website, Washington State Department of Ecology (WDOE) Air Quality Website, Yakima Regional Clean Air Agency (YRCAA) website (YRCAA 2011), and Benton Clean Air Agency website (BCAA; 2011).

3.13.2 Current Conditions and Trends, Regional Overview

3.13.2.1 Climate

The Project area is located in south-central Washington generally between the Columbia River and Yakima River in south-central Washington in the Central Basin climatological region. The region's climate is semi-arid with cold winters and long, hot summers. It is situated in the rain shadow of the Cascade Mountains with a low level of annual precipitation. Based on weather station data collected at Priest Rapids Dam and Yakima between 1946 and 2013, the average annual temperature was 52.5 degrees Fahrenheit (˚F). The July temperature average was 74.3˚F with a range of 53.3˚F to 91.4˚F (low to high averages) and a January average of 31.5˚F and a range of 21.0˚F to 40.5˚F. Winter snowfall at Priest Rapids Dam and Yakima is 5.9 and 23.5 inches per year, respectively. The total annual precipitation during the period for both sites was 7.57 inches (Western Regional Climate Center [WRCC] 2013). The growing season averages about 150 days. During July and August, it is not unusual for four to six weeks to pass without measurable rainfall. "Chinook" winds, which produce a rapid rise in temperature, also occur in the region. A few damaging hailstorms are reported in the agricultural areas each summer (WRCC 2013). Average annual wind speed in Yakima is 7.1 miles per hour (mph). The highest average winds occur in April, with an 8.6 mph monthly average (National Oceanic and Atmospheric Administration [NOAA] 2011).

3.13.2.2 Air Quality

Air quality in the region is generally good. Pollution sources are primarily from the Yakima urban area, woodstoves and fireplaces, open burning, major highways (e.g., Interstate [I] 82, I-90), and fugitive dust created as a result of agricultural operations and unpaved road travel. Pollutants generated by rangeland fires or maneuvering activities on Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) may substantially affect regional air quality in the short term.

3.13.3 Current Management Considerations

Federal

Environmental Protection Agency, Region 10
The Clean Air Act (CAA), as amended in 1990, requires the USEPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment.

BLM IM 2008-171 – Guidance on Incorporating Climate Change into Planning and National Environmental Policy Act Documents
This Instruction Memorandum (IM) provides draft guidance on incorporating climate change analysis into management plans and National Environmental Policy Act (NEPA) documents.

BLM Oregon IM-2010-012
This IM provides Oregon/Washington State Office guidance on analyzing greenhouse gas emissions and addressing changing climate conditions in NEPA documents.

State and County Management

In the state of Washington, local authorities typically have oversight over air quality; however, within the Project area air quality is regulated by one local clean air agency and two regional offices of the WDOE:

- YRCAA
- WDOE Eastern Regional office, and
- WDOE Central Regional Office

In the state of Washington, there are both state and national ambient air quality standards. Standards exist for the following pollutants:

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO_2)
- Free particles <10 microns (PM_{10})
- Free particles <2.5 microns ($PM_{2.5}$)
- Total suspended particulates (TSP)
- Ozone (O_3)
- Sulfur dioxide (SO_2)

WDOE maintains air quality monitoring stations across the state to monitor pollutants. Monitoring stations in the Project region are located in Yakima, Ellensburg, Toppenish, Mesa, and Moses Lake (WDOE 2011). The Yakima monitoring station is located at 402 S 4th Avenue approximately four miles south the Project. Emission inventories for the JBLM YTC from 1995 and 2000 showed that JBLM YTC did not generate sufficient air contaminants to require Title V permitting (Army 2010).

TABLE 3.13-1 NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING PERIOD	NATIONAL (NAAQS)		WASHINGTON STATE (WAAQS)	NOTES
		PRIMARY	SECONDARY		
Ozone (O_3)	8-hour	0.075 parts per million (ppm)	0.075 ppm	0.075 ppm	1
	1-hour (Daily Maximum)	0.12 ppm	0.12 ppm	-	2
Free particles <2.5 microns ($PM_{2.5}$)	Annual (Arithmetic Mean)	15.0 μg/m^3	15.0 μg/m^3	12.0 μg/m^3	3
	24-hour	35 μg/m^3	35 μg/m^3	35 μg/m^3	4
Free particles <10 microns (PM_{10})	Annual (Arithmetic Mean)	-	-	50 μg/m^3	5
	24-hour	150 μg/m^3	150 μg/m^3	150 μg/m^3	6
Carbon monoxide (CO)	8-hour	9 ppm (10 mg/m^3)	-	9 ppm (10 mg/m^3)	7
	1-hour	35 ppm(40 mg/m^3)	-	35 ppm (40 mg/m^3)	7

POLLUTANT	AVERAGING PERIOD	NATIONAL (NAAQS)		WASHINGTON STATE (WAAQS)	NOTES
		PRIMARY	SECONDARY		
Nitrogen dioxide (NO_2)	Annual (Arithmetic Mean)	0.053 ppm	0.053 ppm	0.05 ppb (100 mg/m^3)	8
	1-hour	100 ppb	-	100 ppb	9
Sulfur dioxide (SO_2)	Annual (Arithmetic Mean)	0.03 ppm	-	0.02 ppm	8
	24-hour	0.14 ppm	-	0.14 ppm	7
	3-hour	-	0.5 ppm (1300 µg/m^3)	0.5 ppm	7
	1-hour	75 ppb	-	75 ppb	12
Lead (Pb)	Rolling 3-month average	0.15 µg/m^3	0.15 µg/m^3	0.15 µg/m^3	11
	Quarterly average	1.5 µg/m^3	1.5 µg/m^3	-	-
Total suspended particulates (TSP)	Annual (Geometric Mean)	-	-	60 µg/m^3	11
	24-hour	-	-	150 µg/m^3	7

Source: USEPA 2011; WDOE 2013.
[1] The 3-yr average of the 4th highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.
[2] Not to be above this level on more than one day in a calendar year.
[3] The 3-year average from a community-oriented monitor is not to be above this level.
[4] The 3-year average of the annual 98th percentile for each population-oriented monitor within an area is not to be above this level.
[5] The 3-year average arithmetic mean concentrations at each monitor within an area is not to be above this level.
[6] Not to be exceeded more than once per year on average over three years (NAAQS). Not to be above this level on more than three days over three years with daily sampling (WAAQS).
[7] Not to be above this level more than once in a calendar year.
[8] Not to be above this level in a calendar year.
[9] The 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor is not to be above this level.
[10] Not to be above this level more than twice in a consecutive 7-day period.
[11] Not to be above this level.
[12] Effective August 23, 2010, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Section 106 of the CAA and its amendments require that air quality be protected against impacts on visibility in areas of national or regional natural, recreational, scenic or historic value. These areas are designated as Class I areas and are located in eight areas as identified by WDOE. The nearest Class I areas are located in the Mt. Rainier National Park and Goat Rocks Wilderness areas approximately 50 miles to the west of the Project location.

Prevention of Significant Deterioration (PSD) permits are required for construction projects that may significantly increase air pollutant emissions. The WDOE prepares PSD permits for industrial sources of air pollution. PSD applies to new major sources or major modifications at existing sources for pollutants where the area the source is located is in attainment or unclassifiable with the NAAQS. The Project is not considered a major new source of pollution and, therefore, PSD does not apply.

Areas that have experienced persistent air quality problems are designated by the USEPA as nonattainment areas. The federal CAA requires additional air pollution controls in these areas. Each nonattainment area is declared for a specific pollutant; however, nonattainment areas for different pollutants may overlap each other or share common boundaries. After air monitoring shows that a nonattainment area is meeting health-based air quality standards, USEPA re-designated the areas as attainment. Areas that are re-designated to attainment are called maintenance areas (WDOE 2011).

A portion of the City of Yakima is considered a CO maintenance area and a large area encompassing Yakima, Selah, and portions of the Project area are within a particulate maintenance area. Table 3.13-2 shows Yakima City monitored ambient air quality at the 402 S 4th Ave. station for $PM_{2.5}$ and PM_{10} from 2009 to 2012. No exceedances were recorded for the 24-hour or annual averaging period between 2009 and 2012. Prior to project construction, contractors doing demolition, excavation, clearing, construction, or landscaping work must file a Dust Control Plan with the YRCAA to control fugitive dust emissions.

TABLE 3.13-2 YAKIMA CITY MONITORED AMBIENT AIR QUALITY: $PM_{2.5}$ AND PM_{10}

POLLUTANT	YEAR	24-HOUR VALUES				ANNUAL	
		# OBSERVATIONS	1ST THROUGH 4TH MAX. RANGE (HIGH-LOW) (µG/M3)	98TH PERCENTILE	# OF EXCEED	MEAN	# EXCEED
$PM_{2.5}$	2010	115	50.7-35.1	35	0	8.5	0
	2011	65	43.4-35.3	36	0	13.2	0
	2012	341	65-38.3	31	0	10.4	0
PM_{10}	2009	61	53-50	N/A	0	50	0
	2010	57	38-36	N/A	0	36	0
	2011	58	59-43	N/A	0	43	0
	2012	59	58-54	N/A	0	54	0

Source: USEPA Air Data Website - Monitor Values Report-Yakima County 402 S 4th Ave, Station-Site ID 530770009 (USEPA 2013).

3.13.4 NNR Route Segment Specific Considerations

3.13.4.1 NNR-1

This segment is located within the YRCAA administrative area.

3.13.4.2 NNR-2

This segment is located within the YRCAA administrative area.

3.13.4.3 NNR-3

This segment is located within the YRCAA and the WDOE Central Regional Office administrative areas.

3.13.4.4 NNR-4

This segment is located within the WDOE Central Regional Office administration area.

3.13.4.5 NNR-5

This segment is located within the WDOE Central Regional Office administration area.

3.13.4.6 NNR-6

This segment is located within the WDOE Central Regional Office administration area.

3.13.4.7 NNR-7

This segment is located within the WDOE Central Regional Office administration area.

3.13.4.8 NNR-8

This segment is located within the WDOE Central and Eastern Regional Office administration areas.

3.13.4.9 MR-1

The Manastash Ridge (MR-1) subroute is located within the WDOE Central Regional Office administration area.

3.13.5 Global Climate Change

BLM recognizes the importance of climate change and the potential effects it may have on the natural environment and has issued two recent IMs: IM 2008-171, "Guidance on Incorporating Climate Change into Planning and NEPA Documents" (BLM 2008) and IM OR-2010-012 (BLM 2010), "Analysis of Greenhouse Gas Emissions and Consideration of Climate Change in National Environmental Policy Act Documents." According to the BLM's IM No. 2008-171 (BLM 2008), climate change considerations should be acknowledged in Environmental Impact Statement documents. The IM states that ongoing scientific research has identified the potential impacts of human caused greenhouse gas emissions and changes in biological carbon sequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these greenhouse gas emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although greenhouse gas levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused carbon dioxide equivalent (CO_2(e)) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in human caused greenhouse gas concentrations" (IPCC 2007).

Ongoing scientific research has identified the potential impacts of climate changing pollutants on global climate. These pollutants are commonly called "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 (EIA 2009a). Anthropogenic (human) activities are increasing atmospheric concentrations to levels that could increase the earth's temperature up to 7.2˚F by the end of the twenty-first century (USEPA 2009a). The principal greenhouse gases emitted onto the atmosphere through human activities are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases (USEPA 2010a). Of these four gases, CO_2 is the major greenhouse gas emitted (USEPA 2010a; Houghton 2010). For example, CO_2 emissions resulting from the combustion of coal, oil, and gas constitute 81 percent of all U.S. greenhouse gas emissions (EIA 2009b). Carbon dioxide enters the atmosphere primarily through the burning of fossil fuels 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 ppm but have increase 36 percent to 379 ppm in 2005, all of which is attributed to human activities (IPCC 2007).

Of the remaining three 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. MH_4 concentrations have increased 148 percent above pre-industrial levels (USEPA 2009b, 2010b). N_2O is emitted during agricultural and industrial activities, and during the combustion of fossil fuels and solid waste. N_2O atmospheric levels have increase 18 percent since the beginning of industrial activities (USEPA 2009b, 2010b). Fluorinated gases, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6) 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 CO_2 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 (USEPA 2009b, 2010b).

Global atmospheric greenhouse gas concentrations are a product of emissions and removal over time. Through the process of photosynthesis, atmospheric carbon is captured and stored as biomass in vegetation, especially forests. Soils also store carbon in the form of decomposing plant materials and constitute the largest carbon reservoir on land. The stored carbon can be released back into the atmosphere when biomass is burned (EIA 2010). In addition, $CO_{2,}$ N_2O, and CH_4 emissions increase in areas where soil disturbance occurs (Kessavalou et al. 1998). Models predict atmospheric concentrations of all greenhouse gases are to increase over the next century, but the extent and rate of change is difficult to predict, especially on a global scale.

The IPCC completed a comprehensive report assessing the current state of knowledge on climate change, its potential impacts and options for adaptation and mitigation (IPCC 2007). According to this report, global climate change may ultimately contribute to a rise in sea level, destruction of estuaries and coastal wetlands, and changes in regional temperature and rainfall patterns, with major implications to agriculture and coastal communities. The IPPC has suggested that the average global surface temperature could rise 1.0 to 4.5˚F in the next 50 years, with significant regional variation. The National Academy of Sciences (2006) indicated that there are uncertainties regarding how climate change may affect different regions. Computer models indicate that such increases in temperature will not be equally distributed globally, but are likely to accentuate at higher latitudes, such as in the Arctic, where the temperature increase may be more than double the global average. Also, warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. Vulnerabilities to climate change depend considerably on specific geographic and social contexts.

Several activities occur within the Project area that may generate emissions of climate changing pollutants. For example, agriculture, fires, JBLM YTC training activities, City of Yakima, and recreation using combustion engines can potentially generate CO_2 and MH_4. Other activities may help sequester carbon, such as managing vegetation to favor perennial grasses and increase vegetative cover, which may help build organic carbon in soils and function as “carbon sinks.”

It is difficult to discern whether global climate change is already affecting resources, let alone the area of the proposed Project. In most cases there is more information about potential or projected effects of global climate change on resources. It is important to note that projected changes are likely to occur over several decades to a century. Therefore, many of the projected changes associated with climate change may not be measurably discernible within the reasonably foreseeable future.

The CAA is a federal law that establishes regulations to control emissions from large generation sources such as power plants. The USEPA has issued the Final Mandatory Reporting of Greenhouse Gases Rule that requires reporting of greenhouse gas emissions from large sources. Under the rule, suppliers of fossil fuels, 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 USEPA (USEPA 2010b). Executive Orders 13423 (72 Fed. Reg. 3919 [January 24, 2007]) and 13514 (74 Fed. Reg. 52,117 [October 8, 2009]) require federal agencies to measure manage and reduce greenhouse gas emissions by agency defined target amounts and dates. In the state of Washington, Executive Orders 07-02 and 09-05 direct state agencies to work with western states and Canadian provinces to develop a regional emissions reduction program designed to reduce greenhouse gas emissions to 1990 level by 2020 (WDOE 2010).

3.14 WATER RESOURCES

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to water resources along the NNR and subroute, including those raised during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

This section presents a discussion of the water resources in the Project area. The affected environment is described for surface waters, groundwater, floodplains, and other sensitive water resources. For the purposes of this analysis, the Project area was defined as a two-mile wide corridor: one mile either side of alternative route segment centerlines.

3.14.1 Data Sources

The analysis of water resources in the Project area was conducted using planning documents, field studies and digital data sources. Sources included:

- Surface water data from the U.S. Geological Survey (USGS) National Hydrography Dataset.
- Floodplain data for Yakima and Grant Counties from the Federal Emergency Management Agency’s DFIRM program dated July 22, 2010. Floodplain data for Kittitas County is older Q3 data dated 1996.
- National Wetland Inventory (NWI) digital data from the U.S. Fish and Wildlife Service (USFWS).
- Digital watershed mapping from the Washington State Department of Ecology.
- Aerial imagery used in analyzing water resources consists of the National Agriculture Imagery Program (NAIP) imagery 2009.
- Digital Adopted Shoreline data was obtained from the Washington State Department of Ecology.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) Cultural and Natural Resource Management Plan, January 2002.
- Final Environmental Statement (EIS) for Fort Lewis Army Growth and Force Structure Realignment, July 2010.
- Special Status Plant Species Survey Report (POWER 2013).

3.14.2 Current Conditions and Trends, Regional Overview

3.14.2.1 Precipitation

The Project area is located in south-central Washington generally between the Columbia River and Yakima River in south-central Washington in the Central Basin climatological region. The Region’s climate is semi-arid, with cold winters and long, hot summers. It is situated in the rain shadow of the Cascade Mountains, with a low level of annual precipitation. Winter snowfall at Priest Rapids Dam and Yakima is 5.9 and 23.5 inches per year, respectively. The total annual precipitation during the period of record for both sites (1946 through 2005) was 7.57 inches. The growing season averages about 150 days. During July and August, it is not unusual for four to six weeks to pass without measurable rainfall. A few damaging hailstorms are reported in the agricultural areas each summer (Western Regional Climate Center [WRCC] 2013).

3.14.2.2 Watersheds

A watershed is an area draining into a river, lake or other waterbody. The Washington State Department of Ecology (WDOE) and other state natural resource agencies have divided the state into 62 Water Resource Inventory Areas (WRIA) to delineate the state's major watersheds. The Project area includes portions of three WRIAs including Upper Yakima (WRIA 39), Alkali/Squilchuck (WRIA 40) and Lower Crab (WRIA 41). The WRIA boundaries are shown in Appendix A - Water Resources and Wetlands map.

3.14.2.3 Water Quality

The federal Clean Water Act (CWA), adopted in 1972, requires that all states restore their waters to be "fishable and swimmable." Section 303(d) of the federal CWA requires Washington State to periodically prepare a list of all surface waters in the state for which beneficial uses of the water (drinking, recreation, aquatic habitat, and industrial use) are impaired by pollutants. These are water quality limited estuaries, lakes, and streams that fall short of state surface water quality standards, and are not expected to improve within the next two years. There are no water features within the Project area that have been identified as impaired by the WDOE.

3.14.2.4 Shorelines

Washington's Shoreline Management Act governs the use and development of Washington shorelines and creates a partnership between local and state government. The Act strives to achieve responsible shoreline use and development, environmental protection, and public access. Local governments develop programs based on the Act and state guidance, and the state ensures local programs consider statewide public interests.

Within the Project area, designated shorelines are associated with the Yakima and Columbia Rivers. Shorelines fall under the jurisdiction of the respective counties; however, the shoreline along the banks of Priest Rapids Reservoir is managed by Grant County Public Utility District (PUD). The Grant County PUD Priest Rapids Hydroelectric Project is licensed by and requires consultation with the Federal Energy Regulatory Commission (FERC). The FERC and Grant County PUD identified stakeholders to complete a Shoreline Management Plan (SMP) for the shorelines along the reservoirs created by the two dams. The FERC has prepared an Environmental Assessment for Grant County PUD's proposed SMP and approval is pending.

3.14.2.5 Floodplains

A floodplain is the area on the sides of a stream, river, or watercourse that is subject to periodic flooding. The extent of the floodplain is dependent on soil type, topography, and water flow characteristics. A 100-year flood is a flood stage that statistically has a one percent probability of occurring in any given year.

Flood flows are typically experienced in the Columbia River Basin during May and June as a result of the melting of the winter snowpack. Maximum flood peaks result from heavy snow accumulation and a prolonged period of intense snowmelt, occasionally augmented by heavy rain. Natural streamflow recedes during July and August and remains at relatively low levels throughout the winter (U.S. Army Corps of Engineers [USACE] 2003).

Floodplain categories in the Project area included 100-year floodplain zones (Zone A) and no flood zones (Zone X), which are outside the 100 and 500-year floodplains. Flood Insurance Risk Zone A areas are subject to inundation by the one-percent-annual-chance flood event.

One hundred-year floodplains within the Project area (two-mile wide corridor) are associated with the Yakima River and Selah Creek. No 500-year floodplains are within the Project area. The 100-year floodplain associated with the Columbia River is located outside of the Project area. Appendix A - Water Resources and Wetlands map shows floodplains in the Project area.

3.14.2.6 Wetlands

The regulatory definition of Section 404 CWA jurisdictional wetlands according to the U.S. Environmental Agency (USEPA) and USACE are “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.”

Wetlands can be vegetated or non-vegetated and are classified on the basis of their hydrology, vegetation, and substrate. Wetlands are classified according to the system proposed by Cowardin and others (Cowardin et al. 1979), which is used by the NWI to map and inventory the nation’s wetlands.

Given the semi-arid nature of the Project area, wetlands are scarce. The two wetland types found within the Project area are palustrine and lacustrine.

Palustrine wetlands are a grouping of the vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie, which are found throughout the United States. It also includes the small, shallow, permanent, or intermittent water bodies often called ponds. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers. Within the Project area, palustrine wetlands are associated with ponds and a persistent wetland located within JBLM YTC’s cantonment area.

Lacustrine refers to fresh water lakes or reservoirs greater than 20 acres in size, with less than 30 percent of the surface covered by emergent vegetation. The plants found in lacustrine wetlands will be influenced by the climate of the area. Lacustrine wetlands within the Project area are associated with the Yakima and Columbia Rivers.

3.14.2.7 Perennial Streams/Creeks

The primary surface water features found within the Project area include the Columbia River in the eastern portion of the Project area and the Yakima River in the western portion. In addition to the Columbia River, Lmuma, Burbank, Johnson, Foster, and Selah Creeks are present within the Project area and contain perennial flow for much of their length. Lmuma and Selah Creeks are crossed by the NNR and flow to the Yakima River, while Johnson and Foster Creeks, located outside of the ROW, flows to the Columbia River. For perennial streams within the Project area, water often flows below the surface through coarse gravel prior to discharging into the Yakima and Columbia Rivers (JBLM YTC 2002).

3.14.2.8 Intermittent Drainage Courses

With the exception of the perennial streams and rivers mentioned above, water in the Project area is scarce. Streams are generally unnamed, small and intermittent, flowing for a short period of time in spring or in response to a large storm event. Named intermittent drainages in the Project area include Scorpion Coulee Creek and Badger Creek; both of which are crossed by the NNR.

3.14.2.9 Seeps and Springs

There are over 200 seeps/springs documented within the JBLM YTC. Seeps and springs on JBLM YTC are located primarily in the bottoms of drainages or on the sides of hills. Groundwater seeps and springs are known to occur within the Project area, primarily associated with Johnson and Foster Creeks (JBLM YTC 2002).

3.14.2.10 Priest Rapids Hydroelectric Facility Operation

Grant County PUD owns two large hydroelectric dams on the Columbia River - Priest Rapids and Wanapum dams. These facilities, licensed together as the Priest Rapids Hydroelectric Project, make up the second largest non-federal hydroelectric project in the country. These facilities produce nearly 2,000 megawatts of electricity, enough to power the city of Seattle. The Priest Rapids provides power to Grant County and millions of homes and businesses in the Northwest.

On October 21, 1954, the Federal Power Commission (now the FERC) issued a permit to Grant County PUD authorizing the construction of the Priest Rapids Project. Priest Rapids Dam began operation in 1959 and Wanapum Dam went on-line in 1963. In 2008, Grant County PUD received a new long-term license to operate Priest Rapids and Wanapum dams through 2052. The terms of the license direct the utility to provide protection to aquatic and terrestrial resources and cultural resources, including constructing and operating fish hatcheries, construction and operation of fish passage facilities, and adopting and implementing shoreline and recreation management plans (FERC 2008). Grant County PUD distributes the power from these two dams and other power resources at production cost through long-term contracts with 22 regional utilities in Washington, Oregon, and Idaho.

3.14.2.11 Flowage Easements

Any easement is a right or privilege by one to use the land of another for a specific purpose. In the case of a flowage easement, this usually consists of the perpetual right, power, privilege, and easement to overflow, flood, and submerge the lands affected; reserving, however, to the fee owner of the lands all such rights and privileges as may be used and enjoyed without interfering with or abridging the rights granted in the flowage easement.

An owner of land is entitled to "just compensation" whenever the waters of a stream or lake are altered or impounded so as to inundate, saturate, or erode his land. This applies to lands not previously affected by natural flooding, as well as to those which have been subject to natural flooding, where water level alteration or artificial impoundment aggravates this natural flooding condition. Such alteration constitutes a "taking" of the land involved and the taker must either purchase the affected land in fee or acquire a flowage easement.

Flowage easements associated with the operation of the Priest Rapids Hydroelectric facility and held by the Grant County PUD are located around the shoreline perimeter of the Priest Rapids Reservoir.

3.14.2.12 Irrigation Canals

There are several canals, wasteways, and other irrigation facilities in the Project area. The Selah-Moxee Irrigation Canal, located east of the Pomona Heights Substation, crosses Sage Trail Road and is managed and operated by the Selah Moxee Irrigation District. The Roza Canal is managed by the Roza Irrigation District, and is located along the Yakima River. An unnamed irrigation pump ditch owned and operated by Kittitas Reclamation District is located along the south side of Badger Pocket at the boundary of JBLM YTC.

3.14.2.13 Groundwater

Groundwater in the Project area occurs within four principal aquifers: surficial sedimentary units (principally Ellensburg Formation), Saddle Mountains Basalt, Wanapum Basalt, and Grande Ronde Basalt (U.S. Department of the Army [Army] 2010). The four principal aquifers are not present throughout the Project area, with the location dependent upon rock type, geologic structure, and topography. Within JBLM YTC reported subsurface depths of groundwater range from 20 feet in stream valleys to more than 200 feet at higher elevations (Army 2010).

3.14.2.14 Wells

Drinking water supplies in the Project area are met primarily by wells that pump groundwater. Individual domestic wells tap permeable portions of a surficial sedimentary aquifer, while most municipal wells tap deeper aquifers in basalt (lava bedrock) and sedimentary interbed layers that underlay the sediments (Pacific Groundwater Group 2011). The drinking water supply for JBLM YTC is provided entirely from groundwater sources. Six wells provide water for three permitted drinking water distribution systems within JBLM YTC (Army 2010).

For more than 100 years, irrigated agriculture has existed in the region, with farmers applying fertilizers and pesticides to attempt to maximize crop yields. In the past 25 to 30 years, large scale dairy operations have joined feedlots in the area, significantly increasing the amount of nitrates present. For much of the past 150 years, people have depended on the aquifers for their domestic and stock water. Up until fairly recently, the well construction techniques and health and safety protections in place on those wells were fairly rudimentary. People have often utilized the first available water resource for their water supply. The shallowest aquifers in the valleys are reported to have been contaminated by bacteria and nitrates and chemicals for much of that time (Dispute Resolution Center of Yakima and Kittitas Counties 2010).

Existing studies and related water quality data indicate that nitrate contamination of groundwater exist in the region and at least portions of the Project area. In some areas, nitrate levels are in excess of the state drinking water maximum contaminant level (MCL) of 10 milligrams per liter (Washington State Department of Agriculture et al. 2009).

Under Section 1431 of the Safe Drinking Water Act, the USEPA has broad authority to take action where there is a contaminant in an underground source of drinking water that may present an imminent and substantial endangerment to the health of persons. The USEPA has determined that these conditions exist in the Yakima Valley because nitrate levels are above the MCLs.

JBLM YTC also utilizes non-potable water from both ground and surface water sources for fire suppression activities. Fire suppression well water resources within the Project area include developed and undeveloped well/water points (JBLM YTC 2002).

3.14.3 Current Management Considerations

At the federal level, the USACE regulates wetlands and other waters of the United States including rivers and streams under the CWA. Some aspects of this authority have been delegated to the state and local governments. Washington State agencies regulate wetlands under the Hydraulic Code, State Water Pollution Control Act, SMA, and the Forest Practices Act. Local governments such as the county or city, regulate wetlands under the Growth Management Act and the Shoreline Management Act. Applicable regulations and regulatory framework are presented below.

Federal Jurisdiction

Clean Water Act

The CWA regulates discharges into waters of the United States. Several sections of the CWA apply to the Project as described below.

Section 401

Section 401 of the CWA requires that states certify compliance of federal permits and licenses with state water quality requirements. A federal permit to conduct an activity that results in discharges into waters of the United States is issued only after the affected state certifies that existing water quality standards would not be violated if the permit were issued. The WDOE would review each permit for compliance with state water quality standards.

Section 402
Section 402 authorizes stormwater discharges under the National Pollutant Discharge Elimination System. The state of Washington, Department of Ecology, Water Quality Program, is delegated by the USEPA as the state water pollution control agency responsible for implementing all federal and state water pollution control laws and regulations. In Washington, the USEPA has a general permit authorizing facilities to discharge stormwater from construction activities disturbing land of one acre or more into waters of the United States, in accordance with various site conditions.

Section 404
Authorization from the USACE under Section 404 is required when there is a discharge of dredge material or fill material into waters of the United States, including wetlands. A Section 404 permit may be required depending on the final location of the transmission line route. Under Section 404(e) the USACE can issue general permits to authorize activities that have minimal individual and cumulative adverse environmental effects. A nationwide permit is a general permit that authorizes activities across the country. There are currently 49 nationwide permits that authorize a wide variety of activities including utility lines. A Nationwide 12 Permit authorizes the construction, maintenance, and repair of utility lines and associated facilities including access roads provided the activity does not result in the loss of greater than 0.5 acre of Waters of the United States (including wetlands) for each single and complete project.

Rivers and Harbors Act
Section 10 of the Rivers and Harbors Act of 1899 regulates all work done in, or structures placed below, the ordinary high water mark of navigable waters of the United States. Pursuant to the implementing regulations, USACE Section 10 permits are required for electric transmission lines crossing navigable waters of the United States and, as such, would be required for this Project.

Coastal Zone Management Consistency
The Coastal Zone Management Program is authorized by the Coastal Zone Management Act of 1972 and administered at the federal level by the National Oceanic and Atmospheric Administration Office of Ocean and Coastal Resource Management, Coastal Programs Division. Management of the program is delegated to the states participating in the program. In Washington, the WDOE administers the program.

State Jurisdiction

Water Quality Certification
Applicants receiving a Section 404 permit from the USACE, a Coast Guard permit or license from the FERC, are required to obtain a Section 401 water quality certification from the WDOE. Issuance of a certification means that WDOE anticipates that the applicant's project will comply with state water quality standards and other aquatic resource protection requirements under WDOE’s authority. The 401 Certification can cover both the construction and operation of the proposed Project. Conditions of the 401 Certification become conditions of the federal permit or license.

Hydraulic Project Approval
Any form of work that uses, diverts, obstructs, or changes the natural flow or bed of any fresh water or saltwater of the state, requires a Hydraulic Project Approval from the Washington Department of Fish and Wildlife (WDFW).

Aquatic Use Authorization
Under what is commonly referred to as the Aquatic Lands Act, anyone wishing to use or cross state-owned aquatic lands, including owners of adjacent lands, must get authorization from the Washington State Department of Natural Resources, Aquatics Division. Use authorizations are required for physical installations on state-owned aquatic lands. Aquatic lands include the beds of Puget Sound, navigable rivers, lakes, and other waters; and much of the tidelands (land covered and exposed by the tide) and shorelands of lakes and other fresh waters. The aerial crossing of the Columbia River would require an aquatic use authorization.

Local Jurisdiction (County/City)

Shoreline Development/Shoreline Management Act
In Washington, the Coastal Zone Management Act is implemented through the Shoreline Management Act. The Shoreline Management Act regulates most shorelines of the state including marine waters, streams and rivers (with a mean annual flow of 20 cubic feet per second or more), lakes and reservoirs, or water areas of the state (larger than 20 acres) associated wetlands and portions of the flood plain. The Shoreline Management Act regulates wetlands with 200 feet of shoreline water bodies and wetlands associated with these water bodies. The Shoreline Management Act is implemented through a permit program for activities in and on the shorelines of the state. Permits are issued by local governments.

For the proposed Project, the transmission line structures located with 200 feet of the shoreline for a crossing of the Columbia River by Route Segment NNR-8 below the Wanapum Dam in Kittitas and Grant Counties would require a Shoreline Substantial Development Permit (SDP). The permits are issued by the counties if permit applications comply with the local shoreline master program for the county and the policies and provisions of the Shoreline Management Act. The WDOE has primary responsibility to review issued permits for compliance with the shoreline master program.

Most developments that meet a specific dollar threshold are considered substantial developments and require a SDP. Under certain circumstances, local governments can allow deviations from shoreline master program requirements through variance or a Conditional Use Permit**.**

Critical Areas Ordinance
The Washington State Growth Management Act (GMA) identifies five Critical Areas in each Washington state county in accordance with RCW 36.70A.170. Critical areas include the following areas and ecosystems: (a) wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas. Counties that are covered under the GMA, are required to protect Critical Areas (Washington State Department of Community, Trade and Economic Development 2003).

Floodplain Permit
If a project is located in a mapped 100-year floodplain, the local government requires that a permit be obtained prior to development. Proposed projects are reviewed and conditions imposed on any permits issued to reduce the potential for damage from floodwater. Permits are required for any development in the floodplain.

Permitting Process
To streamline the environmental permitting process, multiple regulatory agencies (i.e., local governments, USACE, WDOE, WDFW, WDNR, and Washington State Department of Transportation) joined forces to create one application that can be used to apply for more than one permit at a time. The process is known as the Joint Aquatic Resources Permit Application (JARPA). The JARPA can be used for the permits and approvals listed above.

3.14.4 NNR Route Segment -Specific Considerations

3.14.4.1 Route Segment NNR-1

The Route Segment NNR-1 Project area crosses the Selah-Moxee Irrigation canal and several un-named intermittent or ephemeral drainages.

3.14.4.2 Route Segment NNR-2

The Route Segment NNR-2 Project area crosses an irrigation canal on JBLM YTC and several un-named intermittent or ephemeral drainages. This route segment Project area also crosses one Palustrine wetland bisected by JBLM YTC's Firing Center Road. This palustrine wetland is highly disturbed and contains two noxious weeds: purple loosestrife (*Lythrum salicaria*) and Reed canarygrass (*Phalaris arundinacea*).

3.14.4.3 Route Segment NNR-3

The Route Segment NNR-3 Project area parallels a palustrine wetland. This wetland is an excavated pond associated with the Selah Creek Rest Area and contains no wetland vegetation. Route Segment NNR-3 Project area crosses several un-named intermittent or ephemeral drainages. The Project area for this route segment also crosses three streams categorized as perennial: Burbank Creek, Lmuma Creek, and Selah Creek. Riparian vegetation is present along Burbank and Lmuma Creeks. Selah Creek contains perennial flow for much of the season (JBLM YTC 2002); however, the reach of Selah Creek within the Project area appears to be intermittent.

3.14.4.4 Route Segment NNR-4

The Route Segment NNR-4 Project area crosses several un-named intermittent or ephemeral drainages with no riparian vegetation present.

3.14.4.5 Route Segment NNR-5

The Route Segment NNR-5 Project area crosses several intermittent or ephemeral drainages with no riparian vegetation present. The Project area for this route segment also crosses Badger Creek, which is intermittent or ephemeral within the Project area.

3.14.4.6 Route Segment NNR-6

The Route Segment NNR-6 Project area crosses several un-named intermittent or ephemeral drainages. A section of the ROW for this route segment parallels Foster Creek and is within 0.4 mile at its closest location. The ROW for Route Segment NNR-6 also parallels Johnson Creek. At its nearest point, Johnson Creek lies approximately one mile south of the Route Segment NNR-6 ROW. Both Foster and Johnson Creeks are perennial and contain forested riparian vegetation.

3.14.4.7 Route Segment NNR-7

Route Segment NNR-7 crosses several un-named intermittent or ephemeral drainages. Route Segment NNR-7 also parallels Johnson Creek. At its nearest point, Johnson Creek lies approximately one-half mile south of Route Segment NNR-7. Johnson Creek is perennial and contains forested riparian vegetation.

3.14.4.8 Route Segment NNR-8

The Route Segment NNR-8 Project area crosses the Columbia River below Wanapum Dam. The Columbia is a lacustrine wetland type. Within the Route Segment NNR-8 Project area, some riparian vegetation is present along the edges of the Columbia River.

3.14.4.9 Route Segment MR-1

The Project area for Route Segment MR-1 crosses several un-named intermittent and ephemeral drainages. This route segment's ROW also crosses Scorpion Coulee Creek, which is intermittent and contains little to no riparian vegetation. An unnamed irrigation canal is located along the south side of Badger Pocket at the of JBLM YTC boundary.

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3.15 GEOLOGY AND SOILS

The Bureau of Land Management (BLM) has determined that a Supplemental Draft Environmental Impact Statement (SDEIS) is required to analyze impacts for the New Northern Route (NNR) and Manastash Ridge (MR) subroute. As was done in the Draft Environmental Impact Statement (DEIS), this section describes the existing conditions (affected environment) and considers issues related to geology and soils along the NNR and MR subroute, including those raised during scoping. This SDEIS section builds on the information presented in the January 2013 DEIS and includes references to that document throughout the text where appropriate.

3.15.1 Data Sources

The evaluation was conducted using digital data sources and previously conducted studies. Sources reviewed included the Soil Survey of Yakima Training Center (National Cooperative Soil Survey [NCSS] 1994); the Natural Resources Conservation Service (NRCS) Web Soil Survey; soil data from the NRCS for Yakima County, Grant County, Benton County, Kittitas County and the Yakima Training Center (NRCS 2009); an article on the geology of the Terrace Heights community near the City of Yakima (Lind and Vachon n.d.); and geologic maps of the Priest Rapids (Reidel and Fecht 1994) and Yakima (Walsh 1986) quadrangles from the Washington State Department of Natural Resources (DNR). The Washington Division of Geology and Earth Resources (WDGER), a division of the DNR maintains information about the existing geology and geologic hazards in the state of Washington. Data from WDGER that was used included surface geology at scale 1:100,000, landslides at scale 1:24,000, seismogenic features consisting of active faults, and ground response including liquefaction susceptibility.

3.15.2 Current Conditions and Trends, Regional Overview

3.15.2.1 Geology

The Project area is located in the Columbia Plateau physiographic province. The geology of the Project area consists of interbedded volcanic and sedimentary rocks of the Columba River Basalt Group. The Columbia River Basalt formed when lava erupted intermittently out of north-northwest-trending fissure systems across southeastern Washington and adjacent portions Idaho and Oregon during the Miocene (17 to 6 million years ago). About the time of the last basalt flow, the Cascade Range became active again and mudflows and pyroclastic material were interfingered with basalt flows. Streams carried this lighter material towards the eastern lowlands, creating the uppermost portion of the Ellensburg Formation (NCSS 1994). Tectonic forces caused enough steady north-south compression to fold the basalt like an accordion from Toppenish to Ellensburg, forming ridges (anticlines) and valleys (synclines).

Yakima Ridge is part of the long, parallel ridges of the Yakima Fold Belt. The Yakima Fold Belt includes anticlinal ridges within the Project area. Generally from south to north they include the Yakima, Umtanum, Saddle Mountain, and Manastash Ridges. Yakima Ridge is the southern ridge of the ridges in the Project area. As the Yakima ridge rose and the Yakima River eroded down through the resistant basalt, the Yakima River deposited a flat layer of cobbles, gravels, pebbles and silts onto its floodplain, which eventually rose in elevation due to uplift, out of reach of the river, resulting in a terrace (Lind and Vachon n.d.).

The majority of faulting in the area is associated with creation of this fold belt during the late Miocene; therefore, they are not considered active for power line design purposes. Faults that are considered active are shown on the Geohazards Map in Appendix A and are discussed in more detail in Section 3.15.4.

The Project area was subject to as many as 40 catastrophic floods during the Pleistocene (18,000-10,000 years ago), as a result of glaciers damming and releasing the Clark Fork River in northern Idaho and Montana. At Wallula Gap, south of the Tri-Cities, the constricted topography trapped the flooding water, allowing it to back up into the Project area where sediments settled onto hillsides, terraces, and valleys (Lind and Vachon n.d.). Evidence of these events on Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) consists of backwater deposits of granite erratics, silts, sands, and gravel.

More recently, during the late Pleistocene (10,000 years ago), the continental and alpine glaciers melted back, releasing large amounts of water and trapped sediment. Windblown glacial silt, called loess, was deposited in a thick layer across eastern Washington. Loess comprises the primary component of the rich, silt-loam soils of the area (Lind and Vachon n.d.).

3.15.2.2 Geologic Hazards

Topography in the Project area consists of gently rolling to moderate hilly plateaus and steep slopes from Umtanum Ridge, MR, and the Saddle Mountain Ridges to the Columbia River. Elevations in the Project area range from 490 to 3,400 feet above sea level.

Geologic hazards in the Project area generally consist of Quaternary faults and their associated seismogenic events such as earthquakes, liquefaction, and landslide susceptibility. Earthquakes are the expression of large energy releases that result from sudden movement along faults. Quaternary faults are considered active and therefore are likely to have earthquakes occur along their length in the future. The U.S. Geological Survey (USGS) measures seismicity as the probability an area would be affected by a damaging earthquake. It is measured as the probability of a certain degree of ground shaking in terms of the percentage of acceleration due to gravity.

In accordance with the National Electric Safety Code (NESC), the Proponent is required to consider the potential for seismic activity in the design of transmission structures and facilities and must construct the transmission structures and substation facilities to withstand seismic forces. The Project area is located in a moderately active seismic region of Washington designated by the Uniform Building Code as Seismic Zone 2B, which is the middle of the scale.

The USGS Quaternary Fault and Fold Database (part of the Earthquake Hazards Program) and data obtained from WDGER were reviewed to identify potentially hazardous faults near the Project area. Active faults identified in close proximity to the NNR and MR included Umtanum Ridge-Gable Mountain-Associated Structure Faults (crossing the Project at Segment NNR-3) and Saddle Mountains-Associated Structure Faults (Segments NNR-4, NNR-6, NNR-7, NNR-8, and MR-1). All of the structure faults within two miles of the Project are considered to be of indeterminate age at this time and are therefore classified as Class B structures. This classification indicates further study would need to be conducted to determine whether the structures are Quaternary in age and therefore considered active. Both of these fault systems are thrust faults associated with anticlines and both show evidence of quaternary-age movement along some portion of the fault systems, but not along the structure faults that are in close proximity to the Project. The nearest fault with evidence of quaternary movement is a concealed trace of the Saddle Mountains Fault, lying just east of the Columbia River approximately three miles from Route Segment NNR-8. Two additional faults lie within the six-mile wide study corridor—the class B Hanson Creek Fault, running approximately three miles south of the Saddle Mountains and the class B Frenchman Hills Structure Fault to the North of the Project. All of these faults are shown on the Geohazards Map in Appendix A.

Liquefaction occurs when soils lose shear strength and deform during an earthquake, acting like quicksand which is capable of causing great damage to structures in the area. Liquefaction typically occurs in areas of loose sandy soils that are saturated with water, such as low-lying coastal areas, lakeshores, and river valleys. Liquefaction susceptibility maps have been prepared for each county in the state of Washington, including Yakima, Grant, Benton and Kittitas counties (WDGER 2010a). These maps provide an estimate of the likelihood that soil will liquefy as a result of earthquake shaking based on the physical characteristics of the soil (e.g., grain texture, compaction, and depth of groundwater). Liquefaction susceptibility maps depict the relative hazard in terms of low, low to moderate, and moderate to high liquefaction susceptibility (Appendix A - Geohazards Map). The risk of liquefaction is extremely low to low throughout most of the Project area. The few exceptions include: 1) moderate-to-high susceptibility in two alluvium deposits—one large deposit along the Columbia River in Route Segment NNR-8 and one small deposit in NNR-2 and 2) low-to-moderate susceptibility within landslide deposits—several small deposits along Route Segment NNR-6, one large deposit along MR-1, and one small deposit along Segment NNR-7.

Landslides are the downward and outward movement of earth materials on a slope through sliding or flowing along a slope failure plane. The slope failure can be a result of one or more of the following: ground saturation; ground shaking; removal of the 'toe' of the feature; and loading the upslope end of the feature. Landslides in the Project area have been identified by the WDGER (WDGER 2010b). Historical and Quaternary landslide deposits are shown on the Geohazards map in Appendix A. These landslide features include several small deposits along Route Segment NNR-6 and one small deposit along Segment NNR-7. These features are of unknown age, but aerial photo review indicates they are not currently active. While stable Quaternary landslide features are constructed upon regularly, to maintain the stability of these features, field review and determination of Best Management Practices (BMPs) for these two areas would be prudent.

3.15.2.3 Soils

The soil types present in the Project area can be generally divided into three groups:

- Soils found on alluvial fans;
- Soils found on uplands, hillslopes, ridgetops and benches; and
- Soils found on terraces, floodplains, escarpments and channeled scablands.

The parent materials for alluvial fan soils primarily consist of loess and alluvium. These soils are well drained and their slopes range from 0 to 30 percent. The main land uses that overlay this soil group are military training and grazing. Limitations to the use of these soils include hard pan, salt accumulation, and the potential for water erosion.

The parent materials for upland, hillslope, ridgetop, and bench soils primarily consist of loess, alluvium, residuum derived from basalt, colluvium derived from basalt and loess derived from basalt. These soils are well drained to somewhat excessively drained and they are generally steeper than alluvial fan soils, with slopes ranging from 0 to 60 percent. The main uses that overlay this soil group are military training and grazing. Limitations to the use of these soils include slope, depth to bedrock, rock fragments and the potential for water erosion.

The parent materials for terrace, floodplain, escarpment, and Channeled Scabland soils primarily consist of alluvium, loess, eolian sands, lake sediments and old alluvium. These soils are well drained to excessively drained and they are also generally steeper than alluvial fan soils, with slopes ranging from 0 to 60 percent. The main uses that overlay this soil group are military training and grazing. Limitations to the use of these soils include salt accumulation, depth to bedrock and slope.

Ground disturbance, changes in grade, and changes in soil stability from construction activities can significantly impact soils susceptible to wind and water erosion. The NRCS considers slope and soil properties such as cohesion, drainage, and organic content in determining soil erosion potential of soils.

The NRCS data classifies water erosion potential (K factor without rock fragments) on a scale from 0.10 to 0.64, with 0.10 having the lowest water erosion potential and 0.64 having the highest water erosion potential. In this analysis, water erosion potential from 0.10 to 0.28 is classified as low, water erosion potential from 0.29 to 0.46 is classified as moderate, and water erosion potential from 0.47 to 0.64 is classified as high. Water erosion potential for each route segment is discussed in Section 3.15.5. Water erosion potential for the Project area is presented on the Soil Erosion Potential by Water Map in Appendix A.

The NRCS data provided classifies wind erosion potential (i.e., Wind Erodibility Index) on a scale from 0 to 250, with 0 having the lowest wind erosion potential, and 250 having the highest wind erosion potential. In this analysis, wind erosion potential from 0 to 50 is classified as low, wind erosion potential from 51 to 100 is classified as moderate, and wind erosion potential from 101 to 250 is classified as high. Wind erosion potential for each zone is discussed in Section 3.15.4. Wind erosion potential for the Project area is presented on the Soil Erosion Potential by Wind Map in Appendix A.

Soils with the ability to recover from degradation will have the best potential for revegetation and restoration once a construction project has been completed. Soil resilience is dependent upon adequate stores of organic matter, good soil structure, low salt and sodium levels, adequate nutrient levels, microbial biomass and diversity, adequate precipitation for recovery, and other soil properties. The NRCS provides soil restoration potential ratings for each soil type, from low to high restoration potential. Soil restoration potential for each route segment is discussed in Section 3.15.4. Soil restoration potential for the Project area is shown on both the Soil Erosion Potential by Water and Soil Erosion Potential by Wind Maps in Appendix A.

Soil details for each route segment, including water erosion potential, wind erosion potential and soil restoration potential are shown in Table 3.15-1. Descriptions of each soil series represented in soil types within the route segments are shown in Table 3.15-2.

3.15.3 Current Management Considerations

Pertinent laws, ordinances, regulations, and standards governing soil resources and geological hazards are summarized and discussed below.

Soil and Water Resources Conservation Act of 1977
Legislation providing for the collection and analysis of soil and related resource data and the appraisal of the status, condition, and trends for these resources. The Act (16 United States Code [U.S.C.] §2001 et seq.) provides for the U.S. Department of Agriculture (USDA) to possess information, technical expertise, and a system for providing assistance to land users with respect to conservation and use of soils, plants, woodlands, watershed protection, and related resource uses. The full suite of regulations promulgated by the USDA under this Act is available at 7 Code of Federal Regulations (CFR) Parts 600-699.

Washington State Environmental Policy Act
The Washington State Environmental Policy Act (SEPA), Chapter 43.21c Revised Code of Washington (RCW) provides the framework for agencies to consider the environmental consequences of a proposal before taking action. It also gives agencies the ability to condition a proposal due to identified likely significant adverse impacts. The Act is implemented through the SEPA Rules, Chapter 197-11 Washington Administrative Code (WAC).

Environmental review is required for any proposal which involves a government "action", as defined in the SEPA Rules (WAC 197-11-704) and is not categorically exempt (WAC 197-11-800 through 890). Project actions involve an agency decision on a specific project, such as a construction project or timber harvest. Non-project actions involve decisions on policies, plans, or programs, such as the adoption of a comprehensive plan or development regulations.

The SEPA review and checklist require an evaluation of unstable soils, evidence of past landslides, erosion potential, and other geologic hazards.

The Institute of Electrical and Electronics Engineers
The Institute of Electrical and Electronics Engineers (IEEE) 693 *Recommended Practices for Seismic Design of Substations* was developed by the Substations Committee of the IEEE Power Engineering Society, and approved by the American National Standards Institute and the IEEE-SA Standards Board. This document provides seismic design recommendations for substations and equipment consisting of seismic criteria, qualification methods and levels, structural capacities, performance requirements for equipment operation, installation methods, and documentation. This recommended practice emphasizes the qualification of electrical equipment.

IEEE 693 is intended to establish standard methods of providing and validating the seismic withstand capability of electrical substation equipment. It provides detailed test and analysis methods for each type of major equipment or component found in electrical substations. This recommended practice is intended to assist the substation user or operator in providing substation equipment that will have a high probability of withstanding seismic events to predefined ground acceleration levels. It establishes standard methods of verifying seismic withstand capability, which gives the substation designer the ability to select equipment from various manufacturers, knowing that the seismic withstand rating of each manufacturer's equipment is an equivalent measure. Although most damaging seismic activity occurs in limited areas, many additional areas could experience an earthquake with forces capable of causing damage. This recommended practice should be used in all areas that may experience earthquakes.

2009 International Building Code
Published by the International Code Council, the 2009 International Building Code (IBC) is used by the state of Washington and local jurisdictions. The purpose and subject matter of the IBC include comprehensive provisions regulating construction aspects of building and providing uniform standards for the purpose of protecting health, safety and general welfare.

Yakima Critical Areas Ordinance
The Washington State Growth Management Act identifies Critical Areas. Critical areas established in each Washington State county in accordance with RCW 36.70A.170. The Yakima County Critical Areas Ordinance regulates geo-hazards within the county. Crossing of these areas in Yakima County may require a Critical Areas Permit.

3.15.4 NNR Route Segment-Specific Considerations

The study areas for geologic hazards for each route segment consisted of a six-mile wide corridor (three miles on either side of the route segment centerlines). The study areas for soils characterization for each route segment consisted of a 500 foot-wide corridor (250 feet either side of the alternative route segment centerlines).

3.15.4.1 Route Segment NNR-1

Route Segment NNR-1 lies just north of the western-most end of Yakima Ridge, an east-west trending anticline. No significant geologic hazards are present. The nearest identified fault trace lies approximately four miles away. While moderate-to-high liquefaction susceptibility lies along the Yakima River within a quarter-mile of the Pomona Heights Substation, the entire right-of-way (ROW) is classified as extremely low to low. A few historic and/or quaternary landslide deposits lie within the six-mile study corridor, but not within the ROW. The ROW crosses five intermittent/ephemeral creek washes.

The 144.9-acre soils characterization study area for NNR-1 contains 132.2 acres of soils with high water erosion potential, zero acres of soils with high wind erosion potential, and 44.5 acres of soils with low soil restoration potential.

3.15.4.2 Route Segment NNR-2

Route Segment NNR-2 runs through developed areas, approximately half-mile east of the Yakima River. One thin strip of moderate to high liquefaction susceptibility lies along a creek that passes through the ROW. Class B Structure Faults associated with the Umtanum Ridge-Gable Mountain Fault, pass through the three-mile corridor—the nearest is approximately 1.5 miles from the ROW. A few historic and/or quaternary landslide deposits lie within the six-mile study corridor, but not within the ROW. The ROW crosses two intermittent/ephemeral creek washes.

The 303.5-acre soils characterization study area for NNR-2 contains 181.7 acres of soils with high water erosion potential, zero acres of soils with high wind erosion potential, and 33.2 acres of soils with low soil restoration potential.

3.15.4.3 Route Segment NNR-3

Route Segment NNR-3 crosses Umtanum Ridge, an east-west trending anticline, west of I-82. The ROW crosses several Class B structure faults associated with the Umtanum Ridge-Gable Mountain Fault System. The six-mile study corridor contains a few strips of moderate to high liquefaction susceptibility along rivers and creeks, but none pass through the ROW. Several historic and/or quaternary landslide deposits lie within the six-mile study corridor, but not within the ROW. The ROW crosses three intermittent/ephemeral creek washes.

The 562.0-acre soils characterization study area for NNR-3 contains 36.2 acres of soils with high water erosion potential, zero acres of soils with high wind erosion potential, and 135.1 acres of soils with low soil restoration potential.

3.15.4.4 Route Segment NNR-4

Route Segment NNR-4 crosses MR, east of I-82. The ROW crosses a Class B structure fault associated with the Saddle Mountains Fault System. The ROW is all classified as extremely low to low liquefaction susceptibility and crosses no landslide deposits—the six mile corridor contains a few small landslide deposits and pockets of low-to-moderate liquefaction susceptibility. The ROW crosses four intermittent/ephemeral creek washes.

The 274.9-acre soils characterization study area for NNR-4 contains 9.5 acres of soils with high water erosion potential, zero acres of soils with high wind erosion potential, and 20.9 acres of soils with low soil restoration potential.

3.15.4.5 Route Segment NNR-5

The short Route Segment NNR-5 skirts the southern edge of Badger Pocket, a small low area surrounded by MR, the Saddle Mountains, and the Boylston Mountains. The six-mile corridor contains a few Class B structure faults associated with the Saddle Mountains Fault System. The ROW is all classified as extremely low to low liquefaction susceptibility and crosses no landslide deposits—the six mile corridor contains a few small landslide deposits. The ROW crosses two intermittent/ephemeral creek washes.

The 107.9-acre soils characterization study area for NNR-5 contains 38.7 acres of soils with high water erosion potential, zero acres of soils with high wind erosion potential, and 0.8 acre of soils with low soil restoration potential.

3.15.4.6 Route Segment NNR-6

The Route Segment NNR-6 crosses the Saddle Mountains, an anticline feature, and traverses the mountain's northern slopes. The route roughly follows the Class B Saddle Mountains Fault System and associated structure faults. Along the north-facing slopes of the Mountains, the ROW passes through several historic/quaternary landslide deposits. Recent movement was not evident in aerial photography; however, to maintain the stability of these features field review and determination of BMPs for this area would be prudent. The landslide deposits are classified as low to moderate liquefaction susceptibility. The six-mile corridor contains one small strip of moderate to high liquefaction susceptibility along Johnson Creek. The ROW crosses five intermittent/ephemeral creek washes.

The 390.5-acre soils characterization study area for NNR-6 contains 31.1 acres of soils with high water erosion potential, zero acres of soils with high wind erosion potential, and 12.4 acres of soils with low soil restoration potential.

3.15.4.7 Route Segment NNR-7

Route Segment NNR-7 traverses along the Saddle Mountain's northern slopes. The route roughly follows the Class B Saddle Mountains Fault System and associated structure faults. The six-mile corridor contains several small historic/quaternary landslide deposits and the ROW passes through one of them. Recent movement was not evident in aerial photography; however, to maintain the stability of these features field review and determination of BMPs for this area would be prudent. The landslide deposits are classified as low to moderate liquefaction susceptibility. The six-mile corridor contains a few small strip of moderate to high liquefaction susceptibility along creeks. The ROW crosses 13 intermittent/ephemeral creek washes.

The 498.6-acre soils characterization study area for NNR-7 contains 8.6 acres of soils with high water erosion potential, zero acres of soils with high wind erosion potential, and 127.3 acres of soils with low soil restoration potential.

3.15.4.8 Route Segment NNR-8

The short Route Segment NNR-8 crosses the Columbia River just north of the Saddle Mountains and ends at the Vantage Substation. The six-mile corridor contains several Class B structure faults associated with the Saddle Mountains Fault System. The portion of the fault lying east of the Columbia River is Class A—considered late Quaternary in age (<130,000 years) and ends just within the six-mile corridor. As Route Segment NNR-8 crosses the Columbia River, there are significant areas mapped as exhibiting moderate to high liquefaction potential. There are no ephemeral/intermittent stream crossings or landslide deposits near NNR-8.

The 167.8-acre soils characterization study area for NNR-8 contains zero acres of soils with high water erosion potential, 113.0 acres of soils with high wind erosion potential, and 132.8 acres of soils with low soil restoration potential.

3.15.4.9 Route Segment MR-1

The Route Segment MR-1wraps around MR and crosses the ridge at I-82. The ROW crosses a Class B structure fault associated with the Saddle Mountains Fault System. The six-mile corridor contains several historic/quaternary landslide deposits and the ROW passes through one large deposit. Recent movement was not evident in aerial photography; however, to maintain the stability of these features field review and determination of BMPs for this area would be prudent. The landslide deposits are classified as low-to-moderate liquefaction susceptibility. The ROW crosses 22 intermittent/ephemeral creek washes.

The 710.4-acre soils characterization study area for MR-1 contains 22.0 acres of soils with high water erosion potential, zero acres of soils with high wind erosion potential, and 60.7 acres of soils with low soil restoration potential.

TABLE 3.15-1 SOIL UNITS BY ROUTE SEGMENT

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	AREA (acres)	SOIL RESTORATION POTENTIAL
NNR-1				
Ritzville silt loam, 8 to 15 percent slopes	High	Moderate	83.3	Moderate
Kiona stony silt loam, 15 to 45 percent slopes	High	Low	31.9	Low
Roza clay loam, 15 to 30 percent slopes	Low	Moderate	11.7	Moderate
Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes	High	Moderate	7.5	Low
Harwood-Burke-Wiehl silt loams, 2 to 5 percent slopes	High	Moderate	5.1	Low
Esquatzel silt loam, 0 to 2 percent slopes	High	Moderate	4.4	Moderate
Meloza-Roza complex, 15 to 30 percent slopes	Low	Low	1.0	Moderate
NNR-2				
Willis silt loam, 2 to 5 percent slopes	High	Moderate	90.8	Moderate
Selah silt loam, 10 to 15 percent slopes	Moderate	Moderate	37.4	Moderate
Meloza-Roza complex, 15 to 30 percent slopes	Low	Low	34.4	Moderate
Willis silt loam, 8 to 15 percent slopes	High	Moderate	25.6	Moderate
Willis silt loam, 2 to 5 percent slopes	High	Moderate	24.8	Moderate
Esquatzel-Weirman complex, channeled, 0 to 2 percent slopes	High	Moderate	19.1	Moderate
Scoon loam, 5 to 10 percent slopes	Moderate	Moderate	12.2	Low
Rock Creek very stony silt loam, 0 to 30 percent slopes	Moderate	Low	12.1	Low
Scoon silt loam, 8 to 15 percent slopes	High	Moderate	6.7	Moderate
Meloza-Roza complex, 10 to 15 percent slopes	Low	Low	6.2	Moderate
Drysel loam, 5 to 10 percent slopes	Moderate	Moderate	5.9	Low
Willis silt loam, 8 to 15 percent slopes	High	Moderate	5.0	Moderate
Esquatzel silt loam, 0 to 2 percent slopes	High	Moderate	4.4	Moderate
Meloza-Roza complex, 5 to 10 percent slopes	Low	Low	4.3	Moderate
Roza clay loam, 15 to 30 percent slopes	Low	Moderate	3.7	Moderate
Scoon silt loam, 5 to 8 percent slopes	High	Moderate	2.5	Moderate
Esquatzel silt loam, 0 to 2 percent slopes	High	Moderate	2.4	Moderate
Roza clay loam, 8 to 15 percent slopes	Low	Moderate	1.5	Moderate
Roza clay loam, 5 to 8 percent slopes	Low	Moderate	1.3	Moderate
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	1.3	Low
Rock Creek very stony silt loam, 0 to 30 percent slopes	Moderate	Low	1.2	Low
Fortyday-Drino-Nevo complex, 15 to 30 percent slopes	Moderate	Low	0.4	Low
Ralock silt loam, 15 to 30 percent slopes	High	Moderate	0.3	High

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	AREA (acres)	SOIL RESTORATION POTENTIAL
Kiona stony silt loam, 15 to 45 percent slopes	High	Low	0.1	Low
Palerf-Ralock-Vantage complex, 15 to 30 percent slopes	Moderate	Low	0.0	High
NNR-3				
Ralock-Palerf complex, 30 to 45 percent slopes	Moderate	Moderate	59.9	High
Clerf very cobbly loam, 30 to 45 percent slopes	Low	Low	51.7	Moderate
Rock Creek very stony silt loam, 0 to 30 percent slopes	Moderate	Low	42.1	Low
Rubble land-Rock outcrop complex, 60 to 120 percent slopes	Low	Low	41.7	Not Rated
Vantage very cobbly loam, 3 to 15 percent slopes (m)	Moderate	Low	39.0	Moderate
Argabak-Vantage complex, 3 to 15 percent slopes	Moderate	Low	32.2	Low
Marlic-Zen-Laric complex, 3 to 15 percent slopes	Moderate	Low	28.1	Moderate
Vantage very cobbly loam, 3 to 15 percent slopes	Moderate	Low	26.5	Moderate
Rubbleland-Rock outcrop association	Low	Low	24.0	Not Rated
Ralock-Palerf complex, 15 to 30 percent slopes	Moderate	Moderate	20.1	High
Clerf very cobbly loam, 15 to 30 percent slopes	Low	Low	18.7	Moderate
Argabak very cobbly loam, 15 to 30 percent slopes	Moderate	Low	14.4	Low
Vantage-Clerf complex, 30 to 70 percent slopes	Moderate	Low	14.3	Moderate
Argabak very cobbly loam, 3 to 15 percent slopes	Moderate	Low	14.1	Low
Niben-Vantage-Benwy complex, 15 to 30 percent slopes	Moderate	Low	13.9	High
Scoon silt loam, 5 to 8 percent slopes	High	Moderate	12.7	Moderate
Selah-Terlan complex, 10 to 15 percent slopes	Moderate	Moderate	12.4	Moderate
Palerf-Vantage complex, 15 to 30 percent slopes	Moderate	Low	12.4	High
Wipple cobbly clay loam, 30 to 45 percent slopes	Low	Low	8.7	Moderate
Vantage-Clerf-Wipple complex, 15 to 30 percent slopes	Moderate	Low	7.2	Moderate
Vantage-Clerf complex, 3 to 15 percent slopes	Moderate	Low	7.0	Moderate
Vantage-Clerf complex, 15 to 30 percent slopes	Moderate	Low	6.6	Moderate
Nevo complex, 3 to 15 percent slopes	High	Low	6.5	Low
Kiona-Rubble land complex, 30 to 75 percent slopes	Moderate	Low	6.3	Low
Rock Creek very stony silt loam, 0 to 30 percent slopes	Moderate	Low	6.2	Low
Argabak-Zen-Grinrod complex, 3 to 15 percent slopes	Moderate	Low	6.1	Low
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	5.8	Low
Grinrod-Horseflat complex, 45 to 60 percent slopes	Moderate	Low	5.0	Moderate
Esquatzel silt loam, 0 to 2 percent slopes	High	Moderate	4.8	Moderate
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	High	Moderate	3.9	Moderate
Willis silt loam, 8 to 15 percent slopes	High	Moderate	2.1	Moderate
Esquatzel-Aquolls-Weirman complex, 0 to 5 percent slopes	High	Moderate	1.9	Moderate
Esquatzel silt loam, 0 to 2 percent slopes	High	Moderate	1.7	Moderate
Esquatzel silt loam, 0 to 2 percent slopes	High	Moderate	1.0	Moderate
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	High	Moderate	0.7	Low
Scoon loam, 5 to 10 percent slopes	Moderate	Moderate	0.7	Low
Willis silt loam, 5 to 8 percent slopes	High	Moderate	0.7	Moderate
Norod-Horseflat complex, 45 to 60 percent slopes	Moderate	Low	0.6	High
Vantage very cobbly loam, 3 to 15 percent slopes	Moderate	Low	0.2	Moderate
Neviot-Palerf-Vantage complex, 30 to 60 percent slopes	Moderate	Low	0.0	High
NNR-4				
Vantage very cobbly loam, 3 to 15 percent slopes	Moderate	Low	37.4	Moderate
Marlic-Zen-Laric complex, 3 to 15 percent slopes	Moderate	Low	29.1	Moderate
Selah silt loam, 2 to 5 percent slopes	Moderate	Moderate	28.9	Moderate
Vantage-Clerf complex, 15 to 30 percent slopes	Moderate	Low	28.3	Moderate
Manastash-Durtash complex, 5 to 10 percent slopes	Moderate	Low	22.6	Moderate
Meloza-Roza complex, 5 to 10 percent slopes	Low	Low	16.4	Moderate
Vantage very cobbly loam, 15 to 30 percent slopes	Moderate	Low	13.5	Moderate

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	AREA (acres)	SOIL RESTORATION POTENTIAL
Argabak-Zen-Grinrod complex, 3 to 15 percent slopes	Moderate	Low	13.3	Low
Zen-Marlic-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	11.5	Moderate
Clerf very cobbly loam, 30 to 45 percent slopes	Low	Low	9.5	Moderate
Benwy silt loam, 10 to 15 percent slopes	High	Moderate	9.5	Moderate
Selah loam, 2 to 5 percent slopes	Moderate	Moderate	9.1	Moderate
Vantage-Clerf complex, 3 to 15 percent slopes	Moderate	Low	8.5	Moderate
Zen silt loam, 10 to 15 percent slopes	Moderate	Moderate	8.5	Moderate
Manastash loam, 2 to 5 percent slopes	Moderate	Low	6.8	Moderate
Vantage-Clerf complex, 15 to 30 percent slopes	Moderate	Low	4.7	Moderate
Selah loam, 5 to 10 percent slopes	Moderate	Moderate	3.9	Moderate
Argabak very cobbly loam, 3 to 15 percent slopes	Moderate	Low	3.6	Low
Argabak-Vantage complex, 3 to 15 percent slopes	Moderate	Low	2.9	Low
Norod-Ralock-Horseflat complex, 45 to 60 percent slopes	Moderate	Low	2.3	High
Clerf very cobbly loam, 15 to 30 percent slopes	Moderate	Low	1.7	Moderate
Argabak very cobbly loam, 15 to 30 percent slopes	Moderate	Low	0.9	Low
Clerf very cobbly loam, 15 to 30 percent slopes	Low	Low	0.6	Moderate
Meloza-Roza complex, 15 to 30 percent slopes	Low	Low	0.6	Moderate
Ralock-Palerf complex, 30 to 45 percent slopes	Moderate	Moderate	0.5	High
Argabak very cobbly loam, 3 to 15 percent slopes	Moderate	Low	0.1	Low
NNR-5				
Terlan-Durtash-Selah complex, 2 to 5 percent slopes	Moderate	Moderate	55.0	Moderate
Benwy silt loam, 5 to 10 percent slopes	High	Moderate	35.2	Moderate
Vantage very cobbly loam, 3 to 15 percent slopes	Moderate	Low	8.7	Moderate
Esquatzel-Weirman complex, channeled, 0 to 2 percent slopes	High	Moderate	2.8	Moderate
Benwy silt loam, 5 to 10 percent slopes	Moderate	Moderate	2.0	Moderate
Selah silt loam, 5 to 10 percent slopes	Moderate	Moderate	1.6	Moderate
Laric-Zen complex, 3 to 15 percent slopes	Moderate	Low	1.4	Not Rated
Esquatzel-Weirman complex, 0 to 2 percent slopes	High	Moderate	0.8	Low
Vantage-Benwy-Argabak complex, 3 to 15 percent slopes	Moderate	Low	0.3	Moderate
Argabak-Zen-Grinrod complex, 3 to 15 percent slopes	Moderate	Low	0.2	Moderate
Terlan-Durtash-Selah complex, 2 to 5 percent slopes	Moderate	Low	0.1	Moderate
NNR-6				
Camaspatch-Tanksel-Lainand complex, 45 to 60 percent slopes	Moderate	Low	89.6	High
Vantage very cobbly loam, thin, 3 to 15 percent slopes	Moderate	Low	55.6	Moderate
Camaspatch very cobbly loam, thin, 3 to 15 percent slopes	Moderate	Low	25.5	Moderate
Laric-Zen complex, 3 to 15 percent slopes	Moderate	Low	20.3	Not Rated
Vantage-Clerf complex, 15 to 30 percent slopes	Moderate	Low	16.1	Moderate
Camaspatch-Tanksel complex, 30 to 45 percent slopes	Moderate	Low	15.7	Moderate
Vantage very cobbly loam, 15 to 30 percent slopes	Moderate	Low	14.1	Moderate
Vantage very cobbly loam, 3 to 15 percent slopes	Moderate	Low	13.8	Moderate
Tanskel-Patron-Camaspatch complex, 15 to 30 percent slopes	Low	Low	13.0	High
Ralock-Palerf complex, 30 to 45 percent slopes	High	Moderate	12.6	High
Wipple cobbly clay loam, 3 to 15 percent slopes	Low	Low	12.4	Low
Camaspatch-Whiskeydick complex, 45 to 60 percent slopes	Moderate	Low	12.1	Moderate
Benwy silt loam, 5 to 10 percent slopes	High	Moderate	10.3	Moderate
Vantage-Clerf complex, 3 to 15 percent slopes	Moderate	Low	9.5	Moderate
Zen-Benwy-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	8.5	Moderate
Camaspatch very cobbly loam, 15 to 30 percent slopes	Moderate	Low	8.4	Moderate
Ralock-Palerf complex, 15 to 30 percent slopes	High	Moderate	8.2	High
Vantage-Clerf complex, 30 to 45 percent slopes	Moderate	Low	7.7	Moderate
Lainand-Tanksel complex, 30 to 45 percent slopes	Low	Low	7.6	High

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	AREA (acres)	SOIL RESTORATION POTENTIAL
Palerf-Ralock-Vantage complex, 15 to 30 percent slopes	Moderate	Low	7.0	High
Tanksel-Wockum complex, 30 to 45 percent slopes	Low	Low	6.3	High
Terlan-Durtash-Selah complex, 2 to 5 percent slopes	Moderate	Moderate	3.8	Moderate
Grinrod-Horseflat complex, 45 to 60 percent slopes	Moderate	Low	3.1	Moderate
Norod-Ralock-Horseflat complex, 45 to 60 percent slopes	Moderate	Low	3.0	High
Terlan gravelly loam, 2 to 5 percent slopes	Moderate	Low	2.9	Moderate
Terlan-Durtash-Selah complex, 5 to 15 percent slopes	Moderate	Moderate	2.1	Moderate
Camaspatch-Whiskeydick complex, 30 to 45 percent slopes	Moderate	Low	1.0	Moderate
Vantage-Clerf-Rubble land complex, 30 to 45 percent slopes	Moderate	Low	0.4	Moderate
Zen-Marlic-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	0.0	Moderate
NNR-7				
Marlic-Zen-Laric complex, 3 to 15 percent slopes	Moderate	Low	71.0	Moderate
Drysel loam, 5 to 10 percent slopes	Moderate	Moderate	51.6	Low
Zen-Benwy-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	47.3	Moderate
Palerf-Ralock-Vantage complex, 15 to 30 percent slopes	Moderate	Low	47.3	High
Selah silt loam, 5 to 10 percent slopes	Moderate	Moderate	42.2	Moderate
Selah silt loam, 10 to 15 percent slopes	Moderate	Moderate	41.1	Moderate
Disage-Clenage complex, 15 to 30 percent slopes	Moderate	Low	22.3	Not Rated
Laric-Zen complex, 3 to 15 percent slopes	Moderate	Low	20.3	Not Rated
Norod-Horseflat complex, 15 to 30 percent slopes	Moderate	Low	19.3	High
Timmerman complex, 2 to 5 percent slopes	Low	Moderate	17.8	Low
Zen-Marlic-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	15.6	Moderate
Brehm-Gorskel-Gorst complex, 10 to 15 percent slopes	Moderate	Moderate	13.7	Moderate
Finley complex, 3 to 15 percent slopes	Low	Moderate	10.1	Low
Nosser-Levnik complex, 3 to 15 percent slopes	Moderate	Low	10.0	Low
Wanapum complex, 5 to 10 percent slopes	Moderate	Low	9.8	Low
Vantage-Clerf complex, 15 to 30 percent slopes	Moderate	Low	9.0	Moderate
Argabak very stony loam, 3 to 15 percent slopes	Moderate	Low	8.0	Low
Argabak very cobbly loam, 3 to 15 percent slopes	Moderate	Low	7.9	Low
Norod-Horseflat complex, 30 to 45 percent slopes	Moderate	Low	7.7	High
Fortyday-Nevo-Rock outcrop, 3 to 15 percent slopes	Low	Moderate	5.9	Low
Ralock-Palerf complex, 30 to 45 percent slopes	High	Moderate	5.0	High
Vantage very cobbly loam, thin, 3 to 15 percent slopes	Moderate	Low	4.3	Moderate
Drino-Disage-Kiona complex, 30 to 45 percent slopes	Moderate	Low	4.3	Low
Ralock-Palerf complex, 15 to 30 percent slopes	High	Moderate	3.7	High
Drino cobbly loam, 15 to 30 percent slopes	Moderate	Low	1.7	Low
Norod-Ralock-Horseflat complex, 30 to 45 percent slopes	Moderate	Moderate	1.1	High
Vantage-Clerf complex, 30 to 45 percent slopes	Moderate	Low	0.2	Moderate
Norod-Ralock-Horseflat complex, 45 to 60 percent slopes	Moderate	Low	0.1	High
Vantage very cobbly loam, 15 to 30 percent slopes	Moderate	Low	0.1	Moderate
Drino-Rubble land-Rock outcrop complex, 30 to 75 percent north slopes	Low	Low	0.1	Not Rated
Grinrod-Horseflat complex, 15 to 30 percent slopes	Moderate	Low	0.1	Moderate
NNR-8				
Schawana complex, 0 to 15 percent slopes	Low	High	66.0	Low
Burbank loamy fine sand, 0 to 5 percent slopes	Low	High	47.0	Low
Fortyday-Nevo-Rock outcrop, 3 to 15 percent slopes	Low	Moderate	15.2	Low
Water	Low	Low	14.4	Not Rated
Water	Low	Low	12.0	Not Rated
Fortyday-Rubble land-Rock outcrop complex, 45 to 70 percent slopes	Low	Low	8.7	Not Rated

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	AREA (acres)	SOIL RESTORATION POTENTIAL
Burbank very cobbly loamy sand, 0 to 15 percent slopes	Low	Moderate	4.6	Low
MMR-1				
Rollinger silt loam, 10 to 15 percent slopes	Moderate	Moderate	190.6	High
Argabak-Vantage complex, 3 to 15 percent slopes	Moderate	Low	41.3	Low
Wipple cobbly clay loam, 15 to 30 percent slopes	Low	Low	34.3	Moderate
Vantage-Clerf complex, 15 to 30 percent slopes	Moderate	Low	29.3	Moderate
Zen-Marlic-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	28.1	Moderate
Wipple cobbly clay loam, 30 to 45 percent slopes	Low	Low	26.2	Moderate
Rollinger silt loam, 5 to 10 percent slopes	Moderate	Moderate	25.7	High
Niben-Vantage-Benwy complex, 15 to 30 percent slopes	Moderate	Low	25.3	High
Clerf very cobbly loam, 30 to 45 percent slopes	Low	Low	23.4	Moderate
Rollinger silt loam, 45 to 60 percent slopes	Moderate	Moderate	23.0	High
Vantage very cobbly loam, 3 to 15 percent slopes	Moderate	Low	22.7	Moderate
Manastash-Selah-Durtash complex, 15 to 30 percent slopes	Moderate	Moderate	22.2	Moderate
Rollinger silt loam, 30 to 45 percent slopes	Moderate	Moderate	21.2	High
Argixerolls-Durixerolls complex, steep south	Low	Low	20.1	Moderate
Marlic-Zen-Laric complex, 3 to 15 percent slopes	Moderate	Low	19.6	Moderate
Clerf very cobbly loam, 15 to 30 percent slopes	Low	Low	17.5	Moderate
Marlic-Zen-Laric complex, 3 to 15 percent slopes	Moderate	Low	16.1	Moderate
Selah silt loam, 5 to 10 percent slopes	Moderate	Moderate	14.7	Moderate
Palerf-Ralock-Vantage complex, 15 to 30 percent slopes	Moderate	Low	13.8	High
Benwy silt loam, 10 to 15 percent slopes	High	Moderate	11.5	Moderate
Rollinger silt loam, 15 to 30 percent slopes	Moderate	Moderate	9.4	High
Grinrod-Horseflat complex, 45 to 60 percent slopes	Moderate	Low	6.9	Moderate
Argabak-Zen-Grinrod complex, 15 to 30 percent slopes	Moderate	Low	6.6	Low
Ralock-Palerf complex, 30 to 45 percent slopes	High	Moderate	6.0	High
Wipple cobbly clay loam, 30 to 45 percent slopes	Low	Low	5.4	Low
Palerf-Ralock-Vantage complex, 30 to 70 percent slopes	Moderate	Low	5.2	High
Ralock-Palerf complex, 30 to 45 percent slopes	Moderate	Moderate	4.7	High
Ralock silt loam, 30 to 45 percent slopes	High	Moderate	4.6	High
Benwy silt loam, 5 to 10 percent slopes	Moderate	Moderate	4.5	Moderate
Cheviot-Rubble land complex, 30 to 75 percent slopes	Low	Low	3.9	Moderate
Vantage-Clerf complex, 30 to 70 percent slopes	Moderate	Low	3.8	Moderate
Argabak extremely cobbly loam, 3 to 15 percent slopes	Moderate	Low	3.8	Low
Argabak very cobbly loam, 3 to 15 percent slopes	Moderate	Low	3.7	Low
Patron-Camaspatch complex, 15 to 30 percent slopes	Moderate	Low	3.5	High
Blint very cobbly loam, 45 to 60 percent slopes	Moderate	Low	3.3	High
Wockum-Blint-Windry complex, 45 to 60 percent slopes	Moderate	Moderate	3.0	High
Vantage very cobbly loam, 3 to 15 percent slopes	Moderate	Low	1.5	Moderate
Rollinger ashy silt loam, 5 to 10 percent slopes	Moderate	Moderate	1.2	High
Grinrod-Horseflat complex, 45 to 60 percent slopes	Moderate	Low	0.7	Moderate
Rollinger ashy silt loam, 10 to 15 percent slopes	Moderate	Moderate	0.7	High
Blint very cobbly loam, 15 to 30 percent slopes	Moderate	Low	0.7	High
Argixerolls-Durixerolls complex, 30 to 70 percent south slopes	Low	Low	0.5	Moderate
Rollinger ashy silt loam, 45 to 60 percent slopes	Moderate	Moderate	0.3	High
Benwy silt loam, 10 to 15 percent slopes	Moderate	Moderate	0.1	Moderate
Blint very cobbly ashy loam, 45 to 60 percent slopes	Low	Low	0.0	High
Selah loam, 5 to 10 percent slopes	Moderate	Moderate	0.0	Moderate

TABLE 3.15-2 SOIL SERIES DESCRIPTIONS

Series	Description
Aquolls	Found on channels on flood plains. The parent materials consist of alluvium. Depth to a root restrictive layer is 20 to >60 inches. The natural drainage class is poorly drained or somewhat poorly drained.
Argabak	Found on structural benches, hillslopes. The parent material consists of loess and residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 5 to 12 inches. The natural drainage class is well drained.
Argixerolls	Found on south-facing alluvial fan escarpments. The parent materials consist of loess and alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Benwy	Found on structural benches, highly dissected fan terraces, hillslopes, backslopes, summits, and footslopes and toeslopes of plateaus. The parent materials consist of loess, colluviums, and alluvium from loess and basalt. Depth to a root restrictive layer, duripan, is 40 to >60 inches. The natural drainage class is well drained.
Blint	Found on upland hillslopes. The parent materials consist of loess mixed with volcanic ash in the surface over basalt colluvium. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained.
Brehm	Found on old alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.
Burbank	Found on outwash terraces. The parent material consists of eolian sands over gravelly glacial outwash. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained.
Burke	Found on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.
Camaspatch	Found on exposed side slopes of ridges and plateaus and on structural benches. The parent material consists of colluvium and residuum from basalt with an influence of loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.
Cheviot	Found on footslopes and sideslopes of canyons and hills. The parent materials consist of colluvium derived from basalt mixed with loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Clenage	Found on ridgetops and hillslopes. The parent materials consist of residuum and colluviums from basalt and interbedded sediments with additions of loess. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained.
Clerf	Found on hillslopes, ridges. The parent material consists of loess, colluvium and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained.
Disage	Found on hillslopes, ridges. The parent material consists of residuum and colluvium from basalt with loess. Depth to a root restrictive layer, bedrock, lithic, is 14 to 20 inches. The natural drainage class is well drained.
Drino	Found on hillslopes. The parent material consists of colluvium from basalt with loess. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained.
Drysel	Found on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.
Durixerolls	Found on south-facing convex areas on alluvial fan escarpments. The parent materials consist of loess and alluvium. Depth to a root restrictive layer, duripan is 10 to 40 inches. The natural drainage class is well drained.
Durtash	Found on alluvial fans. The parent materials consist of loess and alluvium. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.
Esquatzel	Found on flood plains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Finley	Found on terraces, alluvial fans. The parent material consists of alluvium. Depth to a root restrictive layer, strongly contrasting textural stratification, is 20 to 40 inches. The natural drainage class is well drained.
Fortyday	Found on hillslopes, structural benches. The parent material consists of loess, colluvium and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 14 to 20 inches. The natural drainage class is well drained.
Gorskel	Found on old alluvial fans. The parent materials consist of loess and alluvium. Depth to a root restrictive layer is 10 to 20 inches. The natural drainage class is well drained.
Gorst	Found on old alluvial fans. The parent materials consist of loess. Depth to a root restrictive layer is 12 to 20 inches. The natural drainage class is well drained.

Series	Description
Grinrod	Found on footslopes, sideslopes, ridgetops and benches. The parent material consists of residuum and colluvium from basalt with additions from loess. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained.
Harwood	Found on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.
Horseflat	Found on hillslopes, ridges, and structural benches. The parent material consists of colluvium and residuum from basalt and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.
Kiona	Found on hillslopes, hills. The parent material consists of loess and colluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Lainand	Found on hillslopes, sideslopes of ridges, plateaus, and canyons. The parent materials consist of basalt colluviums with an influence of mixed loess and volcanic ash near the surface. Depth to a root restrictive layer, bedrock, lithic, is 40 to >60 inches. The natural drainage class is well drained.
Laric	Found on ridgetops and structural benches. The parent materials consist of loess and residuum weathered from basalt. The depth to a root restrictive layer, bedrock, lithic, is 5 to 12 inches. The natural drainage class is well drained.
Levnik	Found on hillslopes and plateaus. The parent materials consist of residuum weathered from basalt and slope alluvium with additions of loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.
Manastash	Found on fan remnants interspersed with partial ballenas of piedmont slopes and on terrace remnants. The parent materials consist of old alluvium mixed with loess over cemented gravels. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.
Marlic	Found on ridgetops and structural benches. The parent materials consist of loess and slope alluvium over residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.
Meloza	Found on alluvial fans. The parent material consists of fine textured interbedded sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Neviot	Found on hillslopes and canyon walls. The parent materials consist of colluviums from basalt and loess with an influence of volcanic ash near the surface. Depth to a root-restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Nevo	Found on plateaus, hillslopes, ridges, structural benches. The parent material consists of loess and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 5 to 12 inches. The natural drainage class is well drained.
Niben	Found on hillslopes, shoulders, footslopes and plateaus. The parent materials consist of interbedded sediments and slope alluvium with additions of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Norod	Found on hillslopes. The parent material consists of basalt colluviums and loess mixed with volcanic ash near the surface. Depth to a root restrictive layer, bedrock, lithic, is 25 to 40 inches.
Palerf	Found on hillslopes. The parent material consists of residuum and colluvium from basalt, and loess mixed with volcanic ash. Depth to a root restrictive layer, bedrock, lithic, is 25 to 40 inches. The natural drainage class is well drained.
Patron	Found on hillslopes. The parent material consists of residuum and colluviums from basalt and loess with volcanic ash in the surface. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Ralock	Found on north-facing hillslopes and alluvial fans. The parent material consists of loess influenced by volcanic ash and colluviums from basalt, and alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Ritzville	Found on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Rock creek	Found on ridges, plateaus. The parent material consists of residuum from basalt with loess. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is well drained.

Series	Description
Rollinger	Found on north-facing hillslopes and piedmont slopes. The parent materials consist of loess mixed with volcanic ash at the surface and slope alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Roza	Found on alluvial fans. The parent material consists of fine textured interbedded sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Schawana	Found on structural benches, hillslopes. The parent material consists of eolian deposits over residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is somewhat excessively drained.
Scoon	Found on terraces, alluvial fans. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.
Selah	Found on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.
Starbuck	Found on structural benches. The parent material consists of loess and alluvium. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.
Tanksel	Found on hillslopes. The parent material consists of colluvium from basalt, with an influence of loess and volcanic ash in the surface horizons. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained.
Terlan	Found on dissected flat summit, fan terraces, and fan remnants. The parent materials consist of alluvium mixed with loess over a gravelly duripan. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.
Timmerman	Found on outwash plains, terraces. The parent material consists of glacial outwash and alluvium. In some portions of this component, depth to a root restrictive layer, strongly contrasting textural stratification, is 10 to 20 inches. In other places, depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained
Vantage	Found on ridges, hillslopes. The parent material consists of loess, colluvium and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.
Wanapum	Found on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 11 to 19 inches. The natural drainage class is well drained.
Whiskeydick	Found on sideslopes, plateaus, and benches. The parent materials consist of residuum and colluvium from basalt ant minor amounts of loess. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained.
Wiehl	Found on terraces. The parent material consists of eolian deposits over residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained
Willis	Found on uplands. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 30 to 60 inches. The natural drainage class is well drained.
Windry	Found on hillslopes and ridgetops. The parent materials consist of stony colluvium from basalt and loess. Depth to a root restrictive layer, bedrock, lithic, is 14 to 20 inches. The natural drainage class is well drained.
Wipple	Found on hillslopes, footslopes, and structural benches. The parent materials consist of basalt colluviums with additions of loess. Depth to a root restrictive layer is 40 to more than 60 inches. The natural drainage class is well drained.
Wockum	Found on hillslopes. The parent materials consist of loess mixed with volcanic ash in the surface and colluviums from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.
Zen	Found on hill slopes, ridges and benches of dissected basalt plateaus. The parent material consists of loess and slope alluvium above basalt bedrock. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained.

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CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter describes the potential consequences, or impacts, on the environment that could result from the construction, operation, and maintenance of the proposed New Northern Route (NNR) Alternative and Design Options. Also described are the effects of taking no action (No Action Alternative) and a comparison with the Draft Environmental Impact Statement (DEIS) Agency Preferred Alternative. The last sections in this chapter present an evaluation of cumulative effects and the irreversible and irretrievable commitment of resources.

4.1.1 Impact Assessment and Mitigation Planning

The potential environmental consequences from the Project were ascertained through a systematic analysis that included assessing impacts of the Project on the environment and then determining if these impacts could be mitigated.

Implementation of the proposed Project could impact or modify the existing condition of the environment. Impacts from the proposed Project can occur directly, indirectly, or cumulatively. Direct impacts are the result of the physical destruction or degradation of a resource potentially resulting from the proposed Project. An example of a direct impact is the removal and grading of grassland habitat during the construction of a road. Indirect impacts are effects that are somewhat distant from the Project in time, space, or both. A common example of an indirect impact is the introduction and establishment of noxious weeds in newly disturbed soil.

In this analysis, environmental effects that occur during Project construction and would be anticipated to return to a preconstruction condition at or within three to five years following construction were considered short-term impacts. Environmental effects that would be anticipated to remain for the life of the Project (approximately 50 years) were considered long-term impacts. Permanent impacts are those that would be anticipated to remain for the life of the Project and beyond, including irreversible and irretrievable commitment of resources.

The intensity of the environmental effect also can vary. What constitutes a low, moderate, or high impact on a resource varies by resource and assumptions made regarding each. These impacts and impact levels (i.e., low, moderate or high) are described in the effects analysis section for each resource.

4.1.1.1 Identify Ground Disturbance

The purpose of the analysis was to determine the types and amount of ground disturbance that could occur based on the design criteria and typical specifications of the proposed facilities, construction techniques and equipment used, extent and duration of construction, requirements for operation of the transmission line, and activities associated with routine maintenance of the Overhead Design Option. The majority of potential impacts that could occur would result from activities associated with construction, and includes the following:

- Upgrading existing access roads or constructing new roads for access where needed;
- Preparing structure sites;
- Assembling and erecting structures; and
- Stringing conductors (e.g., wire-pulling and splicing sites).

In addition, impacts on some resources would occur following construction from the presence of the transmission line and access roads. Also, periodic maintenance could cause short-term impacts.

The amount of ground that could be disturbed as a result of Project activities was estimated based on the typical design characteristics of this 230 kilovolt (kV) Project (Section 2.4.1). Short-term, long-term, and access road disturbance was estimated and the disturbance model calculations and assumptions are presented in Chapter 2, Section 2.4.3.2. Short-term disturbance included structure work areas for the staging and installation of the tangent H-frame, single pole structures, and angle/dead end structures as well as the conductor pulling and tensioning sites. Long-term disturbance included H-frame, single pole, angle/dead end, and lattice structure base areas as well as work pad areas in slopes over eight percent for equipment stability for structure installation.

The amount of ground that could be disturbed as a result of Project activities for the Underground Design Option is based on industry standards and methods used on other transmission line projects. The description of the construction components, technologies, methods, and disturbance assumptions are based on other projects implemented by utilities that have installed 230 kV underground facilities elsewhere in the United States, and reflect the assumptions detailed in Section 2.4.5.1. These assumptions include contraction of the continuous concrete duct bank, splice vaults every 1,500 feet, and overhead-to-underground transition stations. Access road construction was assumed to be the same for the Overhead Design Option and the Underground Design Option, with a continuous, permanent 24-foot cleared area and permanent 30-foot ROW.

Overhead and Underground Design Option transmission line access for construction would be via a combination of new access roads, overland access, improvement to existing roads and use of existing terrain or roads as is. Where the proposed transmission line would parallel existing transmission lines or other linear utilities, the existing access roads along the existing utilities would be used wherever possible to minimize the amount of new access road construction. In some areas, only temporary roads would be needed. Long-term access roads would be constructed where needed for construction and long-term maintenance. Overland access would occur in areas where no grading would be needed and would be used to the greatest extent possible. Overland travel would consist of “drive and crush” and/or “clear and cut” travel. Drive and crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed but not cropped. Soil is compacted, but no surface soil is removed. Eight levels of access (Levels 0 through 7) were developed and numerically arranged based on the anticipated ground disturbance expected with Level 0 having the lowest level of ground disturbance and Level 7 having the most disturbance (see Table 2-4).

The short-term, long-term, and access road disturbance calculations by route segment and end to end route alternative are presented in Section 2.4.3.2 and Tables 2-7, 2-8, 2-9, 2-10, 2-11, and 2-12.

4.1.1.2 Impact Assessment

Based on the estimated ground disturbance associated with the Project (Chapter 2) and the resource inventory information reflecting the existing environment, each resource specialist determined the types, level, and amount of impacts that could occur on the resource. Computer-assisted models were developed to support this determination, which allowed the method used for each resource to be tailored to specific requirements and assumptions for analysis of each resource. Qualitative and quantitative variables of resource sensitivity, resource quantity, and estimated ground disturbance were considered in predicting the magnitude of impacts. Four levels were established and defined for each resource: high, moderate, low, and no identifiable impact. A high impact could cause substantial change or stress to an environmental resource or use and would generally be considered a significant impact and could be reduced through mitigation; a moderate impact could potentially cause some change or stress to an environmental resource or use ranging between a significant and insignificant impact and could be reduced through mitigation; a low impact could be a detectable but slight change or stress and would generally be considered an insignificant impact; and a no identifiable impact would be considered where there is no measurable impact to the resource. Mitigation measures applied to the Project may reduce impacts, but may not reduce impacts from a high to a moderate level, or from a moderate to a low level. Mitigation measures would not be applied to low level impacts. What constitutes a low, moderate, or high impact on a resource varies by resource as are the assumptions for analysis for each resource.

4.1.1.3 Identify Protection Measures

Project Design Features (PDFs) and environmental protection measures described in Chapter 2 (Section 2.5) were incorporated into the Project design and would be implemented during construction and operation of the proposed Project. The measures were designed to avoid or minimize environmental impacts from Project construction, operation, and maintenance activities. These are items that Pacific Power would be required to implement as part of the Project development. The PDFs were developed in an iterative process that involved conducting the impact analysis and then adding standard operating procedures, environmental protection measures and best management practices to the proposed Project and alternatives as PDFs to address identified impacts.

4.1.1.4 Assess Residual Impacts

Residual impacts are the environmental effects that remain after mitigation measures are applied. The locations of potential residual impacts were identified if possible. The intensities of such potential residual impacts anticipated to occur from implementation of an alternative along the reference centerline were assessed and discussed in the residual impacts discussion for each resource.

In certain cases, mitigation measures were identified following the impact assessment to reduce or minimize residual impacts. Mitigation measures were developed in collaboration with the Bureau of Land Management (BLM) and cooperating agencies. Prior to the construction of the transmission line, the Proponent would coordinate with the BLM, other cooperating agencies, and landowners to discuss the implementation of mitigation at specific locations or areas.

A Mitigation Framework (Framework) for Greater sage-grouse (sage-grouse) is being developed to minimize the amount and significance of impacts from the proposed Project to sage-grouse. This Framework is being cooperatively developed by Project stakeholders, will be updated periodically and is intended to be a living document which will see further revisions. The Framework’s foundational principles and standards offer a basis from which impacts can be assessed and successful mitigation opportunities can be implemented. The Framework will guide the development of impact assessment and mitigation programs for sage-grouse.

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4.2 VEGETATION AND SPECIAL STATUS PLANT SPECIES

4.2.1 Methods and Impact Types

4.2.1.1 Analysis Methods

The impact analysis for vegetation involved calculating the number of miles traversed by the transmission line route segments per vegetative cover type. Once the mileage was obtained, the rates of disturbance from the disturbance model were applied to these distances to generate estimates of the number of acres of impact per mile of transmission line by vegetation type. Refer to Chapter 2 for a description of the disturbance model.

Federally listed and proposed plant species and designated and proposed critical habitat were analyzed in accordance with the Federal Endangered Species Act (ESA; 1973) and ESA Section 7 Consultation guidelines (U.S. Fish and Wildlife Service [USFWS] and National Marine Fisheries Service [NMFS] 1998). Other rare plant species of concern were analyzed following Bureau of Land Management (BLM) 6840 Manual guidance for special status species management (BLM 2008).

Pedestrian surveys for targeted special status plants were conducted on accessible federal and state lands with the 150-foot right-of-way (ROW) corridor (Appendix B-3 Special Status Plants Report). Sections of some route segments and the majority of Manastash Route (MR) -1 were not surveyed due to route adjustments that were made following the completion of the pedestrian surveys and outside the appropriate seasonal survey period. Federal and state lands comprise approximately 75 percent of the total ROW corridor. The remaining 25 percent is comprised of non-federal (private and county) land and was not surveyed. Of the 715.1 acres of federal and state lands within the 150-foot wide ROW corridor, 205.3 acres (29 percent) were accessible and surveyed (see Table 3.2-3). As not all land within the 150-foot ROW corridor was surveyed, the analysis for special status plants is based upon several assumptions which have been incorporated into Project Design Features (PDFs). First, ROW clearance surveys on federal land would be completed prior to construction and during the appropriate season for the detection of target in areas that would be disturbed and that have potential suitable habitat for special status plants. Populations of special status plant species would be delineated on Project maps as “Avoidance Areas,” and would be marked in the field prior to the start of construction. If any new populations of special status plants are discovered on federal lands during Project surveys or construction, these findings would be reported within 48 hours to the authorized officer at the appropriate state or federal agency and would be treated the same as currently known populations. In cases where such species are identified, appropriate action would be taken to avoid adverse impacts on the species and their habitats. A Plant Protection Plan would be developed identifying specific measures to protect special status plants. Protection measures could include timing restrictions, altering the placement of roads or structures, and the use of biological monitors to protect biological resources during construction. In situations where impacts to sensitive plants cannot be avoided by construction activities, transplanting of plants would be considered and prior approval from the appropriate land management agency would be obtained. Depending on species and conditions, the transplanting of special status plants may include the following: seed collection, propagation, planting and supplemental watering for one or two seasons; or transplanting and supplemental watering for one or two seasons.

There may be undiscovered populations of special status plant species in areas that may be impacted by this Project. The baseline information provided in Chapter 3 has been used to determine impacts to each species and their habitat. Occurrence location information used for this analysis is from geographic information system (GIS) layers as mapped by the Washington Natural Heritage Program (WNHP) and/or BLM. The WNHP GIS occurrence polygons include large buffers, so it is uncertain if the occurrences actually intersect with areas of impact from the proposed Project. For the purposes of this analysis, the assumption is made that the entire mapped area is occupied by the species. The WNHP does not disclose special status plant occurrence information for private lands due to privacy laws. Therefore, without surveys on private lands, there is no way to disclose what effects this Project may have on special status plants on private land.

For the Underground Design Option, the analysis assumed that open cut trenching would be used for the entire length of the underground section. Open cut trenching is the most common method of construction for underground transmission line installation. Also for the Underground Design Option, it was assumed that underground splice vaults would not be placed in or near stream and drainage course crossings. Refer to Section 4.14 for more information on impacts to water resources.

4.2.1.2 Impact Criteria

Sensitivity classifications were assigned to vegetation resources that occur within the Project area. These sensitivity classifications served as the basis for the assigning of impact levels. Criteria used to assign resource sensitivity included species' legal status (federally-listed and Candidate species; BLM and state sensitive species) and biologically important plant community (wetlands, riparian areas, aspen, and sagebrush). Table 4.2-1 summarizes the resource sensitivity classification for vegetation resources that occur in the Project area.

TABLE 4.2-1 VEGETATION RESOURCE SENSITIVITY CLASSIFICATIONS

VEGETATION RESOURCE	SENSITIVITY	POTENTIAL IMPACT FROM THE PROPOSED PROJECT
Riparian, Perennial Streams/Wetland	High	Reduction in a fragile sensitive habitat.
Sagebrush/Perennial Grassland, Bitterbrush/Perennial Grassland	High	Reduction in quality habitat that supports sensitive obligate species and is slow to recover from disturbance.
Special Status Plant Species Occurrences	High	Disturb fragile populations of species and reduction in special status species habitat.
Trees	High	Reduction in quality habitat that supports sensitive obligate species and is slow to recover from disturbance.
Basalt Cliffs	Moderate	Reduction in quality habitat that supports sensitive obligate species and is limited in distribution.
Intermittent Stream	Moderate	Reduction in habitat (abundance and quality) that is slow to recover to pre-disturbance state.
Sagebrush and Rabbitbrush/Annual Grassland	Moderate	Reduction in habitat (abundance and quality) that is slow to recover to pre-disturbance state or is at-risk of further degradation.
Annual and Perennial Grassland	Low	Reduction in habitat (abundance and quality).

4.2.1.3 Impact Types

Impacts to vegetation resources were measured on multiple scales. Impacts can vary in intensity from no change or only slightly discernible change to a full modification of the environment. In addition to intensity there is duration. Duration was evaluated in terms of short-term and long-term impacts. The general types of impacts caused by the construction, operation, and maintenance of the Project are presented in Table 4.2-2.

Impacts can occur directly or indirectly and be short- or long-term. Direct impacts are the result of the physical destruction or degradation of a resource that could occur from the proposed Project. An example of a direct impact is the removal and grading of grassland habitat during the construction of a road.

Indirect impacts are effects that are somewhat distant from the Project in time, space, or both. A common example of an indirect impact is the introduction and establishment of noxious weeds and invasive species in newly disturbed soil.

Impacts are considered short-term if they disturb vegetation, but do not prevent the reestablishment of vegetation communities to pre-impact structure and functionality within five years. Impacts to grasslands are frequently considered short-term because these communities typically recover more quickly than plant communities possessing a woody component (Olson et al. 2000; Lesica et al. 2005). Long-term impacts continue for an extended period of years. Long-term impacts are impacts where a complete change in functionality occurs (e.g., land conversion) or where return to pre-impact conditions takes an extended time to occur (e.g., more than five years). Due to their woody component, long-term impacts can be expected in sagebrush dominated areas.

TABLE 4.2-2 SUMMARY OF IMPACTS TO VEGETATION RESOURCES

IMPACT	PROJECT ATTRIBUTE	POTENTIAL IMPACT AND VEGETATION RESOURCE EFFECT	LONGEVITY
Direct injury and/or mortality to vegetation	Vehicle and human trampling during construction and maintenance.	Destruction, mortality, and injury to vegetation. Reduction in habitat quantity and quality. Potential disturbance and/or destruction of special status plants and/or habitat.	Short-term in areas adjacent to the ROW. Long-term in areas associated with clearing and grading for access roads and transmission structures.
Ground disturbance	Construction, tower foundations, access roads.	Habitat loss and reduction in habitat quality through the potential establishment of noxious weeds and invasive species, increased erosion potential.	Short-term within the footprint from construction. Long-term from access roads and structures.
Fugitive dust generation	Construction, maintenance and repair activities	Reduced photosynthesis, impaired species respiration, reduction in habitat quality.	Short-term within the footprint from construction. Long-term from access roads.
Exposure to pollutants	Chemical spills from construction and maintenance.	Reduced survival, population and growth.	Short-term, localized to construction and maintenance sites.
Fire	Construction and maintenance equipment, human access.	Habitat loss and reduction in habitat quality through the potential post-fire establishment of noxious weeds and invasive species.	Short-term in the construction footprint for the transmission line. Long-term for access roads.

4.2.2 Impact Levels

Impact levels are based on vegetation types that occur along the assumed transmission line centerline (route number and Mile Post). Impact levels are assigned based on resource sensitivity (e.g., special status plant or sensitive habitat), resource quality (the existing condition of the resource), resource quantity (the amount of the resource potentially affected), and the type and duration of impact (short- or long-term). These criteria were applied to develop impact level categories of high, moderate, low and no identifiable.

High – A high level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause a substantial adverse change or stress to vegetation resources that have a high sensitivity.

Moderate – A moderate level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause some change or stress (ranging between substantial and insubstantial) to vegetation resources that have moderate sensitivity.

Low - A low level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause an insubstantial or minor change or stress to vegetation resources that have low sensitivity.

No Identifiable - No identifiable impact would be indicated where no measurable impact would occur to vegetation resources.

4.2.3 Impacts Common to All Route Segments

4.2.3.1 General Vegetation

This section presents information on impacts common to all route segments for the Overhead Design Option. Impacts to vegetation resources from the Underground Design Option are discussed individually in Section 4.2.4 for Route Segments NNR-4u and NNR-6u.

The proposed Project would directly affect vegetation communities through the temporary trampling of herbaceous vegetation, the partial removal of aboveground plant cover, and the complete removal of vegetation due to construction of the transmission line, access roads, and temporary work spaces. Vegetation would be permanently removed and disturbed at structure bases and along permanent access roads. Vegetation removal could have a variety of effects on vegetation communities including changes in community structure and composition. The degree of impact depends on the type and amount of vegetation affected and the rate at which vegetation would regenerate after construction. In addition, removal of vegetation can reduce or change the functional qualities of vegetation for wildlife habitat (see Section 4.3 Wildlife and Special Status Wildlife Species). Within the Project area, the recovery of vegetation would vary by plant community type following construction. Grasslands and herbaceous wetlands would generally recover within five to seven years while shrublands, including sagebrush and rabbitbrush, may require 30 to 50 years (Olson et al. 2000; Lesica et al. 2005). PDFs would be implemented during construction and operation and are anticipated to be effective at minimizing the amount vegetation that would be impacted (refer to Section 2.5 - Project Design Features Common to Action Alternatives). PDFs include: minimizing the blading of native plant communities during construction, operation, and maintenance consistent with safe construction practices; utilizing existing roads to the extent possible; and reseeding disturbed areas with certified weed-free native or other acceptable species as detailed in the Reclamation, Revegetation, and Monitoring Framework Plan in the Plan of Development (POD).

Ground disturbance and vegetation removal can increase the potential for the introduction and spread of noxious weeds and invasive species (Olson 1999; Levine et al. 2003). Non-native plant invasions have the potential to change the composition and diversity of native plants through competition, altering the natural fire regime, and by changing ecosystem processes (e.g., nitrogen cycling). Construction of access roads and the movement of construction equipment and other vehicles along these roads would increase the potential for the spread of noxious weeds and invasive species in the affected areas (Sheley et al.

1999; Gelbard and Belnap 2003). Non-native plants, such as cheatgrass, create a more continuous fuel bed than native bunchgrasses, resulting in an increase in fire frequency and intensity (Brown 2000; Paysen et al. 2000). See Section 4.12 - Wildland Fire Ecology and Management for more information on potential wildland fire impacts. PDFs would be implemented to minimize the spread of noxious weeds and invasive species from Project activities and include the following: reseeding disturbed areas with certified weed-free land management agency-approved native or non-native species; washing all equipment before entering the Project area and when leaving areas where noxious weeds are present; closing or rehabilitating new or improved access roads that are not required for maintenance or by the land management agencies; developing and incorporating a Fire Protection and Control Plan into the POD; and complying with all federal, state, and county noxious weed control regulations and guidelines. In addition, a Noxious Weed and Invasive Plant Management Plan would be developed in consultation with land management agencies and local weed control districts and would be incorporated into the final POD.

Riparian areas can be particularly vulnerable to disturbance. The removal of vegetation along waterways can cause an increase in water temperature, an increase water velocity, and decrease wildlife habitat. Disturbance of soil in or near riparian areas may lead to erosion of the streambank and increase the deposition of sediment into waterways. In addition, removal of protective vegetation could also expose soil to potential wind and water erosion. This can result in further loss of soil and vegetation, as well as an increase in sediment input to water resources. Impacts to soil and geology are discussed in Section 4.15 Soils and Geology, impacts to water resources are described in Section 4.14 Water Resources, and Section 4.3 Wildlife and Special Status Wildlife Species discusses impacts to wildlife. PDFs to reduce impacts to riparian areas include: avoiding riparian areas and wetlands, where possible, and minimizing disturbance to drainage channels and stream banks.

Finally, indirect effects could result from the fragmentation of connected vegetation types. Fragmentation refers to the breaking up of the contiguous areas of vegetation into smaller patches, which results in the creation of habitat edges (i.e., areas where two or more vegetation types meet) along the ROW. Edge areas have different microclimatic conditions and structure, which may lead to different species composition than the interior area (Saunders et al. 1991). Edge effects are typically more dramatic in forest and woodland vegetation communities compared with shrubland and grassland communities. As plant communities become smaller and more fragmented, they become more susceptible to outside influences such as invasive weed species. Habitat loss, degradation, and fragmentation has already occurred in the Project area by other transmission lines, roads, highways and interstates, Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) training operations, non-native plant invasions, fire, alteration by livestock grazing, and conversion of sagebrush steppe to residential and agricultural land (JBLM YTC 2002; Rice et al. 2008; Shaw et al. 1999). PDFs would be implemented during construction, operation, and maintenance and are anticipated to be effective at reducing further degradation of habitat. PDFs include: minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing existing roads where possible; implementing noxious weed and invasive plant control measures that would be developed as part of a Noxious Weed and Invasive Plant Management Plan that will be incorporated into the final POD; closing or rehabilitating new or improved access roads that are not required for maintenance or by the land management agencies; and reseeding disturbed areas with certified weed-free native or other acceptable species as detailed in the Reclamation, Revegetation, and Monitoring Framework Plan.

4.2.3.2 Special Status Plants

Special status plants may be directly or indirectly impacted by construction activities. They can be directly impacted when the plants or their habitats are destroyed or altered in a way such that they can no longer survive. Special status plants growing outside the construction zone could be indirectly impacted if the effects of construction activities degrade their habitat. This could occur through soil erosion, invasion by non-native species, increased off-highway vehicle (OHV) usage, and an increase in fire (Olson 1999; Ouren et al. 2007). In addition to PDFs described above to reduce impacts to general vegetation, the following PDFs would be implemented during construction, operation, and maintenance to minimize impacts to special status plants: adhering to measures and terms and conditions developed during the consultation period under Section 7 of the ESA (1973) as specified by the USFWS; taking appropriate action (e.g., avoiding or spanning areas supporting plants, transplanting) to avoid adverse impacts on identified special status species and their habitats; delineating populations of special status plants for avoidance during construction; and developing a Plant Protection Plan to identify specific measures for the protection of special status plants.

Effects Determination

Effects determinations for BLM Sensitive and federally listed species that occur or have the potential to occur in the Project area is based on: known occurrences in the proposed Project area; surveys that were conducted during the appropriate time of the year by qualified botanists; available suitable habitat in surveyed and unsurveyed areas; potential impacts from the proposed Project; and known range and rarity (Table 4.2-3).

Federally Threatened, Endangered and Candidate Species

Impacts to federal threatened, endangered, and candidate species are discussed below and impacts to state-listed and BLM sensitive species are discussed further by route segment. In addition, a separate Biological Assessment, which assesses these ESA-listed species, would be prepared for the Agency Preferred Alternative. There are no known occurrences of federally listed, proposed, or candidate species within any of the route segments. Three candidate and two listed species are known or suspected to occur within the region the Project is located in. To provide a regional context for special status plants, the region is defined as the Yakima and Upper Columbia River Basins watersheds. Impacts to these species are discussed below.

Umtanum desert buckwheat

The entire known range of Umtanum desert buckwheat is on federally owned land in the Hanford National Monument, Washington. Other potential locations within the lower Columbia River Basin were intensively searched for additional populations in 1996 and 1997; however no other populations were found. Potential threats to Umtanum desert buckwheat include fire, OHV use, low germination rates and high seedling mortality (USFWS 2010b). No occurrences of this species were found during the special status plant surveys and it is unlikely to occur in the Project area because limited potential habitat is present. For all route segments, no effects are anticipated to occur to Umtanum desert buckwheat with the construction of the proposed Project because intensive surveys have been conducted in suitable habitat throughout the region and limited potential habitat is present within the Project area.

Ute Ladies'-Tresses

Ute ladies'-tresses is known to occur in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, and Wyoming. In Washington, there are four known populations: three small occurrences near the Columbia River in Chelan County and one occurrence in Okanogan County (USFWS 1995). The USFWS is currently in a review period to consider whether delisting Ute ladies'-tresses is warranted (USFWS 2004b). The riparian habitat on which Ute ladies'-tresses depends has been drastically modified by urbanization, agriculture and development. Habitat loss or degradation from competition from non-native plants and vegetation succession are the most widespread threats. No occurrences of this species were found during the special status plant surveys in May or July. For all route segments, potential Project impacts may affect, but are not likely to adversely affect Ute ladies'-tresses because limited potential habitat is present. Wetlands and the area immediately adjacent to the Columbia River would be avoided. In addition, PDFs that have been incorporated into the Project are anticipated to minimize impacts to special status species. PDFs include: adhering to measures and terms and conditions that are identified during the consultation period under Section 7 of the ESA (1973); taking appropriate action to avoid adverse impacts on identified special status species and their habitats; delineating populations of special status plants for avoidance during construction; and developing a Plant Protection Plan to identify specific measures for the protection of special status plants. The Plant Protection Plan would be incorporated into the POD and would include the following: timing restrictions; pre-construction ROW clearance surveys; the use of biological monitors; procedures to follow if new special status plants are discovered on federal or state lands during Project surveys or construction; and protection measures for any newly discovered populations. It is anticipated that no impacts would occur to Ute ladies'-tresses or its habitat with the construction of the proposed Project.

TABLE 4.2-3 EFFECTS DETERMINATION FOR BLM SENSITIVE AND FEDERALLY LISTED SPECIES THAT OCCUR OR HAVE THE POTENTIAL TO OCCUR IN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	LEGAL STATUS[2]	EFFECTS DETERMINATION BY ROUTE SEGMENT[1]								
			NNR-1	NNR-2	NNR-3	NNR-4o/NNR-4u	NNR-5	NNR-6o/NNR-6u	NNR-7	NNR-8	MR-1
Annual sandwort	*Minuartia pusilla* var. *pusilla*	WA State Review Group 1	NE	NE	NE	NE	NE	NE	NE	MIN	NE
Basalt daisy	*Erigeron basalticus*	SOC, BLM-S	NE	NE	MIN	NE	NE	NE	NE	NE	NE
Beaked spike-rush	*Eleocharis rostellata*	WS	NE	NE	NE	NE	NE	NE	NE	MIN	NE
Bristle-flowered collomia	*Collomia macrocalyx*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Caespitose evening-primrose	*Oenothera caespitosa* ssp. *caespitosa*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Columbia milkvetch	*Astragalus columbianus*	BLM-S	NE	NE	NE	NE	NE	MIN	MIN	MIN	NE
Coyote tobacco	*Nicotiana attenuata*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Dwarf evening-primrose	*Camissonia pygmaea*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Geyer's milk-vetch	*Astragalus geyeri*	BLM-S	NE	NE	NE	NE	NE	NE	NE	MIN	NE
Gray cryptantha	*Cryptantha leucophaea*	BLM-S	NE	NE	NE	NE	NE	NE	MIN	MIN	NE
Hedgehog cactus	*Pediocactus simpsonii var. robustior*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Hoover's desert-parsley	*Lomatium tuberosum*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Hoover's tauschia	*Tauschia hooveri*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Longsepal globemallow	*Iliamna longisepala*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Miner's candle	*Cryptantha scoparia*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Naked-stemmed evening-primrose	*Camissonia scapoidea ssp. scapoidea*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Nuttall's sandwort	*Minuartia nuttallii* ssp. *fragilis*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Pauper milkvetch	*Astragalus misellus var. pauper*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Suksdorf's monkeyflower	*Mimulus suksdorfii*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Umtanum desert buckwheat	*Eriogonum codium*	T	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ute ladies'-tresses	*Spiranthes diluvialis*	T	MN	MN	MN	MN	MN	MN	MN	MN	MN
Weakstem cryptantha	*Cryptantha flaccida (formerly C. rostellata)*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Wenatchee Mountain checker-mallow	*Sidalcea oregana* var. *calva*	E	MN	MN	MN	MN	MN	MN	MN	MN	MN
White Bluffs bladderpod	*Physaria douglasii* ssp. *tuplashensis*	T	NE	NE	NE	NE	NE	NE	NE	MN	NE

COMMON NAME	SCIENTIFIC NAME	LEGAL STATUS[2]	EFFECTS DETERMINATION BY ROUTE SEGMENT[1]								
			NNR-1	NNR-2	NNR-3	NNR-4o/NNR-4u	NNR-5	NNR-6o/NNR-6u	NNR-7	NNR-8	MR-1
White eatonella	*Eatonella nivea*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Wormskiold's northern wormwood	*Artemisia borealis* var. *wormskioldii*	C, BLM-S	NE/NE	NE/NE	NE/NE	NE/NE	NE/NE	NE/NE	NE/NE	NE/MIN	NE/NE

[1]For BLM Sensitive Species: NE=No effect; MIN=May impact individuals or habitat, but would not contribute toward the need for federal listing; MIM=May impact individuals or habitat, and may contribute toward the need for federal listing. For Federally Listed Species: NE=No effect; MN=May affect, not likely to adversely affect; ML=May affect, likely to adversely affect.
[2]Key: E – Endangered; T – Threatened; C – Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive.

Wenatchee Mountain Checker-Mallow

The known historical and current range of Wenatchee Mountain checker-mallow is restricted to Chelan County, Washington. The historical range covered an area approximately 11 by 3 miles and extended southeast of Leavenworth, Washington. Currently five populations are known to occur (USFWS 2004a). Wenatchee Mountain checker-mallow is typically associated with moist meadows and open conifer stands; however, known populations are associated with a drainage ditch and along the shoulder of a forest road (USFWS 2004a). The nearest population is approximately 50 miles north of the Project area. No occurrences of this species were found during the special status plant surveys in May or July. Primary threats include hydrological disturbance, ground disturbance associated with timber harvest, development and agriculture, competition from non-native grasses, fire, infestation by aphids, and livestock (USFWS 2004a). For all route segments, Project impacts may affect, but are not likely to adversely affect Wenatchee Mountain checker-mallow because limited potential habitat is present, primarily associated with canals, intermittent streams, and the Columbia River. Wetlands and the area immediately adjacent to the Columbia River would be avoided and canals, drainage ditches, and riparian areas would be spanned, where practicable. In addition, PDFs that have been incorporated into the Project are anticipated to minimize impacts to special status species. PDFs include: adhering to measures and terms and conditions developed during the consultation period under Section 7 of the ESA (1973) as specified by the USFWS; taking appropriate action to avoid adverse impacts on identified special status species and their habitats; delineating populations of special status plants for avoidance during construction; and developing plant protection plans to identify specific measures for the protection of special status plants. It is anticipated that no impacts would occur to Wenatchee Mountain checker-mallow or its habitat with the construction of the proposed Project.

White Bluffs Bladderpod

Only one population of White Bluffs bladderpod is known to occur. This population is restricted to the upper edge of the White Bluffs of the Columbia River in Franklin County, Washington, which is outside the Project area (USFWS 2010c). Primary threats include landslides in the White Bluffs, infestation of nonnative weeds, OHV use, and wildland fire. No occurrences of this species were found during the special status plant surveys in May or July. The effects determination of no effects was made for all route segments except for Route Segment NNR-8. For this route segment, potential Project impacts may affect, but are not likely to adversely affect White Bluffs bladderpod because limited potential habitat is present along the Columbia River. PDFs that have been incorporated into the Project are anticipated to minimize impacts to special status species. PDFs include: adhering to measures and terms and conditions developed during the consultation period under Section 7 of the ESA (1973) as specified by the USFWS; taking appropriate action to avoid adverse impacts on identified special status species and their habitats; delineating populations of special status plants for avoidance during construction; and developing plant protection plans to identify specific measures for the protection of special status plants. It is anticipated that no impacts would occur to White Bluffs bladderpod or its habitat with the construction of the proposed Project.

Wormskiold's Northern Wormwood

There are two known existing occurrences of Wormskiold's northern wormwood. These occurrences are located approximately 202 river miles apart along the Columbia River in Washington (USFWS 2011). Primary threats to Wormskiold's northern wormwood include altered water regimes, erosion, trampling, OHV compaction, and exotic species invasions. Historically known populations and suitable habitat in Washington and in Oregon have been lost due to dam construction (USFWS 2011). No occurrences of this species were found during the special status surveys in May or July, but one of the existing populations is known to occur approximately 1.25 miles south of Route segment NNR-8 on an island in the Priest Rapids Reservoir. No impacts to Wormskiold's northern wormwood are anticipated to occur because no structure or road construction work would occur along the bank of the Columbia River and PDFs have been incorporated into the Project to minimize impacts to special status species. PDFs include: adhering to measures and terms and conditions developed during the consultation period under Section 7 of the ESA (1973) as specified by the USFWS; taking appropriate action to avoid adverse impacts on identified special status species and their habitats; delineating populations of special status plants for avoidance during construction; developing a Plant Protection Plan to identify specific measures for the protection of special status plants; and by applying and maintaining standard erosion and sediment control methods as specified in the Stormwater Pollution Prevention Plan as part of the POD. It is anticipated that no impacts would occur to Wormskiold's northern wormwood or its habitat with the construction of the proposed Project.

4.2.4 Impacts Specific to Route Segments

Long-term impacts to vegetation were assessed for each route segment and are presented in Table 4.2-4. Impacts for each route segment are discussed in detail in the following sections. Impacts to agricultural land, disturbed/developed areas and water are discussed in detail in Land Jurisdiction and Land Use (Section 4.4), Water Resources (Section 4.14), and Soil and Geology (Section 4.15) and are not discussed in this section.

4.2.4.1 Route Segment NNR-1

General Vegetation

Route Segment NNR-1 parallels Sage Trail Road and an existing distribution line. Construction of Route Segment NNR-1 would result in approximately 1.8 acres of long-term ground disturbance to vegetation (Table 4.2-4). Long-term disturbance to vegetation communities would occur in 0.1 acre of annual grasslands and noxious weeds, 1.0 acre of rabbitbrush annual grassland, and 0.7 acre of big sagebrush perennial grassland (Table 4.2-4). Short-term disturbance would occur to approximately 10.9 acres of vegetation. Short-term disturbance would occur in work areas, turn around areas, and pulling and tensioning sites. Refer to Chapter 2 for a description of these sites. Impacts to vegetation along this route segment are similar to those described above for all route segments (Section 4.2.3) and include vegetation removal, introduction and spread of noxious weeds and invasive weeds, and fragmentation of connected vegetation types. Disturbance would be minimized by PDFs designed to reduce impacts to vegetation resources. PDFs include using existing public roads to access structure sites where practicable, minimizing blading and disturbance to plant communities, revegetating following construction, and implementing a Noxious Weed and Invasive Plant Management Plan. Refer to Section 2.5 - Project Design Features Common to Action Alternatives for a complete list and description of PDFs.

With the implementation of PDFs, long-term impacts to vegetation from the construction of Route Segment NNR-1 include 0.5 mile of no identifiable, 1.2 miles of low, and 0.7 mile of moderate due to long recovery times for sagebrush.

Special Status Species and Priority Ecosystem

No special status plant species are known to occur within one mile of Route Segment NNR-1 (Table 4.2-5). No known WNHP priority ecosystems would be disturbed through construction of Route Segment NNR-1. One-hundred percent of federal lands (2.8 acres) within this route segment were surveyed for special status plants; however, the majority of Route Segment NNR-1 is comprised of non-federal land (40.6 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance could occur to potential habitat for special status plants, including 0.7 acre of suitable, 1.1 acres of marginal, and 0.5 acre unsuitable habitat (Table 4.2-5). In addition to PDFs described above to reduce impacts to general vegetation, the following PDFs would be implemented during construction, operation, and maintenance to minimize impacts to special status plants: taking appropriate action to avoid adverse impacts on identified special status species and their habitats; delineating populations of special status plants for avoidance during construction; and developing a Plant Protection Plan to identify specific measures for the protection of special status plants.

TABLE 4.2-4 LONG-TERM DISTURBANCE TO VEGETATION BY ROUTE SEGMENT

ROUTE SEGMENT	VEGETATION TYPE (LINEAR MILES CROSSED, ACRES DISTURBED, AND % OF VEGETATION TYPE DISTURBED BY TOTAL ROUTE SEGMENT)[1]																																	TOTAL LONG-TERM DISTURBANCE[2]	
	ANNUAL GRASSLAND AND NOXIOUS WEEDS			BITTERBRUSH PERENNIAL GRASSLAND			FORB			INTERMITTENT STREAM / DRY GULLY			PERENNIAL GRASSLAND			RABBITBRUSH ANNUAL GRASSLAND			RIPARIAN / WETLAND			ROCK / BASALT CLIFF			SAGEBRUSH ANNUAL GRASSLAND			SAGEBRUSH PERENNIAL GRASSLAND			TREE			TOTAL MILES OF VEGETATION DISTURBED	TOTAL ACRES OF VEGETATION DISTURBED
	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac
NNR-1 2.4 miles	0.1	0.1	4.2													1.1	1.0	45.2										0.7	0.7	29.5				1.9	1.8
NNR-2 5.1 miles	1.2	1.0	24.5										0.5	0.4	9.3	0.2	0.2	4.4							0.5	0.3	8.6	0.9	0.7	19.0	0.3	0.2	5.2	3.6	2.8
NNR-3 9.3 miles	0.1	0.2	1.2										1.4	2.9	16.4							0.3	0.4	2.4	0.4	0.5	2.7	7.0	13.6	77.3				9.2	17.6
NNR-4o 4.6 miles	0.3	0.2	4.1	0.2	0.3	5.5							0.1	0.1	1.6										1.7	2.8	50.8	2.3	2.0	37.9				4.6	5.4
NNR-4u 4.6 miles	0.3	0.6	3.2	0.2	0.5	2.8							0.1	0.2	1.1										1.7	8.2	46.5	2.3	8.3	46.5				4.6	17.8
NNR-5 1.8 miles										0.1	0.2	13.8																1.7	1.3	86.2				1.8	1.5
NNR-6o 6.5 miles							0.7	0.6	9.2				0.2	0.2	2.6													5.6	5.8	88.1				6.5	6.6
NNR-6u 6.5 miles							0.7	1.3	7.8				0.2	0.4	2.2													5.6	15.3	90.0				6.5	17.0
NNR-7 8.3 miles																												8.3	7.2	100.0				8.3	7.2
NNR-8 2.8 miles	0.6	0.5	21.3										0.2	0.1	6.0										0.1	0.1	3.8	1.5	1.6	68.9				2.4	2.3
MR-1 11.9 miles	4.9	12.9	37.7																									4.4	12.5	36.9				9.3	25.4

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of vegetation type disturbed (acres) compared to the total amount of disturbance (acres) for the Route (including agriculture, disturbed or developed, and water which are not shown).
[2]Total long-term disturbance to vegetation does not include disturbance to agriculture, disturbed or developed and water. Acres of short-term disturbance are presented in the discussion section for each route segment.

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TABLE 4.2-5 LONG-TERM DISTURBANCE TO SPECIAL STATUS SPECIES AND HABITAT BY ROUTE SEGMENT

ROUTE SEGMENT	HABITAT SUITABILITY (LINEAR MILES CROSSED, ACRES DISTURBED, AND % OF HABITAT DISTURBED BY TOTAL ROUTE SEGMENT)[1]									SPECIAL STATUS PLANTS AND COMMUNITIES		
	SUITABLE			MARGINAL			UNSUITABLE			WNHP SPECIAL STATUS PLANT POLYGONS CROSSED	SPECIAL STATUS PLANTS FOUND DURING SURVEY	WNHP PRIORITY ECOSYSTEM CROSSED
	mi	ac	%	mi	ac	%	mi	ac	%	mi	mi	mi
NNR-1 2.4 miles	0.7	0.7	30	1.2	1.1	48	0.5	0.5	22	0	0	0
NNR-2 5.1 miles	0.9	0.7	18	2.3	1.8	46	1.9	1.4	36	0	0	0
NNR-3 9.3 miles	7.3	14.0	80	1.9	3.6	20	0.1	0.0	0	2.9	2.6	0
NNR-4o 4.6 miles	2.5	2.3	43	2.1	3.1	57	0	0.0	0	0	0	0
NNR-4u 4.6 miles	2.5	8.8	49	2.1	9.0	51	0	0.0	0	0	0	0
NNR-5 1.8 miles	1.8	1.5	100	0	0.0	0	0	0.0	0	0	0	0
NNR-6o 6.5 miles	6.3	6.4	97	0.2	0.2	3	0	0.0	0	0.3	0	0
NNR-6u 6.5 miles	6.3	16.6	98	0.2	0.4	2	0	0.0	0	0.3	0	0
NNR-7 8.3 miles	8.3	7.2	100	0	0.0	0	0	0.0	0	3.4	0	0
NNR-8 2.8 miles	1.5	1.6	70	0.9	0.7	30	0.4	0.0	0	0.5	0	0
MR-1 11.9 miles	4.4	12.5	37	4.9	12.9	38	2.6	8.6	25	0	0	0.4

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of vegetation type disturbed (acres) compared to the total amount of disturbance (acres) for the Route.
[2]Total long-term disturbance to vegetation does not include disturbance to agriculture, disturbed or developed and water. Acres of short-term disturbance are presented in the discussion section for each route segment.

With the implementation of PDFs described above, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 0.5 mile of no identifiable (e.g., developed and agricultural land), 1.2 miles of low impacts, and 0.7 mile of moderate impacts.

4.2.4.2 Route Segment NNR-2

General Vegetation

Route Segment NNR-2 parallels an existing JBLM YTC fire break road, existing roads, and an existing transmission line. Construction of Route Segment NNR-2 would result in long-term disturbance of approximately 2.8 acres of vegetation. Disturbance would occur in 1.0 acre of annual grasses and noxious weeds, 0.4 acre of perennial grassland, 0.2 acre of rabbitbrush annual grassland, 0.3 acre of sagebrush annual grassland, 0.7 acre of sagebrush perennial grassland, and 0.2 acre of tree (Table 4.2-4). Short-term disturbance would occur to approximately 20.3 acres of vegetation. Impacts are similar to those described above for Route Segment NNR-1 and Impacts Common for All Route Segments (Section 4.2.3). Disturbance would be minimized by PDFs designed to reduce impacts to vegetation resources. PDFs include using existing public roads to access structure sites, minimizing blading and disturbance to plant communities, revegetating following construction, and implementing a Noxious Weed and Invasive Plant Management Plan. Refer to Section 2.5 Project Design Features Common to Action Alternatives for a complete list and description of PDFs.

With the implementation of PDFs, long-term impact levels for Route Segment NNR-2 include 1.5 miles of no identifiable, 1.9 miles of low, and 1.7 miles of moderate impacts.

Special Status Species and Priority Ecosystem

WNHP data indicates that basalt daisy, Hoover's desert-parsley, and Pauper milkvetch are known to occur within one mile of Route Segment NNR-2 (Table 4.2-5). None of these species were documented during the special status plant surveys for Route Segment NNR-2; however, Hoover's desert-parsley and Pauper milkvetch were documented within the ROW for Route Segment NNR-3 and are discussed in more detail for that route segment. Basalt daisy is known to occur within one mile of Route Segment NNR-2, where Route Segment NNR-3 crosses the Selah Creek Canyon. Basalt daisy is discussed in more detail for Route Segment NNR-3. No known WNHP priority ecosystems would be disturbed through construction of Route Segment NNR-2. Approximately 88 percent (79.7 acres) of federal lands within this route segment were surveyed for special status plants (Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants, including 0.7 acre of suitable, 1.8 acres of marginal and 1.4 acres unsuitable habitat (Table 4.2-5). PDFs described above for Route Segment NNR-1 would also be implemented during construction and maintenance of Route Segment NNR-2 to minimize impacts to special status plants and include: avoiding or spanning areas supporting special status plants, where practicable; delineating populations of special status plants for avoidance during construction; and developing plant protection plans as part of the POD to identify specific measures for the protection of special status plants. With the implementation of PDFs, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 1.5 miles of no identifiable impacts, 2.2 miles of low impacts, and 1.4 miles of moderate impacts.

4.2.4.3 Route Segment NNR-3

General Vegetation

Long-term disturbance to approximately 17.6 acres of land (Table 4.2-4) would occur with the construction of Route Segment NNR-3. The majority, 13.6 acres, would occur in areas classified as sagebrush perennial grassland. Construction would also result in the long-term disturbance of 0.2 acre of annual grassland and noxious weeds, 2.9 acres of perennial grassland, 0.4 acre of rock/basalt cliff, and 0.5 acre sagebrush annual grassland. Approximately 34.8 acres of vegetation would be temporarily disturbed. Impacts are similar to those described above for Route Segment NNR-1. Disturbance would be minimized by PDFs described above that are designed to reduce impacts to vegetation resources. PDFs include using existing public roads to access structure sites, minimizing blading and disturbance to plant communities, revegetating following construction, and implementing a Noxious Weed and Invasive Plant Management Plan. Refer to Section 2.5 Project Design Features Common to Action Alternatives for a complete list and description of PDFs.

Impact levels for Route Segment NNR-3 include 0.1 mile of no identifiable impacts, 1.8 miles of low, and 7.4 miles of moderate impacts.

Special Status Species and Priority Ecosystem

Approximately 0.9 mile of Route Segment NNR-3 would pass through the western edge of the BLM Yakima River Canyon Area of Critical Environmental Concern, which was designated for the preservation of basalt daisy and Hoover's desert parsley (BLM 1992b). No federally listed special status plant species or priority ecosystems are known to occur along Route Segment NNR-3 (Table 4.2-5). Special status plant surveys conducted for the proposed Project documented Hoover's desert-parsley, hedgehog cactus, and Pauper milkvetch within Route Segment NNR-3. In addition, WNHP data indicates that Hoover's tauschia and basalt daisy are known to occur within one mile of Route Segment NNR-3. Approximately 43 percent (33.6 acres) of federal lands within this route segment were surveyed for special status plants (Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants, including 14.0 acres of suitable and 3.6 acres of marginal habitat. PDFs described above for Route Segment NNR-1 would also be implemented during construction and maintenance of Route Segment NNR-3 to minimize impacts to special status plants and include: avoiding or spanning areas supporting special status plants, where practicable; delineating populations of special status plants for avoidance during construction; and developing a Plant Protection Plan as part of the POD to identify specific measures for the protection of special status plants. With the implementation of PDFs, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 0.5 mile of low impacts and 8.7 miles of moderate impacts.

Basalt Daisy

Basalt daisy is a federal Species of Concern (SOC), BLM Sensitive, and Washington Threatened species. It is endemic to Washington and occurs exclusively in a small area (approximately 33 square miles) along the Yakima River and Selah Creek Canyons. Five populations occupying approximately 1,369 acres are known to occur in Washington. Primary threats to basalt daisy include basalt mining, railroad and highway maintenance and construction, and herbicide spray drift from nearby agricultural fields. Within the proposed Project area, basalt daisy is known to occur where Route Segment NNR-3 crosses Selah Creek Canyon (for approximately 0.7 mile). This species was not documented during the special status plant surveys; however, the steep canyon wall above Selah Creek was not surveyed due to safety and access limitations. It is anticipated that the proposed Project would span Selah Creek and would use existing access roads. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Hedgehog Cactus

Hedgehog cactus is a BLM Sensitive and Washington Sensitive Species. Hedgehog cactus ranges from eastern Washington to Nevada. In Washington, it has been found in Yakima, Kittitas, Chelan, Douglas, and Grant counties. At the regional level, fourteen populations occupying approximately11,895 acres are known to occur. One occurrence of hedgehog cactus was documented during the special status plant survey along Route Segment NNR-3. This occurrence consisted of approximately 34 live individuals scattered across approximately 4.6 acres. Due to route adjustments made following the special status plant surveys, approximately 0.9 acre of occupied habitat remains within the ROW. In general, the primary threat to hedgehog cactus is collecting by cactus collectors (WNHP and BLM 2005). For this occurrence, direct impacts to hedgehog cactus could occur due to habitat loss from ground disturbance and injury and/or mortality from vehicle and human trampling. Indirect impacts could occur through the degradation in habitat quality through the establishment of noxious weeds and invasive plants and increased wildland fire. In addition to PDFs described above, the following PDFs would be also be implemented to reduce direct and indirect impacts to hedgehog cactus from the proposed Project: minimize the blading of native plant communities during construction, consistent with safe construction practices; utilize existing roads where possible; reseed disturbed areas using an Agency-approved mixture of certified weed-free native and non-native species or seed for revegetation as detailed in a Reclamation, Revegetation, and Monitoring Framework Plan; and develop and incorporate a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. In addition, closing access roads that are not required for operation and maintenance would minimize potential impacts from cactus collectors. Approximately 1.7 acres of disturbance is anticipated to occur where hedgehog cactus was documented, less than 0.1 percent of the known occupied habitat of hedgehog cactus in the region. For the proposed Project, it was assumed that these occurrences would be spanned and construction activities would avoid these occurrences. With the implementation of PDFs described above and the assumption that occurrences would be spanned and avoided, Project construction, operation and maintenance activities could impact individuals or habitat(moderate impact), but would not contribute toward the need for federal listing.

Hoover's Desert Parsley

Hoover's desert parsley is a federal SOC, BLM Sensitive, and Washington Sensitive species. This species is endemic to Washington and is known only from Yakima County and adjacent portions of Benton, Grant, and Kittitas counties. Within the region, Hoover's desert parsley is known from 22 populations occupying approximately 13,210 acres. One occurrence of Hoover's desert parsley was documented for NNR-3 during the special status plant surveys. This occurrence consisted of approximately 21 individuals scattered across 0.2 acre of a basalt flow. WNHP data indicates that occurrences of Hoover's desert parsley intersect Route Segment NNR-3 for approximately 1.2 miles; however, these locations include large buffers, so it is uncertain whether additional occurrences intersect the ROW corridor. General threats to this species are gravel extraction, road construction, military training activities, and grazing (Camp and Gamon 2011). For the proposed Project, direct impacts to Hoover's desert parsley could occur due to habitat loss from ground disturbance and mortality from vehicle and human trampling. Indirect impacts could occur due to habitat degradation through the establishment of noxious weeds and invasive species (e.g., cheatgrass) and increased wildland fire. PDFs described above for hedgehog cactus would be implemented to minimize impacts to Hoover's desert parsley. Approximately 0.4 acre of disturbance is anticipated to occur where Hoover's desert parsley was documented, less than 0.1 percent of the known occupied habitat of Hoover's desert parsley in the region. For the proposed Project it was assumed that this occurrence would be spanned and no construction activities would disturb this occurrence. With the implementation of PDFs described above and the assumption that this occurrence would be spanned, Project construction, operation, and maintenance could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Hoover's Tauschia

Hoover's tauschia is a federal SOC, BLM Sensitive and Washington Sensitive species. Hoover's tauschia is regional endemic extending from south-central Yakima County to east-central Kittitas County (WNHP and BLM 2005). Within the region, 28 populations occupying approximately 13,911 acres are known to occur. WNHP data indicates that Hoover's tauschia intersects Route Segment NNR-3 for approximately 0.4 mile. These locations include large buffers; therefore, it is uncertain whether this occurrence intersects the ROW corridor. Potential threats to Hoover's tauschia include loss and degradation of habitat through orchard expansion and housing, grazing, OHV use, and road construction. Fire is typically not a threat because Hoover's tauschia sites generally do not have enough vegetation present to carry a fire (WNHP and BLM 2005). Direct impacts and PDFs that would be implemented to minimize impacts to potential occurrences of Hoover's tauschia are similar to those described above for hedgehog cactus. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Pauper Milkvetch

Pauper milkvetch is a BLM Sensitive and Washington Sensitive species. It is an endemic to Washington and currently occurs in Klickitat, Yakima, Kittitas, and Douglas Counties. Eleven populations, occupying 11,491 acres, are known to occur. One extensive occurrence of pauper milkvetch was documented during special status plants surveys. This occurrence consisted of approximately 1,800 individuals scattered across 34.6 acres. As only the ROW was surveyed, it is likely that this occurrence extends beyond the ROW. Due to route adjustments made following the special status plant surveys, approximately 12.6 acres of occupied habitat remains within the ROW. The primary threats to this species are soil disturbing activities such as grazing, road construction, and military training (Camp and Gamon 2011). Direct impacts and PDFs that would be implemented to minimize impacts to potential occurrences of pauper milkvetch are similar to those described above for hedgehog cactus. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact) but would not contribute toward the need for federal listing.

4.2.4.4 Route Segment NNR-4o/NNR-4u

General Vegetation

Overhead Design Option

Long-term disturbance to approximately 5.4 acres of land (Table 4.2-4) would occur with the construction of Route Segment NNR-4o. Long-term disturbance would occur in 0.2 acre of annual grassland and noxious weeds, 0.3 acre of bitterbrush perennial grassland, 0.1 acre of perennial grassland, 2.8 acres of sagebrush annual grassland, and 2.0 acres of sagebrush perennial grassland. Approximately 17.6 acres of vegetation would be disturbed on a short-term basis. Impacts and PDFs designed to reduce impacts are similar to those described above for Impacts Common to All Route Segments (Section 4.2.3) and for Route Segment NNR-1. Refer to Section 2.5 Project Design Features Common to Action Alternatives for a complete list and description of PDFs.

With the implementation of PDFs, long-term impact levels for Route Segment NNR-4o would include 0.4 mile of low and 4.2 miles of moderate impacts.

Underground Design Option
Construction of NNR-4u would result in approximately 17.8 acres of long-term disturbance to vegetation. Long-term disturbance would occur primarily in sagebrush annual grassland (8.2 acres) and sagebrush perennial grassland (8.3 acres). The remaining disturbance would occur in 0.6 acre of annual grassland and noxious weeds, 0.5 acre of bitterbrush perennial grassland, and 0.2 acre of perennial grassland. Approximately 33.5 acres of vegetation would be disturbed on a short-term basis. In addition to impacts described above in Section 4.2.3, additional underground construction disturbance would occur through open cut trenching and excavation for the installation of underground duct bank, splice vaults, and construction of access roads and temporary work sites. PDFs described above for Section 4.2.3 and for Route Segment NNR-1 would also be implemented for the Underground Design Option. Following the implementation of PDFs, long-term impact levels to vegetation would include 0.4 mile of low and 4.2 miles of moderate impacts.

Special Status Species and Priority Ecosystem

No special status plant species or priority ecosystems are known to occur within one mile of Route Segment NNR-4o/NNR-4u (Table 4.2-5). Approximately 43 percent (26.3 acres) of federal lands within this route segment were surveyed for special status plants (Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. With NNR-4o, long-term disturbance to special status species potential habitat would occur to 2.3 acres of suitable and 3.1 acres of marginal habitat. With the Underground Design Option, long-term disturbance to potential habitat for special status species would occur to 8.8 acres of suitable and 9.0 acres of marginal habitat. PDFs described above for Route Segment NNR-1 and Impacts Common for All Route Segments (Section 4.2.3) would be implemented during construction and maintenance of Route Segment NNR-4o/NNR-4u to minimize impacts to special status plants and include: adhering to measures and terms and conditions developed during the consultation period with the USFWS; avoiding or spanning areas supporting special status plants where practicable; marking populations of special status plants for avoidance during construction; and developing a Plant Protection Plan as part of the POD to identify specific measures for the protection of special status plants. With the implementation of PDFs, impacts to special status plant species and potential suitable habitat is anticipated to include 0.4 mile of low impacts and 4.2 miles of moderate impacts.

4.2.4.5 Route Segment NNR-5

General Vegetation

Construction of Route Segment NNR-5 would result in long-term disturbance to approximately 1.5 acres of land (Table 4.2-4). The majority of disturbance (1.3 acres) would occur in areas classified as sagebrush perennial grassland. Long-term disturbance would also occur to 0.2 acre of intermittent stream / dry gully. Approximately 7.5 acres would be disturbed on a short-term basis. Impacts and PDFs designed to reduce impacts are similar to those described for Route Segment NNR-1. Refer to Section 2.5 Project Design Features Common to Action Alternatives for a complete list and description of PDFs.

Impact levels for Route Segment NNR-5 would include 0.1 mile of low and 1.7 miles of moderate impacts.

Special Status Species and Priority Ecosystem

No special status plant species are known to occur along Route Segment NNR-5 (Table 4.2-5). No known WNHP priority ecosystems would be disturbed through construction of Route Segment NNR-5. Ninety-one percent of federal lands (29.6 acres) within this route segment were surveyed for special status plants (Table 3.2-3); however, as not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance could occur to 1.5 acres of potential habitat for special status plants. With the implementation of PDFs described above for NNR-1 and in Section 4.2.3, impact levels to special status plant species and potential suitable habitat are anticipated to be moderate for the entire route segment (1.8 miles).

4.2.4.6 Route Segment NNR-6o/NNR-6u

General Vegetation

Overhead Design Option
Long-term disturbance to approximately 6.6 acres of land (Table 4.2-4) would occur with the construction of Route Segment NNR-6o. The majority of the long-term disturbance would occur in 5.8 acres of sagebrush perennial grassland, with 0.6 acre also occurring in areas classified as forbs (e.g., narrowleaf mock goldenweed and thyme-leaf buckwheat) and 0.2 acre of perennial grassland. Approximately 24.0 acres of vegetation would be disturbed on a short-term basis. Impacts and PDFs designed to reduce impacts are similar to those described above for Impacts Common to All Route Segments (Section 4.2.3) and for Route Segment NNR-1. Refer to Section 2.5 Project Design Features Common to Action Alternatives for a complete list and description of PDFs.

With the implementation of PDFs, long-term impact levels for Route Segment NNR-6o would include 0.9 mile of low and 5.6 miles of moderate impacts.

Underground Design Option
Construction of NNR-6u would result in approximately 17.0 acres of long-term disturbance to vegetation. Long-term disturbance would occur primarily in sagebrush perennial grassland (15.3 acres), with the remaining disturbance occurring in 1.3 acres of forbs and 0.4 acre of perennial grassland. Approximately 47.3 acres of vegetation would be disturbed on a short-term basis. In addition to impacts described above in Section 4.2.3, additional underground construction disturbance would occur through open cut trenching and excavation for the installation of underground duct bank, splice vaults, and construction of access roads and temporary work sites. PDFs described above for Section 4.2.3 and for Route Segment NNR-1 would also be implemented for the Underground Design Option. Following the implementation of PDFs, long-term impact levels to vegetation would include 0.9 mile of low and 5.6 miles of moderate impacts.

Special Status Species and Priority Ecosystem

No federally listed plant species or priority ecosystems are known to occur along Route Segment NNR-6o/NNR-6u (Table 4.2-5). Due to route adjustments made following the special status plant surveys, none of Route Segment NNR-6o/NNR-6u was surveyed for special status plants (Table 3.2-3). Caespitose evening-primrose, coyote tobacco, longsepal globemallow, and weakstem cryptantha are known to occur within one mile of Route Segment NNR-6o/NNR-6u. WNHP data shows an occurrence of Suksdorf's monkeyflower intersects this route segment near its eastern terminus.

Overhead Design Option
With NNR-6o, long-term disturbance to special status species potential habitat would occur to 6.4 acres of suitable and 0.2 acre of marginal habitat. PDFs described above for Route Segment NNR-1 and Impacts Common for All Route Segments (Section 4.2.3) would be implemented during construction and maintenance of Route Segment NNR-6o to minimize impacts to special status plants. With the implementation of PDFs, impacts to special status plant species and potential suitable habitat is anticipated to include 0.3 mile of low impacts and 6.2 miles of moderate impacts.

Underground Design Option

With the Underground Design Option (NNR-6u), long-term disturbance to potential habitat for special status species would occur to 16.6 acres of suitable and 0.4 acre of marginal habitat. PDFs described above for Route Segment NNR-1 and Impacts Common for All Route Segments (Section 4.2.3) would be implemented during construction and maintenance of Route Segment NNR-6u to minimize impacts to special status plants. Suksdorf's monkeyflower is known to occur near the eastern end of Route Segment NNR-6u, in approximately the same location where a five-acre transition station would be needed. If preconstruction surveys document any special status plants within trenching or transition stations, line adjustments would be made to avoid or minimize impacts to these species where practicable. If avoidance is not possible, impacts to special status plant species and habitat would be minimized through the implementation of PDFs such as: implementing measures identified in the Reclamation, Re-vegetation, and Monitoring Framework Plan; in coordination with the land management agencies, salvaging and respreading topsoil surrounding the plants to preserve the seed bank and localized species habitat conditions; using weed-free borrow material and soil; and implementing a Noxious Weed and Invasive Plant Control Plan. With the implementation of PDFs, impacts to special status plant species and potential suitable habitat is anticipated to include 0.3 mile of low impacts and 6.2 miles of moderate impacts.

Caespitose Evening-Primrose

Caespitose evening-primrose is a BLM Sensitive and Washington Sensitive species. This species is known from eastern Oregon eastward, through Montana and Wyoming to the Dakotas. In Washington it occurs in Kittitas, Yakima, Grant and Benton Counties. Within the region, nine populations occupying approximately 1,737 acres are known to occur. Primary threats to caespitose evening-primrose include habitat disturbance through grazing, road construction and maintenance, land conversion and mineral extraction (WNHP and BLM 2005). WNHP data indicates that caespitose evening-primrose is known to occur within one mile of Route Segment NNR-6o/NNR-6u. As this entire route segment was not surveyed due to route adjustments made following the special status plant survey, this species could have the potential to occur within the ROW. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Coyote Tobacco

Coyote tobacco is a BLM Sensitive and a Washington Sensitive species. This species is known to occur from southern British Columbia, northern Idaho, and Montana south to northwest Mexico. In Washington, it is known to occur in Grant, Kittitas, Klickitat and Yakima Counties. Within the region, thirteen populations occupying approximately 1,794 acres are known to occur. Threats to coyote tobacco include habitat loss through invasive plants, livestock grazing, agriculture, military activities, off-road vehicle use, herbicides and road maintenance (Camp and Gamon 2011). WNHP data indicates that an occurrence of coyote tobacco is present within one mile of Route Segment NNR-6o/NNR-6u. As this entire route segment was not surveyed due to route adjustments made following the special status plant survey, this species could have the potential to occur within the ROW. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Longsepal Globemallow

Longsepal globemallow is a BLM Sensitive and a Washington Sensitive species. This species is endemic to central Washington. It is known to occur in Kittitas, Chelan and Douglas Counties. Within the region, forty-five populations occupying 15,482 acres are known to occur. The primary threats to longsepal globemallow include fire suppression, road construction and maintenance, logging, off-road vehicle use, recreation, grazing and habitat loss through the introduction of nonnative species (Camp and Gamon 2011). WNHP data indicates that an occurrence of longsepal globemallow is present within one mile of Route Segment NNR-6o/NNR-6u. This species was documented along the former alignment of Route Segment NNR-6o/NNR-6u. As this entire route segment was not surveyed due to route adjustments made following the special status plant survey, this species could have the potential to occur within the ROW. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Suksdorf's Monkeyflower

Suksdorf's monkeyflower is a BLM Sensitive and Washington Sensitive species. The distribution of Suksdorf's monkeyflower ranges from California to Washington, Montana, Wyoming, Colorado and Arizona. In Washington, it is known to occur in Benton, Chelan, Grant, Kittitas, Klickitat, and Yakima Counties. Within the region, 25 populations occupying approximately 8,776 acres are known to occur. Potential threats to Suksdorf's monkeyflower include habitat degradation by livestock, agriculture and military training activities (Camp and Gamon 2011). WNHP data indicates that Suksdorf's monkeyflower intersects Route Segment NNR-6o/NNR-6u for 0.3 mile. These locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. Direct impacts and PDFs that would be implemented to minimize impacts to potential occurrences of Suksdorf's monkeyflower are similar to those described above for hedgehog cactus (Route Segment NNR-3). With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Weakstem Cryptantha

Weakstem cryptantha is a BLM Sensitive and a Washington Threatened species. Weakstem cryptantha is known to occur in central Washington south to central California. In Washington, it is known to occur in Kittitas, Grant, Klickitat, Garfield, and Asotin Counties. Within the region, six populations occupying approximately 816 acres are known to occur. The primary threats to weakstem cryptantha include grazing, erosions, and habitat loss through the invasion of exotic plant species (Camp and Gamon 2011). WNHP data indicates that weakstem cryptantha is known to occur within one mile of Route Segment NNR-6o/NNR-6u. As this entire route segment was not surveyed, it is possible that weakstem cryptantha could occur within the ROW. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

4.2.4.7 Route Segment NNR-7

General Vegetation

Long-term disturbance to approximately 7.2 acres of land (Table 4.2-4) would occur with the construction of Route Segment NNR-7. All of the long-term disturbance would occur in areas classified as sagebrush perennial grassland. Approximately 30.9 acres of vegetation would be temporarily disturbed. Impacts are similar to those described above for Route Segment NNR-1. Disturbance would be minimized by PDFs described above that are designed to reduce impacts to vegetation resources. PDFs include using existing public roads to access structure sites, minimizing blading and disturbance to plant communities, revegetating following construction, and implementing a Noxious Weed and Invasive Plant Management

Plan. Refer to Section 2.5 - Project Design Features Common to Action Alternatives for a complete list and description of PDFs.

Moderate impacts levels are anticipated for the entire length of this route segment (8.3 miles).

Special Status Species and Priority Ecosystem

No federally listed special status plant species or priority ecosystems are known to occur along Route Segment NNR-7 (Table 4.2-5). WNHP data indicates that bristle-flowered collomia, caespitose evening-primrose, Columbia milkvetch, dwarf evening-primrose, gray cryptantha, miner's candle, naked-stemmed evening-primrose, Suksdorf's monkeyflower, weakstem cryptantha, and white eatonella are known to occur within one mile of Route Segment NNR-7. Special status plant surveys were conducted along this route segment; however, adjustments were made to the preliminary route to decrease separation distances between the proposed Project and an existing 230 kV line therefore the current ROW was not surveyed. Approximately 1.6 percent (2.4 acres) of federal land within this route segment was surveyed for special status plants (Table 3.2-3). Long-term disturbance would occur to 7.2 acres of potential suitable habitat for special status plants. PDFs described above for Route Segment NNR-1 would also be implemented during construction, operation, and maintenance of Route Segment NNR-7 to minimize impacts to special status plants and include: adhering to measures and terms and conditions developed during the ESA Section 7 consultation period with the USFWS; avoiding or spanning areas supporting special status plants, where practicable; delineating populations of special status plants for avoidance during construction; and developing plant protection plans as part of the POD to identify specific measures for the protection of special status plants. With the implementation of PDFs, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to be moderate for 8.3 miles.

Bristle-flowered Collomia

Bristle-flowered collomia is a BLM Sensitive and a Washington Sensitive species. This species is distributed from north-central Oregon into central Washington. In Washington, it is known to occur in Kittitas and Yakima Counties. Within the region, nine populations occupying 869 acres are known to occur. Primary threats to bristle-flowered collomia are habitat loss through non-native plant invasion, grazing, off-road vehicle use and military training (WNHP and BLM 2005). WNHP data indicates that bristle-flowered collomia intersects Route Segment NNR-7 for approximately 0.2 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. As this entire route segment was not surveyed due to route adjustments made following the special status plant survey, this species could have the potential to occur within the ROW. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Caespitose Evening-Primrose

Refer to Route Segment NNR- 6o/NNR-6u for information on Caespitose evening-primrose. WNHP data indicates that caespitose evening-primrose intersects Route Segment NNR-7 for approximately 1.6 miles; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. As this entire route segment was not surveyed due to route adjustments made following the special status plant survey, this species could have the potential to occur within the ROW. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Columbia Milkvetch

Columbia milkvetch is a federal SOC, BLM Sensitive and a Washington Sensitive species. Columbia milkvetch is restricted to an area approximately 25 miles by 5.0 miles along the west side of the Columbia River in Yakima, Kittitas, and Benton counties. In the region, nineteen populations are known to occur on approximately 34,579 acres. Primary threats to this species are the continued degradation of habitat by military training activities and livestock grazing, increase competition by exotic invasive species, and loss of habitat by orchard development (WNHP and BLM 2005). WNHP data indicates that Columbia milkvetch is known to occur within one mile of Route Segment NNR-7. As the entire ROW was not surveyed, Columbia milkvetch could be present. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Dwarf Evening-primrose

Dwarf evening-primrose is a BLM Sensitive and Washington Sensitive species. It is a regional endemic known from eastern Washington, eastern Oregon, and Idaho. In Washington, it is known to occur in Benton, Douglas, Franklin, Grant, and Kittitas Counties. Within the region, nineteen populations are known to occur occupying 6,564 acres. Primary threats to dwarf evening-primrose include resource extraction, road construction, herbicide drift, and invasion of non-native species. WNHP data indicates that dwarf evening-primrose intersects Route Segment NNR-7 for approximately 0.4 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. As the entire ROW was not surveyed, dwarf evening-primrose could be present. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Gray Cryptantha

Gray cryptantha is a federal SOC, BLM Sensitive and Washington Sensitive species. It is endemic to the Columbia and Lower Yakima Rivers in Washington and Oregon. In Washington, it is known to occur in Benton, Franklin, Grant, Kittitas, Walla Walla, and Yakima Counties. Thirty-three populations occupying 16,169 acres are known to occur. Primary threats to gray cryptantha include off-road vehicle use and competition from invasive and noxious weeds. WNHP data indicates that gray cryptantha intersects Route Segment NNR-7 for approximately 0.4 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. As the entire ROW was not surveyed, dwarf evening-primrose could be present. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Miner's Candle

Miner's candle is a BLM Sensitive and Washington Sensitive species. It is found in Washington, Oregon, California, Idaho, Nevada, Montana, and Wyoming. Within Washington, it is known to occur in Benton, Grant, Kittitas, and Yakima Counties. Four populations are known to occur within the region, occupying approximately 401 acres. Threats to this species include grazing, off-road vehicle use, development and competition with non-native plants. WNHP data indicates that Miner's candle intersects Route Segment

NNR-7 for approximately 0.5 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. As the entire ROW was not surveyed, miner's candle could be present. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Naked-stemmed Evening-primrose

Naked-stemmed evening-primrose is a BLM Sensitive and Washington Sensitive species. It occurs from eastern Oregon and Washington to Wyoming and Colorado. In Washington, it is known to occur in Kittitas County. Two populations occupying 229 acres are known to occur within the region. Threats to naked-stemmed evening-primrose are primarily from gravel extraction, invasion by weedy species, and military training activities. WNHP data indicates the naked-stemmed evening-primrose is present within one mile of Route Segment NNR-7. As the entire ROW was not surveyed, naked-stemmed evening-primrose could be present. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Suksdorf's Monkeyflower

Refer to Route Segment NNR- 6o/NNR-6u for information on Suksdorf's monkeyflower. WNHP data indicates that Suksdorf's monkeyflower intersects Route Segment NNR-7 for approximately 0.6 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Weakstem Cryptantha

Refer to Route Segment NNR- 6o/NNR-6u for information on weakstem cryptantha. WNHP data indicates that weakstem cryptantha intersects Route Segment NNR-7 for approximately 0.7 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. As this entire route segment was not surveyed, it is possible that weakstem cryptantha could occur within the ROW. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

White Eatonella

White eatonella is a BLM Sensitive and Washington Threatened species. It is known to occur in southeast Oregon, western Nevada, and Washington (Grant and Kittitas Counties). Seven populations occupying 853 acres are known to occur within the region. Threats to white eatonella are primarily from grazing, gravel extraction, disturbance from off-road vehicle use, military training and competition from non-native plants. WNHP data indicates that white eatonella is known to occur within one mile of Route Segment NNR-7. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

4.2.4.8 Route Segment NNR-8

General Vegetation

Long-term disturbance to approximately 2.3 acres of land (Table 4.2-4) would occur with the construction of Route Segment NNR-8. The majority of the long-term disturbance would occur within 1.6 acres of sagebrush perennial grassland. The remaining long-term disturbance would occur within 0.5 acre of annual grassland and noxious weeds, 0.1 acre of perennial grassland, and 0.1 acre of sagebrush annual grassland. Approximately 11.0 acres of vegetation would be temporarily disturbed. Impacts are similar to those described above for Route Segment NNR-1. Disturbance would be minimized by PDFs described above that are designed to reduce impacts to vegetation resources. PDFs include using existing public roads to access structure sites, minimizing blading and disturbance to plant communities, revegetating following construction, and implementing a Noxious Weed and Invasive Plant Management Plan. Refer to Section 2.5 - Project Design Features Common to Action Alternatives for a complete list and description of PDFs.

Impacts for Route Segment NNR-8 are anticipated to be: no identifiable for 0.4 mile (spanning the Columbia River and associated basalt cliffs), low for 0.8 mile, and moderate for 1.6 miles.

Special Status Species and Priority Ecosystem

No federally listed special status plant species or priority ecosystems are known to occur along Route Segment NNR-8 (Table 4.2-5). WNHP data indicates that annual sandwort, beaked spike-rush, bristle-flowered collomia, caespitose evening-primrose, Columbia milkvetch, dwarf evening-primrose, Geyer's milkvetch, gray cryptantha, Great Basin gilia, naked-stemmed evening-primrose, and white eatonella are known to occur within one mile of Route Segment NNR-8. Approximately 93.1 percent (30.3 acres) of federal land within this route segment was surveyed for special status plants (Table 3.2-3). Long-term disturbance would occur to 0.7 acres of marginal and 1.6 acres of suitable habitat for special status plants. PDFs described above for Route Segment NNR-1 would also be implemented during construction and maintenance of Route Segment NNR-8 to minimize impacts to special status plants and include: adhering to measures and terms and conditions developed during the ESA Section 7 consultation period with the USFWS; avoiding or spanning areas supporting special status plants, where practicable; delineating populations of special status plants for avoidance during construction; and developing plant protection plans as part of the POD to identify specific measures for the protection of special status plants. With the implementation of PDFs, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to be: no identifiable for 0.4 mile, low for 0.6 mile, and moderate for 1.8 miles.

Annual Sandwort

Annual sandwort is a WA State Review Group 1 species. It is known to occur from British Columbia south to California, Nevada and Arizona. In Washington, it has been documented in Grant, Chelan, Whitman, Spokane, Walla Walla, and Klickitat Counties. With the region, one population occupying approximately 23 acres is known to occur. The primary threat to annual sandwort is from off-road vehicles. WNHP data indicates that annual sandwort intersects Route Segment NNR-8 for approximately 0.3 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Beaked Spike-Rush

Beaked spike-rush is a Washington Sensitive species. Beaked spike rush is known to occur from Nova Scotia, Canada south to Mexico, the Greater Antilles, and in the South American Andes. In Washington, beaked spike-rush is known to occur in Grant and Yakima Counties. Six populations occupying approximately 563 acres are known to occur within the region. The primary threat to beaked spike-rush is invasion of habitat by non-native species. WNHP data indicates that beaked spike-rush is known to occur within one mile of Route Segment NNR-8. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Bristle-Flowered Collomia

Refer to Route Segment NNR-7 for information on bristle-flowered collomia. WNHP data indicates that bristle-flowered collomia is known to occur within one mile of Route Segment NNR-8. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Caespitose Evening-Primrose

Refer to Route Segment NNR- 6o/NNR-6u for information on caespitose evening-primrose. WNHP data indicates that caespitose evening-primrose is known to occur within one mile of Route Segment NNR-8. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Columbia Milkvetch

Refer to Route Segment NNR-7 for information on Columbia milkvetch. WNHP data indicates that Columbia milkvetch is known to occur within one mile of Route Segment NNR-8. Plant surveys conducted for the DEIS (Route Segment 3b) located a population of Columbia milkvetch. This occurrence is located outside of the ROW for Route Segment NNR-8. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Dwarf Evening-Primrose

Refer to Route Segment NNR-7 for information on dwarf evening-primrose. WNHP data indicates that dwarf evening-primrose intersects Route Segment NNR-7 for approximately 0.1 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Geyer's Milkvetch

Geyer's milkvetch is a BLM Sensitive and Washington Threatened species. It is known to occur in Oregon, California, Nevada, southern Idaho, Utah, Washington, and Wyoming. In Washington, it is known to occur in Grant County, with eight populations occupying approximately 1,689 acres. Threats to Geyer's milkvetch are from agricultural conversion, off-road vehicle use and grazing. WNHP data indicates that Geyer's milkvetch is located within one mile of Route Segment NNR-8. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Gray Cryptantha

Refer to Route Segment NNR-7 for information on gray cryptantha. WNHP data indicates that gray cryptantha intersects Route Segment NNR-7 for approximately 0.2 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Great Basin Gilia

Great Basin gilia is a Washington Threatened species. It is distributed throughout the Great Basin from California to Washington, Idaho, New Mexico, and Colorado. In Washington, it is known to occur in Benton, Grant, and Franklin Counties. Eight populations occupying approximately 1,320 acres are known to occur within the region. Potential threats to Great Basin gilia include ground disturbance by recreational use and competition from non-native species. WNHP data indicates that Great Basin gilia is known to occur within one mile of Route Segment NNR-8. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

Naked-Stemmed Evening-Primrose

Refer to Route Segment NNR-7 for information on naked-stemmed evening-primrose. WNHP data indicates the naked-stemmed evening-primrose is present within one mile of Route Segment NNR-8. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

White Eatonella

Refer to Route Segment NNR-7 for information on white eatonella. WNHP data indicates that white eatonella occurs within one mile of Route Segment NNR-8. With the implementation of PDFs described above and the assumption that any occurrences found during pre-construction surveys would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute toward the need for federal listing.

4.2.4.9 Route Segment MR-1

General Vegetation

Long-term disturbance to approximately 25.4 acres of land (Table 4.2-4) would occur with the construction of Route Segment MR-1. The long-term disturbance would occur within 12.5 acres of sagebrush perennial grassland and 12.9 acres of annual grassland/noxious weeds. Approximately 45.2 acres of vegetation would be temporarily disturbed. Impacts are similar to those described above for Route Segment NNR-1. Disturbance would be minimized by PDFs described above that are designed to reduce impacts to vegetation resources. PDFs include using existing roads to access structure sites, minimizing blading and disturbance to plant communities, revegetating following construction, and implementing a Noxious Weed and Invasive Plant Management Plan. Refer to Section 2.5 - Project Design Features Common to Action Alternatives for a complete list and description of PDFs.

Impacts for Route Segment MR-1 are anticipated to be: no identifiable for 2.6 miles (disturbance occurring in developed or already disturbed areas); low for 4.9 miles, and moderate for 4.4 miles.

Special Status Species and Priority Ecosystem

No special status species are known to occur within one mile of Route Segment MR-1 (Table 4.2-5). WNHP data indicates that Route Segment MR-1 intersects one WNHP Priority Ecosystem, big sagebrush-bluebunch wheatgrass, for approximately 0.4 mile. Impacts to this priority ecosystem would occur through disturbance and vegetation removal associated construction. Impacts would be reduced by: closing access roads where not needed; implementing noxious weed control; and minimizing blading and disturbance to plant communities. Due to route adjustments made following the special status plant surveys, approximately 0.3 percent (0.4 acre) of Route Segment MR-1 was surveyed for special status plants (Table 3.2-3). With Route Segment MR-1, long-term disturbance to special status species potential habitat would occur to 12.5 acres of suitable, 12.9 acres of marginal, and 8.6 acres of unsuitable habitat. PDFs described above for Route Segment NNR-1 and Impacts Common for All Route Segments (Section 4.2.3) would be implemented during construction and maintenance of Route Segment MR-1 to minimize impacts to special status plants. With the implementation of PDFs, impacts to special status plant species and potential suitable habitat is anticipated to include 2.5 miles of no identifiable, 4.9 miles of low impacts and 4.5 miles of moderate impacts.

4.2.5 Mitigation Measures

The PDFs and environmental protection measures described in Section 2.5 (Project Design Features Common to Action Alternatives) would be incorporated into the Project design and would be implemented during construction and operation of the proposed Project. These measures are designed to avoid or minimize environmental impacts from Project construction, operation and maintenance activities and are items that Pacific Power has committed to implement as part of the Project development; therefore, at this time no additional mitigation would be required. If desired biological objectives are not achieved with the existing PDFs, additional mitigation measures may be implemented.

4.2.6 Impact Summary by Alternative

4.2.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to vegetation would occur, but changes in vegetation would continue as a result of natural conditions and future development.

4.2.6.2 Route Alternatives

Table 4.2-6 presents a summary of the impacts for the NNR Alternative, by design option, and the DEIS Agency Preferred Alternative and impact levels following the implementation of PDFs for vegetation resources. The impact summary for special status plants and priority ecosystems is presented separately in Table 4.2-7.

Long-term disturbance to vegetation would be similar for NNR Alternative - MR Subroute (65.1 acres), NNR Alternative - Underground Design Option (68.0 acres), and the DEIS Agency Preferred Alternative (66.1 acres; Table 4.2-6). The NNR Alternative – Overhead Design Option would disturb the least amount of vegetation (45.2 acres). The DEIS Agency Preferred Alternative would disturb the lowest percent of vegetation classified as a moderate impact (40 percent). The NNR Alternative – Overhead Design Option and the NNR Alternative - Underground Design Option would disturb the most vegetation classified as moderate (76 percent each), primarily associated with long-term disturbance in sagebrush.

The NNR Alternative design options have route segments in common; therefore, the miles of special status species polygons that would be crossed (7.1 miles) and the number of miles with special status plants documented during the surveys (2.6 miles) is the same (Table 4.2-7). The DEIS Agency Preferred Alternative would cross a comparable number of special status species polygons (7.5 miles) and fewer miles of the route segment would cross locations with special status plants documented during plant surveys (1.0 mile). One WNHP priority ecosystem would be crossed by NNR Alternative - MR Subroute. The four alternatives would cross similar miles of suitable habitat, ranging from 27.6 miles (DEIS Agency Preferred Alternative) to 31.2 miles (NNR Alternative - MR Subroute).

TABLE 4.2-6 LONG-TERM DISTURBANCE TO VEGETATION AND IMPACT SUMMARY OF ALTERNATIVES

ALTERNATIVES	VEGETATION TYPE (LINEAR MILES CROSSED, ACRES DISTURBED, AND % VEGETATION TYPE DISTURBED)																																			IMPACTS			
	ANNUAL GRASSLAND AND NOXIOUS WEEDS			BITTERBRUSH PERENNIAL GRASSLAND			FORBS			INTERMITTENT STREAM / DRY GULLY			PERENNIAL GRASSLAND			RABBITBRUSH ANNUAL GRASSLAND			RIPARIAN / WETLAND			ROCK / BASALT CLIFF			SAGEBRUSH ANNUAL GRASSLAND			SAGEBRUSH PERENNIAL GRASSLAND			TREES			TOTAL VEGETATION DISTURBED		HIGH	MODERATE	LOW	NO IDENTIFIABLE
	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	mi	mi	mi	mi
NNR Alternative – Overhead Design Option NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.3 miles	2.3	2.0	4.4	0.2	0.3	0.6	0.7	0.6	1.3	0.1	0.2	0.5	2.4	3.6	8.1	1.3	1.2	2.7	0	0	0	0.3	0.4	1.0	2.7	3.7	8.2	28.0	33.0	73.0	0.3	0.2	0.5	38.3	45.2	0	30.7	7.1	2.5
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.7 miles	6.9	14.6	22.5	0	0	0	0.7	0.6	0.9	0.1	0.2	0.3	2.3	3.6	5.5	1.3	1.2	1.8	0	0	0	0.3	0.4	0.7	1.0	0.9	1.4	30.1	43.5	66.7	0.3	0.2	0.3	43.0	65.1	0	31.0	11.6	5.1
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.3 miles	2.3	2.3	3.4	0.2	0.5	0.7	0.7	1.3	1.9	0.1	0.2	0.3	2.4	3.9	5.8	1.3	1.2	1.8	0	0	0	0.3	0.4	0.6	2.7	9.1	13.4	28.0	48.7	71.6	0.3	0.2	0.3	38.3	68.0	0	30.7	7.1	2.5
DEIS Agency Preferred Alternative 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	13.5	19.2	24	0	0	0	0	0	0	0	0	0	3.7	4.5	6.0	2.6	3.0	4.0	0.3	0.3	0	0	0	0	0.6	0.6	1.0	26.9	38.4	48.0	0.1	0.1	0	48.1	66.1	0	26.5	21.6	18.2

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of vegetation type disturbed compared to the total amount of disturbance for each Alternative (including agriculture, cliff/rock, disturbed or developed, and water which are not shown). [2]Total miles of vegetation disturbance does not include disturbance to agriculture, cliff/rock, disturbed or developed and water. [3]Impact levels in linear miles. Areas with no identifiable impacts include areas where no roads would be necessary; steep areas that would be spanned; disturbance to agriculture; and disturbed or developed areas and water. PDFs described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

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TABLE 4.2-7 LONG TERM DISTURBANCE TO SPECIAL STATUS PLANT SPECIES AND HABITAT, AND IMPACT SUMMARY OF ALTERNATIVES

ALTERNATIVES	SPECIAL STATUS PLANTS AND ECOSYSTEMS (MILES)			HABITAT SUITABILITY (MILES)[1]			IMPACTS (MILES)[2]			
	WNHP SPECIAL STATUS PLANT POLYGONS CROSSED	SPECIAL STATUS PLANTS FOUND DURING SURVEY	WNHP PRIORITY ECOSYSTEMS CROSSED	SUITABLE	MARGINAL	UNSUITABLE	HIGH	MODERATE	LOW	NO IDENTIFIABLE
NNR Alternative – Overhead Design Option NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.3 miles	7.1	2.6	0	29.3	8.6	2.9	0	32.7	5.2	2.4
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.7 miles	7.1	2.6	0.4	31.2	11.4	5.5	0	33.1	9.7	4.9
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.3 miles	7.1	2.6	0	29.3	8.6	2.9	0	32.7	5.2	2.4
DEIS Agency Preferred Alternative 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	7.5	1.0	2.9	27.6	20.3	18.4	0	31.7	17.6	17.0

[1]Unsuitable habitat included: agricultural land; developed, road, or firebreak; irrigation canal; open water; and watered poplar. Marginal habitat included: annual grassland, perennial grassland; rabbitbrush/annual grassland, and sagebrush annual grassland. Suitable habitat included: basalt cliff/rock, sagebrush/perennial grassland, aspen, intermittent stream or dry gully, and riparian.
[2]Impact levels in linear miles.

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4.3 WILDLIFE AND SPECIAL STATUS WILDLIFE SPECIES

4.3.1 Methods and Impact Types

4.3.1.1 Analysis Methods

The impact analysis for wildlife and special status wildlife species identified in Section 3.3 focused on impacts resulting from actions that alter habitat. The three areas of focus for this analysis included biological change, habitat degradation, and disturbance. Alteration may occur through direct habitat loss via surface disturbance, direct mortality from construction activities, or indirectly through the reduction in habitat quality such as increased noise levels or the presence of anthropogenic structures. Both the direct and indirect impacts of transmission line development are associated with ground disturbance caused by constructing road networks for access; installation of transmission structures, conductors, and other infrastructure; and ongoing maintenance. Wildlife habitats were assembled from vegetation categories described in Section 3.2 - Vegetation and Special Status Plants, Affected Environment. Refer to Chapter 2 for a description of the disturbance model and to Section 4.2 for a discussion of the impacts specific to vegetation.

Potential impacts analyzed specifically for sage-grouse are habitat loss, degradation, and fragmentation; increased predation; behavioral avoidance; disturbance and displacement; impairment of habitat connectivity; and collision. Impacts to sage-grouse were evaluated using: 1) geographic information system (GIS) data analysis of existing habitat within the Project area; 2) habitat loss calculated by using typical disturbance types associated with the construction, operation and maintenance of the proposed New Northern Route (NNR) Alternative (e.g., new access road construction, work areas); 3) the total number of structures per route segment and the anticipated number of new structures located greater than 0.25 mile from an existing line; 4) analysis of Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) corvid (raven) data; 5) analysis of the Washington Wildlife Habitat Connectivity Working Group (WHCWG) habitat connectivity and linkage reports; 6) GIS data on active, inactive and historical lek locations and observations; and 7) sage-grouse telemetry location data (Cadwell et al. 1998; Livingston and Nyland 2002; Stell Environmental Enterprises [SEE] 2013). Analysis of existing habitat was based on aerial photos, vegetation data, U.S. Geological Survey (USGS) Gap Analysis Program (GAP) data, fire history data, plant surveys, and a habitat assessment (Appendix B-2) conducted for the proposed Project.

Impacts to wildlife and special status wildlife species are presented by route segment (Sections 4.3.3 - Impacts Common to All Route Segments and 4.3.4 - Impacts Specific to Route Segment) and then collectively by Alternative (Section 4.3.6). Potential impacts to greater sage-grouse are analyzed and discussed at length in the Sage-Grouse Analysis and Mitigation Report, and will be incorporated in the full administrative draft of the Supplemental Draft Environmental Impact Statement (SDEIS).

4.3.1.2 Impact Criteria

Sensitivity classifications were assigned to wildlife resources that occur within the Project area. These sensitivity classifications served as the basis for assigning impact levels. The criteria used to assess the impacts to wildlife resources are summarized in Tables 4.3-1, 4.3-2, and 4.3-3.

TABLE 4.3-1 WILDLIFE RESOURCE SENSITIVITY CLASSIFICATION

WILDLIFE RESOURCE	SENSITIVITY	POTENTIAL IMPACT FROM THE PROPOSED PROJECT
Bald Eagle Management Area	High	Disturb important bald eagle populations and reduction in species habitat.
Bald eagle winter roost - within 1 mile	High	Disturb important bald eagle habitat during a sensitive period in the species lifecycle.

WILDLIFE RESOURCE	SENSITIVITY	POTENTIAL IMPACT FROM THE PROPOSED PROJECT
Raptor nesting area - within 1 mile of the proposed transmission line	High	Disturb breeding raptors, nest abandonment, and reduction in breeding habitat.
Riparian/Wetland	High	Reduction in a fragile sensitive habitat.
Sagebrush/Perennial Grassland	High	Reduction in quality habitat that supports important obligate species and is slow to recover from disturbance.
Special Status Wildlife Species Occurrences	High	Disturb fragile populations of species and reduction in species habitat.
Trees (Aspen and Poplar)	High	Reduction in quality habitat that supports important obligate species and is slow to recover from disturbance.
Basalt cliffs	Moderate	Reduction in quality habitat that supports important obligate species.
Mule deer year-round habitat	Moderate	Disturb important habitat during a stressful period to mule deer.
Riparian Intermittent Stream	Moderate	Reduction in a fragile sensitive habitat (abundance and quality).
Sagebrush and Rabbitbrush/Annual Grassland	Moderate	Reduction in habitat (abundance and quality) that is slow to recover to pre-disturbance state.
Salmonid spawning area	Moderate	Reduce quality of a fragile habitat.
Agricultural land	Low	Reduce habitat (abundance and quality).
Urban/developed	Low	Reduce habitat (abundance and quality).

TABLE 4.3-2 SAGE-GROUSE RESOURCE SENSITIVITY CLASSIFICATION

RESOURCE CATEGORY	SENSITIVITY	POTENTIAL IMPACT FROM THE PROPOSED PROJECT
Sage-grouse lek – within 0 to 4 miles of the proposed NNR transmission line alternative	High	Disturbance and displacement of breeding grouse; increased predation; behavioral avoidance; reduction in breeding habitat.
Greater Sage-Grouse Regularly Occupied Habitat Management Unit	High	Reduction in habitat (abundance and quality) that serves as sage-grouse habitat.
Sagebrush/Perennial Grassland (Breeding, Late Brood-rearing/Summer, and Winter Habitat)	High	Reduction in quality habitat that is slow to recover from disturbance.
Sage-grouse lek – within > 4 miles from the proposed transmission line and within suitable habitat	Moderate	Disturbance and displacement of breeding grouse; increased predation; behavioral avoidance; reduction in breeding habitat.
Greater Sage-Grouse Connectivity Habitat Management Unit	High	Reduction in habitat (abundance and quality) that serves as a movement corridor between seasonally used areas.
Non-forested Riparian, Intermittent Stream (Breeding and Late Brood-rearing/Summer Habitat)	Moderate	Reduction in habitat that could serve as suitable seasonal habitat, especially during breeding and summer.
Bitterbrush/perennial grassland (Potential Breeding and Late Brood-rearing/Summer Habitat, depending on surrounding vegetation)	Moderate	Reduction in habitat that could be used as breeding and late brood-rearing/summer habitat
Sagebrush/Annual Grassland (Winter Habitat)	Moderate	Reduction in disturbed habitat that could provide potential suitable seasonal habitat.
Greater Sage-Grouse Expansion Habitat Management Unit	Low	Reduce habitat (abundance and quality) that could serve as expansion areas for sage-grouse.
Perennial Grassland (Potential Summer Habitat, depending on surrounding vegetation)	Low	Reduction in habitat that could be used as summer habitat.

RESOURCE CATEGORY	SENSITIVITY	POTENTIAL IMPACT FROM THE PROPOSED PROJECT
Annual grassland, noxious weeds, rabbitbrush/annual grassland, developed/disturbed (Unsuitable Habitat)	Low	Reduction in unsuitable vegetation or disturbance in developed/disturbed areas.

TABLE 4.3-3 SUMMARY OF IMPACTS TO WILDLIFE RESOURCES

IMPACT	PROJECT ATTRIBUTE	POTENTIAL IMPACT AND WILDLIFE RESOURCE EFFECT	IMPACT CATEGORY AND LONGEVITY
Direct injury and/or mortality to vegetation	Vehicle and human trampling during construction and maintenance.	Destruction, mortality, and injury to vegetation, reduction in habitat quantity and quality.	Biological disturbance and Biological change. Short-term in areas adjacent to the right-of-way (ROW). Long-term in areas associated with clearing and grading for access roads and transmission structures.
Direct injury and/or mortality to wildlife	Vehicle and human trampling during construction and maintenance.	Destruction, mortality, and injury to wildlife species. Species with limited mobility or that occupy burrows or nests are most susceptible. Destruction of nests.	Biological change. Short-term within the footprint from construction and structures and in areas adjacent to the ROW. Long-term for access roads.
Ground disturbance	Construction, structure foundations, access roads.	Habitat quantity and quality reduction ; habitat degradation.	Biological disturbance and Biological change. Short-term within the footprint from construction. Long-term from access roads and structures.
Fugitive dust generation	Construction, maintenance and repair activities.	Reduced photosynthesis, impaired species respiration, and reduction in habitat quality.	Biological disturbance and Biological change. Short-term within the footprint from construction. Long-term from access roads.
Exposure to pollutants	Chemical spills from construction and maintenance.	Reduced survival, population, and growth.	Biological disturbance. Short-term, localized to construction and maintenance sites.
Noise, human presence	Construction, maintenance, and repair activities.	Displace wildlife, disrupt breeding, migration, and foraging.	Biological disturbance. Short-term within the footprint from construction. Long-term from access roads.

IMPACT	PROJECT ATTRIBUTE	POTENTIAL IMPACT AND WILDLIFE RESOURCE EFFECT	IMPACT CATEGORY AND LONGEVITY
Fire	Construction and maintenance equipment, human access.	Habitat loss and reduction in habitat quality through the potential post-fire establishment of noxious weeds.	Biological disturbance and Biological change. Short-term in the construction footprint for the transmission line. Long-term for access roads.
Avian collisions	Conductors, shield wires, and guy-wires.	Reduction in avian populations; waterfowl and upland game birds would be most susceptible.	Biological disturbance. Long-term for the Project ROW.
Increased and/or enhanced predator habitat	Transmission structures	Raptors and corvids (e.g., crows, ravens, jays) exploit perching opportunities, resulting in increased predation on small mammal and avian species.	Biological disturbance and Biological change. Long-term for the Project ROW.

4.3.1.3 Impact Types

Impacts to wildlife resources were measured on multiple scales to include: 1) Biological Disturbance; 2) Biological Change; and 3) Magnitude. Magnitude was evaluated in terms of intensity and duration. Impacts can vary in intensity from no change or only a slightly discernible change, to a full modification of the environment. In addition to intensity, duration was evaluated in terms of short-term and long-term impacts.

Impacts are considered short-term if they disturb vegetation or wildlife, but do not prevent the reestablishment of vegetation and wildlife communities to pre-impact structure and functionality within five years. Impacts to grasslands are frequently considered short-term because these communities typically recover more quickly than plant communities possessing a woody component (Olson et al. 2000; Lesica et al. 2005). Long-term impacts continue for an extended period of years. Due to their woody component, long-term impacts can be expected in sagebrush dominated areas. Another example of short-term versus long-term impact would be collision risk with construction vehicles—which would be a short-term impact in most cases (assuming population levels recover within a few years) versus the long-term impact of collision risk with the conductor lines—with the risk continuing for the duration of the project.

The main impacts to sage-grouse that could occur from construction, operation, and maintenance of the proposed NNR Alternative include:

1) Habitat loss and degradation, including direct habitat loss at structures and access roads and indirect habitat loss or degradation in the surrounding landscape resulting from spread of invasive exotic weeds and fires.
2) Potential predation opportunities from avian and terrestrial predators; primarily from avian predators using the transmission structures as perches and nesting substrates.
3) Potential behavioral avoidance of infrastructure associated with the proposed NNR Alternative.
4) Disturbance and displacement from temporary human presence during construction and maintenance activities.

5) Impairment of habitat connectivity between sage-grouse populations in Washington.
6) Direct mortality to sage-grouse through collisions with the transmission line conductor and structures, destruction of sage-grouse nests during construction, and collisions with construction and maintenance vehicles.

Biological Disturbance

Many species are sensitive to disturbance by the presence of humans, which can occur through construction activities and road access. Increased disturbance can result in reductions in productivity, increases in energy expenditures, or displacements in population (Bennett 1991; Mader 1984); however, the magnitude of impact to the species often depends on the specific disturbance. Examples of disturbance from transmission line presence are collision risk, and avoidance behavior. Disturbance from access roads includes human disturbance of breeding areas, nests, dens, and burrows.

Potential disturbance to wildlife species associated with the proposed Project includes any activities, either short- or long-term, that would disrupt species. The increased stress on wildlife caused by the disturbance may result in decreased productivity (e.g., failed or abandoned nest), decreased survival (e.g., collision), or displacement (e.g., abandonment of previously occupied areas). The wildlife species that occur in different vegetation communities are described in Section 3.3 - Wildlife and Special Status Wildlife Species and Tables 3.3-3 and 3.3-7. Disruption from the proposed Project was analyzed by taking into account: 1) increased noise levels during construction; 2) increased noise levels from the energized transmission line; 3) increased vehicle traffic during construction and for maintenance activities; 4) increased off-highway vehicle use and other recreational traffic because of increased access; and 5) the presence of structures and conductors (collision risk and perching opportunities).

Biological Change

Impacts resulting in change include modification of habitat type, species composition, species behavior, or population size. Habitat change in this analysis was generally associated with: 1) long-term habitat loss through vegetation removal and/or destruction; 2) habitat conversion (e.g., removal of shrubland and reclamation to grassland); 3) habitat degradation (e.g., introduction or spread of noxious weeds and invasive species; and 4) introduction of habitat features not currently present (e.g., perching habitat associated with structures). Biological change from habitat loss, habitat conversion, and habitat degradation was evaluated through a GIS data analysis of vegetation communities within the Project area and equated to habitat. Based on the disturbance model, habitat loss was calculated within each habitat type by disturbance type and by short- or long-term duration.

The general types of impacts caused by the construction, operation and maintenance of the proposed Project are presented in Table 4.3-3.

4.3.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Resource sensitivity levels (Tables 4.3-1 and 4.3-2) and impact types (Table 4.3-3) were the primary factors used in estimating potential impact levels for wildlife resources. In addition, the resource quality (the existing condition of the resource) and resource quantity (the amount of the resource potentially affected) were also considered. These criteria were applied to develop impact level categories of high, moderate, low, and no identifiable. The impact levels are defined as follows:

High – A high level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause an adverse biological change or biological disturbance to wildlife resources.

Moderate – A moderate level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause some adverse biological change or biological disturbance to wildlife resources.

Low - A low level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause a minor adverse biological change or biological disturbance to wildlife resources.

No Identifiable - No identifiable impact would be indicated where no measurable impact would occur to wildlife resources.

4.3.3 Impacts Common to All Route Segments

Impacts from construction, operation and maintenance of the proposed Project would impact wildlife populations residing in or near the Project area; however, the extent of the impact would vary among species and for each species would depend on: species occurrence within and near the ROW; habitat requirements; amount of suitable habitat directly or indirectly disturbed by the Project; and sensitivity to disturbance and habitat change. General impacts would include habitat loss and degradation; increased risk of mortality due to collision or increased human access to habitat; generation of fugitive dust; exposure to pollutants; wildfire; increased predator presence; disturbance during critical periods, such as nesting or wintering periods; temporary disturbance and displacement due to construction activities; long-term disturbance or displacement due to operation and maintenance of the infrastructure. Construction activities are generally short-term and related to transmission structure installation, staging areas, access road improvements, new access road construction, and temporary pulling/tensioning sites.

The Project Design Features (PDFs) and environmental protection measures described in Section 2.5 - Project Design Features Common to Action Alternatives, have been incorporated into the Project design and would be implemented during construction and operation of the proposed Project. These measures are designed to avoid or minimize environmental impacts from Project construction, operation, and maintenance activities and are items that Pacific Power has committed to implement as part of the Project development. PDFs will be reviewed, revised, and developed further, as appropriate, to reduce impacts associated with specific resource concerns (e.g., cultural, biological, visual resources), and will be included in the Plan of Development (POD) for this Project. The POD will be reviewed and approved by state and federal agencies and made a part of the authorizations to be issued for use of federal lands by the proposed Project. Initial impacts described below take into account the implementation of these PDFs.

4.3.3.1 Habitat

Construction of the proposed Project and associated infrastructure could result in degradation and loss of wildlife habitat through direct and indirect impacts. Habitat loss for a given species would occur in areas where vegetation is completely removed or becomes altered such that a given wildlife species is unlikely to use it. Degradation of habitat could occur if vegetation composition and/or structure within currently suitable habitat becomes altered and does not adequately meet food and cover requirements. The two primary causes of habitat degradation that have potential to occur as a result of the Project are spread of invasive weeds and altered fire regimes.

Direct Habitat Loss

Direct habitat loss would result from temporary trampling of herbaceous vegetation and removal of vegetation due to construction of the transmission line, access roads, and temporary work spaces. Vegetation would be permanently removed and disturbed at structure bases and along permanent access roads. Vegetation removal could have a variety of effects on habitat including changes in community structure and composition. The degree of impact depends on the type and amount of vegetation affected and the rate at which vegetation would regenerate after construction. Within the Project area, the recovery of vegetation following revegetation would vary by plant community type following construction. Grasslands and herbaceous wetlands would generally recover within five to seven years, while shrublands (e.g., sagebrush) may require 30 to 120 years, depending on the subspecies and size of disturbance (Olson et al. 2000; Lesica et al. 2005; Baker 2006; Knick and Connelly 2011). Because the proposed NNR alternative closely parallels an existing Pacific Power transmission line for the majority of its length, utilizing nearby existing roads will reduce the need for new access roads, thus greatly decreasing the amount of direct habitat loss associated with the proposed NNR alternative. PDFs implemented during construction and operation are anticipated to be effective at minimizing the amount of vegetation that would be impacted (refer to Section 2.5 - Project Design Features Common to Action Alternatives). PDFs include: minimizing construction sites within native plant communities; maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; and reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD. Direct short-term and long-term habitat disturbance is presented in Tables 4.3-4 and 4.3-5 and discussed for each route segment in Section 4.3.4.

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TABLE 4.3-4 SUMMARY OF DISTURBANCE TO HABITAT TYPE BY ROUTE SEGMENT

ROUTE SEGMENT	SHRUB-STEPPE COVER TYPES									GRASSLAND AND FORB COVER TYPES									CLIFF COVER TYPE			RIPARIAN, WETLAND, AND AQUATIC COVER TYPES												DISTURBED COVER TYPES		
	SAGEBRUSH / PERENNIAL GRASSLAND			SAGEBRUSH / ANNUAL GRASSLAND			OTHER SHRUBLANDS			ANNUAL GRASSLAND / NOXIOUS WEEDS			FORB			PERENNIAL GRASSLAND			ROCK / BASALT CLIFFS			INTERMITTENT STREAM / DRY GULLY			OPEN WATER / CANAL			RIPARIAN / WETLAND			TREE			AGRICULTURE / DISTURBED		
	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area[1]	Short-term Disturbance (acres)	Long-term Disturbance (acres)	% Disturbed within Project Area
NNR-1	0	3.8	1	0	0	0	5.0	1.0	30	0.4	0.1	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	0.5	<1
NNR-2	0	4.5	<1	0	2.3	16	0.8	0.2	5	4.8	1.0	<1	0	0	0	2.0	0.4	<1	0	0	0	0	0	0	0	0	0	0	0	0	1.2	0.2	45	5.8	1.0	<1
NNR-3	0	39.8	<1	0	2.0	5	0	0	0	0.4	0.2	<1	0	0	0	5.2	2.9	18	1.1	0.4	20	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	<1
NNR-4o*	0	10.7	<1	0	8.5	24	0.8	0.3	31	1.2	0.2	<1	0	0	0	0.4	0.9	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
NNR-4u*	0	25.2	<1	0	20.4	59	1.5	0.5	57	2.2	0.6	<1	0	0	0	0.7	0.2	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
NNR-5	0	8.4	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0.2	50	0	0	0	0	0	0	0	0	0	0	0	<1
NNR-6o*	0	26.5	<1	0	0	0	0	0	0	0	0	0	2.6	0.6	<1	0.7	0.2	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
NNR-6u*	0	56.0	<1	0	0	0	0	0	0	0	0	0	5.1	1.3	<1	1.5	0.4	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
NNR-7	0	38.1	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
NNR-8	0	9.1	<1	0	0.5	25	0	0	0	2.5	0.5	2	0	0	0	0.8	0.1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
MR-1	0	29.3	<1	0	0.5	0	0	0	0	18.6	12.8	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.9	8.6	<1

[1]Percentage of habitat within the one-mile buffer of the route segment centerline (Project Area) that will be disturbed by either short-term or long-term disturbance. Refer to table 3.3-2 for a summary of acres of each cover type present within the one-mile buffer of each route segment (Project area).

TABLE 4.3-5 SUMMARY OF DISTURBANCE TO DESIGNATED GREATER SAGE-GROUSE MANAGEMENT UNITS (ACRES) AND THE PERCENT (%) OF TOTAL DISTURBANCE THAT WOULD OCCUR WITHIN EACH MANAGEMENT AREA

ROUTE SEGMENTS / DISTURBANCE		WASHINGTON GREATER SAGE-GROUSE MANAGEMENT UNITS - ACRES DISTURBED, TOTAL ACRES PRESENT WITHIN ANALYSIS AREA, PERCENT (%) OF HABITAT DISTURBED WITHIN ANALYSIS AREA BY ROUTE SEGMENT[1]									LAND NOT DESIGNATED AS A SAGE-GROUSE MANAGEMENT UNIT
		REGULARLY OCCUPIED HABITAT (416,031 ACRES)			OCCASIONALLY OCCUPIED HABITAT (558,301 ACRES)			EXPANSION HABITAT (411,345 ACRES)			
ROUTE SEGMENT	TOTAL ACRES OF DISTURBANCE	ACRES DISTURBED	ACRES PRESENT WITHIN ANALYSIS AREA[2]	PERCENT DISTURBED WITHIN ANALYSIS AREA	ACRES DISTURBED	ACRES PRESENT WITHIN ANALYSIS AREA	PERCENT DISTURBED WITHIN ANALYSIS AREA	ACRES DISTURBED	ACRES PRESENT WITHIN ANALYSIS AREA	PERCENT DISTURBED WITHIN ANALYSIS AREA	ACRES DISTURBED
NNR-1	13.1	13.1	20,171	<1%		2,410					
NNR-2	24.2	22.5	29,202	<1%	0.5	7,563	<1%				1.2
NNR-3	52.4	52.0	60,750	<1%	0.4	13,586					
NNR-4o*	23.0	23.0	52,361	<1%		1,608					
NNR-4u*	51.3	51.3	52,361	<1%		1,608					
NNR-5	9.0	9.0	39,630	<1%							
NNR-6o*	30.6	30.6	64,143	<1%							
NNR-6u*	64.3	64.3	64,143	<1%							
NNR-7	38.1	38.1	63,601	<1%		10,569					
NNR-8	13.5	2.7	22,590	<1%	10.8	19,358	<1%		804		
MR-1	79.7	79.7	63,352	<1%		8,112					

[1]No designated Connectivity Habitat, is present within the Project area. [2]The Project area is defined as an eight-mile-wide corridor; four miles from either side of route segment centerlines.
*o = overhead design option; u = underground design option.

Numbers are rounded and may not sum exactly.

Indirect Habitat Degredation

Indirect impacts to habitat could occur during construction through the generation of fugitive dust. High levels of fugitive dust can impact the growth of some organisms (reduced photosynthesis) and can impact drinking water. Most impacts from fugitive dust would last only until the next rain event when the dust is washed away and diluted. Potential impacts from the generation of fugitive dust would be transient as construction progresses and would not occur in one area for a long duration. Prior to construction, a Dust Control Plan would be developed as part of the POD and would identify dust control measures to be implemented during construction. Fugitive dust emissions would also be reduced by implementing the following PDFs: limiting ground disturbing activities during construction; closing and revegetating new or improved access roads, where practicable; utilizing water trucks to control dust during construction; and covering construction materials that are a source of blowing dust (e.g., dirt piles and open pits). Indirect impacts to habitat could occur because ground disturbance and vegetation removal increase the potential for the introduction and spread of noxious and invasive weeds (Olson 1999; Trombulak and Frissell 2000; Levine et al. 2003).

Spread of Invasive Weeds

Ground disturbance and vegetation removal can increase the potential for the introduction and spread of noxious weeds and invasive species (Olson 1999; Levine et al. 2003). Disturbed areas, such as roads and construction work areas, can act as conduits for weeds to become established in native habitats adjacent to the disturbed areas (Gelbard and Belnap 2003). Linear features such as power lines and roads are also associated with a greater abundance of noxious and invasive weeds that decrease with increasing distance from the linear feature (Gelbard and Belnap 2003; Bradley and Mustard 2006; Bradley 2010). Non-native plant invasions have the potential to alter wildlife habitat quality by outcompeting native plants, altering the natural fire regime, and by changing ecosystem processes (e.g., nitrogen cycling). Construction of access roads and the movement of construction equipment and other vehicles along these roads would increase the potential for the spread of noxious weeds in the affected areas (Sheley et al. 1999; Gelbard and Belnap 2003). PDFs would be implemented to reduce the potential spread of noxious weeds and invasive species from Project activities and include the following: reseeding disturbed areas with certified weed-free materials (e.g., borrow material, straw wattles, and bale barriers); reseeding disturbed areas with certified weed-free land management agency approved native or non-native species; washing all equipment before entering the Project area and when leaving areas where noxious weeds are present; closing and revegetating new or improved access roads that are not required for maintenance; and complying with all federal, state and county noxious weed control regulations and guidelines. In addition, a Noxious Weed and Invasive Plant Management Plan would be developed in consultation with land management agencies and local weed control districts, and would be incorporated into the final POD. The Noxious Weed and Invasive Plant Management Plan would emphasize control of cheatgrass during follow-up visits to prevent, to the extent practical, the establishment of cheatgrass before, during, and shortly after establishment of reclaimed vegetation.

Alteration of Fire Regime

Biological change through habitat modification and degradation could occur in the Project area by a wildland fire event. Non-native plants, particularly cheatgrass, create a more continuous fuel bed than native bunchgrasses, resulting in an increased risk of wildfire. Wildfires in turn, increase opportunities for cheatgrass establishment. This creates a positive feedback loop, often resulting in a self-sustaining cycle that permanently converts large portions of the landscape from sagebrush steppe to annual grasslands dominated by cheatgrass (Brown 2000; Paysen et al. 2000). In addition, increased use of access roads and the Project right-of-way (ROW) could lead to an increase in fire danger from campfires, un-extinguished cigarettes, and vehicle exhaust systems coming into contact with dry vegetation. To minimize the potential for wildland fire and loss of wildlife habitat, the following PDFs would be implemented: the development and implementation of a Noxious Weed and Invasive Plant Management Plan; closing or restoring new or improved access roads that are not required for maintenance; all applicable fire laws and regulations would be observed during the construction period and construction personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires; and a Fire Protection and Control Plan would be developed and incorporated into the POD. This Plan would include measures to be implemented during construction and maintenance, such as: restricting smoking to designated areas; restricting equipment parking to sites cleared of all flammable material; equipping vehicles with appropriate fire suppression equipment; and training Pacific Power and its contractors on fire safety, minimizing fire hazards, and how to safely suppress a fire until firefighters can respond. See Section 4.12 - Wildland Fire Ecology and Management for more information on potential wildland fire impacts.

A potential indirect effect of habitat loss is habitat fragmentation, which may affect sage-grouse habitat connectivity and predation risk. Fragmentation of habitat may be caused by the replacement of sagebrush steppe with early successional grassland habitat or by the presence of the infrastructure which may cause sage-grouse behavioral avoidance of the ROW, even where habitat is not directly removed. Loss of connectivity through habitat fragmentation may inhibit daily movements of sage-grouse within their home-ranges as well as migration movements. Fragmentation may also inhibit dispersal ability, leading to greater isolation among habitat patches (Saunders et al. 1991; WHCWG 2010 and 2012; Robb and Schroeder 2012). Fragmentation may increase the risk of predation by attracting predators. Howe et al. (2014) found a positive correlation between sagebrush steppe/annual grassland habitat edge and density of common ravens, a common nest predator of sage-grouse and other species.

4.3.3.2 General Wildlife

Collisions

Construction and maintenance of the proposed Project has the potential to cause biological disturbance through wildlife injury or mortality from collisions or interactions with construction and maintenance equipment and transmission line structures. Potential direct mortality from construction equipment includes collision with animals and crushing of nests or dens. Bird collisions with overhead wires typically involve large, less maneuverable species such as pelicans or species that fly at high speeds and low altitudes such as ducks (California Energy Commission [CEC] 2002; Manville 2005; PacifiCorp 2006). Other factors that influence the likelihood of collisions with wires include the habitat type where lines are located, age of birds as juveniles are more likely than adults to collide with lines, and environmental characteristics (e.g., visibility, weather, time of day). Collisions are more likely to occur in areas with high concentrations of birds in close proximity to lines (CEC 2002; PacifiCorp 2006). Available literature indicates that waterfowl, including ducks, geese, swans, cranes, and shorebirds appear to be most susceptible to collisions when power lines are located near wetlands (Erickson et al. 2005; Faanes 1987; Anderson 1978). In general, raptors are considered less susceptible to collisions with overhead wires than other groups of birds; however, an increased risk of collision occurs where there are repeated flights across power lines, especially during bad weather or while pursuing prey (Avian Power Line Interaction Committee [APLIC] 1994 and 2006; Manosa and Real 2001). PDFs would be incorporated and implemented to minimize wildlife injury and mortality associated with the proposed Project. Specific PDFs to reduce collision risk would include: installing bird flight diverters in locations with known avian collision mortality; installing markers on any new fences constructed or repaired in sage-grouse habitat; moving vehicles and equipment at slow speeds; restricting construction vehicle movement to pre-designated locations; avoiding construction or maintenance activities within four miles of active sage-grouse leks from February 1 to June 15; avoiding construction during the bird nesting season when possible or conducting pre-construction clearance surveys and buffering active nests by at least 100 feet; and avoiding mowing the ROW during the bird nesting season. Pacific Power's Bird Management Program Guidelines include protocols for documenting the incidence of mortalities from collision with the line and problem nests, contacting the appropriate resource agency and additional actions to be taken to reduce mortalities such as installing bird flight diverters or marking static wires in sensitive areas when warranted (PacifiCorp 2006). A wildlife protection plan identifying specific measures to protect wildlife resources would be developed and incorporated into the POD.

Electrocution

Raptor electrocution on transmission lines has received substantial attention and has resulted in the development of 'avian-safe' or 'raptor-safe' design guidelines for new transmission lines (APLIC 2006; APLIC and U.S. Fish and Wildlife Service [USFWS] 2005). Research has indicated that most avian electrocutions occur on low-medium voltage lines (4 kilovolt [kV] to 69 kV) on which conductor spacing is small and can be bridged by large birds (APLIC and USFWS 2005). The industry standard for avian protection includes a minimum horizontal separation of 60 inches between conductors (APLIC 2006). This separation is intended to allow sufficient clearance for eagles; however, applying this standard would also help protect smaller birds, including ospreys, hawks, owls, wading birds, and songbirds (PacifiCorp 2006). The proposed 230 kV transmission line would have a horizontal separation between conductors of 230 inches (19.5 feet) and would be avian-safe with no potential for electrocution of raptors or other bird species. The proposed Project would result in no identifiable impacts with regard to avian electrocution.

Predation

Mammalian predators and scavengers may use roads and transmission ROWs as travel corridors which may facilitate predation on sage-grouse (Bennett 1991; Forman and Alexander 1998). Because the Project ROW would occur within sagebrush steppe and grassland habitats that are already open, the effects of mammalian predation on sage-grouse are likely to be less pronounced compared with corridor effects in forested landscapes. In the relatively treeless environment of the NNR Project area, avian predators are more likely to benefit from a transmission line structures than mammalian predators. Armentrout and Haul (2005) reported that sage-grouse nests and adults associated with leks near transmission lines were lost at a higher rate to avian rather than mammalian predators. They reported that predation attributed to mammals actually occurred at a lower rate near transmission lines.

Transmission line structures provide substrates for perching, roosting, and nesting for some avian species (i.e., raptors and corvids) (APLIC 2006; Knight et al. 1995; Steenhof et al. 1993). In open areas where natural substrates are limited, this may increase local abundance of avian predator species and increase predation pressures on prey species such as small mammals and nesting birds (Call and Maser 1985; Connelly et al. 2000; Vander Haegen et al. 2002; Howe et al. 2014). The distance that these effects could extend from the transmission line depends on the hunting range of the predator species. Some raptor species may benefit from the proposed Project by the creation of new perching sites from which to hunt prey. Common raven populations have increased fourfold in the western U.S. during the past 40 years (Sauer et al. 2012). Raven populations often increase following human alteration of landscapes due to increased availability of food (e.g., litter associated with human use, roadkill, refuse, landfills), water (e.g., stock ponds, reservoirs), and nesting substrates (e.g., transmission line structures, communication towers, buildings) (Knight and Kawashima 1993; Kristan and Boarman 2004; Howe et al. 2014). In eastern Idaho, Howe et al. (2014) reported a 31 percent decrease in the odds of nesting by ravens for every 0.6 mile (1.0 kilometer) increase in distance away from a transmission line ROW, with 48 of 82 nests in the study located on transmission poles.

Long-term monitoring of raven nests at JBLM YTC began in 1994. In 1994, 28 raven nests were located on JBLM YTC; seven (25 percent) of them were located on anthropogenic structures, including one on a power line structure (Paulus and Malkin 1995). In 2013, 47 raven nests were located on JBLM YTC, a 68 percent increase relative to 1994. Only two of the 47 nests were located within one mile of all the proposed NNR route segments. Both were located near Route Segment NNR-6, including one in a tree along Foster creek, and one on a building one mile south of NNR-6 and one mile east of NNR-5. Although an attempt is made to locate all raven nests on JBLM YTC each year, search efforts have not been spatially and temporally consistent (JBLM YTC personal communication February 25, 2014).

A correlation between raven abundance and transmission lines has been established elsewhere (Howe et al. 2014); at JBLM YTC the distribution of raven nests does not appear to be spatially correlated with the locations of transmission lines. None of the active raven nests identified in 2013 were located on the existing Pomona-Wanapum 230 kV transmission line structures that the proposed NNR alternative closely parallels. It is unclear if the apparent nesting patterns of ravens at JBLM YTC are real or just an artifact of spatial variation in search effort.

The Terrace Heights Landfill is located approximately 3.5 miles southeast of NNR-1 and NNR-2, and is likely to provide an abundant source of food for ravens (Paulus and Malkin 1995). Transmission line structures may be more likely to be used by ravens in areas near this abundant food supply.

Because raptor and corvid populations are not likely to be limited by availability of nesting and perching substrates in areas where those resources currently exist, it is reasonable to expect the effect of new transmission structures to be greatest where other tall structures, including transmission lines, do not currently exist. The proposed Project closely parallels an existing 230 kV transmission line (Pomona-Wanapum) that primarily uses H-frame poles similar to the ones proposed for the new Project. As part of Project design, whenever feasible, new structures will be placed in sync with the existing Pomona-Wanapum transmission line structures such that most new structures will be located within 200 feet of an existing structure. Given the territorial nature of raptor and corvid species and density limitations imposed by food availability, it seems unlikely that adding a structure 200 feet from a similar existing one would have much, if any, effect on the density of corvids or raptors. The new perches could increase the amount of landscape that is within view of a perch and effectively widen the corridor of increased predation risk, typically by about 200 feet.

To assess impacts to wildlife species from the presence of additional perching sites, the total number of structures per route segment was estimated. In general, the number of perching opportunities for a given route segment is directly related to its length. Table 4.3-6 presents the number of transmission structures for the proposed Project by route segment as well as the number of structures that will be located greater than 0.25 mile from an existing transmission line. As discussed in the previous paragraph, new structures in new areas are likely to have a higher impact than new structures in close proximity (less than 0.25 mile) to existing structures because they may encourage predators to occupy previously unoccupied areas. The proposed Project would not result in any new structures farther than 0.25 mile from existing structures for Route Segments NNR-4, NNR-6, NNR-7, or NNR-8. Route Segment MR-1 would require considerably more new structures beyond 0.25 mile of an existing line compared with all other route segments combined (85 compared with 50).

To minimize the potential for increased predation rates the following PDFs will be implemented: the line will closely parallel an existing 230 kV transmission line, typically staying within 200 feet; whenever possible, locations of the new structures will match the spans of adjacent transmission lines; to avoid providing food subsidies to ravens or other predators, food waste will be kept in covered receptacles and removed daily; and perch deterrents will be used within four miles of active leks.

TABLE 4.3-6 SUMMARY OF NEW TRANSMISSION STRUCTURES THAT WOULD BE INSTALLED BY ROUTE SEGMENT

ROUTE SEGMENT	LENGTH OF ROUTE SEGMENT (MILES)	LENGTH (MILES) AND PERCENT OF ROUTE SEGMENT LOCATED >0.25 MILE FROM AN EXISTING TRANSMISSION LINE	TOTAL ESTIMATED NUMBER OF NEW STRUCTURES	TOTAL ESTIMATED NUMBER OF NEW STRUCTURES LOCATED >0.25 MILE FROM AN EXISTING TRANSMISSION LINE
NNR-1	2.4	1.1 (44%)	31	14
NNR-2	5.0	2.1 (42%)	48	21
NNR-3	9.3	0.6 (7%)	69	5
NNR-4o*	4.5	0	35	0
NNR-4u*	4.5	0	4	0
NNR-5	1.8	1.2 (67%)	16	10
NNR-6o*	6.4	0	48	0
NNR-6u*	6.4	0	2	0
NNR-7	8.2	0	61	0
NNR-8	2.7	0	20	0
MR-1	11.9	11.2 (94%)	90	85

Source: Number of structures and types is based on preliminary engineering and design. *o = overhead design option; u = underground design option. The number of structures for undergrounding took into account transition stations. For this table, transition stations were considered as a structure.

Disturbance from Human Presence and Avoidance of Infrastructure

Another direct impact on wildlife from the construction of the proposed Project would be visual and noise disturbance. For the most part, the increases in noise and visual disturbance from construction would result from temporary human presence during construction and maintenance activities and would be short-term and localized. Short-term disturbance due to the presence of humans and construction equipment may impact wildlife species by causing them to temporarily vacate habitat in the construction area. Long-term disturbance could also occur; for locations outside of the JBLM YTC, which has controlled access, the proposed NNR alternative may also result in increased human presence to areas previously inaccessible, as well as to off-road vehicle recreation (USFWS 2010a). For species, such as sage-grouse, that avoid trees and other tall objects, the presence of permanent structures may have a long-term visual impact, essentially creating indirect habitat loss surrounding the structures if animals avoid occupying the adjacent habitat (Schroeder 2010; Wisdom et al. 2011; Stonehouse 2013). To minimize visual and noise disturbance to wildlife, the following PDFs would be implemented: restricting construction and maintenance activities during sensitive periods; avoiding construction during the bird nesting season when possible or conducting pre-construction clearance surveys and buffering active nests by at least 100 feet; conducting pre-construction clearance surveys for sage-grouse in overland access areas; restricting construction activity to predetermined spatial limits, including restrictions on use outside of the ROW; siting the line to closely parallel an existing 230 kV transmission line, typically staying within 200 feet; whenever possible, locations of the new structures will be in sync with the existing line; adhering to reasonable speed limits in construction and maintenance areas; and closing and revegetating new or improved access that is not required for maintenance.

4.3.3.3 Federally Endangered, Threatened, and Candidate Species

Impacts to federally endangered, threatened and candidate species are discussed below. In addition, a separate Biological Assessment, which assesses these Endangered Species Act (ESA)-listed species, will be prepared for the Agency Preferred Alternative. Impacts to state-listed and U.S. Bureau of Land Management (BLM) special status species are discussed below and by route segment.

Bull Trout
Critical habitat for bull trout occurs within the Project area within the Yakima River and its tributaries, and the mainstem of the Columbia River (USFWS 2010c). Bull trout occur within the reach of the Columbia River that would be spanned by the proposed Project. Bull trout are not known to spawn within streams within the Project area because the streams are too small and not cold enough over a long enough time period to provide suitable spawning and rearing habitat; however, bull trout could use streams for short periods for foraging (AECOM Environmental 2010). No structure or road construction work would occur within the Columbia or Yakima Rivers. For the Columbia River crossing, the structures would be approximately 200-foot tall steel lattice structures. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. These may include straw wattles, straw bale barriers, and silt fencing which would be placed at construction boundaries. Specific erosion and sediment control measures and locations would be specified in a Stormwater Pollution Prevention Plan (SWPPP). The implementation of PDFs is anticipated to be effective at minimizing impacts to bull trout. No identifiable impacts to bull trout or bull trout habitat are anticipated to occur through construction, operation, and maintenance of the proposed Project.

Chinook Salmon
The endangered Chinook salmon has designated critical habitat within the Project area. The Upper Columbia River Chinook Evolutionarily Significant Unit (ESU) critical habitat includes the reach of the Columbia River that is within the Project area and that would be spanned by the proposed Project. Tributaries of the Columbia River in and near the Project area, including the Yakima River, are not part of the Upper Columbia River Spring Run Chinook ESU; they are part of the Mid-Columbia River Spring Run Chinook ESU which is not listed under the ESA (National Oceanic and Atmospheric Administration [NOAA] 2013). It is unlikely that spawning occurs in streams within the Project area. No structure or road construction work would occur within the Columbia River. For the Columbia River crossing, the structures would be approximately 200-foot tall steel lattice structures for the crossing. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. These may include straw wattles, straw bale barriers and silt fencing which would be placed at construction boundaries. Specific erosion and sediment control measures and locations would be specified in a SWPPP. The implementation of PDFs is anticipated to be effective at minimizing impacts to Chinook salmon. No identifiable impacts to Chinook salmon or its habitat are anticipated to occur through construction, operation, and maintenance of the proposed Project.

Steelhead
The reach of the Columbia River that would be spanned by the proposed Project is within designated critical habitat for the Upper Columbia River steelhead Distinct Population Segment (DPS). The Yakima River and Burbank Creek, also within the Project area, are within critical habitat for the Middle Columbia River steelhead DPS. No structure or road construction work would occur within the three waterways that are designated critical habitat. The Yakima River is located greater than or equal to 0.75 mile from the proposed Project and would not be directly impacted. Burbank Creek and the Columbia River would be spanned. For the Columbia River crossing, the structures would be approximately 200-foot tall steel lattice structures. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. These may include straw wattles, straw bale barriers, and silt fencing which would be placed at construction boundaries. Specific erosion and sediment control measures and locations

would be specified in a SWPPP. The implementation of PDFs is anticipated to be effective at eliminating impacts to steelhead. No identifiable impacts to steelhead or its habitat are anticipated to occur through construction, operation, and maintenance of the proposed Project.

Gray Wolf

As of December 2012, Washington had nine confirmed wolf packs, none of which are located in or near the Project area (Washington Department of Fish and Wildlife [WDFW] 2011b). The closest confirmed wolf pack is located approximately 30 miles northwest of the Project area (Becker et al. 2013). The proposed Project would have no identifiable impact on the gray wolf or its habitat.

Washington Ground Squirrel

Washington ground squirrels are not known to occur within the Project area, but suitable habitat exists. Potential impacts to Washington ground squirrel include both biological change and biological disturbance such as displacement from construction activities, injury or mortality from vehicle strikes or interactions with other equipment during construction or maintenance activities, and the permanent and temporary loss of grassland and shrub-steppe habitat. While construction activities would disturb individuals, their typical behavioral response to retreat underground would not necessarily cause displacement from the area. Washington ground squirrels do not migrate, but instead move underground to hibernate during winter months. Although these behaviors may be beneficial for avoiding dangers from predation, cold temperatures and lack of forage, construction-related ground disturbance may result in injury or mortality if individuals are underground in the Project corridor and are crushed by construction equipment. In addition, the potential for impacts may increase following emergence from hibernation in late January through March and when the young appear aboveground in late March or April. Vehicle strikes during active construction or maintenance would most likely result in the highest incidences of injury or mortality to Washington ground squirrels. In addition, the installation of structures within grassland and shrub-steppe habitat would cause permanent loss of usable acreage, and may increase perching habitat for predators such as raptors.

The long-term loss of grassland and shrub-steppe habitat would range from 5 to 58 acres per route segment, which would be an incremental increase in loss due to the already degraded nature of the surrounding ecosystem due to JBLM YTC training operations, non-native plant invasions, fire, habitat alteration by livestock grazing, and conversion of sagebrush steppe to residential and agricultural. Short-term and long-term ground disturbance is presented in Table 4.3-4 and discussed for each route segment in Section 4.3.4.

PDFs implemented during construction and operation are anticipated to be effective at minimizing the impact on Washington ground squirrels (refer to Section 2.5 - PDFs Common to Action Alternatives). PDFs include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; restricting construction activity to predetermined spatial limits, including restrictions on use outside of the ROW; siting the line to closely parallel an existing 230 kV transmission line; adhering to reasonable speed limits in construction and maintenance areas; and closing or rehabilitating new or improved access that is not required for maintenance. With the implementation of PDFs described above, the scale of biological change and biological disturbance to Washington ground squirrel and its habitat is anticipated to be insignificant or minor; impacts levels are expected to be low.

Greater Sage-Grouse

Potential impacts to sage-grouse are analyzed and discussed at length in Appendix B-5 - Sage-grouse Technical Report, and summarized in this section. Potential impacts to sage-grouse include: 1) habitat loss and degradation; 2) collision with infrastructure or construction vehicles; 3) increased predation due to increased perching and nesting opportunities for avian predators; 4) disturbance and displacement due to temporary human presence; 5) behavioral avoidance of infrastructure; and 6) impeded habitat connectivity. Many of the potential impacts to sage-grouse are similar for other wildlife species and were introduced and discussed at length above. The sage-grouse specific implications of these impacts are briefly discussed below. Habitat loss and degradation is discussed above in Section 4.3.3.1, collision, predation, and disturbance are discussed above in Section 4.3.3.2. Avoidance of infrastructure and impeded connectivity are introduced and discussed specifically for sage-grouse in the following paragraphs.

Habitat Loss and Degradation

As discussed in Section 4.3.3.1, construction of the proposed Project could result in degradation and loss of wildlife habitat through direct removal of vegetation or through indirect alteration of vegetation through the spread of invasive weeds or altered fire regimes. Invasive weeds and fires are often interrelated because non-native plants, particularly cheatgrass, often create a more continuous fuel bed than native bunchgrasses, resulting in shorter intervals between occurrence of wildfires (Brown 2000; Paysen et al. 2000).

The Washington Sage-Grouse Recovery Plan (Stinson et al. 2004) and the range wide USFWS 12-Month Findings for Petitions to List the Greater Sage-Grouse as Threatened or Endangered (USFWS 2010a) identify habitat loss and degradation from large-scale fires as the primary threat to remaining sage-grouse populations. The Recovery Plan states that fire prevention is critical to maintain sage-grouse populations on the JBLM YTC (Stinson et al. 2004). Specific PDFs anticipated to be effective at minimizing habitat loss and degradation are discussed in Section 4.3.3.1.

Collision

As discussed in Section 4.3.3.2, injury or mortality could occur to sage-grouse from collisions or interactions with construction and maintenance equipment and transmission line infrastructure. Because research data on sage-grouse collisions with power lines are minimal, the number of sage-grouse collisions with transmission lines is difficult to evaluate (Johnson and Holloran 2010). A study in Idaho that outfitted 58 juvenile sage-grouse with radio transmitters, found 2 of the 11 mortalities observed (18 percent) resulted from collisions with a power line; however, the study does not indicate what size of transmission line was present in the study area (Beck et al. 2006). In contrast, a study in Nevada on the response of sage-grouse to construction of a 345 kV transmission line did not find any collision mortalities of the 240 hens which were outfitted with radio transmitters (Blomberg and Sedinger 2009). Additional incidental discoveries or anecdotal accounts of sage-grouse collisions with power lines exist (Schroeder 2010).

The placement of the proposed NNR alternative line along the northern periphery of the habitat occupied by the existing JBLM YTC grouse population (instead of through the population) and closely paralleling an existing line should reduce the risk of collision. Additional PDFs anticipated to be effective at minimizing collision risk are discussed in Section 4.3.3.2.

Predation

As discussed in Section 4.3.3.2, transmission lines may result in increased predation on sage-grouse, particularly from avian predators (corvids and raptors) that may perch and/or nest on transmission structures. Raven populations have increased dramatically in the west following human alteration of the landscape and may be more abundant near power lines (Howe et al. 2014).

While specific studies linking transmission lines and predation risk for sage-grouse are lacking (Utah Wildlife in Need [UWIN] 2010), raven research indirectly suggests a link between transmission lines and predation on sage-grouse. Sage-grouse nest failure has been positively correlated with raven abundance (Coates and Delehanty 2010) and occupancy (Bui et al. 2010). However, increased predation on sage-grouse might occur at some, but not all transmission line sites. A study in Nevada found no difference in sage-grouse nest success by distance to power line even though raven densities increased dramatically post-construction (Blomberg et al. 2010). Even the relationship between raven abundance and sage-grouse nest success may be complicated. The study in Nevada found that, after the ten-year results were calculated, the distance to transmission line was not a significant negative influence on nest survival, pre-fledgling survival, or female survival (Nonne et al. 2013). In southern Wyoming, Dinkins (2013) documented lower sage-grouse nest success (22 percent) when ravens were detected within 550 meters of the nest compared with success at nests with no ravens detected nearby (41 percent).

Specific PDFs anticipated to be effective at minimizing increased predation are discussed in Section 4.3.3.1.

Disturbance From Human Presence and Avoidance of Infrastructure

As discussed in Section 4.3.3.2, visual and noise disturbance from human presence and avoidance of infrastructure have potential to impact sage-grouse.

Sage-grouse are known to be sensitive to human presence (Connelly et al. 2000) as well as vehicle traffic and noise (Holloran 2005; Dzialak et al. 2012). Lek buffers recommended to protect sage-grouse from disturbance and displacement during the breeding season vary in the literature from 0.6 mile to three miles (Connelly et al. 2000; Idaho Sage-grouse Advisory Committee 2006). Due to heightened concern for sage-grouse within Washington, the USFWS recommended this Project avoid disturbance during the breeding season within a four mile buffer of occupied leks.

Behavioral avoidance of infrastructure may be an indirect cause of habitat loss if the proposed NNR Alternative results in sage-grouse avoiding existing suitable habitat. It may be difficult to differentiate between behavioral avoidance and other effects that may decrease abundance of sage-grouse near project infrastructure such as increased predation, collisions, or habitat degradation. This section discusses effects of behavioral avoidance on sage-grouse abundance and lek persistence, in spite of the uncertainty surrounding the mechanism for these effects.

Possible explanations for sage-grouse avoidance and extirpation of leks near transmission power lines are: 1) sage-grouse directly avoid the tall structures lines because they are adapted to inhabit treeless environments; 2) sage-grouse indirectly avoid power lines because they are avoiding the avian predators that are more abundant near power lines; or 3) a combination thereof. To date, no studies have examined mechanisms for sage-grouse avoidance of tall structures (UWIN 2010).

As discussed above, use of transmission lines by avian predators is well documented (APLIC 2006; Knight et al. 1995; Steenhof et al. 1993) and densities of avian predators may increase near transmission lines (Howe et al. 2014). Dinkins et al. (2012) documented sage-grouse avoidance of avian predators in Wyoming. Nests and brood-rearing areas were located in areas with lower densities of ravens, magpies, golden eagles, and *Buteo* hawks compared with random locations.

Reports on direct sage-grouse avoidance of power lines and effects on lek persistence are conflicting, with no clear consistent pattern evident among studies (Ellis 1984; Braun et al. 2002; Blomberg et al. 2010;

Idaho Power Company 2010; Schroeder 2010; Wisdom et al. 2011; Stonehouse 2013). Research on this issue is reviewed and summarized in Appendix B-5 - Sage-grouse Technical Report.

While evidence for sage-grouse behavioral avoidance of power lines is minimal and evidence of decreased lek attendance and/or persistence is inconsistent, avoidance of power lines has been well documented for other prairie grouse species (Hagen 2003; Robel et al. 2004; Pitman et al. 2005; Pruett et al. 2009) and sage-grouse avoidance and/or lek decline has been well documented for other infrastructure, including communication towers, roads, and oil and gas development areas (Connelly et al. 2004; Holloran 2005; Johnson et al. 2011; Naugle et al. 2011; Dzialak et al. 2012; Harju et al. 2013). It remains unclear which, if any, of the effects documented for oil and gas development might also apply to transmission lines.

Disturbance and avoidance effects on sage-grouse will depend on the proximity of sage-grouse to the Project. The proposed NNR alternative ROW is located outside of the current YTC grouse population range, where 95 percent of sage-grouse use is estimated to occur (Figure 3.3-4). The eight-mile-wide sage-grouse analysis area slightly overlaps the population range (by approximately eight percent), but does not overlap the core range, where 80 percent of sage-grouse use is estimated to occur (Figure 3.3-4). Recent use has been documented near route segments NNR-4, NNR-5, and NNR-6, but use appears to be infrequent. No grouse were seen during ground transect surveys conducted in May and July of 2013; scat was observed in six locations adjacent to NNR-6, one location on NNR-5, and one location on NNR-4.

Based on 2013 data, there are two active leks and 12 historic leks known to occur within four miles of the proposed NNR alternative (Table 4.3-7). To ascertain the length of the proposed NNR alternative route segments that could have an impact on active leks, the length (miles) of the centerline within four miles of active leks was calculated (Table 4.3-7). Route Segment NNR-3 has the longest length of line that is within four miles of an active lek (4.1 miles). A visual analysis conducted indicates that approximately 1.6 miles (approximately 11 transmission line structures) of NNR-3 would not be visually obstructed by terrain and would therefore be visible from lek #1. Within four miles of lek #2, all transmission line structures would be visually obstructed by terrain and, therefore, not visible from the lek.

PDFs expected to minimize the beneficial effect to avian predators and thus reduce sage-grouse avoidance of the Project due to predator presence include: avoiding providing food subsidies to ravens or other predators by keeping food waste in covered receptacles and removing daily; and using perch deterrents within four miles of active leks.

The PDFs also include conducting pre-construction clearance surveys for sage-grouse in overland access areas, and avoiding construction and/or maintenance activities within four miles of active leks from February 1 to June 15 to protect lekking, nesting, and early brood-rearing and avoiding construction and/or maintenance activities within sage-grouse winter habitat from December 1 through February 1 if winter conditions are exceptionally severe, i.e., snow cover is much higher than normal (e.g., above sagebrush height) or temperatures are much lower than normal. Winter construction and/or maintenance activities within sage-grouse winter habitat will be coordinated with JBLM YTC. Seasonal restrictions will protect grouse during vulnerable breeding and winter periods. Additional PDFs anticipated to be effective at minimizing disturbance and avoidance of infrastructure by sage-grouse and other wildlife are discussed in Section 4.3.3.1.

TABLE 4.3-7 MILES OF CENTERLINE WITHIN 4 MILES OF ACTIVE GREATER SAGE-GROUSE LEKS

ROUTE SEGMENT	ACTIVE LEKS WITHIN 4 MILES (NUMBER)[1]	MILES OF CENTERLINE WITHIN 4 MILES OF ACTIVE LEK
NNR-1	0	0
NNR-2	1 (lek #1)	1.2
NNR-3	1 (lek #1)	4.1
NNR-4o and NNR-4u*	0	0
NNR-5	0	0
NNR-6o and NNRu6u*	1 (lek #2)	3.7
NNR-7	0	0
NNR-8	0	0
MR-1	0	0

Notes: [1]Active leks are defined as a lek that has been attended by at least two male sage-grouse within the past 24 months (2012-2013; Stinson et al. 2004; SEE 2013). *o = overhead design option; u = underground design option.

Habitat Connectivity and Linkage

The proposed Project has potential to impede connectivity among sage-grouse populations, with implications for the genetic and demographic health of the populations. The WHCWG modeled connectivity potential among the four sage-grouse populations in Washington (two established populations and two reintroduced populations). Additional information on this analysis is provided in Appendix B-2.

The WHCWG analysis identified the linkage between the JBLM YTC Habitat Concentration Area (HCA) and the Mansfield Plateau/Moses Coulee HCA as “fairly good” (Figure 3.3-3). Much of the habitat along this linkage zone is shrub steppe that is protected within state-owned wildlife areas (e.g., WDFW Colockum Wildlife Area). Impediments to this linkage include the relative steepness of the terrain and disturbance associated with Interstate (I) 90, several existing transmission lines, and wind energy development. Conditions for movement are best in the central portion of the linkage, but there are areas of concern at both ends. Near its northern end, the modeled linkage zone is constricted as it crosses the Columbia River near Rock Island Dam. Near the southern end, north of I-90 and the NNR, the linkage is constricted by wind energy development on state and private land (Robb and Schroeder 2012).

The least-cost pathway appears to intersect the NNR alternative Project area near Route Segments NNR-6 and NNR-7. Local patterns of sage-grouse distribution suggest that NNR-6 is likely to be the most important connectivity zone. Telemetry data, observational data, and population range modeling indicates a higher probability of sage-grouse use near NNR-4, NNR-5 and western NNR-6 than near eastern NNR-6 and NNR-7, but the presence of existing wind development north of I-90 reduces the linkage value of the more western segments, according to the WHCWG model. Nevertheless, it appears that the entire stretch between Badger Pocket and the Columbia River could serve as valuable linkage habitat. Route Segment NNR-7 is separated from the existing population range by the steep terrain of the Saddle Mountains. On JBLM YTC, sage-grouse prefer flatter areas (less than 15 percent slope; Livingston 1998). WHCWG did not include slope in their models, asserting that slope is not likely a factor impeding movement (Robb and Schroeder 2012).

The HCA on Yakama Nation lands is separated from the JBLM YTC HCA due to urban development and freeway infrastructure along I-82. The least-cost pathway connects to the JBLM YTC HCA south of the proposed Project; therefore, connectivity with the Yakima Nation HCA is unlikely to be affected by the NNR.

Because the proposed NNR closely parallels an existing Pacific Power 230 kV transmission line as it crosses the identified linkage area, the magnitude of its effect on sage-grouse movement will depend on a number of unknown variables, including the perception of the vertical structures by sage-grouse, and the potential for the structures to attract avian predators. The proposed NNR transmission line would impede sage-grouse movement, but only to the extent that sage-grouse avoid the transmission line (refer to the Behavioral Avoidance of Infrastructure discussion above). There is no research indicating how the width of a disturbance corridor (such as a transmission line ROW) influences sage-grouse movement. The resistance values assigned by WHCWG indicate that they predict that adding a second transmission line to an existing ROW corridor will increase the existing impediment by roughly 25 percent.

The impact of the proposed NNR alternative line also depends on the behavior of sage-grouse relative to other landscape features located between the two populations. If no movement occurs between the two populations currently, then adding an impediment would not result in a change. Genetic evidence suggests that currently there may be little movement between the two populations. Nevertheless, the effort by WHCWG to evaluate the linkages indicates motivation to restore and enhance connectivity and it is possible that impedance to movement by other existing landscape features in the linkage zone could be ameliorated in the future.

To minimize the potential for predation and behavioral avoidance and thus the impedance to movement and connectivity, the following PDFs would be implemented: the line will closely parallel an existing 230 kV transmission line, with transmission centerline separation typically staying within 200 to 300 feet; whenever possible, locations of the new structures will match the spans of adjacent transmission lines; and perch deterrents will be used within four miles of active leks.

Given the current location of active leks, perch deterrents will be installed on transmission line structures within a four mile stretch of NNR-6 that is within the most likely zone for movement between populations to occur. The PDFs would likely minimize the benefits to avian predators (discussed in Section 4.3.3.2), which would reduce sage-grouse avoidance due to predators. These PDFs may also minimize the visual impact of the structures on sage-grouse which would reduce an avoidance effect of the structures.

4.3.3.4 Special Status Species

Fish, Amphibians, and Invertebrates

Several special status aquatic species have the potential to occur within the Project area, especially along the Columbia River and Yakima River, as described in Section 3.3.2.3. Coho salmon, leopard dace, and mountain sucker occur in the Yakima and Columbia River watersheds. Sockeye Salmon occurs in the Columbia River Watershed, migrating through the Project area on its way to and from the ocean. It is very unlikely that any special status fish species spawn on any streams within the Project area. Two special status species of mussels occur in the Columbia River (California floater and western ridged mussel) and a special status dragonfly (Columbia clubtail) occurs on the Yakima River. All three species are likely to occur within the Project area. Three special status species of amphibian could possibly occur in the Project area in or near rivers and streams (refer to Section 3.3.2.3).

No construction would occur and no Project features would be located in the Columbia River, the Yakima River, or adjacent wetlands. Riparian areas would be spanned to avoid direct disturbance. In addition, indirect impacts to special status aquatic species would be eliminated through the implementation of PDFs: erosion would be minimized by applying and maintaining standard erosion and sediment control methods. Specific erosion and sediment control measures and locations would be identified in a SWPPP.

No identifiable impacts to special status fish, amphibians, or invertebrates or their habitats are anticipated to occur through construction, operation, and maintenance of the Project.

Reptiles

Several special status reptiles have the potential to occur within the Project area including three that have been documented in the Project area (night snake, striped whipsnake, and sagebrush lizard) and one that is likely to occur (side-blotched lizard). Impacts to these species could occur from biological disturbance, including injury or mortality from vehicle strikes and equipment; from biological change through direct habitat loss or degradation; and increased predation by avian predators. PDFs will minimize disturbance and change to habitat and wildlife as described in Sections 4.3.3.1 and 4.3.3.2. Impact levels will range from moderate to no identifiable impact depending on the location. Segment-specific occurrences and impact levels are discussed in Section 4.3.4.

Species Protected Under the Migratory Bird Treaty Act

Virtually all native bird species in the United States are protected under the Migratory Bird Treaty Act (MBTA), with the exception of upland game birds (e.g., grouse, quail). This includes 30 out of the 34 special status bird species, as well as numerous additional species not listed as Federal Species of Concern, BLM-Sensitive, or Washington State Threatened and Endangered, but still fully protected under MBTA. While this document does not specifically list every MBTA-protected species with potential to occur within the Project area, the listed special status bird species are representative of the various taxonomic groups, habitat associations, and potential impacts to other bird species in the Project area. Potential impacts to MBTA-protected birds include habitat loss and degradation, collision risk, destruction of nests during the breeding season, and disturbance particularly during the breeding season. PDFs are expected to reduce impacts to MBTA-protected birds. Some of the key PDFs include avoiding construction during the breeding season or having biologists conduct clearance surveys to find nests and buffer each nest from disturbance until the nesting attempt is complete; maintaining intact vegetation wherever possible; reseeding disturbed areas; implementing a noxious weed control plan; adherence to reasonable speed limits; and siting the line to closely parallel an existing 230 kV transmission line. Specific impacts and PDFs are discussed in detail below, under Raptors, Waterfowl and Other Aquatic Birds, and Other Special Status Upland Bird Species.

Raptors

Four special status raptor species are documented to nest within the Project area: golden eagle, bald eagle, ferruginous hawk, and burrowing owl. Other raptor species documented or likely to nest within the Project area include prairie falcon, osprey, Swainson’s hawk, red-tailed hawk, American kestrel, and great-horned owl. All raptors are protected under the MBTA and are typically sensitive to disturbance while nesting. Nesting sites are vulnerable to construction disturbances because raptors may abandon the nest during periods of high human activity, resulting in egg or nestling mortality and nest failure. Other potential impacts to raptors include collision with the transmission line and habitat loss, including direct habitat loss through vegetation removal and indirect habitat loss or degradation through increased risk of weed invasion and wildfire. Electrocution is not a significant risk to raptors on 230 kV lines because of adequate separation distance between conductors. Implementation of PDFs such as seasonal restrictions and buffers to avoid nesting raptors during construction would limit disturbance to breeding raptors (refer to PDFs in Section 2.5 for a list of nest buffers by species). Implementation of PDFs to minimize collision risk, vegetation disturbance, weed invasion, and wildfires (as described in Sections 4.3.3.1 and 4.3.3.2) would further reduce impacts to raptors. Location-specific occurrences and impact levels are discussed in Section 4.3.4.

Waterfowl and Other Aquatic Birds

Within the Project area, Waterfowl Priority Species Regional Areas have been identified near the two extreme ends of the proposed Route: the Selah Waterfowl Concentration Area/Selah Gravel Pit Wetlands associated with the Yakima River, just northwest of the Pomona Heights Substation and the Wanapum Pools Waterfowl Concentration Area within Wanapum Lake on the Columbia River, just northwest of the Vantage Substation. Wanapum Pool is also identified by WDFW Priority Habitats and Species (PHS) as regularly occupied by common loons in low densities. American white pelicans have also been documented within the Project area on the Columbia River. Overall, eight special status aquatic bird species occur or are likely to occur within the Project area: black-crowned night heron; great blue heron; Clark’s, western, and eared grebes; tundra swan; American white pelican; and common loon. Waterfowl and aquatic bird injury and mortality could occur through collision with the transmission line. The only portion of the ROW with suitable habitat for waterfowl and other aquatic species is the Columbia River crossing at NNR-8. In this area, the line would parallel four existing transmission lines within 350 to 1,300 feet. To the extent that collision potential exists, the additional line will likely not add greater risk than what already occurs at the crossing. It is conceivable that waterfowl and other aquatic species occasionally travel across the proposed Route enroute from the Yakima River to the Columbia River or vice versa. The proposed Project more or less parallels one or more existing transmission lines for the entire route. PDFs include installing bird flight diverters in locations with known avian mortality through collision with transmission line infrastructure and closely paralleling existing transmission lines. Aside from collision risk, the scale of biological change and biological disturbance to waterfowl, other aquatic birds, and their habitat is anticipated to be low. Segment-specific impact levels are discussed in Section 4.3.4.

Other Special Status Upland Bird Species

Priority Species Regional Areas identified by PHS within the Project area include regular concentration areas for chukar and loggerhead shrike. Nine other special status upland bird species occur or are likely to occur within the Project area: long-billed curlew, ring-necked pheasant, Vaux’s swift, gray flycatcher, cedar waxwing, sage thrasher, sage sparrow, black-throated sparrow, and vesper sparrow. The latter four species breed in relatively high densities in sagebrush steppe and are likely to nest within the ROW in shrubs or on the ground. Ground disturbance during the breeding season would have a high probability of destroying nests of these four songbird species causing direct mortality. For all four species nest failure is relatively common under natural conditions and the birds habitually renest within the same season if a nest fails. Direct mortality associated with construction is unlikely to have a significant impact on local population sizes of these species. Other impacts to special status upland bird species include direct habitat loss, indirect habitat loss, or degradation, increased predation from corvids and raptors attracted to nesting and/or perching opportunities on the structures, and disturbance or displacement from noise or visual disturbance, especially during construction. Habitat loss and degradation has the greatest potential to impact upland special status bird species; however, the amount of habitat loss resulting from the Project will be relatively small. Total short-term and long-term direct disturbance for all habitat types combined is anticipated to be 204 to 266 acres, depending on the alternative (Table 4.3-9). The implementation of PDFs are anticipated to reduce impacts to special status upland bird species, and include: avoiding construction during the breeding season or having biologists conduct clearance surveys to find nests and buffer each nest from disturbance until the nesting attempt is complete; maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas with certified weed-free land management agency-approved native and non-native species or seed for revegetation as detailed in the POD; reseeding disturbed areas with certified weed-free materials (e.g., seed, borrow material, straw wattles and bale barriers); washing all equipment before entering the Project area and when leaving areas where noxious weeds are present; closing and revegetating new or improved access roads that are not required for maintenance; implementing a noxious weed control plan; adherence to reasonable speed limits; and siting the line to closely parallel an existing 230 kV transmission line. Segment-specific impact levels are discussed in Section 4.3.4.

Mammals
Eight special status mammal species are documented or likely to occur within the Project area: black-tailed and white-tailed jackrabbits, Merriam's shrew, Townsend's ground squirrel, pallid bat, elk, bighorn sheep, and two subspecies of mule deer: Columbian black-tailed deer (west of I-82) and Rocky Mountain mule deer (east of I-82). For all eight species, habitat loss and degradation have the most potential to have a serious impact, particularly if wildfire causes the replacement of sagebrush steppe and perennial grasses and forbs with the annual cheatgrass. However, the amount of habitat loss resulting from the Project will be relatively small. Total short-term and long-term direct disturbance for all habitat types combined is anticipated to be 204 to 266 acres, depending on the alternative (Table 4.3-9). PDFs will minimize spread of invasive weeds and avoid increasing wildfire risk (as described in Section 4.3.3.1). Collision with vehicles during construction is another potential impact on all eight mammal species. Townsend's ground squirrels retreat into underground burrows when disturbed and Merriam's shrews often utilize burrows as well. These species may be unable to avoid being crushed or buried by construction equipment if they occupy areas where construction causes ground disturbance. Nevertheless, because total area of ground disturbance will be relatively small, the potential to adversely impact population size of these species is small. For the other mammal species collision risk would be minimized by adhering to reasonable speed limits during construction and maintenance. The potential for increased presence of avian predators could negatively impact populations of white-tailed and black-tailed jackrabbits, Merriam's shrew, and Townsend's ground squirrel. The proposed Project's effect on avian predators is anticipated to be relatively small because the Project closely follows an existing 230 kV line with similar structures, with the exception of Route Segment MR-1 which would not be sited close to an existing line.

The big game species, elk, mule deer, and bighorn sheep, are sensitive to disturbance, particularly during parturition/calving/lambing and during winter when increased energy expenditure can negatively affect survival. The Wenas State Wildlife Area within the Yakima River Canyon and on the foothill slopes west of the canyon is an important wintering area for elk and mule deer (WDFW 2006b). As the designated elk and mule deer winter range barely overlaps the Project area, construction disturbance would be unlikely to impact wintering populations within the Wenas Wildlife Area. The south slopes of the Saddle Mountains have been identified as a mule deer regular large concentration area. While the PHS data does not specify a season of use for this area, the south-facing sagebrush steppe slopes are probably heavily used during winter. This area slightly overlaps the Project area at NNR-7 and overlaps the ROW at NNR-6. Adherence to seasonal restrictions on construction activities within these areas should minimize disturbance impacts to mule deer. A bighorn sheep population with roughly 200 to 300 animals inhabits the Wenas State Wildlife Area particularly near cliffs along the Yakima River Canyon and nearby tributaries. Areas designated as year round and lambing habitat occur west of the Project area, primarily west of the Yakima River. Area designated as bighorn sheep winter range overlaps portions of the NNR-3 Project area, as well as the southwestern end of NNR-4 and MR-1. The proposed ROW crosses designated winter range in two areas: on the steep slopes surrounding Burbank Creek and the steep slopes surrounding Lmuma Creek and its tributaries. Adherence to seasonal restrictions on construction activities within these areas should minimize disturbance impacts to bighorn sheep. Additional PDFs to minimize disturbance impacts are described in Section 4.3.3.2. Segment-specific impact levels are discussed in Section 4.3.4.

4.3.4 Impacts Specific to Route Segments

Impacts to habitat and species are discussed below for each route segment. A map showing special status wildlife locations and management areas is included in Appendix A; however, due to the sensitive nature of location information, this map is presented at a small-scale (WDFW 2011b; Guggenmos 2012).

4.3.4.1 Route Segment NNR-1

Approximately 5.4 acres of long-term and 7.7 acres of short-term disturbance would occur through the construction of Route Segment NNR-1. The majority of disturbance for this route segment would occur in habitat that has been disturbed in the past and is currently dominated by rabbitbrush (1.0 acre long-term and 5.0 acres short-term), exotic annual grasses (0.1 acre long-term and 0.4 acre short-term), and developed areas, such as agricultural and residential areas (0.5 acre long-term and 2.3 acres short-term; Table 4.3-4). The remaining 3.8 acres of long-term disturbance would occur within areas classified as sagebrush/perennial grassland. PDFs would be implemented to minimize further habitat degradation, as described in Section 4.3.3.1. Impact levels to habitat are expected to be low for 1.7 miles and moderate for 0.7 mile (sagebrush/perennial grassland).

The presence of transmission structures, which could provide additional perch and/or nesting sites for avian predators, could negatively impact nearby prey species such as small mammals and avian species, particularly when the new structures are built in an area where perching opportunities currently do not exist (i.e., greater than 0.25 mile from existing structures or trees). Construction of Route Segment NNR-1 would require an estimated 31 structures in a landscape dominated by low growing grasses and shrubs. An estimated 14 new structures would be located greater than 0.25 mile from an existing transmission line or trees (Table 4.3-6).

Within one mile of Route Segment NNR-1, potentially suitable habitat is present for 50 special status wildlife species that are possible, likely, or known to occur (Tables 3.3-2, 3.3-3, and 3.3-7). Potential impacts and PDFs to address them are discussed in Sections 4.3.3.1 and 4.3.3.2. Species or wildlife resources that have been documented at specific locations within one mile of Route Segment NNR-1 include bull trout critical habitat, steelhead critical habitat (Middle Columbia River DPS), a bald eagle nest, and the Selah Waterfowl Concentration Area/Selah Gravel Pit Wetlands.

Critical habitat for bull trout occurs within one mile of Route Segment NNR-1 in the Yakima River. Bull trout are not known to spawn within streams within the Project area because the streams are too small and not cold enough over a long enough time period to provide suitable spawning and rearing habitat; however, bull trout could use streams for short periods for foraging (AECOM Environmental 2010). No structure or road construction work would occur within the Yakima River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of PDFs are anticipated to be effective at eliminating impacts to bull trout; no identifiable impacts to bull trout or bull trout habitat are anticipated to occur through construction, operation, and maintenance of the proposed Project.

The reach of the Yakima River within one mile of Route Segment NNR-1 is within designated critical habitat for the Middle Columbia River steelhead DPS. No structure or road construction work would occur within the Yakima River, which is located greater than or equal to 0.75 mile from the proposed Project. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. No identifiable impacts to steelhead or its habitat are anticipated to occur through construction, operation, and maintenance of the proposed Project.

The Selah Waterfowl Concentration Area/Selah Gravel Pit Wetlands associated with the Yakima River are located within one mile of Route Segment NNR-1, just northwest of the Pomona Heights Substation. Four special status aquatic bird species are likely to utilize the area: great blue heron, eared grebe, tundra swan, and American white pelican. Waterfowl and aquatic bird injury and mortality could occur through collision with the transmission line, though it is not very likely because the route will not cross the wetlands or cross between the wetlands and likely feeding areas such as agricultural fields. Bald eagles are also known to utilize the Selah Wetlands and there is a documented bald eagle nest located along the

Yakima River approximately 0.8 mile west of NNR-1. PDFs include installing bird flight diverters in locations with known avian mortality through collision with transmission line infrastructure. NNR-1 is expected to have no identifiable impacts to waterfowl or aquatic bird species. NNR-1 is expected to have 0.3 mile of low impact level and 2.1 miles will have no identifiable impact on bald eagles.

All of the habitat disturbance associated with Route Segment NNR-1 is within the Regularly Occupied Habitat MU for sage-grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-5). The majority of the disturbance for this route segment would occur in habitat that has been disturbed in the past and is currently dominated by rabbitbrush, exotic annual grasses, and developed areas such as agricultural and residential areas. No disturbance from construction, operation or maintenance of Route Segment NNR-1 is anticipated to occur within suitable or marginal sage-grouse habitat (Table 4.3-8). PDFs implemented during construction and operation are anticipated to be effective at reducing impacts to sage-grouse habitat (refer to Sections 4.3.3.1 and 4.3.3.2). Considering the existing degraded habitat available within Route Segment NNR-1 and with the implementation of PDFs, the scale of disturbance and degradation to sage-grouse habitat is anticipated to be low for the entire route segment (2.4 miles).

Existing perching, roosting and nesting sites are available along Route Segment NNR-1 from buildings, trees, fences associated with developed areas and existing distribution and 230 kV H-frame transmission lines. Construction of Route Segment NNR-1 would require approximately 31 new structures; approximately 17 (55 percent) of these new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6).

There are no active leks within four miles of Route Segment NNR-1. Potential impacts to lekking sage-grouse would be minimized by the implementation of PDFs (refer to Sections 4.3.3.1 and 4.3.3.2). With the implementation of PDFs combined with no known active or inactive leks within four miles, impacts to lekking sage-grouse with the construction of Route Segment NNR-1 is anticipated to be low.

TABLE 4.3-8 SUMMARY OF SAGE-GROUSE HABITAT WITHIN THE EIGHT-MILE-WIDE ANALYSIS AREA (ACRES) AND DISTURBANCE (ACRES) TO SAGE-GROUSE HABITAT BY ROUTE SEGMENT

ROUTE SEGMENT	SUITABLE HABITAT		MARGINAL HABITAT		UNSUITABLE HABITAT	
	TOTAL ACRES DISTURBED[1]	ACRES PRESENT WITHIN ANALYSIS AREA[2]	TOTAL ACRES DISTURBED[1]	ACRES PRESENT WITHIN ANALYSIS AREA[2]	TOTAL ACRES DISTURBED[1]	ACRES PRESENT WITHIN ANALYSIS AREA[2]
NNR-1	0	6,904	0	1,497	13.1	35,172
NNR-2	0	11,158	7.8	1,511	16.4	38,446
NNR-3	21.1	42,085	15.3	2,262	16.0	35,238
NNR-4o*	15.0	35,433	7.0	926	1.0	18,854
NNR-4u*	33.8	35,433	13.8	926	3.7	18,854
NNR-5	8.6	28,459	0.4	76	0	12,178

ROUTE SEGMENT	SUITABLE HABITAT		MARGINAL HABITAT		UNSUITABLE HABITAT	
	TOTAL ACRES DISTURBED[1]	ACRES PRESENT WITHIN ANALYSIS AREA[2]	TOTAL ACRES DISTURBED[1]	ACRES PRESENT WITHIN ANALYSIS AREA[2]	TOTAL ACRES DISTURBED[1]	ACRES PRESENT WITHIN ANALYSIS AREA[2]
NNR-6o*	9.5	53,145	8.4	197	12.7	11,780
NNR-6u*	20.5	53,145	16.6	197	27.2	11,780
NNR-7	25.3	63,349	12.8	316	0	10,502
NNR-8	6.0	28,603	2.0	1,465	5.5	15,176
MR-1	50.0	44,010	13.3	4,019	16.4	35,410

[1]Acres disturbed are calculated using the disturbance model, with habitat suitability extrapolated from the ROW habitat assessment (Appendix A Habitat Assessment).
[2]Habitat Suitability within the eight-mile-wide analysis area is derived from land cover types. Land cover types are a composite of GAP vegetation data, JBLM YTC vegetation data, and POWER field survey vegetation data. Suitable habitat includes sagebrush/perennial grassland. Marginal habitat includes sagebrush/annual grassland, riparian, intermittent stream, and bitterbrush/perennial grassland. Unsuitable habitat includes forb, perennial grassland, rabbitbrush/annual grassland, annual grassland and noxious weeds, basalt cliffs/rock, tree, and other (includes agriculture, developed/residential areas and open water).
*o = overhead design option; u = underground design option.

4.3.4.2 Route Segment NNR-2

Approximately 9.6 acres of long-term and 14.6 acres of short-term disturbance would occur through the construction of Route Segment NNR-2. The majority of disturbance for this route segment would occur in habitat that has been disturbed in the past and is currently dominated by rabbitbrush, exotic annual grasses, perennial grasses, and developed areas, such as agricultural and residential areas (Table 4.3-4). The remainder of disturbance will include 4.5 acres of areas classified as sagebrush / perennial grassland, and 1.4 acres of tree habitat. PDFs would be implemented to minimize further habitat degradation, as described in Section 4.3.3.1. Impact levels to habitat are expected to be low for 3.3 miles and moderate for 1.7 miles (0.9 mile of sagebrush/perennial grassland, 0.5 mile of sagebrush/annual grassland, and 0.3 mile of tree habitat).

The presence of transmission structures, which could provide additional perch and/or nesting sites for avian predators, could negatively impact nearby prey species such as small mammals and avian species, particularly when the new structures are built in an area where perching opportunities currently do not exist (i.e., greater than 0.25 mile from existing structures or trees). Construction of Route Segment NNR-2 would require an estimated 48 structures in a landscape dominated by low growing grasses and shrubs. An estimated 21 new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6).

Within one mile of Route Segment NNR-2, potentially suitable habitat is present for 38 special status wildlife species that are possible, likely, or known to occur (Tables 3.3-2, 3.3-3, and 3.3-7). Potential impacts and PDFs to address them are discussed in Sections 4.3.3.1 and 4.3.3.2. Species or wildlife resources that have been documented at specific locations within one mile of Route Segment NNR-2 include the Selah Waterfowl Concentration Area/East Selah Wetlands, cliff bands with high concentrations of nesting raptors, a golden eagle nest, a burrowing owl nesting site, black-tailed jackrabbits, and pallid bats.

Cliff bands occur along Selah creek and tributaries within one mile of Route Segment NNR-2; the cliffs attract high concentrations of raptors, including prairie falcons (not a special status species, but sensitive to nest disturbance) and a golden eagle nest documented by PHS in 2013 just under one mile from the proposed route. Cliffs would be spanned thus avoiding direct disturbance to the habitat. Within the breeding season, construction would be avoided within species-specific raptor nest buffers to avoid disturbing nesting birds (0.5 mile for golden eagle and 0.25 mile for prairie falcon; see PDFs in Chapter 2). Impact levels on golden eagles are anticipated to be moderate for 0.4 mile.

A historic burrowing owl nesting site (last documented occupancy in 1993) occurs approximately 0.75 mile from Route Segment NNR-2. While this particular nest is no longer a management concern, it demonstrates potential for burrowing owls to nest within one mile of Route Segment NNR-2. Potential impacts would occur from disturbance during construction activities or from injury or mortality from vehicle strikes or interactions with other equipment used during construction, including mechanical disturbance or crushing of burrows. If an occupied burrowing owl nesting site is found within 0.25 mile of the proposed ROW, a seasonal restriction on construction would be enacted from March to August within the 0.25-mile buffer. Additional PDFs to reduce impact on burrowing owls are described in Sections 4.3.3.1 and 4.3.3.2. Impact levels to burrowing owl are expected to be moderate for 1.4 miles.

The Selah Waterfowl Concentration Area/East Selah Wetlands associated with the Yakima River are located within one mile of Route Segment NNR-2. Four special status aquatic bird species are likely to utilize the area, including great blue heron, eared grebe, tundra swan, and American white pelican. Waterfowl and aquatic bird injury and mortality could occur through collision with the transmission line, though it is not very likely because the route will not cross the wetlands or cross between the wetlands and likely feeding areas such as agricultural fields. PDFs include installing bird flight diverters in locations with known avian mortality through collision with transmission line infrastructure. NNR-2 is expected to have no identifiable impacts to waterfowl or aquatic bird species.

Black-tailed jackrabbit have been documented in several locations within one mile of Route Segment NNR-2. All documented observations were in the 1990s. Potential impacts to black-tailed jackrabbits include a reduction and degradation of habitat, disturbance and displacement from habitats, increased predation from avian predators, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. PDFs to address the impacts are described in Sections 4.3.3.1 and 4.3.3.2. Impact levels to black-tailed jackrabbits are expected to be moderate for 4.9 miles.

Pallid bats were detected via acoustic equipment in 1994. They were detected near the riparian vegetation in Selah Creek, approximately 0.75 mile from the proposed ROW, though the species commonly uses upland habitats like sagebrush steppe, as well. The Project will span the Selah Creek Canyon and avoid disturbing riparian vegetation. The PDFs to address habitat loss and degradation (Section 4.3.3.1) will reduce impacts to pallid bats. NNR-2 is expected to have no identifiable impacts to pallid bats.

The majority of habitat disturbance associated with Route Segment NNR-2 would be located within the Regularly Occupied Habitat MU for sage-grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-5). The majority of disturbance for this route segment would occur in habitat that has been disturbed in the past and is currently dominated by rabbitbrush, exotic annual grasses, and developed areas, such as agricultural and residential areas. No disturbance is predicted to occur within suitable sage-grouse habitat; 7.8 acres of disturbance is anticipated to occur in marginal habitat, and 16.4 acres within unsuitable habitat (Table 4.3-8). With the implementation of PDFs (refer to Sections 4.3.3.1 and 4.3.3.2), the scale of disturbance and degradation to sage-grouse habitat is anticipated to be low for the entire route segment (5.0 miles).

Existing perching, roosting and nesting sites for avian predators are available along Route Segment NNR-2 from buildings, trees, fences associated with developed areas and existing low-voltage distribution and 230 kV H-frame transmission lines. Construction of Route Segment NNR-2 would require an estimated 48 new structures; approximately 21 (44 percent) would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6).

Approximately 1.2 miles of Route Segment NNR-2 is within four miles of an active lek. All of the structures within four miles of the active lek would be visually obstructed by terrain and therefore not visible from the lek. The lek is described in Section 4.3.3.3 Sage-Grouse. Potential impacts to lekking sage-grouse would be minimized by the implementation of PDFs (refer to Sections 4.3.3.1 and 4.3.3.2). Lek impact levels are anticipated to be low for 3.7 miles and moderate for 1.3 miles.

4.3.4.3 Route Segment NNR-3

Approximately 45.3 acres of long-term and 7.1 acres of short-term disturbance would occur through the construction of Route Segment NNR-3. Permanently disturbed areas would include 39.8 acres of sagebrush/perennial grassland and 2.0 acres of sagebrush/annual grassland (Table 4.3-4). Perennial grassland accounts for most of the short-term (5.2 acres) and remaining long-term (2.9 acres) disturbance. Other disturbed habitat includes 0.6 acre of annual grassland/noxious weeds, 0.4 acre of agriculture/disturbed, and 1.5 acres of rock/basalt cliffs. PDFs would be implemented to minimize habitat loss and degradation, as described in Section 4.3.3.1. Impact levels to habitat are expected to be low for 2.0 miles and moderate for 7.2 miles (sagebrush/perennial grassland for 7.0 miles and sagebrush/annual grassland for 0.2 mile).

The presence of transmission structures, which could provide additional perch and/or nesting sites for avian predators, could negatively impact nearby prey species such as small mammals and avian species, particularly when the new structures are built in an area where perching opportunities currently do not exist (i.e., greater than 0.25 mile from existing structures or trees). Construction of Route Segment NNR-3 would require an estimated 69 structures in a landscape dominated by low growing grasses and shrubs. Only an estimated five new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6).

Within one mile of Route Segment NNR-3, potentially suitable habitat is present for 47 special status wildlife species that are possible, likely, or known to occur (Tables 3.3-2, 3.3-3, and 3.3-7). Potential impacts and PDFs to address them are discussed in Sections 4.3.3.1 and 4.3.3.2. Species or wildlife resources that have been documented at specific locations within one mile of Route Segment NNR-3 include steelhead critical habitat (Middle Columbia River DPS), cliff bands with high concentrations of nesting raptors, several golden eagle nests within four breeding territories, a historic ferruginous hawk nest, and winter range for bighorn sheep, elk, and mule deer.

Critical habitat for bull trout occurs within one mile of Route Segment NNR-3 in the Yakima River. Bull trout are not known to spawn within streams within the Project area because the streams are too small and not cold enough over a long enough time period to provide suitable spawning and rearing habitat; however, bull trout could use streams for short periods for foraging (AECOM Environmental 2010). No structure or road construction work would occur within the Yakima River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of PDFs is anticipated to be effective at eliminating impacts to bull trout. No identifiable impacts to bull trout or bull trout habitat are anticipated to occur through construction, operation, and maintenance of the proposed Project.

Within one mile of Route Segment NNR-3, the Yakima River and lower Burbank Creek are designated Critical Habitat for the Middle Columbia River steelhead DPS. No structure or road construction work would occur within the Yakima River, which is located greater than or equal to 0.75 mile from the proposed ROW, or Burbank Creek, which will be spanned by the proposed Project. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. No identifiable impacts to steelhead or its habitat are anticipated to occur through construction, operation, and maintenance of the proposed Project.

Cliff bands occur along Selah Creek and tributaries, Lmuma Creek, and the Yakima River Canyon within one mile of Route Segment NNR-3. The cliffs attract high concentrations of raptors, including prairie falcons (not a special status species, but sensitive to nest disturbance) and several golden eagle nests associated with four territories: one on Selah Creek (0.9 mile away from centerline), one on Lmuma Creek (0.1 mile away from centerline), and two in the Yakima River Canyon (0.8 mile away from centerline). A historic ferruginous hawk nest was documented in 1994 on top of a six-foot rock outcrop approximately 0.3 mile from the route. Cliffs would be spanned thus avoiding direct disturbance to the habitat. Within the breeding season, construction would be avoided within species-specific raptor nest buffers to avoid disturbing nesting birds (0.5 mile for golden eagle and ferruginous hawk and 0.25 mile for prairie falcon; see PDFs in Chapter 2). Impact levels on golden eagles are anticipated to be moderate for 3.8 miles and impact levels on ferruginous hawks are expected to be moderate for 1.8 miles.

Bighorn sheep winter range occurs within one mile of NNR-3 and is crossed by the proposed ROW in two areas totaling 3.7 miles: on the steep slopes surrounding Burbank Creek and the steep slopes surrounding Lmuma Creek and its tributaries. Areas designated as year round and lambing habitat occur only outside of the Project area, primarily west of the Yakima River. Potential impacts to bighorn sheep include direct habitat loss, habitat degradation through weed invasion and/or changes in fire regime, collision with vehicles during construction and maintenance, and disturbance during construction and maintenance. Adherence to seasonal restrictions on construction activities within designated winter range should minimize disturbance impacts to bighorn sheep. Additional PDFs to minimize disturbance impacts and collision risk are described in Section 4.3.3.2; PDFs to minimize habitat loss and degradation are described in Section 4.3.3.1. Impact levels to bighorn sheep are anticipated to be moderate for the 3.7 miles of the route segment that overlap designated winter range.

There is designated winter habitat for elk and mule deer (i.e., Columbian black-tailed deer), west of the Yakima river on Wenas State Wildlife Area, approximately 0.8 mile from the proposed ROW. No construction is anticipated to occur west of the Yakima River. If construction does occur within elk and mule deer winter range, seasonal restrictions would be adhered to (Section 2.5). No identifiable impacts are anticipated for elk and mule deer for Route Segment NNR-3.

The majority of habitat disturbance associated with Route Segment NNR-3 would be located within the Regularly Occupied Habitat Management Unit (MU) for sage-grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-5). Anticipated ground disturbance includes 21.1 acres of suitable sage-grouse habitat, 15.3 acres of marginal habitat, and 16 acres of unsuitable habitat (Table 4.3-8). PDFs are anticipated to be effective at reducing impacts to sage-grouse habitat (refer to Sections 4.3.3.1 and 4.3.3.2). The scale of disturbance and degradation to sage-grouse habitat is anticipated be low for 6.1 miles and moderate for 3.2 miles.

Existing perching, roosting and nesting sites for avian predators are available along Route Segment NNR-3 from buildings, trees, fences associated with developed areas and existing distribution and 230 kV H-frame transmission lines. Construction of Route Segment NNR-3 would require an estimated 69 new structures; approximately five (seven percent) would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6).

Approximately 4.1 miles of Route Segment NNR-3 are within four miles of an active lek. Of the 4.1 miles of line within four miles of the active lek, approximately 1.6 miles and 11 structures would not be visually obstructed by terrain. The lek is described in Section 4.3.3.3 Sage-Grouse. Potential impacts to lekking sage-grouse would be minimized by the implementation of PDFs (refer to Sections 4.3.3.1 and 4.3.3.2). Lek impact levels are anticipated to be low for 5.2 miles and moderate for 4.1 miles.

4.3.4.4 Route Segment NNR-4o/NNR-4u

Route Segment NNR-4 is being considered as either an underground segment (NNR-4u) or as an overhead transmission segment (NNR-4o). Undergrounding would create a larger area of ground disturbance than an overhead line would because the overhead line would cause relatively little ground disturbance along the spanned areas between structures while the underground portion would require a continuous trench and a permanent access road. The overhead option would result in approximately 20.6 acres of long-term and 2.4 acres of short-term disturbance, while the underground option would cause approximately 46.9 acres of long-term disturbance and 4.4 acres of short-term disturbance resulting in more than two times as much ground disturbance as the overhead option. For NNR-4o, permanently disturbed areas would include 10.7 acres of sagebrush/perennial grassland and 8.5 acres of sagebrush/ annual grassland (Table 4.3-4). Undergrounding NNR-4 would increase the permanently disturbed areas to 25.2 acres of sagebrush/perennial grassland and 20.4 acres of sagebrush/annual grassland. The remaining 1.4 acres of long-term disturbance for NNR-4o, 1.3 acres for NNR-4u, and all short-term disturbance (2.4 acres for NNR-4o and 4.4 acres for NNR-4u) consists of annual grassland and noxious weeds, other shrublands, and perennial grassland. PDFs would be implemented to minimize habitat loss and degradation, as described in Section 4.3.3.1. For either option, impact levels to habitat are expected to be low for 0.4 mile and moderate for 4.1 miles (other shrublands for 0.1 mile, sagebrush/perennial grassland for 2.3 miles and sagebrush/annual grassland for 1.7 miles).

The presence of transmission structures, which could provide additional perch and/or nesting sites for avian predators, could negatively impact nearby prey species such as small mammals and avian species, particularly when the new structures are built in an area where perching opportunities currently do not exist (i.e., greater than 0.25 mile from existing structures or trees). Construction of Route Segment NNR-4o would require an estimated 35 structures; none of the new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6). The underground option, NNR-4u would need to be overhead for a short-stretch as it crosses I-82. This would require two transmission towers, both within 0.25 mile of existing structures. In addition, at each of the four transitions between aboveground and underground transmission, a transition station would be required resulting in approximately five acres of disturbance at each transition station.

Within one mile of Route Segment NNR-4, potentially suitable habitat is present for 43 special status wildlife species that are possible, likely, or known to occur (Tables 3.3-2, 3.3-3, and 3.3-7). Potential impacts and PDFs to address them are discussed in Sections 4.3.3.1 and 4.3.3.2. Species or wildlife resources that have been documented at specific locations within one mile of Route Segment NNR-4 include a cliff band with a high concentration of nesting raptors, several golden eagle nests within one breeding territory, a historic ferruginous hawk nest, a historic burrowing owl nesting site, and winter range for bighorn sheep.

Cliff bands occur along Lmuma Creek, within one mile of Route Segment NNR-4; the cliffs attract high concentrations of raptors, including prairie falcons (not a special status species, but sensitive to nest disturbance) and several golden eagle nests associated with one breeding territory, approximately 0.6 mile from the route segment. A historic ferruginous hawk nest was documented in 1994 on top of a six-foot rock outcrop approximately 0.9 mile from the route segment. Cliffs would be spanned thus avoiding direct disturbance to the habitat. Burrowing owl surveys in 2000 located one burrowing owl nesting site within the Project area, approximately 0.1 mile from Route Segment NNR-4. Within the breeding season, construction would be avoided within species-specific active raptor nest buffers to avoid disturbing nesting birds (0.5 mile for golden eagle and ferruginous hawk, 0.25 mile for prairie falcon and burrowing owl; see PDFs in Chapter 2). Impact levels on golden eagles are anticipated to be moderate for 0.5 mile, impact levels on ferruginous hawks are expected to be moderate for 0.3 mile, and impacts on burrowing owl are expected to be moderate for 2.0 miles.

Bighorn sheep winter range occurs within one mile of NNR-4 and is crossed by the proposed route segment for 0.2 mile on the steep slopes surrounding Lmuma Creek and its tributaries. Potential impacts to bighorn sheep include direct habitat loss, habitat degradation through weed spread and/or changes in fire regime, collision with vehicles during construction and maintenance, and disturbance during construction and maintenance. Adherence to seasonal restrictions on construction activities within designated winter range should minimize disturbance impacts to bighorn sheep. Additional PDFs to minimize disturbance impacts and collision risk are described in Section 4.3.3.2; PDFs to minimize habitat loss and degradation are described in Section 4.3.3.1. Impact levels to bighorn sheep are anticipated to be moderate for the 0.2 mile of the route segment that overlap designated winter range.

All of the habitat disturbance associated with Route Segment NNR-4o and NNR-4u would be located within the Regularly Occupied Habitat MU for sage-grouse. For either option, construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-5).

For NNR-4o, anticipated disturbance includes 15 acres of suitable sage-grouse habitat, 7.0 acres of marginal habitat, and 1.0 acres of unsuitable habitat. Undergrounding NNR-4 would increase the anticipated disturbance to 33.8 acres of suitable habitat, 13.8 acres of marginal habitat, and 3.7 acres of unsuitable habitat (Table 4.3-8). PDFs implemented during construction and operation are anticipated to be effective at reducing impacts to sage-grouse habitat (refer to Sections 4.3.3.1 and 4.3.3.2). Habitat impact levels would be low for 1.6 miles and moderate for 3.0 miles.

Existing perching, roosting and nesting sites for avian predators are available along Route Segment NNR-4 from buildings, trees, fences associated with developed areas and existing distribution and 230 kV H-frame transmission lines. Construction of Route Segment NNR-4o would require an estimated 35 new structures, all of which would be located within 0.25 mile of an existing transmission line (Table 4.3-6). The underground option, NNR-4u would need to be overhead for a short-stretch as it crosses I-82. This would require two transmission towers, both within 0.25 mile of existing structures. In addition, at each of the four transitions between above-ground and underground transmission, a transition station would be required resulting in approximately five acres of disturbance at each transition station.

No active leks are known to occur within four miles of Route Segment NNR-4 (Table 4.3-7). With the implementation of PDFs (refer to Sections 4.3.3.1 and 4.3.3.2), impacts to lekking sage-grouse associated with the construction of Route Segment NNR-4, both the overhead and underground design option, is anticipated to be low for the entire route segment (4.5 miles).

4.3.4.5 Route Segment NNR-5

Approximately 8.6 acres of long-term and 0.4 acres of short-term disturbance would occur through the construction of Route Segment NNR-5. Permanently disturbed areas would include 8.4 acres of sagebrush/perennial grassland (Table 4.3-4). The remaining long-term (0.2 acre) and short-term (0.4 acre) disturbance was classified as intermittent stream/dry gully. PDFs would be implemented to minimize habitat loss and degradation, as described in Section 4.3.3.1. Impact levels to habitat are expected to be low for 0.1 miles and moderate for 1.7 miles (sagebrush/perennial grassland).

The presence of transmission structures, which could provide additional perch and/or nesting sites for avian predators, could negatively impact nearby prey species such as small mammals and avian species, particularly when the new structures are built in an area where perching opportunities currently do not exist (i.e., greater than 0.25 mile from existing structures or trees). Construction of Route Segment NNR-5 would require an estimated 16 structures in a landscape dominated by low growing grasses and shrubs. An estimated 10 new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6).

Within one mile of Route Segment NNR-5, potentially suitable habitat is present for 34 special status wildlife species that are possible, likely, or known to occur (Tables 3.3-2, 3.3-3, and 3.3-7). Potential impacts and PDFs to address them are discussed in Sections 4.3.3.1 and 4.3.3.2. Species or wildlife resources that have been documented at specific locations within one mile of Route Segment NNR-5 include a burrowing owl nesting site.

A historic burrowing owl nesting site (last documented occupancy prior to 2000) occurs approximately 0.7 mile from Route Segment NNR-5. While this particular nest is no longer a management concern, it demonstrates potential for burrowing owls to nest within one mile of Route Segment NNR-5. Potential impacts would occur from disturbance during construction activities or from injury or mortality from vehicle strikes or interactions with other equipment used during construction, including mechanical disturbance or crushing of burrows. If an occupied burrowing owl nesting site is found within 0.25 mile of the proposed route, a seasonal restriction on construction would be enacted from March to August, within the 0.25-mile buffer. Additional PDFs to reduce impact on burrowing owls are described in Sections 4.3.3.1 and 4.3.3.2. Impact levels to burrowing owl are expected to be moderate for 0.6 mile.

All of the habitat disturbance associated with Route Segment NNR-5 would be located within the Regularly Occupied Habitat MU for sage-grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Tables 4.3-5). Anticipated ground disturbance includes 8.6 acres of suitable sage-grouse habitat, 0.4 acre of marginal habitat, and 0 acres of unsuitable habitat (Table 4.3-8). With the implementation of PDFs (refer to Sections 4.3.3.1 and 4.3.3.2), habitat impact levels would be low for 0.1 mile and moderate for 1.7 miles.

Existing perching, roosting and nesting sites for avian predators are available along Route Segment NNR-5 from buildings, trees, fences associated with developed areas and existing distribution and 230 kV H-frame transmission lines. Construction of Route Segment NNR-5 would require an estimated 16 new structures; approximately 10 (63 percent) would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6).

No active leks are known to occur within four miles of Route Segment NNR-5 (Table 4.3-7). With the implementation of PDFs (Sections 4.3.3.1 and 4.3.3.2), impacts to lekking sage-grouse associated with the construction of Route Segment NNR-5 is anticipated to be low for the entire length of the route segment (1.8 miles).

4.3.4.6 Route Segment NNR-6o/NNR-6u

Route Segment NNR-6 is being considered as either an underground segment (NNR-6u) or as an overhead transmission segment (NNR-6o). Undergrounding would create a larger area of ground disturbance than an overhead line would, because the overhead line would cause relatively little ground disturbance along the spanned areas between structures and the underground portion would require a continuous trench and a permanent access road. The overhead option would result in approximately 27.3 acres of long-term and 3.3 acres of short-term disturbance, while the underground option would cause approximately 57.7 acres of long-term disturbance and 6.6 acres of short-term disturbance resulting in more than two times as much ground disturbance as the overhead option. For NNR-6o, permanently disturbed areas would include 26.5 acres of sagebrush/perennial grassland, while for NNR-6u, permanently disturbed areas would include 56.0 acres of sagebrush/perennial grassland (Table 4.3-4). PDFs would be implemented to minimize habitat loss and degradation, as described in Section 4.3.3.1. For either option, impact levels to habitat are expected to be low for 0.9 mile and moderate for 5.5 miles (sagebrush / perennial grassland).

The presence of transmission structures, which could provide additional perch and/or nesting sites for avian predators, could negatively impact nearby prey species such as small mammals and avian species, particularly when the new structures are built in an area where perching opportunities currently do not exist (i.e., greater than 0.25 mile from existing structures or trees). Construction of Route Segment NNR-6o would require an estimated 35 structures. None of the new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6). Although the underground option would not require transmission towers, at both transitions between aboveground and underground transmission, a transition station would be required, resulting in approximately 5.0 acres of disturbance at each transition station.

Within one mile of Route Segment NNR-6, potentially suitable habitat is present for 43 special status wildlife species that are possible, likely, or known to occur (Tables 3.3-2, 3.3-3, and 3.3-7). Potential impacts and PDFs to address them are discussed in Sections 4.3.3.1 and 4.3.3.2. Species or wildlife resources that have been documented at specific locations within 1.0 mile of Route Segment NNR-6 include a Merriam's shrew and regular concentration areas of loggerhead shrikes and mule deer.

The McDonald Springs regular concentration of loggerhead shrikes is located approximately 0.9 mile from Route Segment NNR-6. Potential impacts include direct habitat loss, indirect habitat loss or degradation, increased predation from corvids and raptors attracted to nesting and/or perching opportunities on the structures, and disturbance or displacement from noise or visual disturbance, especially during construction. PDFs would be implemented to minimize impacts, as described in Sections 4.3.3.1 and 4.3.3.2. Because the shrike concentration area is nearly 1.0 mile from the route, no identifiable impacts are anticipated.

A Merriam's shrew was documented within 1.0 mile of Route Segment NNR-6 in 1954, demonstrating potential for Merriam's shrews to exist within one mile of Route Segment NNR-6. Potential impacts include habitat loss, habitat degradation, injury or mortality due to crushing by construction equipment or vehicles, experiencing increased predation from avian predators. PDFs would be implemented to minimize impacts, as described in Sections 4.3.3.1 and 4.3.3.2. No identifiable impacts are anticipated.

The south slopes of the Saddle Mountains have been identified as a mule deer regular large concentration area. While the PHS data does not specify a season of use for this area, the south-facing sagebrush steppe slopes are probably heavily used during winter. This area overlaps the ROW for 1.6 miles. Potential impacts include habitat loss, habitat degradation from the spread of invasive weeds, collision with vehicles during construction and maintenance and disturbance during construction and maintenance. Mule deer are most likely to be impacted by disturbance during winter when increased energy expenditure may lower survival. Adherence to seasonal restrictions from December 1 to March 1 on construction activities within the designated concentration area should minimize disturbance impacts to mule deer. Impact levels to mule deer are anticipated to be moderate for the 1.6 miles of the route segment that overlap the designated concentration area.

All of the habitat disturbance associated with Route Segment NNR-6o and NNR-6u would be located within the Regularly Occupied Habitat MU for sage-grouse. For either option construction activities would disturb less than1 percent of Regularly Occupied Habitat (Table 4.3-5).

For NNR-6o, anticipated disturbance includes 9.5 acres of suitable sage-grouse habitat, 8.4 acres of marginal habitat, and 12.8 acres of unsuitable habitat. Undergrounding NNR-6 would increase the anticipated disturbance to 20.5 acres of suitable habitat, 16.6 acres of marginal habitat, and 27.2 acres of unsuitable habitat (Table 4.3-8). With the implementation of PDFs (Sections 4.3.3.1 and 4.3.3.2), habitat impact levels would be low for 4.5 miles and moderate for 1.9 miles.

Existing perching, roosting and nesting sites for avian predators are available along Route Segment NNR-6 from buildings, trees, fences associated with developed areas and existing distribution and 230 kV H-frame transmission lines. Construction of Route Segment NNR-6o would require an estimated 48 new structures, all of which would be located within 0.25 mile of an existing transmission line (Table 4.3-6). Although the underground option would not require transmission towers, at both transitions between above-ground and underground transmission, a transition station would be required, resulting in approximately five acres of disturbance at each transition station.

Approximately 3.7 miles of Route Segment NNR-6 is within 4.0 miles of an active lek (Table 4.3-7). All of the structures within 4.0 miles of the active lek would be visually obstructed by terrain and therefore not visible from the lek. The lek is described in Section 4.3.3.3 Sage-Grouse. With the implementation of PDFs (Sections 4.3.3.1 and 4.3.3.2), lek impact levels are anticipated to be low for 2.1 miles and moderate for 4.3 miles.

4.3.4.7 Route Segment NNR-7

All of the disturbance (38.1 acres) would occur within areas classified as sagebrush/perennial grassland; therefore, it was all considered long-term impact because sagebrush would recover very slowly following disturbance (Table 4.3-4). PDFs would be implemented to minimize habitat loss and degradation, as described in Section 4.3.3.1. Impact levels to habitat are expected to be moderate for all 8.2 miles of the route segment.

The presence of transmission structures, which could provide additional perch and/or nesting sites for avian predators, could negatively impact nearby prey species such as small mammals and avian species, particularly when the new structures are built in an area where perching opportunities currently do not exist (i.e., greater than 0.25 mile from existing structures or trees). Construction of Route Segment NNR-7 would require an estimated 61 structures. None of the structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6).

Within 1.0 mile of Route Segment NNR-7, potentially suitable habitat is present for 57 special status wildlife species that are possible, likely, or known to occur (Tables 3.3-2, 3.3-3, and 3.3-7). Potential impacts and PDFs to address them are discussed in Sections 4.3.3.1 and 4.3.3.2. Species or wildlife resources that have been documented at specific locations within one mile of Route Segment NNR-3 include critical habitat for bull trout, Chinook salmon, and steelhead, cliff bands with potential for high concentrations of nesting raptors, striped whipsnake, night snake, black-tailed jackrabbit, Merriam's shrew, and regular concentrations of chukars and mule deer.

Critical habitats for bull trout, the Columbia River Chinook salmon ESU, and the Upper Columbia River steelhead DPS occur within 1.0 mile of Route Segment NNR-7 in the Columbia River. Tributaries of the Columbia River in and near the Project area are not part of the Upper Columbia River Spring Run

Chinook salmon ESU, they are part of the Mid-Columbia River Spring Run Chinook salmon ESU which is not listed under the ESA (NOAA 2013). It is unlikely that spawning occurs in streams within the Project area. Bull trout and Chinook salmon are not known to spawn within streams within the Project area because the streams are too small and not cold enough over a long enough time period to provide suitable spawning and rearing habitat; however, bull trout could use streams for short periods for foraging (AECOM Environmental 2010). No structure or road construction work would occur within the Columbia River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of PDFs is anticipated to be effective at minimizing impacts to all three species; no identifiable impacts to the three species or their habitats are anticipated to occur through construction, operation and maintenance of the proposed Project.

Cliff bands occur within 1.0 mile of Route Segment NNR-7, near the Columbia River. The cliffs likely attract high concentrations of raptors, though PHS data documents no raptor nests within 1.0 mile of Route Segment NNR-7. Cliffs would be spanned without direct disturbance to the cliff habitat. If a raptor nest is found, seasonal restrictions would occur within the species-specific buffer of the active nest (refer to Section 2.5). No identifiable impacts to raptors or cliff habitat are anticipated to occur through construction, operation, and maintenance of the proposed Project.

Striped whipsnake and night snake have been documented within 1.0 mile of Route Segment NNR-7. Both species utilize a variety of upland steppe habitats. Potential impacts to these species include direct habitat loss, indirect habitat loss or degradation through spread of invasive weeds or change in fire regime, injury or mortality due to crushing by construction equipment or vehicles during construction and maintenance activities, and increased predation from avian predators. PDFs would be implemented to minimize impacts, as described in Sections 4.3.3.1 and 4.3.3.2. For both species, impact levels are expected to be moderate for 0.9 mile of the route segment.

A Priority Species Regional Area regular small concentration of chukars is located approximately 0.9 mile from Route Segment NNR-7 and additional suitable dry rocky slope habitat is present. Potential impacts include disturbance or displacement, injury or mortality from vehicle strikes and equipment, and direct habitat loss or degradation. Noise from construction equipment, helicopters, and general construction activities could disturb and displace chukar on a short-term basis. In addition, the transmission poles would serve as perch sites for raptor species, which could prey on chukar. The implementation of PDFs, as described in Sections 4.3.3.1 and 4.3.3.2, are anticipated to reduce impacts to chukar. No identifiable impacts to chukars are anticipated to occur through construction, operation, and maintenance of the proposed Project.

Black-tailed jackrabbit has been documented within one mile of Route Segment NNR-7. Potential impacts include a reduction and degradation of habitat, disturbance and displacement from habitats, increase in predation from avian predators, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. PDFs to address the impacts are described in Sections 4.3.3.1 and 4.3.3.2. Impact levels to black-tailed jackrabbits are expected to be moderate for 0.8 mile.

A Merriam’s shrew was documented within 1.0 mile of Route Segment NNR-7 in 1954, demonstrating potential for Merriam’s shrews to exist within 1.0 mile of Route Segment NNR-7. Potential impacts include habitat loss, habitat degradation, injury or mortality due to crushing by construction equipment or vehicles, and experiencing increased predation from avian predators. PDFs would be implemented to minimize impacts, as described in Sections 4.3.3.1 and 4.3.3.2. No identifiable impacts are anticipated.

The south slopes of the Saddle Mountains have been identified as a mule deer regular large concentration area. While the PHS data does not specify a season of use for this area, the south-facing sagebrush steppe slopes are probably heavily used during winter. This area comes within approximately 0.9 mile for a short stretch of the Project area. Potential impacts to mule deer include habitat loss, habitat degradation from the spread of invasive weeds, collision with vehicles during construction and maintenance and disturbance during construction and maintenance. Mule deer are most likely to be impacted by disturbance during winter when increased energy expenditure may lower survival. Adherence to seasonal restrictions from December 1 to March 1 on construction activities within the designated concentration area should minimize disturbance impacts to mule deer. Because Route Segment NNR-7 is never less than 0.9 mile from the designated concentration area, no identifiable impacts are anticipated to occur to mule deer through construction, operation, and maintenance of the proposed Project.

All of the habitat disturbance associated with Route Segment NNR-7 would be located within the Regularly Occupied Habitat MU for sage-grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Tables 4.3-5). Anticipated ground disturbance includes 25.3 acres of suitable sage-grouse habitat, 12.8 acres of marginal habitat, and 0 acres of unsuitable habitat (Table 4.3-8). With the implementation of PDFs (Sections 4.3.3.1 and 4.3.3.2), habitat impact levels would be low for 2.8 miles and moderate for 5.4 miles.

Existing perching, roosting and nesting sites for avian predators are available along Route Segment NNR-7 from buildings, trees, fences associated with developed areas and existing distribution and 230 kV H-frame transmission lines. Construction of Route Segment NNR-7 would require an estimated 61 new structures; all would be located within 0.25 mile of an existing transmission line (Table 4.3-6).

No active leks are known to occur within 4.0 miles of Route Segment NNR-7 (Table 4.3-7). With the implementation of PDFs (Sections 4.3.3.1 and 4.3.3.2), impacts to lekking sage-grouse associated with the construction of Route Segment NNR-7 is anticipated to be low for the entire route segment (8.2 miles).

4.3.4.8 Route Segment NNR-8

Approximately 10.2 acres of long-term and 3.3 acres of short-term disturbance would occur through the construction of Route Segment NNR-8. Permanently disturbed areas would include 9.1 acres of sagebrush/perennial grassland and 0.5 acre of sagebrush/annual grassland (Table 4.3-4). Annual grassland/noxious weeds and perennial grassland accounts for the remaining long-term (0.6 acre) and short-term (3.3 acres) disturbance. PDFs would be implemented to minimize habitat loss and degradation, as described in Section 4.3.3.1. Impact levels to habitat are expected to be low for 1.3 miles and moderate for 1.4 miles (sagebrush/perennial grassland).

The presence of transmission structures, which could provide additional perch and/or nesting sites for avian predators, could negatively impact nearby prey species such as small mammals and avian species, particularly when the new structures are built in an area where perching opportunities currently do not exist (i.e., greater than 0.25 mile from existing structures or trees). Construction of Route Segment NNR-8 would require an estimated 20 structures. None of the structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6).

Within 1.0 mile of Route Segment NNR-8, potentially suitable habitat is present for 56 special status wildlife species that are possible, likely, or known to occur (Tables 3.3-2, 3.3-3, and 3.3-7). Potential impacts and PDFs to address them are discussed in Sections 4.3.3.1 and 4.3.3.2. Species or wildlife resources that have been documented at specific locations within 1.0 mile of Route Segment NNR-3 include critical habitat for bull trout, Chinook salmon, and steelhead, cliff bands with potential for high concentrations of nesting raptors, striped whipsnake, night snake, sagebrush lizard, black-tailed jackrabbit, and regular concentrations of mule deer, waterfowl, and common loons.

Critical habitats for bull trout, the Columbia River Chinook salmon ESU, and the Upper Columbia River steelhead DPS occur within 1.0 mile of Route Segment NNR-8 in the Columbia River. Tributaries of the Columbia River in and near the Project area, are not part of the Upper Columbia River Spring Run Chinook salmon ESU; they are part of the Mid-Columbia River Spring Run Chinook salmon ESU which is not listed under the ESA (NOAA 2013). It is unlikely that spawning occurs in streams within the Project area. Bull trout and Chinook salmon are not known to spawn within streams within the Project area because the streams are too small and not cold enough over a long enough time period to provide suitable spawning and rearing habitat; however, bull trout could use streams for short periods for foraging (AECOM Environmental 2010). No structure or road construction work would occur within the Columbia river. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of PDFs is anticipated to be effective at minimizing impacts to all three species. No identifiable impacts to the three species or their habitats are anticipated to occur through construction, operation, and maintenance of the proposed Project.

Cliff bands occur within 1.0 mile of Route Segment NNR-8, near the Columbia River; the cliffs likely attract high concentrations of raptors, though PHS data documents no raptor nests within 1.0 mile of Route Segment NNR-8. Cliffs would be spanned without direct disturbance to the cliff habitat. If a raptor nest is found seasonal restrictions would occur within the species-specific buffer of the active nest (refer to Section 2.5). No identifiable impacts to raptors or cliff habitat are anticipated to occur through construction, operation, and maintenance of the proposed Project.

Striped whipsnake, night snake, and sagebrush lizard have been documented within one mile of Route Segment NNR-8. Potential impacts to these three species include direct habitat loss, indirect habitat loss or degradation through spread of invasive weeds or change in fire regime, injury or mortality due to crushing by construction equipment or vehicles during construction and maintenance activities, and increased predation from avian predators. As striped whipsnake is currently known to occur in one location, near the Vantage Substation, impacts to the species or habitat could occur. However, the implementation of PDFs are anticipated to be successful at minimizing impacts to striped whipsnake, night snake and sagebrush lizard, as described in Sections 4.3.3.1 and 4.3.3.2. For all three species, impact levels are expected to be moderate for 1.7 miles and low for 0.6 mile of the route segment.

The Wanapum Pool fall and winter waterfowl area and common loon use area is located within 1.0 mile of Route Segment NNR-8 on Wanapum Lake, just northwest of the Vantage Substation. Eight special status aquatic bird species occur or are likely to utilize the area (as described in Section 4.3.3.2): black-crowned night heron; great blue heron; Clark’s, western, and eared grebes; tundra swan; American white pelican; and common loon. Common loons and American white pelicans have been specifically documented within one mile of Route Segment NNR-8. Waterfowl and aquatic bird injury and mortality could occur through collision with the transmission line. Where the proposed ROW crosses the Columbia River, the line would parallel four existing transmission lines within 350 to 1,300 feet. To the extent that collision potential exists, the additional line will likely not add greater risk than what already occurs at the crossing. PDFs include installing bird flight diverters in locations with known avian mortality through collision with transmission line infrastructure. NNR-8 is expected to have no identifiable impacts to waterfowl or aquatic bird species.

Black-tailed jackrabbit has been documented within one mile of Route Segment NNR-8. Potential impacts include a reduction and degradation of habitat, disturbance and displacement from habitats, increased predation from avian predators, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. PDFs to address the impacts are described in Sections 4.3.3.1 and 4.3.3.2. Impact levels to black-tailed jackrabbits are expected to be moderate for 1.9 miles and low for 0.6 mile.

A mule deer regular concentration area has been identified on Wanapum Bench within one mile of Route Segment NNR-8, immediately north of the Vantage substation. The PHS data indicates year-round use of this area. This area comes within approximately 0.1 mile of the proposed route, but does not intersect the ROW. Potential impacts to mule deer include habitat loss, habitat degradation from the spread of invasive weeds, collision with vehicles during construction and maintenance, and disturbance during construction and maintenance. Mule deer are most likely to be impacted by disturbance during winter when increased energy expenditure may lower survival. Adherence to seasonal restrictions from December 1 to March 1 on construction activities within the designated concentration area should minimize disturbance impacts to mule deer. No identifiable impacts are anticipated to occur to mule deer through construction, operation and maintenance of the proposed Project.

The majority of the habitat disturbance associated with Route Segment NNR-8 would be located within the Regularly Occupied Habitat MU for sage-grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-5). Anticipated ground disturbance includes 6.0 acres of suitable sage-grouse habitat, 2.0 acres of marginal habitat, and 5.5 acres of unsuitable habitat (Table 4.3-8). With the implementation of PDFs (Sections 4.3.3.1 and 4.3.3.2), the scale of disturbance and degradation to sage-grouse habitat is anticipated to be low for 1.7 miles and moderate for 1.0 mile.

Existing perching, roosting and nesting sites for avian predators are available along Route Segment NNR-8 from buildings, trees, fences associated with developed areas and existing distribution and 230 kV H-frame transmission lines. Construction of Route Segment NNR-8 would require an estimated 20 new structures; all would be located within 0.25 mile of an existing transmission line (Table 4.3-6).

No active leks are known to occur within four miles of Route Segment NNR-8 (Table 4.3-7). With the implementation of PDFs (Sections 4.3.3.1 and 4.3.3.2), impacts to lekking sage-grouse associated with the construction of Route Segment NNR-8 is anticipated to be low for the entire length of the route segment (2.7 miles).

4.3.4.9 Route Segment MR-1

Approximately 51.2 acres of long-term and 28.5 acres of short-term disturbance would occur through the construction of Route Segment MR-1. Permanently disturbed areas would include 29.3 acres of sagebrush/perennial grassland (Table 4.3-4). Areas classified as annual grassland and noxious weeds would experience 12.8 acres of long-term disturbance and 18.6 acres of short-term disturbance. Agriculture/disturbed areas would experience 8.6 acres of long-term and 9.9 acres of short-term disturbance. PDFs would be implemented to minimize habitat loss and degradation, as described in Section 4.3.3.1. Impact levels to habitat are expected to be low for 7.5 miles and moderate for 4.4 miles (sagebrush/perennial grassland).

The presence of transmission structures, which could provide additional perch and/or nesting sites for avian predators, could negatively impact nearby prey species such as small mammals and avian species, particularly when the new structures are built in an area where perching opportunities currently do not exist (i.e., greater than 0.25 mile from existing structures or trees). Construction of Route Segment MR-1 would require an estimated 90 structures in a landscape dominated by low growing grasses and shrubs. Approximately 85 of the new structures would be located greater than 0.25 mile from an existing transmission line. Route Segment MR-1 was proposed as an option to Route Segment NNR-4o. Compared with Route Segment NNR-4o, Route Segment MR-1 would require 55 more structures (Table 4.3-6).

Within 1.0 mile of Route Segment MR-1 potentially suitable habitat is present for 40 special status wildlife species that are possible, likely, or known to occur (Tables 3.3-2, 3.3-3, and 3.3-7). Potential impacts and PDFs to address them are discussed in Sections 4.3.3.1 and 4.3.3.2. Species or wildlife resources that have been documented at specific locations within one mile of Route Segment MR-1 include a cliff band with a high concentration of nesting raptors, several golden eagle nests within one breeding territory, a historic ferruginous hawk nest, white-tailed jackrabbit, and winter range for bighorn sheep.

Cliff bands occur along Lmuma Creek, within 1.0 mile of Route Segment MR-1; the cliffs attract high concentrations of raptors, including prairie falcons (not a special status species, but sensitive to nest disturbance) and several golden eagle nests associated with one breeding territory, approximately 0.6 mile from the route segment. A historic ferruginous hawk nest was documented in 1994 on top of a six-foot rock outcrop approximately 0.9 mile from the route segment. Cliffs would be spanned thus avoiding direct disturbance to the habitat. Within the breeding season, construction would be avoided within species-specific active raptor nest buffers to avoid disturbing nesting birds (0.5 mile for golden eagle and ferruginous hawk and 0.25 mile for prairie falcon; see PDFs in Chapter 2). Impact levels on golden eagles are anticipated to be moderate for 1.2 miles and impact levels on ferruginous hawks are expected to be moderate for 0.2 mile.

White-tailed jackrabbit has been documented approximately 0.8 mile from Route Segment MR-1. Potential impacts include a reduction and degradation of habitat, disturbance and displacement from habitats, increase in predation from avian predators, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. PDFs to address the impacts are described in Sections 4.3.3.1 and 4.3.3.2. No identifiable impacts are anticipated to occur to mule deer through construction, operation, and maintenance of the proposed Project.

Bighorn sheep winter range occurs within one mile of MR-1 and is crossed by the proposed route segment for 0.7 mile on the steep slopes surrounding the Yakima River Canyon and Lmuma Creek and its tributaries. Potential impacts to bighorn sheep include direct habitat loss, habitat degradation through weed spread and/or changes in fire regime, collision with vehicles during construction and maintenance, and disturbance during construction and maintenance. Adherence to seasonal restrictions on construction activities within designated winter range should minimize disturbance impacts to bighorn sheep. Additional PDFs to minimize disturbance impacts and collision risk are described in Section 4.3.3.2; PDFs to minimize habitat loss and degradation are described in Section 4.3.3.1. Impact levels to bighorn sheep are anticipated to be moderate for the 0.7 mile of the route segment that overlap designated winter range.

All of the habitat disturbance associated with Route Segment MR-1 would be located within the Regularly Occupied Habitat MU for sage-grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-5). Anticipated ground disturbance includes 50 acres of suitable sage-grouse habitat, 13.3 acres of marginal habitat, and 16.4 acres of unsuitable habitat (Table 4.3-8). With the implementation of PDFs (Sections 4.3.3.1 and 4.3.3.2), habitat impact levels would be low for 4.3 miles and moderate for 7.6 miles.

Existing perching, roosting and nesting sites for avian predators are available along Route Segment MR-1 from buildings, trees, fences associated with developed areas and existing distribution and 230 kV H-frame transmission lines. Construction of Route Segment MR-1 would require an estimated 90 new structures; approximately 85 (94 percent) would be located greater than 0.25 mile from an existing transmission line (Table 4.3-6).

No active leks are known to occur within four miles of Route Segment MR-1 (Table 4.3-7). With the implementation of PDFs (Sections 4.3.3.1 and 4.3.3.2), impacts to lekking sage-grouse associated with the construction of Route Segment MR-1 are anticipated to be low for the entire length of the route segment (11.9 miles).

4.3.5 Mitigation Measures

The PDFs and environmental protection measures described in Section 2.5 - PDFs Common to Action Alternatives, have been incorporated into the project design and would be implemented during construction and operation of the proposed Project. These measures are designed to avoid or minimize environmental impacts from Project construction, operation, and maintenance activities and are items that Pacific Power has committed to implement as part of the Project development; therefore, at this time no additional mitigation would be required. If desired biological objectives are not achieved with the existing PDFs, additional mitigation measures may be implemented. A Mitigation Framework for Development of a Sage-grouse Habitat Mitigation Plan is currently being developed.

4.3.6 Impact Summary By Alternative

4.3.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to wildlife would occur, but changes in habitat and species composition would continue as a result of current conditions and future development. JBLM YTC would continue to use the majority of the Project area for maneuver and live fire training. Refer to Section 4.17 - Cumulative Effects for a discussion of potential future development.

4.3.6.2 Route Alternatives

Table 4.3-9 presents a summary of the impacts for the NNR Alternative on all wildlife and Table 4.3-10 presents a comparison of the impacts to sage-grouse. Each comparison includes three design options under the NNR Alternative (NNR-Overhead Design Option, NNR-MR Subroute, and NNR-Underground Design Option), as well as the Draft Environmental Impact Statement (DEIS) Agency Preferred Alternative. The tables also tally the number of miles for each overall impact level (high, medium, low) that would be attributed to the Project following the implementation of PDFs for all wildlife species (Table 4.3-9) and for sage-grouse (Table 4.3-10).

The DEIS Agency Preferred Alternative is by far the longest option (66.3 miles), followed by the NNR Alternative – Manastash Ridge (MR) Subroute (47.7 miles). The NNR Alternative – Overhead Design Option and the NNR Alternative - Underground Design Option are the shortest alternatives (40.3 miles). As a result, the DEIS Agency Preferred Alternative would result in the most direct habitat loss (330 acres) and number of transmission structures (i.e., avian predator perching opportunities; 499). The NNR Alternative – Overhead Design Option and the NNR Alternative - Underground Design Option would result in the fewest acres of direct habitat loss (204 and 260, respectively) and the fewest number of transmission structures (328 and 251, respectively).

Overall, the DEIS Agency Preferred Alternative would cause the greatest amount of direct habitat loss to wildlife habitat (330 acres) and sage-grouse habitat (144 acres) while the NNR Alternative – Overhead Design Option would disturb the least amount of habitat. Compared to the NNR Alternative – Overhead Design Option the NNR Alternative - Underground Design Option would disturb more wildlife habitat (260 acres vs. 204 acres) and more sage-grouse habitat (115 acres vs. 85 acres) because it would require more vegetation removal through the excavation of a continuous trench for underground portions and would require a permanent road to access underground locations. For all alternatives, disturbed areas would be restored following construction; however, because of the long recovery times for restoring sagebrush to a community (30 to 120 years), any direct disturbance to sagebrush steppe would be considered a long-term impact. Because the NNR Alternative – Overhead Design Option and the NNR Alternative - Underground Design Option closely parallel the existing Pomona-Wanapum 230 kV transmission line for the majority of their total length, utilizing nearby existing roads will reduce the need for new access roads, greatly decreasing the amount of direct habitat loss associated with the Project.

Indirect habitat loss through the spread of noxious weeds and invasive species and potential increased fire frequency would occur for all alternatives. Ground disturbance and vegetation removal increase the potential for the introduction and spread of noxious and invasive weeds, with disturbed areas, such as roads and construction work areas, acting as conduits for weeds to become established in native habitats adjacent to the disturbed areas. Thus indirect habitat loss through weed spread would be expected to roughly correlate with amount of ground disturbance. Greatest ground disturbance would occur with the construction of the DEIS Agency Preferred Alternative, and the least ground disturbance would occur with the NNR Alternative – Overhead Design Option. The NNR Alternative - MR Subroute would require construction in areas that are not located adjacent to an existing line and in areas with few or no access roads. The NNR Alternative - Underground Design would require greater ground disturbance in underground construction locations through trenching and new, permanent access road construction.

NNR Alternative – Overhead Design Option and the NNR Alternative - Underground Design Option closely parallel an existing 230 kV transmission line that primarily uses transmission structures similar to those proposed for this Project, with most new structures located within approximately 200 feet of existing structures. Given the territorial nature of raptor and corvid species and density limitations imposed by food availability, it is unlikely that the addition of a structure 200 feet from a similar existing structure would have much, if any, effect on the density of corvids or raptors. In those areas, the new perching opportunities could increase the amount of habitat that is within view of a perch and effectively widen the corridor of increased predation risk, by approximately 200 feet from the existing condition. Construction of the DEIS Agency Preferred Alternative would require 399 new structures greater than 0.25 mile from existing structures compared with only 50 for the NNR Alternative – Overhead Design Option or NNR Alternative - Underground Design Option, and 135 for the NNR Alternative - MR Subroute. Construction of the NNR Alternative - MR Subroute would require new H-frame poles in areas largely devoid of tall structures; corvid species may be most likely to use the new structures along Manastash Ridge that are closest to disturbance and agriculture. Because the NNR Alternative - Underground Design Option would be underground for 10.9 miles of its 40.3 mile length it would require the fewest number of total structures (251), but the NNR Alternative - Underground Design Option would not reduce the number of structures greater than 0.25 mile from an existing structure (50), because all 10.9 miles planned for undergrounding closely parallel an existing 230 kV transmission line. The close proximity of the underground sections to existing overhead lines would negate most of the benefit to wildlife that undergrounding might otherwise have.

In spite of being the longest route, the DEIS Agency Preferred Alternative crosses the fewest miles (26.1) of moderate to high sensitivity wildlife habitat (sagebrush/perennial grassland, sagebrush/annual grassland, bitterbrush/perennial grassland, tree, riparian/wetland) because much of the route travels through agricultural or degraded habitat instead of sagebrush. Approximately 51 percent of the anticipated habitat disturbance associated with the DEIS Agency Preferred Alternative is in sagebrush steppe (compared to 76 percent for the NNR Alternative – Overhead Design Option) and 29 percent is in agricultural or disturbed areas (compared to five percent for NNR Alternative – Overhead Design Option). The NNR Alternative crosses special status habitat for 30.7 miles (NNR Alternative – Overhead Design Option and NNR Alternative - Underground Design Option) or 30.1 miles (NNR Alternative - MR Subroute). The amount of special status habitat crossed by the NNR Alternative - MR Subroute is slightly lower than the NNR Alternative – Overhead Design Option or NNR Alternative - Underground Design Option because Route Segment MR-1 avoids some sagebrush/perennial grassland by staying west of I-82 on degraded, heavily grazed habitat and then skirting the eastern edge of Manastash Ridge through degraded habitat that is adjacent to an agricultural area.

The DEIS Agency Preferred Alternative has a much higher number of miles within one mile of documented special status species raptor nests (20.1 miles) than any of the three northern alternatives (9.0 to 10.4 miles). Spatial/temporal buffers would minimize disturbance of actively nesting raptors during construction and maintenance activities. The number of miles within 0.5 mile of a special status species occurrence record is also higher for the DEIS Agency Preferred Alternative (8.2 miles) than for the three northern options (4.9 miles). The amount of Priority Species Regional Area crossed is slightly higher for the DEIS Agency Preferred Alternative (7.2 miles) than for the three northern routes (5.5 to 6.0 miles).

Overall impact levels were driven largely by moderate to high sensitivity habitat (predominately sagebrush steppe), but also took into account documented special status species raptor nests within 1.0 mile of the ROW, documented special status species points within 0.5 mile of the ROW, and Priority Species Regional Area crossings. None of the alternatives had any miles of overall high impact levels or of no identifiable impact levels. The DEIS Agency Preferred Alternative had the most miles of moderate impact and also had the most miles of low impact (Table 4.3-9). While the NNR Alternative - MR Subroute would impact more miles than the NNR Alternative – Overhead Design Option or NNR Alternative - Underground Design Option most of the additional miles would have a low impact level as miles of moderate impact are very similar among the three northern routes. While the NNR Alternative - Underground Design Option would result in slightly fewer transmission structures than the NNR Alternative – Overhead Design Option, the number of structures greater than 0.25 mile from an existing line would be the same and the acres of direct habitat disturbance would be slightly higher. The NNR-Alternative - Underground Design Option did not have different overall impact levels than the NNR Alternative – Overhead Design Option.

A portion of the proposed NNR Alternative would be located within the JBLM YTC Priority Areas for Conservation (PAC). Of the three NNR Alternative options and the DEIS Agency Preferred Alternative, the NNR Alternative - Overhead Design Option or the NNR Alternative - Underground Design Option would have the lowest number of miles within the PAC (38.2 miles each; 94.7 percent of their overall lengths; Table 4.3-10). In addition, the location of the NNR Alternative - Overhead Design Option and the NNR Alternative - Underground Design Option are consolidated with an existing transmission line for the majority of their length within the PAC (36.4 miles; 95 percent of the length within the PAC). The NNR Alternative - MR Subroute has the most miles within the PAC (46.0 miles; 96.4 percent of its overall length). The DEIS Agency Preferred Alternative is within the PAC for 42.9 miles (64.7 percent of its overall length). All of the NNR Alternative options would be just within the boundary of the JBLM YTC Primary Sage-Grouse Protection Area for approximately one mile.

The ROW for the three NNR Alternative options would be located outside of the current JBLM YTC sage-grouse population range, where 95 percent of sage-grouse use is expected to occur (based on the kernel density analysis). The eight-mile-wide sage-grouse Project area for the three NNR Alternative options overlaps approximately eight percent of the total estimated 95 percent population range (15,271 to 15,430 acres, depending on NNR Alternative option). The NNR Alternative options do not overlap the core range, where 80 percent of sage-grouse use is estimated to occur. Recent grouse use has been documented near the NNR Alternative - Overhead Design Option, NNR Alternative - Underground Design Option and the NNR Alternative - MR Subroute Alternative options indicating that these areas are used by grouse occasionally, but telemetry data indicates that use near the proposed route is much lighter than areas within the population range. The DEIS Agency Preferred Alternative ROW would be located outside of the JBLM YTC sage-grouse population range. The eight-mile-wide Project area for the DEIS Agency Preferred Alternative overlaps the core range for approximately 39,312 acres and the population range for approximately 47,082 acres (approximately 44 percent of the total estimated population range).

The three NNR Alternative options would be located within four miles of two active leks. The DEIS Agency Preferred Alternative would be closer to leks; within two miles of two active or inactive leks and within three miles of three additional active or inactive leks. The NNR Alternative - Overhead Design Option and the NNR Alternative - Underground Design Option would be in close proximity to more historic leks (three leks within 0.6 mile) compared with the NNR Alternative - MR Subroute and the DEIS Agency Preferred Alternative (one lek within 0.6 mile). Currently, sage-grouse use near all three of the NNR Alternative options appears to be minimal. The DEIS Agency Preferred Alternative is located in closer proximity to the current population range and core population range.

For the NNR Alternative options, habitat connectivity between the JBLM YTC sage-grouse population and the Mansfield Plateau/Moses Coulee sage-grouse population appears to have the greatest potential where Route Segments NNR-6 and NNR-7 (all three NNR Alternative options) are located. Local patterns of sage-grouse distribution suggest that NNR-6 is likely to be the most important connectivity zone, but the presence of wind development north of I-90 reduces the linkage value, according to the WHCWG model. In addition, the kernel density analysis shows a southeastward shift in the JBLM YTC sage-grouse population range and core population range since 1989. This shift in use could be associated with increased training at JBLM YTC or, as sage-grouse populations have declined, sage-grouse are shifting into core, suitable habitat locations. Nevertheless, it appears that the entire stretch between Badger Pocket and the Columbia River could serve as valuable linkage habitat. Because the proposed NNR Alternative options closely parallel an existing 230 kV transmission line as it crosses the identified linkage area, the magnitude of its effect on sage-grouse movement would depend on a number of unknown variables, including the perception of the vertical structures by sage-grouse, and the potential for the structures to attract avian predators. The NNR Alternative options may impede sage-grouse movement, but only to the extent that sage-grouse avoid the transmission line (refer to the Behavioral Avoidance of Infrastructure discussion above). The NNR Alternative - Underground Design Option could alleviate sage-grouse avoidance of the NNR; however, two existing 500 kV and two existing 230 kV transmission lines, I-90 and the two existing wind developments would still be present on the landscape. Based on information provided by the kernel density analysis, it appears that use of the area north of the proposed NNR alternative has been limited, even two decades ago when the JBLM YTC population was higher (over 400 birds). Of the three main sage-grouse connectivity zones identified by WHCWG, the one linking the JBLM YTC population with the reintroduced Yakama Reservation population was the weakest. That connectivity zone would cross the DEIS Agency Preferred Alternative, with the most valuable zone crossing Route Segment 2c, before detouring around far to the west (or to the east) in order to connect with the habitat on the Yakama Indian Reservation. But, according to Robb and Schroeder (2012), development along the I-82 corridor “essentially isolates” habitat on the Yakama Indian Reservation from the JBLM YTC population, and potential for movement between the two areas “looks dismal.” None of the proposed routes are likely to impact sage-grouse connectivity to the south; given the existing barriers, it is unlikely that movement would occur between the JBLM YTC and Yakama Indian Reservation populations with or without the proposed DEIS Agency Preferred Alternative or any of the NNR Alternative options.

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TABLE 4.3-9 IMPACTS TO SPECIAL STATUS WILDLIFE AND IMPACT SUMMARY OF ALTERNATIVES

ALTERNATIVES	ESTIMATED NUMBER OF NEW TRANSMISSION LINE STRUCTURES		ACRES OF DIRECT DISTURBANCE TO HABITAT	SPECIAL STATUS RESOURCES				MILES OF ROUTE SUBJECT TO EACH IMPACT LEVEL			
	TOTAL NUMBER OF NEW STRUCTURES	TOTAL NUMBER OF NEW STRUCTURES GREATER THAN 0.25 MILE FROM AN EXISTING TRANSMISSION LINE		MILES OF WILDLIFE HABITAT (MODERATE OR HIGH SENSITIVITY) CROSSED[1]	DOCUMENTED SPECIAL STATUS SPECIES RAPTOR NEST WITHIN 1 MILE	DOCUMENTED SPECIAL STATUS SPECIES POINT WITHIN 0.5 MILE	MILES OF PRIORITY SPECIES REGIONAL AREAS CROSSED	HIGH	MODERATE	LOW	NO IDENTIFIABLE
NNR Alternative – Overhead Design Option NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.3 miles	328	50	204	30.7	10.4	4.9	5.5	0	35.5	4.8	0
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.7 miles	383	135	266	30.1	9.0	4.9	6.0	0	36.6	11.1	0
NNR Alternative -Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.3 miles	251	50	260	30.7	10.4	4.9	5.5	0	35.5	4.8	0
DEIS Agency Preferred Alternative 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	499	339	330	26.1	20.1	8.2	7.2	0	40.1	26.2	0

Notes: [1]High sensitivity habitat included riparian, perennial streams/marsh; sagebrush/perennial grassland; sagebrush/annual grassland; and tree (aspen and poplar).

TABLE 4.3-10 SUMMARY OF IMPACTS TO SAGE-GROUSE BY ALTERNATIVE

ALTERNATIVES	MILES WITHIN PAC	DISTURBANCE TO SAGE-GROUSE HABITAT (ACRES)[1]					ESTIMATED NUMBER OF NEW TRANSMISSION LINE STRUCTURES		SAGE-GROUSE POPULATION RANGE				ACTIVE OR INACTIVE LEKS (NUMBER)				PHS HISTORIC LEKS (NUMBER)				DIRECT IMPACT LEVELS (MILES)[3]		
									ACRES WTIHIN ROW		ACRES WITHIN 4 MILES (195,248 ACRES TOTAL)												
		SUITABLE	MARGINAL	UNSUITABLE	TOTAL DISTURBANCE	TOTAL DISTURBANCE WITHIN THE PAC	TOTAL NUMBER OF NEW STRUCTURES	TOTAL NUMBER OF NEW STRUCTURES GREATER THAN 0.25 MILE FROM AN EXISTING TRANSMISSION LINE	0-80% CORE POPULATION RANGE	95% POPULATION RANGE	0-80% CORE POPULATION RANGE	95% POPULATION RANGE	WITHIN 0-0.6 MILE	WITHIN 0-2 MILES	WITHIN 0-3 MILES	WITHIN 0-4 MILES (SDEIS ONLY)[2]	WITHIN 0-0.6 MILE	WITHIN 0-2 MILES	WITHIN 0-3 MILES	WITHIN 0-4 MILES (SDEIS ONLY)[2]	HIGH	MODERATE	LOW
NNR Alternative Overhead Design Option NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.3 miles	38.2	85.3	54	64.7	204	193.3	328	50	0	0	0	15,430 (8%)	0	0	0	2	3	6	8	14	0	23.9	16.4
NNR Alternative MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.7 miles	46.0	120.1	60.1	80	265.8	255.3	383	135	0	0	0	15,271 (8%)	0	0	0	2	1	5	8	14	0	28.5	19.2
NNR Alternative with Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.3 miles	38.2	115.1	69	81.7	260.2	249.5	251	50	0	0	0	15,430 (8%)	0	0	0	2	3	6	8	14	0	23.9	16.4
DEIS Agency Preferred Alternative 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	42.9	144.3	26.8	158.4	329.5	*	499	339	140.2	255.7	39,312	86,395 (44%)	0	2	5	*	1	2	4	*	0	28.7	37.6

Notes: PHS = Priority Habitats and Species [1]Sage-grouse habitat was assessed using the sage-grouse habitat survey data and, in locations not surveyed, through aerial interpretation using adjacent survey information, 2001 JBLM YTC vegetation data, GAP data and fire history data. Habitat was considered suitable if suitable breeding, late brood-rearing or winter habitat was present. [2]The DEIS assessed leks out to three miles. Based on input from wildlife management agencies, the SDEIS analysis was expanded to include leks out to four miles. [3] Impact levels are presented in linear miles. Impacts may be reduced further through site specific engineering and design in conjunction with mitigation. Items with an * indicate information that was not included in the DEIS, but will be added into the FEIS.

4.4 LAND USE

Land use impacts would occur as a result of the construction, operation, and maintenance of the Project and would be caused by the displacement or alteration of existing uses.

4.4.1 Methods and Impact Types

4.4.1.1 Analysis Methods

The methodology used to assess impacts on land use included:

- Identifying the types of Project effects on land uses;
- Evaluating the sensitivity of specific land uses to change;
- Developing criteria for assessing impact intensity;
- Assessing impacts based on project design features (PDF);
- Introducing specific mitigation measures in specific locations to reduce impacts;
- Evaluating residual impacts; and
- Comparing alternatives based on land use impacts.

4.4.1.2 Impact Criteria

Resource sensitivity was considered in determining how susceptible to change land uses would be from the introduction of the proposed Project. Land use impacts were based on sensitivity and potential change that could occur to land uses as a result of Project construction.

Sensitivity is a measure of the probable responses that a land use would have to the direct and indirect impacts associated with the construction and operation of the proposed Project. Refer to Table 4.4-1 for land use resource sensitivity.

Potential change describes the physical, operational, or social changes that could potentially occur to a land use. Changes are brought about by:

- Acquisition of land or property rights to accommodate the Project;
- Installing the Project;
- The physical presence and operation of the Project; and
- Managing the right-of-way (ROW) and maintaining the Project.

The potential for change from introducing the Project differs from one land use category to another with respect to what might be altered and to what extent. This potential for change is predicted by evaluating the environmental conditions, the Project description, and PDFs.

4.4.1.3 Impact Types

Physical impacts to land uses were assessed along the centerline of each of the route segments for the inventoried land use categories. The impact types identified for land uses along the centerlines of alternative route segments include any impact that:

- Displaces, alters, or otherwise physically affects any existing, developing, or planned residential, commercial, industrial, governmental, or institutional use or activity.
- Displaces, alters, or otherwise physically affects any existing agricultural use or activity.
- Alters or otherwise physically affects any established, designated or planned park, recreation, preservation, or educational use area or activity.

- Affects applicable comprehensive and regional plans and/or approved, adopted, or officially stated policies, goals, or operations of communities or governmental agencies.

The impacts of the Project on land jurisdictions primarily involve land policies, land management plans, and permitting requirements of federal, state, and local agencies. The land jurisdictions mapped in the inventory were used to identify the potentially affected land management agencies and to quantify the land area potentially affected by the route segments (see Appendix A - Jurisdiction, Recreation and Special Management Areas).

The crossing or paralleling of existing utilities is a matter of technical coordination and realty agreements with the affected utilities. Impacts were not assessed for these situations.

TABLE 4.4-1 LAND USE RESOURCES SENSITIVITY CLASSIFICATION

LAND USE	SENSITIVITY
Agricultural Land (Dryland, Irrigated, Feedlots, etc.)	High
Residential	High
Recreation or Conservation	High
Military (Joint Base Lewis-McChord Yakima Training Center)	Moderate
Important Farmland - Prime/Unique/Statewide Importance (non-Agriculture)	Moderate
Conservation Reserve Program (CRP) Land (Known Land and Sections containing CRP land)	Moderate
Rangeland (U.S. Bureau of Land Management [BLM] /State Lease Lands)	Low
Undeveloped/Grazing/Vacant	Low

4.4.2 Impact Levels

Potential impacts to land use resources were assessed along the assumed centerline of the proposed 230 kilovolt (kV) Project and access roads. The assumed centerline of the proposed Project for land use impact assessment is 125 feet wide (i.e., the proposed ROW width).

High
Impacts would be considered high where the Project would:

- Cause direct long term impacts and conflict with high sensitivity land uses;
- Physically conflict with the use of residences or agricultural operations such as the displacement of occupied residences or conflicts with center pivot irrigation structures or agricultural buildings in the long term;
- Create areas of non-habitable land in the long term where residential uses already exist or are permitted;
- Potentially affect military training maneuvers and operations in the long term; and/or
- Prevent the long term use of the land according to existing land management plans.

Moderate
Impacts would be considered moderate where the Project would:

- Adversely affect properties by eliminating or limiting the potential for development to occur in the long term around or underneath the transmission lines and/or transmission structures;
- Cause indirect, long term impacts to high or moderate sensitivity land uses;
- Cause direct, long-term impacts to Important Farmland not currently under cultivation;
- Cause direct, long-term impacts to known Conservation Reserve Program (CRP) lands or sections containing CRP land;

- Occupy military land, but does not substantially alter training operations;
- Alter the use of the land according to existing land management plans; and/or
- Cause short-term impacts to agricultural operations or land.

Low
Impacts would be considered low where the Project would:

- Create short-term disturbances during construction to any land use sensitivity; and/or
- Be compatible with low sensitivity land uses.

No impact would occur where land uses would be able to continue as they currently exist. Private land that is not residential or agricultural is assumed to potentially be used for grazing and low impacts may occur. Public lands that are not leased for grazing, agriculture, or other uses would be able to continue as they currently exist and the Project would not result in a change to the use.

4.4.3 Impacts Common to All Route Segments and Design Options

Land uses within or near the alternative route segments would be temporarily disrupted by construction activities such as noise, dust, and traffic. Construction of the Project would temporarily disturb these areas as a result of heavy construction equipment on access roads while moving building materials to structure sites and returning to construction staging areas.

Construction of the route would involve installation of new transmission structures. Installation of the new transmission structures would temporarily disturb land use/cover at each H-frame or single pole location. Established land uses at the proposed H-frame or single pole locations would be temporarily displaced during construction.

Short-term land disturbances would result in a moderate impact in areas where developed land uses occur within or adjacent to the proposed ROW.

After the Project has been constructed, land uses that are compatible with safety regulations would be permitted in and adjacent to the ROW. Existing land uses such as agriculture and grazing are generally permitted within the ROW. Incompatible land uses within the ROW include construction and maintenance of inhabited dwellings and any use requiring changes in surface elevation that would affect electrical clearances of existing or planned facilities.

Land uses that comply with local regulations would generally be permitted adjacent to the ROW. Compatible uses of the ROW on either federal or state lands would have to be approved by the applicable federal or state land management agency. Permission to use the ROW on private lands would be determined by Pacific Power in consultation with the landowner.

The transmission line Columbia River crossing structures could potentially affect aviation activities by modifying aircraft operations and air navigation. With regard to aviation safety, Subpart B, Section 77.13 of the guidelines of the Federal Aviation Administration (FAA) indicate that construction of a project could potentially have a significant impact on aviation activities if a structure or any equipment is positioned such that it would be more than 200 feet above the ground or if an object would penetrate the imaginary surface extending outward and upward at a ratio of 100 to 1 from a public or military airport runway out to a horizontal distance of 20,000 feet (approximately 3.78 miles). If either of these conditions is met, an applicant is required to submit FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area for review and approval of the Project.

The Project will comply with all appropriate regulations of the FAA, and Form 7460-1 would be required of Pacific Power pursuant to FAA Regulations, Part 77. Final locations of the crossing structures, and structure heights, including the transmission lines, conductors, and construction related equipment or facilities that might impact air navigation would be submitted to the FAA for the Project. The Washington State Department of Transportation (WSDOT), Aviation Division will also be contacted.

Refer to Section 4.7-Transportation for WSDOT permitting and approvals necessary to cross Interstate (I) 82.

4.4.4 Impacts Specific to Route Segments and Design Options

Long-term and short-term impacts to land use were assessed for each route segment and are presented in Table 4.4-2. Impacts for each route segment are discussed in detail in the following sections.

TABLE 4.4-2 LONG TERM PROJECT IMPACTS ON LAND USE BY ROUTE SEGMENT (MILES)

ROUTE SEGMENT	IMPACT LEVEL			
	NO IMPACT	LOW	MODERATE	HIGH
NNR-1 2.4 miles	0	0	2.4	0
NNR-2 5.0 miles	0	1.5	3.5	0
NNR-3 9.3 miles	0	4.7	4.6	0
NNR-4o 4.5 mile	0	1.1	3.4	0
NNR-4u 4.5 mile	0	1.1	3.4	0
NNR-5 1.8 miles	0	0	1.8	0
NNR-6o 6.4 miles	0	0	6.4	0
NNR-6u 6.4 miles	0	0	6.4	0
NNR-7 8.2 miles	0	0	8.2	0
NNR-8 2.7 mile	0.4	2.2	0.1	0
MR-1 11.9 mile	0	3.1	8.8	0

4.4.4.1 Route Segment NNR-1

No direct or high impacts are anticipated in this route segment. During ROW acquisition and detailed design, the centerline of this route segment would be adjusted to avoid the need for removal of dwellings or related structures from the Project ROW. Therefore, with prudent adjustments to the location of the route, ROW and structure placement no direct impacts to existing dwellings or related structures are foreseen. Moderate impacts would result from long-term elimination or limitation of any structure placement or development under the transmission line within the ROW.

Overall impacts would be moderate because the Project would eliminate the potential for further development (see Table 4.4-3). However, most of this route is located within or adjacent to the ROW of Sage Trail Road and single pole structures would be used. Higher impacts would occur between mile posts (MP) 0.2 and 2.1 where the ROW would traverse residential parcels and heavy angle structures would be utilized affecting a higher proportion of undeveloped residential land with the necessary guy wires and additional wood pole structures. However impacts would remain moderate.

This route segment also crosses land classified as Farmland of Unique Importance, causing 2.4 miles of long-term disturbance to these lands. However, this is currently non-agricultural land, so impacts would be moderate because no farmland would be converted to non-agricultural uses.

The Project would cross private land in Yakima County. The Project would be in compliance with the Yakima County Comprehensive Plan and all applicable development regulations. The Project would be subject to the Yakima County Code (YCC) 15.50 – Linear Transmission Facilities, and would require a Type II review or a Type II review after review by the Administrative Official should additional public input is deemed necessary.

Moderate impacts would occur for 2.4 miles of this route segment.

4.4.4.2 Route Segment NNR-2

Route Segment NNR-2 would cross approximately 5.0 miles of the perimeter of the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) resulting in long-term impacts. The extreme western perimeter of Training Area 13 would be crossed between MP 0.0 - 1.1. Military operations in this area would be minimally affected because the Project would be on the perimeter of training activity areas and transmission line structures would be located adjacent to an existing fire break road. Impacts would be moderate because the area available for training activities would be reduced, although activities could continue to occur. Moderate impacts would also occur on the parade field area of the route segment (MP 2.5 - 2.7) because a portion of the field would be removed from use. This route segment also crosses land classified as Farmland of Statewide Importance (1.3 miles) and Prime Farmland (2.5 miles), causing 3.7 miles of long-term disturbance. However, this is non-agricultural land and impacts would be moderate.

The Project would be in compliance with the Final Cultural and Natural Resources Management Plan for the JBLM YTC.

Overall, moderate impacts would occur for 3.5 miles and low impacts would occur for 1.5 miles of this route segment.

4.4.4.3 Route Segment NNR-3

Route segment NNR-3 crosses Bureau of Land Management (BLM), private, and WSDOT ROW land. The existing land use along this route segment is related to transportation facilities, special management, and recreation. Transportation related land use is associated with I-82; the route segment crosses I-82 and adjacent to Selah Creek Rest Area. Special management and recreation areas are managed by the BLM or Washington State, and include Selah Cliffs Natural Area Preserve (NAP), Yakima Cliffs/Umtanum Ridge Area of Critical Environmental Concern (ACEC) located between MP 3.3 - 4.3, Yakima Cliffs/Umtanum Ridge ACEC proposed expansion located between MPs 1.5 - 3.3, and the Selah Butte Watchable Wildflower Viewing Area. Refer to Section 4-7 for impacts and necessary WSDOT approvals to cross I-82. The land use for a large portion of the route segment is undeveloped rangeland and BLM grazing allotments. There are two Washington State Recreation and Conservation Office (RCO) funded projects within the Project area: Selah Cliffs NAP Grant # 06-1827 and Selah Cliffs Grant #93-838. The Selah Cliffs Grant #93-838 RCO site is not encumbered by development restrictions because no land has been acquired with grant money. Selah Cliffs NAP Grant # 06-1827 is not crossed by the Project. This route segment would also cross the Reclamation proposed Wymer Dam reservoir between MPs 8.3 - 8.6 and 9.1 - 9.2.

This route segment also crosses land classified as Farmland of Statewide Importance (0.8 mile) and Prime Farmland (0.1 mile), causing 0.9 mile of long-term disturbance. However, this is non-agricultural land, so impacts would be moderate.

Livestock grazing impacts would be low and areas disturbed by construction would be minimal. Following restoration, areas removed from use for the life of the Project would include the small areas at the structure footings and/or guy anchors, as well as new access roads. Route Segment NNR-3 also crosses BLM grazing leases, which would result in moderate impacts for 3.9 miles.

The Project would cross private land in Yakima and Kittitas Counties. The Project would be in compliance with the Yakima County Comprehensive Plan (2007) and all applicable development regulations, the Kittitas County Comprehensive Plan (2013), and the BLM Spokane District 1985/1987 RMP and 1992 RMP Amendment/Record of Decision (ROD). The Project would be subject to the YCC 15.50 – Linear Transmission Facilities, and would require a Type II review or a Type II review after review by the Administrative Official should additional public input is deemed necessary. In Kittitas County, a Conditional Use Permit would be necessary.

Overall, this route segment would create 4.6 mile of moderate impact and 4.7 miles of low impact.

4.4.4.4 Route Segment NNR-4o/4u

<u>Overhead Design Option</u>

Route Segment NNR-4o would cross approximately 3.2 miles of the perimeter of the JBLM YTC resulting in long-term impacts. Training Area 16 would be crossed between MP 1.2 - 4.5. Military operations in this area would be minimally affected because the Project would be on the perimeter of training activity areas. Impacts would be moderate because the area available for training activities would be reduced, although activities could continue to occur. The existing land use along this route segment is also related to transportation facilities associated with I-82 (the route segment crosses over I-82). Refer to Section 4-7 for impacts and necessary WSDOT approvals to cross I-82.

This route segment also crosses land classified as Farmland of Statewide Importance (0.2 mile) and Prime Farmland (0.9 mile), causing 1.1 miles of long-term disturbance. However, this is non-agricultural land, so impacts would be moderate.

The Project would be in compliance with the Final Cultural and Natural Resources Management Plan for the JBLM YTC.

Livestock grazing impacts would be low and areas disturbed by construction would be minimal. Following restoration, areas removed from use for the life of the Project would include the small areas at the structure footings and/or guy anchors, as well as new access roads.

The route segment is located entirely in Kittitas County. Private land is crossed between MP 0.0 - 1.3. The Project would be in compliance with the Kittitas County Comprehensive Plan (2013). In Kittitas County, a Conditional Use Permit would be necessary.

Overall, moderate impacts would occur for 3.4 miles and low impacts would occur for 1.1 miles of this route segment.

Underground Design Option

Route Segment NNR-4u would cross approximately 3.2 miles of the JBLM YTC in Training Area 16, resulting in long-term impacts. Military operations in this area would be minimally affected because the Project would be on the perimeter of training activity areas. Impacts would be moderate because the area available for training activities would be reduced, although activities could continue to occur. The existing land use along this route segment is also related to transportation facilities associated with I-82 (the route segment crosses under I-82). Refer to Section 4-7 for impacts and necessary WSDOT approvals to cross I-82.

This route segment also crosses land classified as Farmland of Statewide Importance (0.2 mile) and Prime Farmland (0.9 mile), causing 1.1 miles of long-term disturbance. However, this is non-agricultural land, so impacts would be moderate.

The Project would be in compliance with the Final Cultural and Natural Resources Management Plan for the JBLM YTC.

Livestock grazing impacts would be low and areas disturbed by construction would be minimal. Following construction the underground ROW would be kept clear of any structures and the only compatible use would consist of grazing activities. The cleared ROW is to ensure that the underground duct bank and splice vaults are accessible for maintenance and transmission cable repairs for the life of the Project. The route segment is located entirely in Kittitas County. Private land is crossed between MP 0.0 - 1.2. The Project would be in compliance with the Kittitas County Comprehensive Plan (2013). In Kittitas County, a Conditional Use Permit would be necessary.

Overall, moderate impacts would occur for 3.4 miles and low impacts would occur for 1.1 miles of this route segment.

4.4.4.5 Route Segment NNR-5

Route Segment NNR-5 would cross approximately 1.8 miles of the JBLM YTC resulting in long-term impacts. This route segment would be located within Training Area 16 and Training Area 1. Training Area 16 is crossed between MP 0.0 and 1.4 and Training Area 1 is crossed between MP 1.4 - 1.8. Military operations in this area would be minimally affected because the Project would be on the perimeter of training activity areas and transmission line structures would be located adjacent to an existing fire break road. Impacts would be moderate because the area available for training activities would be reduced, although activities could continue to occur.

This route segment also crosses land classified as Farmland of Statewide Importance (0.6 mile) and Prime Farmland (0.1 mile), causing 0.7 mile of long-term disturbance. However, this is non-agricultural land, so impacts would be moderate.

The Project would be in compliance with the Final Cultural and Natural Resources Management Plan for the JBLM YTC.

Overall, moderate impacts would occur for 1.8 miles of this route segment.

4.4.4.6 Route Segment NNR-6o/6u

Overhead Design Option

Route Segment NNR-6o would cross approximately 6.4 miles of the JBLM YTC resulting in long-term impacts. Training Area 1 would be crossed between MP 0.0 - 2.2. Training Area 3 would also be crossed between MP 2.2 - 6.4. Military operations in this area would be minimally affected because the Project would be on the perimeter of training activity areas. Impacts would be moderate because the area available for training activities would be reduced, although activities could continue to occur.

This route segment also crosses land classified as Farmland of Statewide Importance (0.3 mile), causing 0.3 mile of long-term disturbance. However, this is non-agricultural land, so impacts would be moderate.

The Project would be in compliance with the Final Cultural and Natural Resources Management Plan for the JBLM YTC.

Overall, moderate impacts would occur for 6.4 miles of this route segment.

Underground Design Option

Route Segment NNR-6u would cross approximately 6.4 miles of the JBLM YTC resulting in long-term impacts. Training Area 1 would be crossed between MP 0.0 - 2.2. Training Area 3 would also be crossed between MP 2.2 - 6.4. Military operations in this area would be minimally affected because the underground alignment would be located adjacent and parallel to the existing Pomona-Wanapum 230 kV transmission line. Impacts would be moderate because the area available for training activities would be reduced, although activities could continue to occur.

This route segment also crosses land classified as Farmland of Statewide Importance (0.3 mile), causing 0.3 mile of long-term disturbance. However, this is non-agricultural land, so impacts would be moderate.

The Project would be in compliance with the Final Cultural and Natural Resources Management Plan for the JBLM YTC.

Overall, moderate impacts would occur for 6.4 miles of this route segment.

4.4.4.7 Route Segment NNR-7

Route Segment NNR-7 would cross approximately 8.2 miles of the JBLM YTC resulting in long-term impacts. Training Area 3 would be crossed between MP 0.0 - 8.2. Military operations in this area would be minimally affected because the Project would be on the perimeter of training activity areas and transmission line structures would be located adjacent to an existing fire break road. Impacts would be moderate because the area available for training activities would be reduced, although activities could continue to occur.

This route segment also crosses land classified as Farmland of Statewide Importance (1.6 miles), causing 0.3 mile of long-term disturbance. However, this is non-agricultural land, so impacts would be moderate.

The Project would be in compliance with the Final Cultural and Natural Resources Management Plan for the JBLM YTC.

Overall, moderate impacts would occur for 8.2 miles of this route segment.

4.4.4.8 Route Segment NNR-8

Jurisdiction crossed by this route is private, BLM, Grant County Public Utility District (PUD), and U.S. Bureau of Reclamation (Reclamation). Route Segment NNR-8 is located in Kittitas and Grant County (south of Wanapum Dam on the east side of the Columbia River). The route parallels the existing Bonneville Power Administration (BPA)/PacifiCorp utility corridor across the Columbia River south of the Wanapum Dam. The transmission line Columbia River crossing structures could potentially affect aviation activities by modifying aircraft operations and air navigation. There are two RCO funded projects within the Project area of this route segment: Wanapum S. P. Boat Launch Replacement Grant # 00-1519 and Wanapum Natural Area Preserve Grant # 08-1185, # 10-1474, and # 12-1182. These RCO sites are not encumbered by development restrictions because no land has been acquired with grant money. The Yakima Cliffs/Umtanum Ridge ACEC proposed expansion area is crossed by the route segment between MP 0.0 - 0.3. Please refer to Section 4.6 - Special Management Areas and Section 4.5 - Recreation. This route segment also crosses State Route (SR) 243. Refer to Section 4-7 for impacts and necessary WSDOT approvals to cross SR 243.

Potential impacts would also occur where the Project parallels and crosses the John Wayne Pioneer Trail thereby presenting a potential conflict. The existing ROW for the trail (railroad corridor) where the Project would be located within this corridor is 200 feet. A high impact would occur as a result of potential conversion of recreational land to non-recreational uses (transmission line structures). Please refer to Section 4.5 - Recreation.

Short-term impacts would occur along segments of Huntzinger Road and SR 243 during construction involving structure erection adjacent to the roadways and conductor stringing over the roadways which could temporarily affect traffic flow and result in a minor traffic delay. A Traffic Management Plan would be prepared detailing measures to ensure safe traffic flow along the roadways during construction. Please refer to Section 4.7 -Transportation. The Project would cause no land use impacts over the Columbia River.

Livestock grazing occurs on both federal and private lands with the Project causing low impacts in these areas.

Overall, moderate impacts would occur for 0.1 mile, low impacts would occur for 2.2 miles, and no impacts would occur for 0.4 mile of this route segment.

4.4.4.9 Route Segment MR-1

Route Segment MR-1 would cross approximately 6.7 miles of military land within the JBLM YTC Training Area 16 and impacts would be long-term. Military operations in this area would be minimally affected because the Project would not be in an area of active military training. Impacts would be moderate because military training activities could continue to occur in Training Area 16. Impacts would be moderate because the area available for training activities would be reduced, although activities could continue to occur. This route segment also crosses I-82. Refer to Section 4-7 for impacts and necessary WSDOT approvals to cross I-82.

Non-agricultural Farmland of Statewide Importance would be affected by this route segment. Long-term, moderate impacts would occur to Farmland of Statewide Importance totaling 4.6 miles.

The Project would be in compliance with the Kittitas County Comprehensive Plan (2013). The Project would also be in compliance with the Final Cultural and Natural Resources Management Plan for the JBLM YTC. In Kittitas County, a Conditional Use Permit would be necessary.

Route Segment MR-1 also crosses WDNR grazing leases between MPs 0.3 - 1.8 and 2.4 - 2.8 which would result in moderate impacts.

Overall, moderate impacts would total 8.8 miles and low impacts would total 3.1 miles for this route segment.

4.4.5 Mitigation Measures

Mitigation measures have been identified to reduce, avoid, minimize, or rectify adverse impacts to land use resources. These mitigation measures were identified in the Draft Environmental Impact Statement (DEIS), but are not applicable to the Draft Environmental Impact Statement (SDEIS) route segments because they were specific to impacts on agricultural resources, which are not crossed by the New Northern Route (NNR) Alternative. For the NNR Alternative, the Project would utilize PDFs to minimize land use impacts; therefore no additional mitigation measures are proposed.

4.4.6 Impact Summary by Alternative

4.4.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to land use would occur.

4.4.6.2 Route Alternatives

Table 4.4-3 presents a summary of the long-term impacts for the NNR Alternative options and the DEIS Agency Preferred Alternatives and residual impact levels.

The NNR Alternative options would have greater impacts on residential land use. The DEIS Agency Preferred Alternative would have greater impacts on irrigated agriculture and dryland agriculture. The NNR Alternative - Underground Design Option and NNR Alternative - MR Subroute would have similar disturbance to JBLM YTC land while the DEIS Agency Preferred Alternative would have least disturbance to JBLM YTC land. The alternative with the most disturbance on state grazing or agricultural leased land would occur on the NNR Alternative - MR Subroute. The NNR Alternative, MR Subroute, and NNR Alternative - Underground Design Option would each have slightly greater impacts on BLM grazing leases. Overall, the greatest distance of high impacts on land use would occur for the DEIS Agency Preferred Alternative.

TABLE 4.4-3 LONG-TERM LAND USE DISTURBANCE AND ALTERNATIVE RESIDUAL IMPACT SUMMARY

ALTERNATIVE	LAND USE OR MANAGEMENT AREA (ACRES OF LONG-TERM DISTURBANCE)						RESIDUAL IMPACTS (MILES)			
	RESIDENTIAL	IRRIGATED AGRICULTURE	DRYLAND AGRICULTURE	MILITARY (JBLM YTC)	STATE GRAZING / IRRIGATED AGRICULTURE LEASE	BLM GRAZING LEASE	HIGH	MODERATE	LOW	NO IDENTIFIABLE
NNR Alternative - Overhead Design Option NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.4 miles	2.7	0	0	21.9	0	7.5	0	30.5	9.5	0.4
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.7 miles	2.7	0	0	39.6	4.2	7.5	0	35.8	11.5	0.4
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.4 miles	2.7	0	0	39.6	0	7.5	0	30.5	9.5	0.4

ALTERNATIVE	LAND USE OR MANAGEMENT AREA (ACRES OF LONG-TERM DISTURBANCE)						RESIDUAL IMPACTS (MILES)			
	RESIDENTIAL	IRRIGATED AGRICULTURE	DRYLAND AGRICULTURE	MILITARY (JBLM YTC)	STATE GRAZING / IRRIGATED AGRICULTURE LEASE	BLM GRAZING LEASE	HIGH	MODERATE	LOW	NO IDENTIFIABLE
DEIS AGENCY PREFERRED ALTERNATIVE 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	1.8	8.7	15.2	11.2	0.9	7.1	0.9	23.4	38.7	3.3

4.5 RECREATION

Impacts on recreation resources would be created as a result of the construction, operation, and maintenance of the Project and would be caused by the displacement or alteration of existing recreation land uses or activities.

4.5.1 Methods and Impact Types

4.5.1.1 Analysis Methods

The recreation impact methodology was similar to the analysis of the land use resources and included:

- Identifying the types of Project effects on recreation resources;
- Evaluating the sensitivity of specific recreational uses to change;
- Developing criteria for assessing impact intensity;
- Assessing impacts based on Project design features (PDF);
- Introducing mitigation measures in specific locations to reduce impacts;
- Evaluating residual impacts; and
- Comparing alternatives based on recreation impacts.

4.5.1.2 Impact Criteria

Resource sensitivity was considered in determining how susceptible to change recreational land uses would be to the introduction of the Project as described in Chapter 2. Impacts were based on sensitivity and impacts that could occur to recreational uses as a result of Project construction, operation, and maintenance.

Sensitivity is a measure of the probable responses that a recreational use or activity would have to the direct and indirect impacts associated with the construction, operation, and maintenance of the proposed Project. Refer to Table 4.5-1 for recreational resource sensitivity.

TABLE 4.5-1 RECREATION RESOURCE SENSITIVITY CLASSIFICATION

RECREATION RESOURCE	SENSITIVITY
Developed Recreation Facilities	High
Trails	High
Planned Recreation Facilities and Trails	Moderate
Public and Private Hunting Areas	Low
Dispersed Recreation Areas	Low

Potential change describes the physical, operational, or social changes that could potentially occur to a recreation use or activity. Changes are brought about by:

- Acquisition of land or property rights to accommodate the Project;
- Installing the Project;
- The physical presence and operation of the Project; and
- Managing the right-of-way (ROW) and maintaining the transmission line.

The potential for change from introducing the transmission line differs from one recreation use category to another with respect to what might be altered and to what extent. This potential for change is predicted by evaluating the environmental conditions, the Project description and Design Options, and PDFs.

4.5.1.3 Impact Types

Physical impacts to recreational uses were assessed along the centerline of each of the route segments for the inventoried recreational use categories. The impact types identified for recreation uses along the centerlines of alternative route segments are characteristically direct and long-term and include any impact that:

- Displaces, alters, or otherwise physically affects any existing, developing, or planned recreational use or activity; and
- Alters or otherwise physically affects any established, designated, or planned park, recreation, preservation, or educational use area or activity.

Visual impacts are typically an important aspect of the recreational experience, are discussed in Section 4.8 - Visual Resources, and are not part of the recreational resource impact analysis.

4.5.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Potential impacts to recreation resources were assessed along the assumed centerline of the proposed 230 kilovolt (kV) transmission line and access roads, with consideration of transmission Underground and Overhead Design Options. The assumed centerline for land use and recreation impact assessment is 125 feet wide (i.e., the proposed ROW width of the Overhead Design Option).

High
Impacts would be considered high where the Project would:

- Permanently preclude, alter, or eliminate developed recreational activities during and after construction of transmission lines or access roads.

Moderate
Impacts would be considered moderate where the Project would:

- Temporarily preclude or limit developed and dispersed recreation opportunities during peak use periods, during and after construction of transmission line, and/or access roads.

Low
Impacts would be considered low where the Project would:

- Temporarily preclude or limit developed and dispersed recreation opportunities during off-peak use periods during and after construction of transmission line and/or access roads; and/or
- Require minor relocation of dispersed recreational activities to equal or better locations during or after construction of transmission line and/or access roads.

No Identifiable
No identifiable impact would occur where recreation uses would be able to continue as they currently exist.

4.5.3 Impacts Common to All Route Segments and Design Options

The proposed Project would potentially affect hunting on public and private lands across most of the Route Segments. Aside from the 15,000-acre private Burbank Creek hunting area, specific hunting locations are not generally known.

During construction of either Design Option, noise from construction vehicles, equipment, and helicopters could displace wildlife to other areas not accessible for hunting. The displacement of wildlife from these areas would result in a diminished hunting experience, but may be offset by wildlife displacement to other hunting areas (see Section 4.3 - Wildlife and Special Status Species impacts). Construction impacts would be short-term and related to structure installation or duct bank trenching and installation, soil stockpiling, staging areas, access road improvements and new access road construction, splice vault installation, temporary pulling/tensioning sites, transition station construction, and other Overhead and Underground Design Option construction activities. Construction impacts are expected to be low.

4.5.4 Impacts Specific to Route Segments and Design Options

Long-term and short-term impacts to recreation resources were assessed for each route segment and are presented in Table 4.5-3. Impacts for each route segment are discussed in detail in the following sections.

4.5.4.1 Route Segment NNR-1

There are no recreation areas or significant recreational activities occurring along Route Segment NNR-1; therefore, no short-term or long-term impacts will occur as a result of the Project construction, operation, or maintenance. No identifiable impacts on recreation resources are expected to occur for the entire 2.4 miles of NNR-1.

4.5.4.2 Route Segment NNR-2

Route Segment NNR-2 is located in a restricted area of Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) and no recreation activities are allowed in this area of the base. No identifiable impacts on recreation resources are expected to occur for the entire 5.0 miles of NNR-2.

4.5.4.3 Route Segment NNR-3

The primary recreation activity occurring along Route Segment NNR-3 is related to the Selah Cliffs Natural Area Preserve (NAP) and activities associated with the BLM Selah Butte Watchable Wildflower Area. Other dispersed recreation activities (such as hunting) also occur.

Short-term or long-term impacts would not occur to recreation occurring within the Selah Cliffs NAP because the ROW would not cross the NAP or the access trail. The construction, operation, and maintenance of the Project would not preclude or inhibit the use of the NAP for recreational activities. Indirect short-term and long-term impacts on recreational user experience related to visual resources, dust, and noise may occur and are covered in the Sections 4.8, 4.13, and 4.16, respectively.

Similarly, impacts to the Selah Butte Watchable Wildflower Area would generally be indirect and related to recreational user experience (covered in the Resource Sections mentioned above). Construction and maintenance access to the area would occur from Selah Creek Drive (located at the south end of Yakima Canyon). Selah Butte Watchable Wildflower Area access could be affected during construction because the primary access road to the Project area and wildflower viewing area would also be used for construction and maintenance activities. However, access to the Project area would generally remain open and only minor delays may occur when construction vehicles are using the road to access the Project ROW. Maintenance vehicle traffic would not cause delays in access to the area. Impacts to the Selah Butte Watchable Wildflower Area would be low.

Low impacts would also potentially occur along Route Segment NNR-3 on dispersed public and private hunting uses by displacing these activities in the short term. Refer to impacts common to all route segments above (Section 4.5.3) for potential hunting impacts along Route Segment NNR-3. Low impacts are expected for these areas. Low impacts would also occur in areas where construction traffic would potentially disrupt access to hunting areas, such as along Burbank Creek Road. Access to these areas would remain open and only minor delays may occur when construction vehicles are using the road to access the Project ROW. Maintenance vehicle traffic would not cause delays in access to the area. Low impacts would occur for 8.4 miles and no identifiable impacts would occur for 0.9 mile of this Route Segment.

4.5.4.4 Route Segment NNR-4o/4u

Route Segment NNR-4 crosses private lands and JBLM YTC managed lands potentially open for dispersed hunting activities. Refer to impacts common to all route segments above (Section 4.5.3) for potential hunting-related recreation impacts on Route Segment NNR-4. Impacts would be similar for the Overhead and Underground Design Options and would be the result of temporary construction activities displacing dispersed hunting activities for a short duration. Low impacts are expected for this entire route segment for either the Overhead or Underground Design Option. Low impacts would occur along 4.3 miles and no identifiable impacts would occur along 0.2 mile of this Route Segment.

4.5.4.5 Route Segment NNR-5

Route Segment NNR-5 crosses JBLM YTC managed lands potentially open for dispersed hunting activities. Refer to impacts common to all route segments above (Section 4.5.3) for potential hunting related recreation impacts on Route Segment NNR-5. Low impacts would occur for the entire 1.8 miles of this Route Segment.

4.5.4.6 Route Segment NNR-6o/6u

Route Segment NNR-6 crosses JBLM YTC managed lands potentially open for dispersed hunting activities. Refer to impacts common to all route segments above (Section 4.5.3) for potential hunting related recreation impacts on Route Segment NNR-6. Impacts would be similar for the Overhead and Underground Design Options and would be the result of temporary construction activities displacing recreational activities for a short duration. Low impacts would occur for the entire 6.4 miles of this Route Segment.

4.5.4.7 Route Segment NNR-7

Route Segment NNR-7 crosses JBLM YTC managed lands potentially open for dispersed hunting activities. Refer to impacts common to all route segments above (Section 4.5.3) for potential hunting related recreation impacts along Route Segment NNR-7.

Impacts to the John Wayne Trail may also occur along this Route Segment. Indirect short- and long-term impacts on recreational user experience related to visual resources, dust, and noise may occur and are covered in the Sections 4.8, 4.13, and 4.16, respectively. However, recreation resources associated with the John Wayne Pioneer Trail may be directly impacted in the long term if the Project displaces or converts a portion of the trail to non-recreation uses. Potential impacts would occur where the Project crosses the John Wayne Pioneer Trail at the Route Segment’s east end where the Project would potentially conflict with the use of the trail during construction. Short-term impacts related to the closure of the trail during construction may potentially affect trail users. Implementation of Mitigation Measure REC-1 would mitigate impacts and assure that the Project would span the trail and conversion of trail use would not occur. Low impacts would occur for 8.2 miles of this Route Segment.

4.5.4.8 Route Segment NNR-8

As with Route Segment NNR-7, impacts to the John Wayne Trail may occur along this Route Segment. Indirect short- and long-term impacts on recreational user experience related to visual resources, dust, and noise may occur, and are covered in the Sections 4.8, 4.13, and 4.16, respectively. However, recreation resources associated with the John Wayne Pioneer Trail may be directly impacted in the long term if the Project displaces or converts a portion of the trail to non-recreation uses. Potential impacts would occur where the Project crosses the John Wayne Pioneer Trail, at the Route Segment's west end, where the Project would potentially conflict with the use of the trail during construction. Short-term impacts related to the closure of the trail during construction may potentially affect trail users. Implementation of Mitigation Measure REC-1 would mitigate impacts and assure that the project would span the trail, and conversion of trail use would not occur. Low impacts would occur for 0.4 mile and no identifiable impacts would occur for 2.7 miles of this Route Segment.

4.5.4.9 Route Segment MR-1

Route Segment MR-1 crosses private, state, and JBLM YTC managed lands potentially open for dispersed hunting activities. Refer to impacts common to all route segments above (Section 4.5.3) for potential hunting related recreation impacts along Route Segment MR-1. Low impacts would occur along 11.7 miles and no identifiable impacts would occur along 0.2 mile of this Route Segment.

4.5.5 Mitigation Measures

The following mitigation measure has been identified to reduce, avoid, minimize or rectify adverse impacts to recreation resources. This mitigation measure will be implemented where warranted and is anticipated to be effective, and is summarized in Table 4.5-2 below.

TABLE 4.5-2 PROJECT RECREATION IMPACT MITIGATION MEASURES

MITIGATION MEASURE	DESCRIPTION
REC-1: Modify Structure/ROW Location	Within the standard limits of structure design, single pole and H-frame structures will be located so as to span or avoid sensitive features, and to preserve recreational uses. Avoidance measures may include structure micro-siting, placing access roads and structures at the edge of park boundaries, spanning features, placing structures outside of use areas or the realigning of access roads and ROW centerline.

4.5.6 Residual Impacts

To minimize the effects of Project construction and operation conflicts with recreational activity displacement, mitigation measure REC-1: Modify Structure/ROW Location will be implemented in specific locations as necessary. Mitigation measure REC-1 will be effective at mitigating impacts by reducing the potential operational and maintenance interference and conversion of recreational areas to non-recreational uses. This mitigation measure will be implemented in the following locations:

- Route Segment NNR7: MP 8.1-8.2
- Route Segment NNR-8: MP 0.0-0.1

TABLE 4.5-3 RESIDUAL IMPACTS TO RECREATION BY ROUTE SEGMENT

ROUTE SEGMENT	RESIDUAL IMPACTS (MILES)			
	NO IDENTIFIABLE	LOW	MODERATE	HIGH
NNR-1 2.4 miles	2.4	0	0	0

ROUTE SEGMENT	RESIDUAL IMPACTS (MILES)			
	NO IDENTIFIABLE	LOW	MODERATE	HIGH
NNR-2 5.0 miles	5.0	0	0	0
NNR-3 9.3 miles	0.9	8.4	0	0
NNR-4o/4u 4.5 mile	0.2	4.3	0	0
NNR-5 1.8 miles	0	1.8	0	0
NNR-6o/6u 6.4 miles	0	6.4	0	0
NNR-7 8.2 miles	0	8.2	0	0
NNR-8 2.7 mile	2.3	0.4	0	0
MR-1 11.9 miles	0.2	11.7	0	0

4.5.7 Impact Summary by Alternative

4.5.7.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to recreation would occur.

4.5.7.2 Route Alternatives

Table 4.5-4 presents a summary of residual impacts for the New Northern Route (NNR) Alternative options following the implementation of mitigation measures. The Agency Preferred Route identified in the Draft Environmental Impact Statement (DEIS) is also included in the summary comparison.

The mileage of low impacts on recreation resources would be highest for the NNR Alternative - Manastash Ridge (MR) Subroute and the fewest for the DEIS Agency Preferred Route. The greatest mileage of no identifiable impacts to recreational uses would occur for the DEIS Agency Preferred Route.

TABLE 4.5-4 RECREATION RESOURCES RESIDUAL IMPACT SUMMARY BY ALTERNATIVE

ALTERNATIVE	RESIDUAL IMPACTS (MILES)			
	NO IDENTIFIABLE	LOW	MODERATE	HIGH
NNR Alternative -Overhead Design Option NNR-1, NNR-2, NNR-3, NNR-4 NNR-5, NNR-6, NNR-7, NNR-8 40.4 miles	10.9	29.5	0	0
NNR Alternative - MR Subroute- NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6, NNR-7, NNR-8 47.7 miles	10.8	36.9	0	0

ALTERNATIVE	RESIDUAL IMPACTS (MILES)			
	NO IDENTIFIABLE	LOW	MODERATE	HIGH
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.4 miles	10.9	29.5	0	0
DEIS AGENCY PREFERRED ALTERNATIVE 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	38.2	28.1	0	0

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4.6 SPECIAL MANAGEMENT AREAS

Impacts on special management areas (SMAs) could be created as a result of the construction, operation, and maintenance of the Project. Impacts would be caused by the displacement or alteration of existing uses or activities occurring within the SMA or conflict with legislative mandates, recognized values, and/or goals, objectives, standards, and policies of the management documents or agencies.

4.6.1 Methods and Impact Types

4.6.1.1 Analysis Methods

The SMA impact methodology used was similar to those used to analyze land use resources and included:

- Identifying the types of Project effects on established or proposed SMA resources;
- Evaluating the intent of the designation and any specific legislative or planning directives related to the current or proposed management of the established or proposed SMA;
- Developing criteria for assessing impact intensity;
- Assessing impacts considering the effectiveness of Project Design Features (PDF);
- Introducing specific mitigation measures in specific locations to reduce impacts if possible; and
- Evaluating residual impacts.

4.6.1.2 Impact Criteria

Impacts on SMAs were determined based on Project compatibility with the use of the area, legislative mandates, recognized values, and/or goals, objectives, standards and policies of the management documents or agencies.

The potential change describes the physical changes that could potentially occur to a SMA use or activity, or conflict with legislative mandates, recognized values, and/or goals, objectives, standards and policies. Changes could be brought about by:

- Acquisition of land or property rights to accommodate the Project;
- Constructing the Project;
- The physical presence and operation of the Project; and
- Managing the right-of-way (ROW) and maintaining the Project.

The potential for change from introducing transmission line facilities differs from one SMA to another with respect to what might be altered and to what extent. This potential for change is predicted by evaluating the environmental conditions, the Project description, and PDFs.

4.6.1.3 Impact Types

Physical impacts to recognized values were assessed along the centerline of each of the Route Segments for the inventoried established or proposed SMA. The impact types identified along the centerlines of alternative route segments are characteristically direct and long-term and include any impact that:

- Displaces, alters, or otherwise physically affects any existing, established, or planned SMA; and
- Conflicts with legislative mandates, recognized values, and/or goals, objectives, standards, and policies of the management documents or agencies.

4.6.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Potential impacts to SMA resources were assessed along the assumed centerline of the proposed 230 kilovolt (kV) transmission line and access roads. The assumed centerline of the proposed 230 kV transmission line for impact assessment is 125 feet wide (i.e., the proposed ROW width). The location of SMAs in the Project area and their proximity to the route segments are shown Appendix A - Jurisdiction, Recreation and Special Management Areas.

High
Impacts would be considered high where the Project would:

- Create long-term effects on the use of established SMAs or recognized values described in the applicable agency management documents.

Moderate
Impacts would be considered moderate where the Project would:

- Create short-term effects on the use of established SMAs or recognized values described in the applicable agency management documents.
- Create long-term effects on the use of proposed SMAs or recognized values described in the applicable agency management documents.

Low
Impacts would be considered low where the Project would:

- Not noticeably change or would cause only a minor change in the primary use, use patterns, function, status, and/or recognized/protected values of the established or proposed SMA and/or would generally be in conformance with goals, objectives, standards, and policies of the management documents or managing agency policies applicable to the SMA.
- Create short-term effects on the use of proposed SMAs or recognized values described in the applicable agency management documents.

No identifiable impact would occur where SMA management uses would be able to continue as they currently exist and/or be in complete compliance with the goals, objectives, standards, and policies of the management documents or managing agency policies applicable to the SMA, even with the presence of the transmission line or where no established SMA exists.

4.6.3 Impacts Common to All Route Segments and Design Options

The New Northern Route (NNR) Alternative without Manastash Ridge (MR) Subroute, NNR Alternative Underground Design Option, and the NNR with MR Subroute share route segments that cause impacts on SMAs: route segments NNR-2, NNR-3, and NNR-8 cross the Yakima Hills Important Bird Area (IBA), the existing and proposed Yakima River Cliffs and Umtanum Ridge, and Huntzinger Road Areas of Critical Environmental Concern, or the Washington State Department of Transportation (WSDOT) “environmental management buffer” located north of Selah Cliffs Rest Area. See route segment specific discussion below. Impacts would be identical for the Overhead and Underground Design Options (NNR-4o/4u and NNR-6o/6u).

4.6.4 Impacts Specific to Route Segments and Design Options

Long-term and short-term impacts to SMA resources were assessed for each route segment and are presented in Table 4.5-2. Impacts for each route segment are discussed in detail in the following sections.

4.6.4.1 Route Segment NNR-1

There are no SMAs associated with Route Segment NNR-1 and no impacts would occur for 2.4 miles of this route segment.

4.6.4.2 Route Segment NNR-2

Low impacts for 5.0 miles on the Yakima Hills IBA will occur as a result of the Project because there are no specific management requirements in place as part of the IBA status on Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). JBLM YTC is recognized as an IBA based on the presence of greater sage-grouse habitat. Approximately 3.7 miles of the 5.0 mile Route Segment crosses the highly developed cantonment area of JBLM YTC that does not provide greater sage-grouse habitat. The general goal of the IBA program is to identify the most essential areas for birds, monitor those sites for changes to birds and habitat, and work with land owners and managers to conserve these areas for long-term protection. The construction, operation, and maintenance of the transmission line would generally not conflict with this goal. However, specific biological impacts to greater sage-grouse are detailed in Section 4.3 - Wildlife and Special Status Wildlife Species.

4.6.4.3 Route Segment NNR-3

This Route Segment crosses the established and proposed expansion area of the Yakima River Cliffs and Umtanum Ridge Areas of Critical Environmental Concern (ACEC). The established and proposed areas occupied by the ACEC possess qualities that make it special with regards to vegetation resources (basalt daisy [*Erigeron basalticus*],Hoover's desert-parsley [*Lomatium tuberosum*]), and pauper's milkvetch (Astragalus misellus var. pauper). Moderate impacts to these values and the ACEC would occur in the short-term due to potential relocation of plants that cannot be avoided during the construction of the Project. With the implementation of PDFs and the assumption that potential occurrences would be spanned and avoided, Project construction, operation, and maintenance activities could cause some change or stress to plant populations, but will not contribute a trend toward a change in Agency (Bureau of Land Management [BLM] or state) listing status. Therefore, short-term effects on these values may occur to established or proposed ACECs, causing moderate or low impacts, respectively.

About 0.7 mile of this Route Segment crosses lands recognized by WSDOT as an "environmental management buffer" managed primarily by WSDOT for the protection of basalt daisy. No specific goals, objectives, standards, and policies are in place for the management of this or any other resource, but the area has recognized value for habitat (WSDOT 2014). As required by WSDOT, preconstruction surveys will occur to protect the resource and PDFs will be implemented as part of the Project. These PDFs include: minimize disturbance to vegetation; minimizing the blading of native plant communities during construction, operation, and maintenance, consistent with safe construction practices; utilizing existing public roads to the extent possible; and reseeding disturbed areas with certified weed-free native or other acceptable species as approved by the appropriate land management agency. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs. Because of the implementation of these PDFs and because the environmental management buffer is a non-regulatory designation with no specific management policies, impacts on the area will be low.

4.6.4.4 Route Segment NNR-4o/4u

No identified impacts will occur along the private and WSDOT managed portion of this Route Segment. Low impacts would occur on the Yakima Hills IBA as a result of the Project because there are no specific management requirements in place as part of the IBA status on JBLM YTC. The construction, operation and maintenance of either the Overhead Design Option or the Underground Design Option of the transmission line would generally not conflict with the goals of the IBA program. However, specific biological impacts to greater sage-grouse will occur as a result of the implantation of either Design Option and are detailed in Section 4.3 Wildlife and Special Status Wildlife Species.

4.6.4.5 Route Segment NNR-5

There are no SMAs associated with Route Segment NNR-5 and no impacts would occur.

4.6.4.6 Route Segment NNR-6o/6u

There are no SMAs associated with Route Segment NNR-6 and no impacts would occur.

4.6.4.7 Route Segment NNR-7

There are no SMAs associated with Route Segment NNR-6 and no impacts would occur.

4.6.4.8 Route Segment NNR-8

This Route Segment crosses the proposed expansion area of the Yakima River Cliffs and Umtanum Ridge, and Huntzinger Road ACECs. Moderate impacts to ACEC values (as previously described) would occur in the short-term due to potential relocation of plants that cannot be avoided during the construction of the Project (see Section 4.3.3 and 4.3.4-4). With the implementation of PDFs and the assumption that potential occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to plant populations, but will not contribute a trend toward a change in Agency (BLM or state) listing status. Therefore, short-term effects on these values may occur to established or proposed ACECs, causing moderate or low impacts, respectively.

4.6.4.9 Route Segment MR-1

There are no SMAs associated with Route Segment MR-1 and no impacts would occur.

4.6.5 Mitigation Measures

The PDFs described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

4.6.6 Residual Impacts

Residual impacts are identical to the impacts described in Sections 4.6.4 because no additional mitigation measures are proposed for SMAs.

4.6.7 Impact Summary by Alternative

4.6.7.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to SMAs would occur.

4.6.7.2 Route Alternatives

Impacts would be identical for the NNR Alternative options, with low impacts occurring for 6.9 miles and moderate impacts for 1.3 miles, and no impacts would occur for the remaining portions of each alternative. Low impacts for 12.6 miles of the DEIS Agency Preferred Route would occur.

4.7 TRANSPORTATION

Transportation impacts could be created as a result of the construction, operation, and maintenance of the Project. The focus of the analysis was on both the potential closure of travel lanes, the direct effects of closures/blockages on other facilities, and physical impacts on infrastructure.

4.7.1 Methods and Impact Types

4.7.1.1 Analysis Methods

Sensitivity ratings were developed for transportation resources that could be impacted by the Project. Sensitivity is defined as a measure of probable response of a resource to direct and indirect impacts associated with the construction, operation, and maintenance of a transmission line. Sensitivity ratings were assigned to transportation resources within the Project area. These ratings were based upon a relative evaluation of the resource’s importance and the impact potential that the construction and maintenance of the transmission line would have upon transportation resources for the short-term (construction period) and long-term (operations and maintenance) durations of the Project. The determinations of sensitivity levels included consideration of:

- Roadway Classification
- Closures
- Present and Future Uses
- Traffic Levels
- Access

Using the framework defined above, the transportation network crossed by the route segments was analyzed and assigned a relative sensitivity rating for potential impacts within the Project study area. Sensitivity ratings were categorized as high, moderate, or low. Table 4.7-1 summarizes transportation resource sensitivity in the Project area.

TABLE 4.7-1 TRANSPORTATION RESOURCE SENSITIVITY CLASSIFICATION

TRANSPORTATION RESOURCE	SENSITIVITY
Interstate and state highways	High
County and local roads	Moderate
U.S. Bureau of Land Management (BLM) primary access roads (gravel)	Low
BLM two-track secondary roads (dirt)	Low
Private roads	Low

4.7.1.2 Impact Criteria

Impacts on transportation resources were determined based on duration of impact, type of impact (function and operation or physical), existing traffic levels and traffic level increases based on the Project requirements, potential access impacts, and future use considerations.

4.7.1.3 Impact Types

A transmission line is inherently more likely to affect transportation facilities during construction than during operation because there is typically only a minimal amount of surface activity to operate a transmission line, whether it is an overhead line or an underground line, after construction is completed.

Direct and indirect impacts could include increases in traffic, detours along some roads, and disrupted access to driveways. Construction of the transmission line is not expected to cause major traffic delays or road closures. Minor traffic delays or interference with the highway system would most likely result from construction activities. Transmission line construction would not require temporary closure of the main highways (Interstate [I] 82 and State Route [SR] 243). Users of smaller roads may experience minor delays.

The Underground Design Option route segments are located in areas without extensive public transportation infrastructure, except for the I-82 crossing, which would be spanned by an overhead line between two overhead to underground transition stations (see Section 2.4.5.1) on either side of the highway. Transportation within JBLM YTC would be disrupted and road closures would occur where the Underground Design Option crosses the internal road network servicing the training areas.

Impacts associated with the proposed Project would be short-term and related to the movement of personnel and equipment during construction of the transmission line. Traffic associated with operations would involve a limited number of vehicle trips during routine inspection and maintenance activities. Transmission line inspection and maintenance traffic would occur infrequently and would not involve large numbers of vehicles or workers.

The transportation impact types would consist of the following:

- Short-term impacts types would be created when:
    - Construction would cause temporary lane closures that disrupt traffic flow;
    - Construction would temporarily disrupt the operation of emergency service providers;
    - Construction vehicles would cause physical damage to roads; and/or
    - Construction would generate additional traffic on regional and local roadways.

- Long-term operation impacts would be created when:
    - Operation of the transmission line could interfere with aviation safety.

4.7.2 Impact Levels

Transportation impact levels were defined as follows:

High
- Create long-term effects on the use of roads that requires modification of traffic patterns;
- Affect aviation safety and/or air traffic operations;
- Create long-term alterations of access to agricultural areas;
- Restrict emergency access to developed areas;
- Cause damage to state highways or county roads; and/or
- Halt or impair normal use of state highways and county roads for considerable periods each day during Project construction.

Moderate
- Cause some minor damage to state highways and county roads; and/or
- Halt or impair normal use of state highways and county roads for relatively short periods during Project construction.

Low
- No damage to state highways or county roads; and/or
- Halt or impair normal use of state highways and county roads for only brief periods during Project construction.

4.7.3 Impacts Common to All Route Segments and Design Options

Short-term construction impacts would include increased traffic levels on roadways used to transport equipment, materials and personnel to construction areas and potential damage to existing state, county and local roadways, traffic delays as a result of construction vehicles entering and exiting roads in the area, improvements to existing access roads, and construction of new temporary access roads.

Construction equipment, materials, and personnel would be transported to the Project area using existing and new access roads, and county, state and private roads. Construction activity and movement of heavy equipment would be short-term. Equipment and materials delivery to worksites would generally occur during normal, daytime construction hours. The anticipated transmission line construction workforce and equipment are detailed in Section 2.4.3.14.

Project construction activities would not require major road closures during construction, such as at the I-82 or SR 243 crossings; however, lane closures may occur. Minor private and public roads, such as Sage Trail Road, Shotgun Road, Firing Center Road, Burbank Creek Road, and Huntzinger Road may potentially be closed for short periods of time during construction. The Traffic Management Plan which would be developed would include a detour plan if closures are necessary. Construction vehicles would temporarily increase traffic and could lead to short-term traffic delays on existing roads used to access the Project area. The primary transportation corridors in the Project area (I-82 and SR 243) would be used for the duration of the construction phase of the Project (six to nine months).

The interstate and state controlled access highways would be used to transport construction materials and workers into the Project area from labor and material source locations. The use of county roads for construction would be limited to only those roads that are necessary for access to the Project right-of-way (ROW). Traffic delays are likely to occur intermittently in localized areas and only where necessary during construction. Traffic would be rerouted if possible to minimize traffic flow disruption. As detailed in Chapter 2 (Section 2.5.4), Project Design Features (PDFs) would be implemented to reduce impacts on transportation resources, including the development of a Traffic Management Plan, submitted to and approved by Washington State Department of Transportation (WSDOT). Therefore, construction related impacts to traffic would be moderate to low.

The New Northern Route (NNR) Alternative, Manastash Ridge (MR) Subroute, and the Underground Design Option each would require the crossing of I-82 and SR 243; therefore, a Traffic Management Plan would be required by WSDOT. The Traffic Management Plan would describe measures to minimize impacts on roads, traffic, and travelers that could result from construction activities including road crossings and the transportation of Project components and heavy equipment. A Traffic Management Plan would address each construction segment, locations of temporary work areas, access roads, and crossings and would describe how the minimization measures would be implemented in the field. Rolling slowdown and flagging procedures, signage and illumination requirements, and locations of approved access point from the I-82 or SR 243 would be detailed in the plan. The purpose of the Traffic Management Plan is to mitigate, supplement, and further outline measures required for safe equipment access to the ROW and temporary work areas during Project construction and to address potential transportation related impacts and provide for public safety. Federal Highway Administration (FHWA) review and concurrence is required by WSDOT for approving Pacific Power’s application to cross I-82 land owned by WSDOT. WSDOT is responsible for processing Pacific Power’s utility permit or franchise application(s) to cross I-82 and SR-243. A permanent access break, authorizing the use of Exit 11, would be required for construction access. The Traffic Management Plan would be submitted to WSDOT, JBLM YTC Public Works Department, Kittitas County and Yakima County for review and approval prior to any construction activities taking place. Along with the PDFs detailed in Section 2.5, the Traffic Management

Plan would reduce impacts on transportation resources in the Project area. PDFs applicable to transportation resources include: GEN-1, GEN-4, BIO-14, LU-1, LU-3, LU-5, LU-8, LU-11, LU-12, LU-13, LU-20, VIS-4, SGW-1, PHS-5, and TR-1 through TR-10. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs.

The Project would require surface access to all overhead or underground structures and work areas during construction and operation. Disturbance calculations for the Overhead and Underground Design Options were based on the presence of existing roads (see Section 2.4.3.2, Table 2-4, and Appendix A-Construction Access Levels). For the Underground Design Option, direct continuous access adjacent to the duct bank would be required, unlike the Overhead Design Option which would require direct access only to each overhead structure.

In most cases, existing public roads would be used to transport construction equipment to the approved access roads, and construction staging and equipment and materials storage yards with appropriate approvals from jurisdictional agencies. A prerequisite of obtaining a permanent break in access permits from the FHWA and WSDOT is obtaining access permission approvals from adjacent federal, private, other state agencies. This permission would be secured prior to applying for a permanent break in access permit.

Construction may have to cross a roadway or run parallel to a roadway within or adjacent to a public ROW. Transmission line stringing activities over state highways and county roads could require the temporary closure of traffic lanes potentially resulting in traffic congestion and traffic delays. Bucket trucks would be placed on either side of the roadway to ensure the safe installation and tensioning of conductors crossing the roadway. Figure 4.7-1 below shows how bucket trucks would be used during the stringing of lines across highways.

FIGURE 4.7-1 HIGHWAY CONSTRUCTION STRINGING ACTIVITIES

Damage to the existing road infrastructure could occur as a result of heavy equipment or vehicles utilizing the road system and could cause local traffic delays. All vehicles utilizing public roads would be within the legal size and weight limit. Oversized vehicles would have obtained the necessary permits and be properly flagged and accompanied by escort vehicles as necessary. The operation of equipment and vehicles would potentially track dust, soil, gravel, and other material onto roadway surfaces, but the implementation of a Stormwater Pollution Prevention Plan would minimize impacts on roads resulting in low impacts. Where applicable, stabilized construction access areas would consist of a pad of aggregate rock underlain with geotextile fabric, crushed rock, steel rumble pad or equivalent per WSDOT-approved best management practice. Stabilized construction access points would be installed before any adjacent road grading or other substantial ground disturbing activity occurs. The number of access points from existing public roads would be limited to the fewest number feasible. Whenever practicable, access pads would be sloped downward into the disturbed area to prevent dust, soil, and gravel discharges onto the roadway (PDF TR-9). If sediment is tracked off-site, roads would be cleaned thoroughly by shoveling or sweeping at the end of each day, and more frequently if necessary, with removed sediment being transported to an appropriate disposal area (PDF TR-10). Construction crews would reduce the amount of soil compaction by working when the ground is not wet, using equipment with more tires and wider tires to distribute the weight of the vehicle, and tilling the severely compacted areas after construction is completed. If work must be conducted while the ground is wet, ground mats would be utilized.

Improvements to local roads (including those located on U.S. Bureau of Reclamation [Reclamation], BLM, and state lands) may occur in selected areas as necessary for construction access. Improvements may include widening, adding gravel, smoothing out curves, grading, culvert and drainage ditch installation, brush clearing, or other measures as described in Section 2.4.3.2.

New and improved access road-related impacts to other resources such as land use, visual resources, cultural resources, soils and geology, water resources, wetlands, vegetation, and wildlife are discussed in the resource-specific chapters in this Supplemental Draft Environmental Impact Statement (SDEIS). Impacts on the existing transportation system from access road construction and improvements would be short-term and low.

In areas where the current road system does not provide access to the proposed Project ROW, new roads would be constructed. These roads would occur where overland travel is not possible due to terrain, vegetation, slope, or other conditions that require surface clearing and grading for access. The level of ongoing maintenance of these roads would be determined based on local conditions, agency requirements, and Pacific Power maintenance standards and requirements. Road building related impacts specific to environmental resources such as vegetation, wildlife, and land use are covered in those resource specific sections of this document.

Construction staging areas, regardless of Design Option, would be located in those areas that are approved by the agencies or landowners. As described in Chapter 2, these would occupy approximately five acres and would be located on existing disturbed land. Construction staging areas would be located adjacent to existing roads where practical. Coordination with landowners would be conducted to establish construction area limits. Staging areas would be located away from visually sensitive areas and would not be located in highway ROWs or on WSDOT-owned property.

Operation and maintenance impacts would result from periodic access and use of state and county roads during the life of the Project. Maintenance traffic would normally be a few maintenance vehicles along the ROW several times a year and helicopters flying for transmission line inspection twice a year. Except in isolated locations, vegetation maintenance requirements would be minimal because the Project is located in an area typically dominated by low growing sagebrush and grassland vegetation. Large vehicles such as flatbed trucks or a crane may be required to replace or repair the transmission line and structures on occasion, which could cause minor disruptions to local traffic for brief periods. Impacts to the existing road system are expected to be low during Project operation and maintenance because vehicles would only access the Project ROW periodically and would not affect local traffic conditions.

Even with the implementation of PDFs in place to limit unauthorized access to private or public lands by the installation of gates and other traffic control measures, there is still the potential for unauthorized access and use of newly established roads. The potential impacts that result from unauthorized use of access roads include soil erosion, fire danger, the introduction of noxious weeds, vegetation and wildlife disturbance, habitat disturbance, and cultural resource disturbance. These effects are covered in the applicable resource discussions of Section 4.0.

A helicopter would be used during construction and may be used during periodic maintenance inspections for all route segments. Any helicopter flights would be coordinated with local air traffic controllers and with JBLM YTC aviation operations as required.

The proposed Project would not affect jet routes, air space, or create an obstruction to controlled or uncontrolled airspace. There currently are multiple high voltage transmission lines throughout the Project area. The proposed 230 kilovolt (kV) Columbia River crossing structures would be in the same areas as existing structures and would be less than 200 feet in height. These structures and the 100-foot tall wood pole H-frame and single pole structures would not affect commercial or military aviation operations. A review by the Federal Aviation Administration (FAA), WSDOT-Aviation, and JBLM YTC aviation operations as part of the permitting process would further minimize any potential conflicts created by the project.

4.7.4 Impacts Specific to Route Segments and Design Options

4.7.4.1 Route Segment NNR-1

The primary access to this segment would occur from I-82 and East Selah Road from the west. The highest impacts on transportation for Route Segment NNR-1 would be as a result of traffic delays during construction along Sage Trail Road, a private road. This road is typically 15 to 20 feet wide along the length of the Project. Local road closure and the rerouting of traffic may be necessary. The opportunity to reroute traffic is limited along this route due to the configuration and scarcity of roads in the area. Construction activities along this segment would be fairly brief in relation to overall Project construction and impacts would be moderate. Residents and road owners would be notified in advance of construction activities and potential local road closures and delays. Improvements to the road would not likely be necessary, as the gravel road is in generally good condition and would be able to accommodate the necessary equipment and vehicles. Damage to Sage Trail Road would be immediately repaired after construction is completed in the area. Moderate impacts on transportation would result from the construction of Route Segment NNR-1.

Access Levels for Route Segment NNR-1 are assumed as Level 2 for the entire route and this segment would require the construction of less than 5,016 feet of spur roads off of existing roads (see Table 4.7-2). No new access road construction would be necessary for this route segment.

4.7.4.2 Route Segment NNR-2

Route Segment NNR-2 would be located within the JBLM YTC and accessed from Sage Trail Road, Firing Center Road, Evergreen State Road/East Pomona Road, and the JBLM YTC perimeter fire break road. Some new road construction would be required where the route segment diverges from the perimeter of the JBLM YTC. Firing Center Road is the main road servicing JBLM YTC from Yakima and Selah and delays during construction would be longer as compared to other similar roads because of restricted access to the area of the transmission line. The segment of the line located along Firing Center Road would also require the reconstruction of the existing distribution line located on the south side of the road. This would increase the overall total time as compared to H-frame construction on undeveloped land, but the increase in construction time would not be substantial. Alternatively, construction access could occur from East Pomona Road and Evergreen State Road which would reduce impacts on the JBLM YTC main gate traffic. Lane closures on the JBLM YTC would likely occur for short periods of time. Road closures along a portion of this segment may also be necessary, but alternative traffic routes are typically available within the JBLM YTC cantonment area of the route segment. The Project would cross Firing Center Road at Mile Post (MP) 3.6 - 3.7, Evergreen State Road at MP 3.9 - 4.0, and E. Pomona Road within JBLM YTC at MP 4.6 - 4.7. PDFs, such as the development of a Traffic Management Plan, would be implemented to reduce impacts on traffic within JBLM YTC and on county roads. Damage to roads will be repaired as directed by the county or JBLM YTC.

Access Levels for Route Segment NNR-2 are assumed as Level 2 for the entire route. This segment would require the construction of approximately 2.0 miles of spur roads. Low impacts are expected as a result of the construction of Route Segment NNR-2.

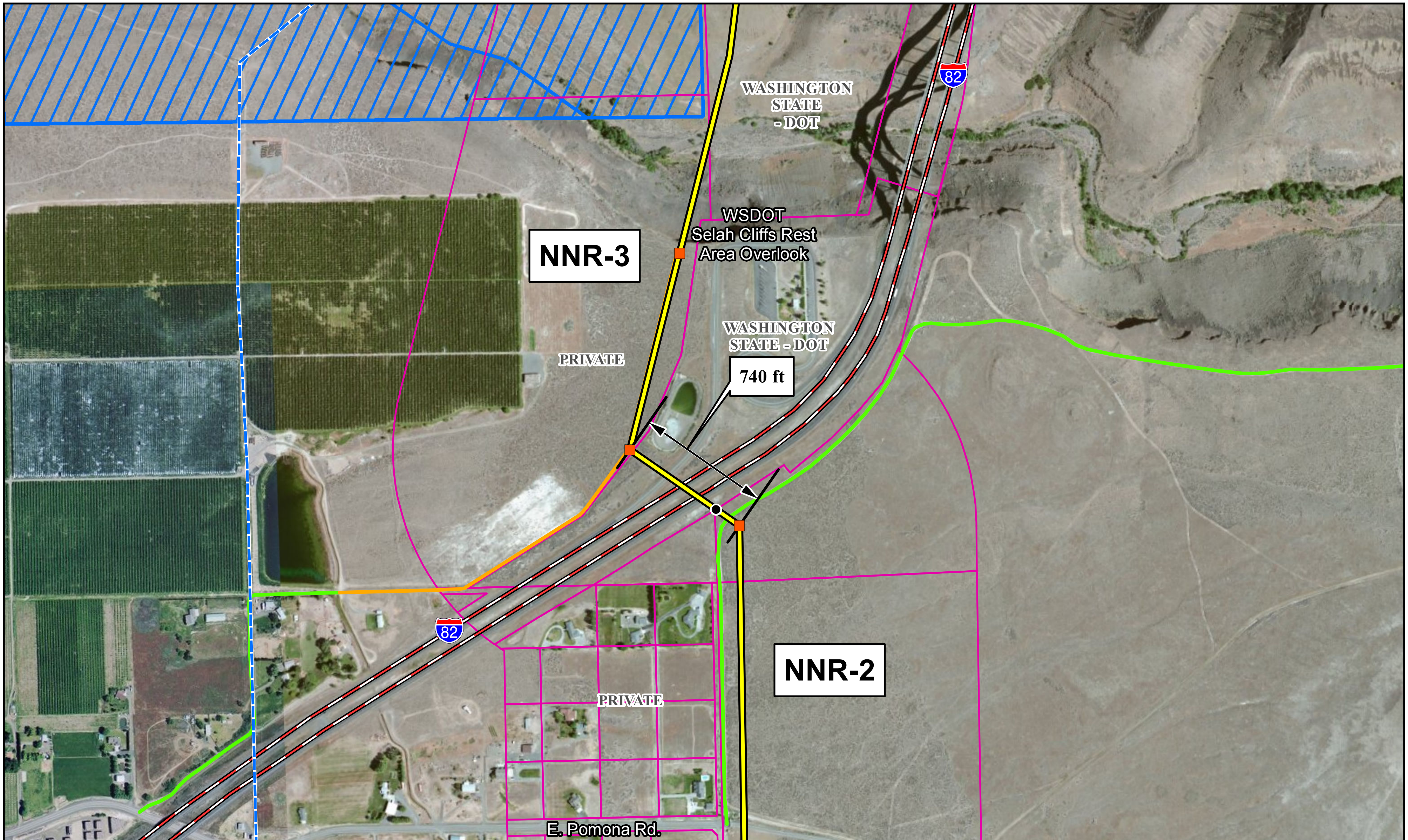
4.7.4.3 Route Segment NNR-3

This segment would be accessed from JBLM YTC, private land located off of Deweese Lane, Selah Creek Drive, BLM roads servicing the Selah Butte area, Burbank Creek Road (private), and an unnamed private road north of Baldy Butte. Much of the route segment would use the existing access roads where the Project parallels the Pomona-Wanapum 230 kV transmission line (Figure 4.7-2).

NNR-3 would also cross I-82 at MP 0.0 - 0.1 just south of the Selah Creek Rest Area. The crossing would involve the placement of one transmission structure on the eastern side of the interstate within the JBLM YTC boundary. The other transmission structure on the western side of the interstate would be placed on private property near a WSDOT pond and southwest of the Selah Cliffs Rest Area. No structures would be placed within the interstate ROW or the rest area. Access on either side of the interstate would occur from JBLM YTC on the south or from the private parcel on the north. The approximate length of this crossing would be about 740 feet and would utilize H-frame structures. Conductor to ground clearance for this crossing would be a minimum of 34 feet. Impacts on I-82 traffic are discussed in Section 4.7.3. No permanent access break would be required for this crossing. The rest area would not be used for staging of equipment or other Project-related purposes. All staging would be outside the WSDOT ROW at this location. Other impacts on I-82 traffic are discussed in Section 4.7.3, Impacts Common to All Alternatives, and would be low.

Transportation impacts created as a result of this route segment may include short-term access delays to agricultural areas around Deweese Lane from construction traffic in the area of the line located on private land west of the Selah Cliffs I-82 Rest Area. Delays in traffic could occur that would affect access to the residential area located along Selah Cliffs Drive, to the Selah Butte Watchable Wildflower Area, and along Burbank Creek Road. This route segment would cross Burbank Creek Road at MP 4.9 - 5.0.

Access Levels for Route Segment NNR-2 are assumed as Levels 2 and 3 for most of the route and would require the construction of approximately 3.5 miles of spur roads and approximately 5.8 miles of access roads for a total of 9.4 miles of new roads. Moderate to low impacts would result from the construction of Route Segment NNR-3.



Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 4.7-2
NNR Alternative I-82 Crossing #1 - Selah Creek Rest Area

Project Features

- Alternative Route
- Conceptual Structures
- Existing Access Road
- New Access Road

Existing Transmission

- Pomona - Wanapum 230 kV Transmission

Transportation

- Interstate Highway

Jurisdiction

- Parcel
- Yakima Training Center (DOD)
- Washington Department of Natural Resources: Natural Area Preserve

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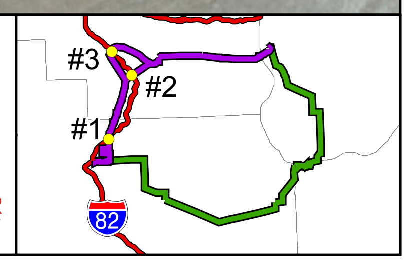


4.7.4.4 Route Segment NNR-4o/4u

Overhead Design Option
This segment would be accessed from Exit 11 through an existing gate adjacent to the stockpile area on the southwest side of the I-82 or from the JBLM YTC Exit 11 access gate. Existing roads on JBLM YTC or private land would be used and improved as necessary (Access Level 2 or 3, typically), including those that follow the Pomona-Wanapum 230 kV transmission line. This route segment would cross I-82 and the JBLM YTC secondary access road servicing the I-82 Exit 11 (Figure 4.7-3).

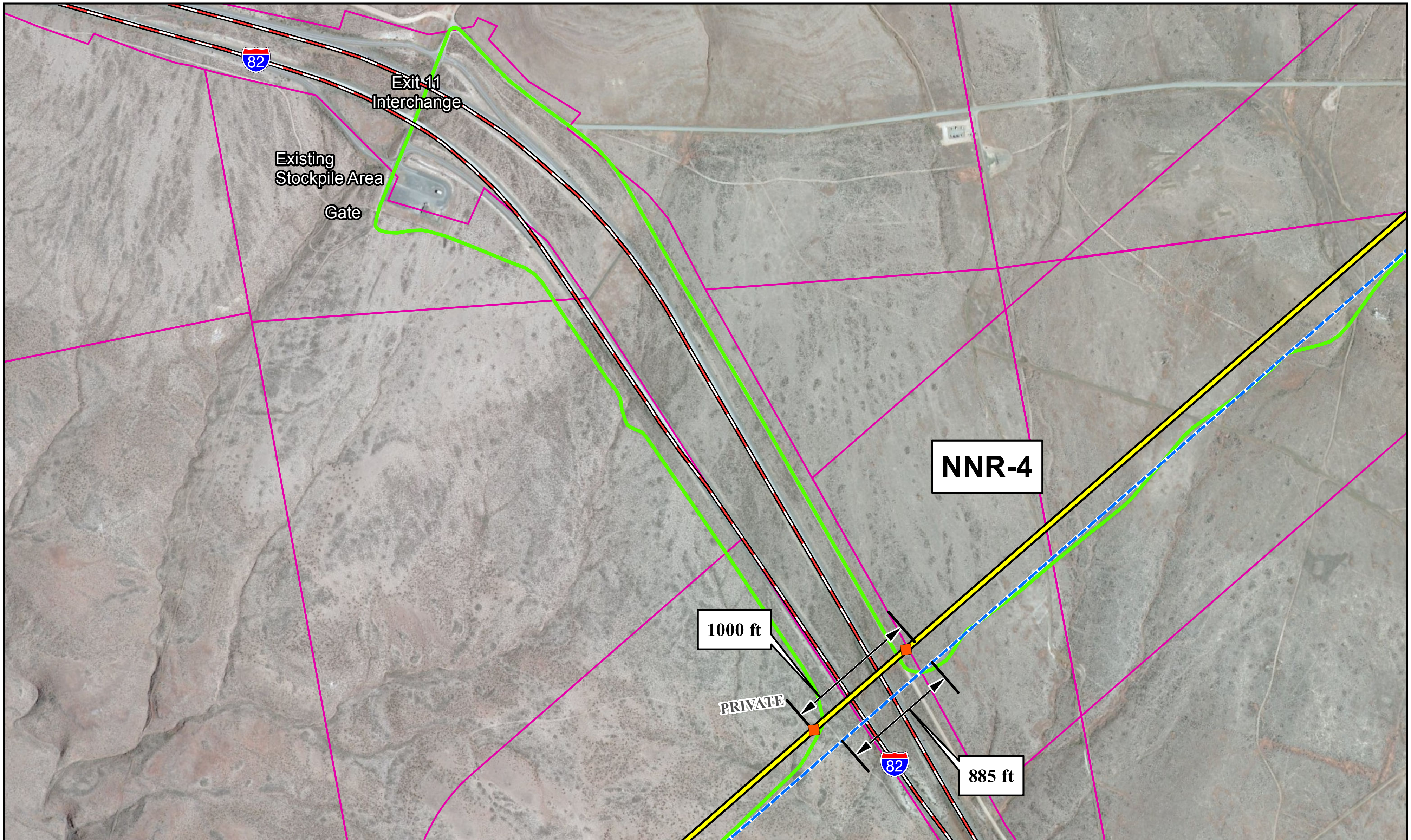
NNR-4o would cross I-82 approximately 200 feet north of the existing Pomona-Wanapum 230 kV transmission line which is one mile south of Exit 11. This crossing would involve the placement of one transmission structure on western side of the interstate on private property. The other structure would be placed on the eastern side of the interstate on the JBLM YTC. No structures would be placed within the interstate ROW. The approximate length on this crossing would be 1,000 feet and would utilize H-frame structures. Conductor to ground clearance of this crossing would be a minimum of 34 feet. A permanent access break, authorizing the use of Exit 11, would be required if access is necessary from I-82. Other impacts on I-82 traffic are discussed in Section 4.7.3, Impacts Common to All Alternatives, and would be low.

Access Levels for Route Segment NNR-4o are assumed as Level 2 and 3 for most of the route as it follows the Pomona-Wanapum 230 kV transmission line. This segment would require the construction of approximately 1.8 miles of spur roads and approximately 1.0 mile of access roads for a total of 2.8 miles of new roads. Low to moderate impacts would result from the construction of Route Segment NNR-4o.

Underground Design Option
The alignment of the Underground Design Option (NNR-4u) would be similar to what is shown in Figure 2-6, with the transition stations located on the west and east sides of the 1,000 foot overhead crossing of I-82 on private and JBLM YTC land. Impacts on transportation would be similar in terms of access (from I-82 Exit 11 and JBLM YTC) and the crossing of I-82. However, construction across JBLM YTC would cause the closure of the secondary access road servicing Exit 11 for a short term during trenching and duct bank construction in this area. Other impacts on I-82 traffic are discussed in Section 4.7.3, Impacts Common to All Alternatives, and would be low. In this area, extensive road construction in the bivouac area of Training Area 16 would allow for the rerouting of traffic within the base. PDFs would reduce traffic impacts to the JBLM YTC road. Low to moderate impacts would result from the construction of Route Segment NNR-4u.

4.7.4.5 Route Segment NNR-5

Route Segment NNR-5 crosses the southern portion of Badger Pocket within JBLM YTC, generally paralleling the fire break road. Access would be provided from the perimeter road and from within JBLM YTC. This road would be minimally affected during the construction of the Project. Route Segment NNR-5 would require the construction of approximately 0.7 mile of spur road and 0.1 mile of new access road for a total of 0.8 mile of new roads. Low impacts would result from the construction of Route Segment NNR-5.



Vantage - Pomona Heights 230 kV
Transmission Line Project

Figure 4.7-3
NNR Alternative I-82
Crossing #2 - Exit 11

Project Features

- Alternative Route
- Conceptual Structures
- Existing Access Road
- New Access Road

Existing Transmission

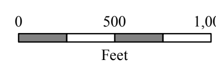
- Pomona - Wanapum 230 kV Transmission

Transportation

- Interstate Highway

Jurisdiction

- Parcel
- Yakima Training Center (DOD)



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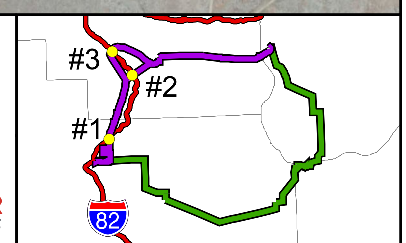

4.7.4.6 Route Segment NNR-6o/6u

Overhead Design Option
This segment would be accessed from within JBLM YTC, typically along the existing Pomona-Wanapum 230 kV transmission line access roads. Existing roads on JBLM YTC land would be used and improved as necessary (Access Level 2 or 3, typically). An existing paved secondary road servicing the northern portion of JBLM YTC and Training Area 1 would be crossed at MP 2.1-2.2 by the Project. Impacts on JBLM YTC traffic using this road would be low because the development and approval of a Traffic Management Plan would be implemented to reduce impacts on travel within JBLM YTC. Route segment NNR-6o would require the construction of approximately 2.6 miles of spur roads and approximately 0.6 mile of access roads for a total of 3.2 miles of new roads. Low to moderate impacts would result from the construction of Route Segment NNR-6o.

Underground Design Option
Impacts created as a result of the construction and operation of the Underground Design Option for this Route Segment would be greater than the Overhead Design Option because the JBLM YTC secondary road would be closed during trenching and duct bank construction. Impacts would be low to moderate because the development and approval of a Traffic Management Plan and repair of damaged roads would reduce impacts on travel on this road within JBLM YTC.

4.7.4.7 Route Segment NNR-7

This segment would be accessed from within JBLM YTC, typically along the existing Pomona-Wanapum 230 kV transmission line access roads. Existing roads on JBLM YTC land would be used and improved as necessary (Access Level 2). An existing JBLM YTC secondary road would be crossed by the Project at MP 7.7 - 7.8. Impacts on JBLM YTC traffic using this road would be low because the development and approval of a Traffic Management Plan would be implemented to reduce impacts on travel within JBLM YTC. Route Segment NNR-7 would require the construction of approximately 3.3 miles of new spur roads and no new access roads. Resulting impacts would be low.

4.7.4.8 Route Segment NNR-8

This route segment parallels the existing Pomona-Wanapum 230 kV, Wind Ridge-Wanapum 230 kV, Schultz-Wautoma No.1 500 kV, and Vantage-Schultz No.1 500 kV transmission lines and access roads and crosses the Columbia River. Access to the route segment would be from Huntzinger Road on the west side of the river. Huntzinger Road is paved for 10.8 miles from I-90 to the Auvil Fruit Company entry area south of the route segment. Improvements would be necessary where the Project follows the existing transmission lines on BLM land west of Huntzinger Road. The highest impacts on transportation for Route Segment NNR-8 would be as a result of traffic delays during construction along Huntzinger Road and SR-243 as a result of lane closure. However, bucket trucks would be used for the stringing of the line across roads. Road closure for a short period of time may be necessary on Huntzinger Road and because this is the only road servicing the area, rerouting traffic would not be possible. Resulting impacts would be moderate.

On the east side of the Columbia River, existing roads would require minimal improvements. The Project would cross SR 243, requiring consultation and coordination with WSDOT. A Utility Permit would be required from WSDOT. The transmission structures would not be placed within either the highway ROW or WSDOT’s Control Zone. Authorization to span the Columbia River for Route Segment NNR-8 would be required from the U.S. Army Corp of Engineers through the Section 10 Rivers and Harbors Act permitting process. Resulting impacts on the transportation network in this area would be low. Flashing lights or spherical balls on the conductors may be required for the portion of the route segment crossing the Columbia River. Pacific Power would consult with the FAA regarding the installation of lights or any other visual warning devices required for aviation safety. Resulting impacts would be low. Route Segment NNR-8 would require the construction of approximately 0.9 mile of new access road and 0.2 mile of improved access road for a total of approximately 1.1 miles of new road.

4.7.4.9 Route Segment MR-1

Access to route segment MR-1 would be from minor two-track roads crossing rangeland on private and Washington Department of Natural Resources land west of I-82 and from Silka Road, Boland Road, Vanderbuilt Road, and two track roads within the JBLM YTC (Figure 4.7-4). This route segment does not generally follow existing roads for a substantial portion of the route and new road construction would be necessary (Access Levels 4 through 7). Route Segment MR-1 would require the construction of approximately 2.0 miles of spur road and 16.7 miles of new access road for a total of approximately 18.7 miles of new road.

This route segment would cross I-82 at MP 5.1 - 5.2. This crossing would involve the placement of a structure on private land on the west side of I-82 directly south of the WSDOT's westbound Manastash Ridge Viewpoint. The other structure would be placed on the eastern side of the interstate on the JBLM YTC. The crossing length would be approximately 1,270 feet. Conductor to ground clearance of this freeway crossing would be a minimum of 34 feet according to WSDOT. No structures would be placed within the interstate ROW. Impacts on I-82 traffic are discussed in Section 4.7.3, Impacts Common to All Alternatives, and would be low.

Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 4.7-4
Manastash Ridge Subroute Crossing #3 - Manastash Ridge Viewpoint

Project Features
- Alternative Route
- Conceptual Structures
- Existing Access Road
- New Access Road

Existing Transmission
- Pomona - Wanapum 230 kV Transmission

Transportation
- Interstate Highway

Jurisdiction
- Parcel
- Yakima Training Center (DOD)

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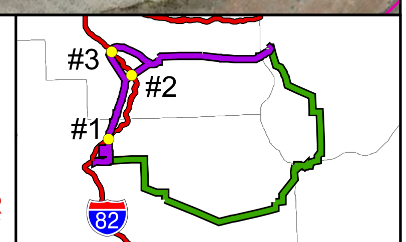

TABLE 4.7-2 NEW ROAD CONSTRUCTION SUMMARY BY ROUTE SUMMARY

ROUTE SEGMENT	MILES OF NEW SPUR ROAD	MILES OF NEW ACCESS ROAD	TOTAL MILES OF NEW ROAD
NNR-1 2.4 miles	0.95	0.00	0.95
NNR-2 5.0 miles	2.03	0.00	2.03
NNR-3 9.3 miles	3.54	5.82	9.36
NNR-4o/4u* 4.5 mile	1.79	0.99	2.78
NNR-5 1.8 miles	0.68	0.13	0.81
NNR-6o/6u* 6.4 miles	2.59	0.56	3.15
NNR-7 8.2 miles	3.30	0.00	3.30
NNR-8 2.7 mile	0.91	0.21	1.12
MR-1 11.9 miles	1.95	16.74	18.69

* Note: Disturbance area calculations for Underground Design Option and Overhead Design Option are identical.

4.7.5 Mitigation Measures

PDFs described in Chapter 2 are designed to reduce effects from the proposed NNR Alternative and design options; therefore, no additional mitigation would be required. Along with the PDFs detailed in Section 2.5, the Traffic Management Plan would reduce impacts on transportation resources in the Project area. PDFs applicable to transportation resources include: GEN-1, GEN-4, BIO-14, LU-1, LU-3, LU-5, LU-8, LU-11, LU-12, LU-13, LU-20, VIS-4, SGW-1, PHS-5, and TR-1 through TR-8. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs.

4.7.6 Residual Impacts

Residual impacts are identical to the impacts described in Section 4.7.4 because no additional mitigation measures are proposed for transportation.

4.7.7 Impact Summary By Alternative

4.7.7.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to transportation would occur.

4.7.7.2 Route Alternatives

The DEIS Agency Preferred Alternative would require the most new and spur road construction, but would not require the crossing of I-82; it would require the crossing of SR 243 in one location. All NNR Design Options would cross I-82 in two locations and would require the crossing of SR 243 in one location. Although the disturbance calculations used the same access road assumptions as the NNR – Alternative Overhead Design Option, the NNR Alternative - Underground Design Option would require the least amount of new access road construction, but grading requirements of the access road (and duct bank) would require the disturbance of more land in steep terrain. It is unknown the extent of actual access road and associated disturbance area for either the NNR Alternative - Underground Design Option or the NNR Alternative - Overhead Design Option because final engineering would not take place until a Final Preferred Route and Design Option is determined.

TABLE 4.7-3 NEW ROAD CONSTRUCTION SUMMARY BY ALTERNATIVE

ALTERNATIVE	MILES OF NEW SPUR ROAD	MILES OF NEW ACCESS ROAD	TOTAL MILES OF NEW ROAD
NNR Alternative - Overhead Design Option* NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.4 miles	15.79	7.70	23.49
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6, NNR-7, NNR-8 47.7 miles	15.95	23.45	39.39
NNR Alternative – Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.4 miles	15.79	7.70	23.49
DEIS AGENCY PREFERRED ALTERNATIVE 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	20.88	16.14	37.01

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4.8 VISUAL RESOURCES

Visual resource impacts would be created as result of the construction, operation, and maintenance of the Project and would be caused by Project components (e.g., structures, lines, roads, equipment) being seen from sensitive viewpoints; the effects of Project components on the inherent aesthetic values of the landscape or compatibility developed landscape; and from the effects on the Visual Resource Management (VRM) Classes as identified by the U.S. Bureau of Land Management (BLM). The effects on VRM Classes is determined by an assessment of whether or not the Project is in compliance with the stated objectives as defined in the BLM Manual 8400 series and current policy. Compliance with other state, regional, or local applicable policies, goals, and objectives as identified in the land management documents (e.g., county General Plans) was also considered as part of the compliance analysis.

4.8.1 Methods and Impact Types

4.8.1.1 Analysis Methods

The impact assessment closely follows the procedures identified in the BLM's VRM system as detailed in the Contrast Rating Manual 8431-1, with modifications appropriate to the proposed Project and lands not under the jurisdiction of the BLM. The modified process considered Project visual compatibility with the developed landscape as well as the VRM components of scenic quality, viewer sensitivity, distance zones, and contrast. A contrast analysis was conducted along all Project segment centerlines using Form 8400-4 and geographic information system (GIS) modeling that utilized the access road disturbance model (see Section 2.4.3.2), vegetation and slope data, and existing transmission configuration data.

The effects analysis utilized a combination of GIS modeling, primary observation, and visual simulation development to evaluate the effects of the Project on visual resources. Viewshed modeling in combination with contrast analysis was used to assess viewer impacts, an assessment from identified Key Observation Points (KOP) was conducted, mitigation measures were developed for agency consideration and residual impacts were determined. Simulations were produced to assist in the assessment and were used to illustrate the major visual impacts from KOPs (see Appendix C-4).

Visibility from sensitive viewpoints was generated by GIS using digital terrain data from the U.S. Geological Survey (USGS) and the sensitive viewpoints mapped. Because structures have not been sited and engineered for each alternative route, landscape visibility was mapped using a 90-foot uniform structure height for the centerline of each route segment and for the overhead-underground transition stations. The 90-foot height is representative of the height expected for the majority of structures. Typical H-frame structure height is expected to be approximately 65 to 90 feet; however, a single pole structure may be up to 110 feet tall. Visibility of the Underground Design Option considered visibility of the ground plane from sensitive viewpoints.

Digital imaging, GIS, computer aided design, and global positioning system (GPS) software assisted in the development of the photo-simulations. The software used in photo-simulation includes:

- *Adobe Photoshop CS5*– Used for photo manipulation and merging.
- *Bentley MicroStation* v8i – Used for modeling transmission structures photo matching, lighting, materials, and rendering simulations.
- *Bentley Inroads v8.5* – Used for Digital Terrain Mapping and modeling.
- *ArcView* – Used for geographic information Project data mapping.

The process of photo-simulation began with taking field photographs, documenting viewpoint locations (coordinates) and weather conditions, and matching those photographs with Project terrain models developed using Microstation. Computer models of the transmission lines and substation were introduced into the terrain model based on preliminary facility layouts developed in ArcView and AutoCAD. The final image is a composite of the 3-dimentional structure modeling and the original photograph. The process ensured that spatial relationships, perspective, proportions, and similar visual attributes were accurate and matched existing landscape conditions.

The KOP photographs were taken with a Canon DSLR Rebel XSI 12 megapixel digital camera with an 18 – 55 millimeter (mm) zoom lens. The camera was hand held at eye-level (approximately five feet, six inches above the ground). The date, time of day, GPS coordinate (latitude/longitude), and weather conditions were documented.

The proposed structure types were modeled based on structure standards provided by Pacific Power and assumed undergrounding construction methods provided by POWER Engineers, Inc. (POWER) staff. Final engineering of the transmission line would occur after the environmental analysis phase of the Project and once a final route is chosen. Actual pole locations and configurations may deviate from the simulations shown in Appendix C-4.

4.8.2 Impact Criteria

Impacts are created as a result of Project contrast, or change, in viewing conditions or scenic quality, and impacts are measured by the alteration of existing form, line, color and/or texture in the vegetation, landform and structures (built features, architectural character). Impacts are a product of how changes are viewed (distance, viewing angle) or the change in the inherent qualities of the (man-made or natural) landscape. Impact to viewers depends on the visual sensitivity of the viewer (see Section 3.8.2.4). Visual contrast is the basis on which visual impacts are measured.

4.8.2.1 Contrasts

Contrasts range from weak to strong, with resulting impacts based on visibility and distance. For scenic quality, contrast directly affects the inherent scenic quality of the landscape or, conversely, is related to the ability of existing development character to absorb the engineered architectural form/line/color/texture of the Project. The impact analysis for the Project was based on contrast and visibility modeling and the Contrast Rating Worksheets (Form 8400-4) from representative sensitive viewpoints (KOPs). A contrast model was also used as a basis to assess impacts along the alternative route segments. The contrast model consisted of landscape contrast and structure contrast, which were combined to determine overall Project contrast along the route segments. For the Underground Design Option, landscape contrast was based on the slope of the terrain and land cover crossed by the underground segment. A database of Project contrast was mapped and entered into the GIS for the impact analysis. Project contrast was then compared with Project visibility, scenic quality, or visually dominant development character to determine preliminary impacts.

As previously stated, visual assessment considered landform, vegetation, and structure contrast. Landform and vegetation contrast was determined based on the access road disturbance model (as described in Section 2.4.3.2) and existing vegetation and was expressed as an overall landscape contrast (see Table 4.8-1 below). Vegetation or land cover was grouped into visually similar categories (Group 2, Group 3, etc.) based on the visual characteristics of the dominant vegetation such as perennial or annual grassland, sagebrush perennial/annual grassland, or sagebrush dominated. In areas with open water, exposed rock, or disturbed/developed areas it was assumed there would be no vegetation removal and vegetation contrast would not occur. No additional road building would occur on basalt cliffs, in developed areas, or where open water is present (N or No Contrast).

TABLE 4.8-1 LANDSCAPE (LANDFORM AND VEGETATION) CONTRAST MATRIX-OVERHEAD DESIGN OPTION

VEGETATION GROUP/LAND COVER	ACCESS LEVEL			
	0	1 or 2	3 or 4	5, 6 or 7
1 - Basalt Cliff/Rock, Disturbed/Developed, Firebreak, Water	N	N	N	N
2 – Annual or Perennial Grassland, Noxious Weeds, Forbs	N	W	W	M
3 – Bitterbrush/Perennial Grassland, Rabbitbrush or Sagebrush Perennial/Annual Grassland, Riparian	N	W	M	S
4 – Aspen, Trees	N/A	S	S	S

Key: N=No Contrast; S=Strong; M=Moderate; W=Weak

For example, in areas where the Project crosses sagebrush (Vegetation Group 3) and where new road construction on slopes of eight to 15 percent (Access Level 5) are anticipated for the Project (also see Appendix A – Access Map), a strong landscape contrast is predicted. Similarly, crossing an area of annual or perennial grassland combined (Vegetation Group 2) with a Project Access Level 1 or 2 would result in weak landscape contrasts because road widening or improvements would occur in already graded areas and low growing vegetation removal would not greatly contrast with graded areas. However, in areas of overstory tree cover (Vegetation Group 4), removal of this vegetation would create strong contrasts due to road or right-of-way (ROW) clearing regardless of the scope of access road construction.

For Underground Design Option route segments (NNR-4u and NNR-6u), increased landform and vegetation and, therefore, landscape contrasts would result from the Project because access roads would not follow contours to the extent that access roads being constructed for the Overhead Design Option could (also see Section 4.7 - Transportation). Additional contrasts would be created due to the additional width of the duct bank and adjacent access road, especially steep terrain areas. Frequently, a substantial amount of grading is required in rugged topography and slopes need to be reduced to a gentler grade to accommodate the straight section of duct bank necessary between the splice vaults, unlike overhead transmission lines, which would require only access road construction between structures disturbing a substantially smaller area in steep terrain. In such areas, the slopes would be cut away along the entire segment of duct bank in steep areas. Extra workspace is typically needed in areas where extensive cutting and grading is required.

To account for additional grading requirements along the entire centerline of the Underground Design Option in steep areas as compared to the Overhead Design Option, the Landscape Contrast Matrix was revised to include the additional grading requirements in steep areas (see Table 4.8-2). Resulting landscape contrasts are based on slope of terrain and vegetation crossed by the assumed centerline of the underground ROW.

TABLE 4.8-2 LANDSCAPE (LANDFORM AND VEGETATION) CONTRAST MATRIX-UNDERGROUND DESIGN OPTION

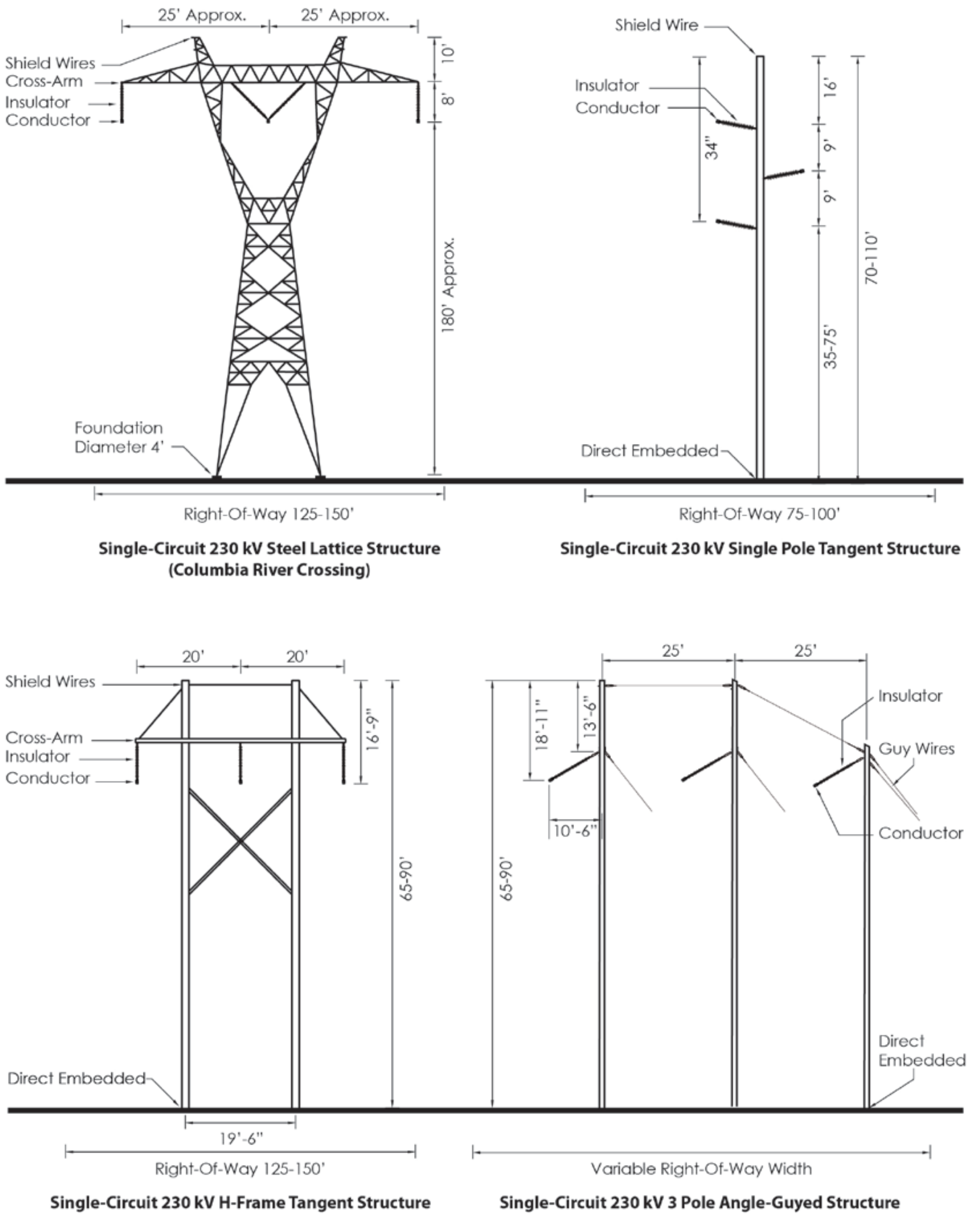
VEGETATION GROUP/LAND COVER	SLOPE (%)			
	0-8	8-15	15-30	30+
2 – Annual or Perennial Grassland, Forbs	M	M	S	S
3 – Rabbitbrush or Sagebrush Perennial/Annual, Riparian	M	S	S	S

Key: N=No Contrast; S=Strong; M=Moderate; W=Weak

Structure contrast was based on existing utility line infrastructure adjacent to the Project. The Project route segments parallel three major utility corridors and would potentially consolidate two sections of distribution line. New structures would also be introduced where currently no utility lines exist. A total of eight combinations of ROW corridor and structure configurations are possible, including consideration of transition stations for the Underground Design Option. These combinations would result in varying degrees of structure contrast (no existing transmission, distribution underbuild, Project parallels 230 kilovolt (kV) and 115 kV corridor, Project parallels lattice 500 kV, and Project parallels 2-230 kV and 2-500 kV corridor). For the structure contrast model, only H-frame or single pole structures were assumed along the route segments. Figure 4.8-1 shows the visual characteristics of the structures. Table 4-8.3 - Structure Contrast Matrix shows the various combinations, landscape viewing context, and resulting structure contrast.

As the final step in contrast analysis, the overall Project contrast was determined based on the combination of landscape and structure contrast along the route segment centerlines (see Table 4.8-4). Strong structure contrasts but weak landscape contrasts would typically produce strong-moderate Project contrasts. For example, in situations where no new roads are being built and minimal ground cover vegetation is removed (weak landscape contrast), the introduction of a new 90-foot H-frame structure where none currently exists (strong structure contrast) would create strong overall visual contrasts because the transmission line structures are the primary Project elements that affect viewers or landscapes.

FIGURE 4.8-1 VISUAL CHARACTERISTICS OF STRUCTURE TYPES



IMAGES NOT TO SCALE

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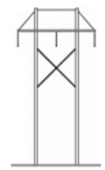
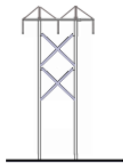
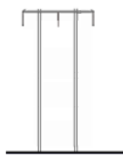
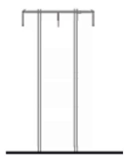
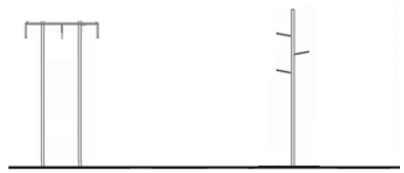
TABLE 4.8-3 STRUCTURE CONTRAST MATRIX

Existing Corridor	Proposed Corridor (Configuration #)	Viewing Context	Structure Contrast
No Structures	 New H-Frame : 230 kV (#1)	Varies; typical structure MR-1	*Strong*
No Structures	 New Single Pole: 230 kV: Route NNR-1, Portion of Route NNR-2 (#2)	Yakima Ridge, JBLM YTC Residential and Land Use NNR-2	*Strong*
 Existing Distribution	 New Single Pole 230 kV with Distribution Under-build: Portion of NNR-1, Portion of NNR-2 (#3)	JBLM YTC Cantonment Area; Residential Land Use NNR-2	*Strong/Moderate*

Existing Corridor	Proposed Corridor (Configuration #)	Viewing Context	Structure Contrast
  Existing 230 kV H-Frame Wood Pole (e.g., Pomona-Wanapum 230 kV)	  New H-Frame 230 kV/ 230 kV H-Frame Wood Pole (#4)	Adjacent to Pomona Heights Substation, JBLM YTC Cantonment Area/Shotgun Lane residential; Grazing and Undeveloped Land Use; Interstate 82 Travel Corridor, sage-brush dominated landscape NNR-2, NNR-3, NNR-4, NNR-6, NNR-7	*Weak*
 Existing 230 kV H-Frame Wood Pole (Pomona-Wanapum 230 kV)	 New Single Pole 230 kV/ 230 kV H-Frame Wood Pole (#5)	JBLM YTC Cantonment Area/Shotgun Lane residential NNR-2	*Moderate/Weak*
(MULTIPLE LINES NOT ILLUSTRATED) Existing Pomona-Wanapum 230 kV, Wanapum-Wind Ridge 230 kV, Vantage-Schultz No.1 500 kV, Schultz-Wautoma No.1 500 kV Corridor (Lattice and H-frame Wood Pole)	(MULTIPLE LINES NOT ILLUSTRATED) 230 kV H-Frame Wood Pole / Existing Pomona-Wanapum 230 kV, Wanapum-Wind Ridge 230 kV, Vantage-Schultz No.1 500 kV, Schultz-Wautoma No.1 500 kV Corridor (#6)	Northeastern JBLM YTC, Columbia River Crossing/Wanapum Dam/Vantage Substation Industrial Area	*Weak*
No Structures	(Underground Design Option Duct Bank Corridor ROW) (#7)	Grazing and Undeveloped Land Use; JBLM YTC Training Areas	*None- See Table 4.8-1 for Landscape Contrast*

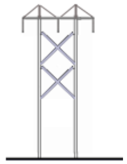
Existing Corridor	Proposed Corridor (Configuration #)	Viewing Context	Structure Contrast
 Existing 230 kV H-Frame Wood Pole (e.g., Pomona-Wanapum 230 kV)	Transition Stations (#8)	Interstate 82 Travel Corridor, Existing Pomona-Wanapum 230 kV transmission line, sage-brush dominated landscape, JBLM YTC training areas	*Strong-Moderate*

TABLE 4.8-4 PROJECT CONTRAST MATRIX

LANDSCAPE CONTRAST	STRUCTURE CONTRAST					
	STRONG	STRONG-MODERATE	MODERATE	MODERATE-WEAK	WEAK	NONE
Strong	S	S	S/M	M	M	M/W
Moderate	S	S/M	M	M	M/W	W
Weak	S/M	M	M	M/W	W	W
N/A, None	M	M	M/W	W	W	N

Key: S=Strong; S/M=Strong/Moderate; M=Moderate; M/W= Moderate/Weak; W=Weak, N=None.

4.8.2.2 Impact Types

Direct and indirect visual resource impacts are difficult to distinguish because the effects occur at the same time and place but simultaneously occur at a further removed distance (e.g., impacts as a result of views from sensitive recreation area and scenic quality impacts on vegetation and landform). Impacts may be considered short-term and long-term.

The development of the Project has the potential to result in three basic types of impacts to visual resources. Construction impacts are considered temporary that result from the presence of construction vehicles and equipment that cause ground disturbance, equipment structure contrasts, and air emissions. Operations and maintenance impacts may be short-term or long-term. Maintenance activities are also considered short-term or periodic if they are also related to the presence of construction vehicles and equipment and associated ground and air disturbances. Operation impacts are primarily associated with the long-term use and presence of the Project (transmission lines, underground-overhead transition stations, cleared duct bank and access road corridor, structures, substations, overhead transmission line access roads) in the landscape. Visual contrast (see Section 4.8.2.1 above), including the effects of light and glare, are produced during construction, operations, and maintenance of the Project.

The general types of impacts caused by the construction, operations, and maintenance of the Project include:

- Introduction of visually dominant transmission structures (wood H-frame, wood single pole, steel lattice structures) that contrasts with the developed or natural landscape for the Overhead Design and the transition station for the Underground Design Option;
- Potential glare created by the presence of the conductors (wires) and associated marker balls (if used for avian mitigation or air traffic safety);
- Landform and vegetation contrasts (grading and vegetation removal) caused by the construction of access roads or road improvements, pulling and tensioning sites, work areas, and laydown areas for the Overhead Design Option;
- Landform and vegetation contrasts (grading and vegetation removal) caused by construction of access roads and duct bank for the Underground Design Option; and
- Structure contrast caused by construction equipment, helicopter conductor stringing, and yarding/staging areas.

As previously stated, impacts associated with the Project affect scenic quality and sensitive viewers. These impacts also relate to whether or not the Project is in compliance with agency management objectives (VRM, General Plans, etc.).

Scenic Quality Impacts and Development Character Compatibility

Scenic quality, as discussed in Section 3.8.4.3, was inventoried during the Visual Resource Inventory (VRI) as part of the BLM planning process or Project inventory. Scenic Quality was also evaluated on undeveloped landscapes outside of areas not inventoried during the VRI. Scenic quality was evaluated using BLM criteria uniformly along all alternatives. At the I-82 crossing areas and on lands owned by the Washington State Department of Transportation (WSDOT), an evaluation on scenic quality was made by WSDOT staff using the Federal Highway Administration's (FHWA's) Visual Impact Assessment for Highway Project methodology. The Project would impact the inherent scenic quality of the landscape independent of how it is viewed from any particular viewpoint. Impacts would be highest on those landscapes that exhibit high visual variability and diversity in terms of land form/vegetation/water and form/line/color/texture and where the Project strongly or moderately contrasts with those elements (see Table 4.8-4). Similarly, the dominant development character, as identified in Section 3.8.4.3, may be affected by the Project if that character is not compatible with the industrial, linear, and vertical visual character of the Project. Though the immediate surrounding land use may be agricultural or residential, the visual influence of a utility corridor greatly affects the impression or character of the landscape in the vicinity of those industrial features (e.g., immediate foreground). The existing transmission corridors and related infrastructure (e.g., substations, dams) also would absorb and be visually compatible with the Project even if the form, line, color, or texture of the Project somewhat contrasts with existing engineered features that dominate that developed area. Therefore, the character of the industrial area would remain even though cumulative impacts would occur. Conversely, in an area where the dominant developed character is expressed by organic, non-linear, and/or architectural (rather than engineered) forms, lines, colors and textures, the Project would not be compatible with that character.

Sensitive Viewer Impacts

Contrast or compatibility impacts scenic quality or dominant developed character regardless of potential viewers. How contrast is seen in the landscape causes impacts on sensitive viewers (see Tables 4.8-5 and 4.8-6). Strong contrasts may occur along a segment of the Project, but if those contrasts are not seen by a sensitive viewer, there would be no viewer impacts (although scenic quality impacts would occur to some degree). Views from representative KOPs (as identified in Section 3.8.4.4) documents how contrast is seen in the Project area from specific viewpoints. Viewing variables such as direction of view, landform, vegetation, or architectural screening influence how sensitive viewers are impacted by the Project and how contrasts are seen in the landscape. Impacts are highest on sensitive viewers where static (stationary), direct, unimpeded views of the Project would occur at close viewing distance and where the Project would dominate and contrast with the existing elements of form, line color and texture of the viewed landscape. Conversely, low sensitivity viewers seeing the Project for a short duration in an area of weak contrasts (e.g., highly developed industrial areas or existing transmission line corridors) may not notice any change in the landscape (low impact).

Agency Management Compliance

Conformance with the stated goals and objectives identified in agency planning documents detailed in Section 3.8.3 was assessed for each of the route segments. On BLM lands, compliance with Interim VRM Class III was determined based views from KOPs and as identified during the contrast analysis (see Section 4.8.2.1). Using BLM Form 8400-1 (Contrast Rating Form), all elements of landform, vegetation and structure contrast in form, line, color and texture must be in conformance with the Interim VRM Class III from identified KOPs. As stated in BLM Manual Handbook H-8410-1 – Visual Resource Inventory, BLM's standard for VRM Class III conformance is as follows:

"The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant features of the natural landscape."

4.8.3 Impact Levels

Impact levels were recorded in one-tenth (0.1) mile increments along each route segment and alternative based on contrast and visibility/scenic quality. Potential impacts were also recorded in data tables for each impact level change along each route segment and alternative. Each potential impact was documented considering the implementation of Project Design Features (PDF) and additional specific mitigation measures were recommended where effective to reduce visual impacts. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs. The impacts remaining after applying specific mitigation measures are referred to as residual impacts.

Impacts were also determined based on viewing condition variables and are specific to each viewing location or corridor. These variables were based on observations in the field. The viewing variables considered include:

1) The visual influence of an industrial or developed setting on the landscapes and views that reduces impacts;
2) Focal points in the landscape or orientation of dominant views are directed away from the Project;
3) Viewer and Project position in the landscape (viewing Project from below);
4) Views that are brief and/or intermittent; and
5) Views that are typically screened by vegetation, landform, or architectural features.

Visual impact levels generally get lower as visual contrasts become weaker or as the distance from the contrast as seen from viewpoint increases. Similarly, landscapes with little visual variety or interest are less affected by the introduction of a new transmission line. Visual impacts were determined by comparing Project contrast with scenic quality or visibility from high or moderate sensitivity viewpoints as identified in Section 3.8.4.3 and 3.8.4.4 and as shown in Tables 3.8-5 though 3.8-7. Impacts are based on primary observation (e.g., views from KOPs, field reconnaissance), consideration of viewing variables, and implementation of selective mitigation measures. These impacts are described in Sections 4.8.4 and 4.8.7 for the route segments and alternatives. Proposed mitigation measures are discussed in detail in Section 4.8.6. Visual impacts were determined for all route segments and are defined as follows:

High – High visual impacts would result from strong, strong-moderate or moderate contrasts in Class A scenic quality landscapes and strong contrasts in Class B landscapes (Table 4.8-5). High impacts would also occur as a result of strong-moderate Project contrasts being seen in the immediate foreground or foreground of high sensitivity viewers, and in the immediate foreground of moderate sensitivity viewers. High impacts would also result from moderate contrasts being seen in the middleground by high sensitivity viewers (Tables 4.8-6 and 4.8-7).

Moderate – Moderate visual impacts would result from moderate-weak or weak contrasts in Class A scenic quality landscapes, from strong-moderate or moderate contrasts in Class B landscapes, and from strong or strong-moderate contrasts in Class C landscapes (Table 4.8-5). Moderate impacts would also occur as a result of strong contrasts being seen in the background of high sensitivity viewers or in the middleground or background of moderate sensitivity viewers (Tables 4.8-6 and 4.8-7).

Low – Low visual impacts would result from moderate weak or weak contrasts in Class B scenic quality landscapes or moderate, moderate-weak, or weak contrasts in Class C landscapes (Table 4.8-5). Low impacts would result from weak contrasts being viewed in the foreground of high sensitivity viewers or in the immediate foreground of moderate sensitivity viewers (Tables 4.8-6 and 4.8-7).

TABLE 4.8-5 SCENIC QUALITY IMPACTS

SCENIC QUALITY	PROJECT CONTRAST				
	STRONG	STRONG/MODERATE	MODERATE	MODERATE/WEAK	WEAK
A	H	H	H	M	M
B	H	M	M	L	L
C	M	M	L	L	L

H = High Impacts; H/M = High/Moderate Impacts; M = Moderate Impacts; M/L = Moderate/Low Impacts; L = Low Impacts.

TABLE 4.8-6 HIGHLY SENSITIVE VIEW IMPACTS

DISTANCE ZONE	PROJECT CONTRAST				
	STRONG	STRONG / MODERATE	MODERATE	MODERATE / WEAK	WEAK
Immediate Foreground 0 to 500 feet-*Underground Design Option* 0 to 1,000 feet- *Pole/H-frame* 0 to 0.75 mi-*Crossing Lattice Steel Tower*	H	H	H	M	M
Foreground 500 feet to 2,000 feet- *Underground Design Option* 1,000 feet to 0.33 mi- *Pole/H-frame* 0.75 mi to 1.5 mi-*Crossing Lattice Steel Tower*	H	H	M	M	L
Middleground 2,000 feet to 0.75 mi - *Underground Design Option* 0.33 mi to 1 mi- *Pole/H-frame* 1.5 mi to 3 mi -*Crossing Lattice Steel Tower*	H	M	M	L	L
Background 0.75 mi to 1.25 mi - *Underground Design Option* 1 to 2 mi- *Pole/H-frame* 3 mi to 4 mi-*Crossing Lattice Steel Tower*	M	M	L	L	L
Seldom Seen Beyond 1.25 mi - *Underground Design Option* Beyond 2 mi - *Pole/H-frame* Beyond 4 mi -*Crossing Lattice Steel Tower*	L	L	L	L	L

H = High Impacts; H/M = High/Moderate Impacts; M = Moderate Impacts; M/L = Moderate/Low Impacts; L = Low Impacts
mi = miles.

TABLE 4.8-7 MODERATELY SENSITIVE VIEW IMPACTS

DISTANCE ZONE	PROJECT CONTRAST				
	STRONG	STRONG / MODERATE	MODERATE	MODERATE / WEAK	WEAK
Immediate Foreground 0 to 500 feet- *Underground Design Option* 0 to 1,000 feet- *Pole/H-frame* 0 to 0.75 mi-*Crossing Lattice Steel Tower*	H	H	M	M	L
Foreground 500 feet to 2,000 feet- *Underground Design Option* 1,000 feet to 0.33 mi- *Pole/H-frame* 0.75 mi to 1.5 mi-*Crossing Lattice Steel Tower*	H	M	M	L	L
Middleground 2,000 feet to 0.75 mi - *Underground Design Option* 0.33 mi to 1 mi- *Pole/H-frame* 1.5 mi to 3 mi -*Crossing Lattice Steel Tower*	M	M	L	L	L
Background 0.75 mi to 1.25 mi - *Underground Design Option* 1 to 2 mi- *Pole/H-frame* 3 mi to 4 mi-*Crossing Lattice Steel Tower*	M	L	L	L	L
Seldom Seen Beyond 1.25 mi - *Underground Design Option* Beyond 2 mi - *Pole/H-frame* Beyond 4 mi -*Crossing Lattice Steel Tower*	L	L	L	L	L

H = High Impacts; H/M = High/Moderate Impacts; M = Moderate Impacts; M/L = Moderate/Low Impacts; L = Low Impacts
mi = miles.

4.8.4 Impacts Common to All Route Segments and Design Options

Short-term visual impacts related to the presence and operation of construction vehicles, equipment, traffic, and fugitive dust affecting views would be common for all route segments. Contrasts related to the staging and laydown areas would be short-term and common to all route segments and Design Options. Staging areas would be located in previously disturbed areas; therefore, the primary visual impacts associated with those sites would be related to the short-term presence of construction materials creating structure contrasts and would be independent of route segments.

Maintenance activities, such as periodic patrolling of the line, would be conducted with helicopters semi-annually and with all terrain vehicles or 4x4 trucks. The locations of these inspections are dependent on the route segment, but would be common to all routes. Short-term structure contrasts created by the presence of patrol vehicles, equipment used for necessary hardware maintenance and repairs (e.g., boom and bucket trucks, flatbed trucks), ROW maintenance and vegetation management, and associated fugitive dust potentially impacting views would create low impacts common to all routes. Operational impacts (e.g., the presence of the transmission line structures, conductors, access roads) would cause the greatest long-term impacts and would be dependent on the location of the route segments and Design Option, as described below. Long-term Project visual impacts are summarized in Table 4.8-8.

4.8.5 Impacts Specific to Route Segments and Design Options

4.8.5.1 Route Segment NNR-1

Visual Contrasts

Along this route segment, the presence of the new wood pole structures would create strong/moderate to moderate visual contrasts. The existing distribution line would be rebuilt along Sage Trail Road (see Appendix A - Visual Resources map), creating strong/moderate structure contrasts (see configuration #3 in Table 4.8-3). No existing transmission or distribution structures exist between MP 0.0 and 0.5, and MP 1.8 to 2.4 (see configuration # 2 in Table 4.8-3 and KOP 1s in Appendix C-4). Landscape contrast would be none to weak because the existing road would typically be used and vegetation cover is not often present due to development or is low-growing, herbaceous ground cover. Where Vegetation Group 3 removal is necessary as a result of spur road construction, greater landscape and Project contrast would result.

Pulling and tensioning sites would also cause short-term landscape and structure contrasts. The presence of a helicopter during the stringing of the transmission line would cause short-term structure contrasts, potentially disrupting views or scenic vistas (e.g., toward the Cascade Mountains). The temporary structure work areas, turn-around areas, and staging areas would cause low impacts due to the duration of landscape and structure contrasts. Overall, Project contrast would typically be moderate to strong-moderate along this route segment except in areas near the Pomona Heights Substation, where Project contrast would be weak.

Scenic Quality Impacts and Development Character

The landscape of Route Segment NNR-1 is developed in character, with low density residential visual architectural elements dominating scenery. The natural scenery is visually subordinate within the landscape, typically only influencing middleground and background views (e.g., Yakima Ridge, Cascade Range). This residential character is affected along the route by the presence of the Pomona-Wanapum 230 kV transmission line crossing the area, which contributes industrial visual elements in an otherwise predominantly residential setting. However, because of the industrial nature of the Project and visual separation from the existing line from the proposed transmission line, the Project's form, line, color and texture would not be compatible with the predominant residential architectural features and would create high impacts on the developed landscape.

Sensitive Viewer Impacts

Residences located along Sage Trail Road and adjacent roads would have new structures and conductors in the line of sight of Mt. Rainier, and the Project structures may impede views, depending on final placement. Therefore, the new pole structures would create high impacts on residential viewers. These impacts are the result of generally strong to strong/moderate structure contrasts seen in the immediate foreground. Structures could potentially obstruct views of Mt. Rainier (at various locations along the route segment) and would affect views across the Selah Valley to the northwest. Mitigation Measure VR-1 (see Table 4.8-2) would reduce impacts created as a result of view obstruction. Also, new conductors would be reflective for several years after installation, producing diffused reflection (glare) that would contrast with the daytime sky or landscape backdrop. KOP 1s, located on the east of Sage Trail Road (see Appendix A - Project Maps-Visual Resources), illustrates views along Sage Trail Road where 3-pole angle-guyed structures and single wood poles are proposed. A visual simulation of the Project from this KOP is shown in Appendix C-4 - KOP 1s, and the KOP Contrast Rating Form is located in Appendix C-5.

Views of the Project from residences located in the County Squires Mobile Manor are generally screened by vegetation, but some would view the Project against the Yakima Ridge. From this location, the Pomona-Wanapum 230 kV transmission line is also within the foreground viewshed and low impacts on theses residences are anticipated.

Viewers using East Selah Road would have very brief views of the Project in the immediate foreground. Views from both travelling directions are generally screened by buildings, vegetation, and topography. The Project would be seen in the visual context of the existing Pomona-Wanapum 230 kV transmission line, Pomona Heights Substation, and existing transmission lines located along East Selah Road. Impacts would be low on these viewers, also.

Agency Management Compliance

There are no federal or state lands crossed by this route segment. The Project would comply with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.2 Route Segment NNR-2

Visual Contrasts

On the south end of the Project along this route segment, strong structure contrasts would be created as a result of the introduction of H-frame structures where no currently exist except in the area where the Project crosses the Ellensburg-Moxee No.1 115 kV transmission line. The line also follows the JBLM YTC fire break road in this area and would be utilized for the Project; therefore, weak landscape contrasts would result. Overall, strong Project contrasts would be created on the south end of the route segment. As the line turns to the west near the water tower on JBLM YTC, the Project would parallel the existing Ellensburg-Moxee No.1 115 kV transmission line to the south end of the JBLM YTC Parade Field. Ellensburg-Moxee No.1 has a similar H-frame configuration and scale. Weak structure contrasts would result along this portion of the route segment.

From the south end of the Parade Field to Firing Center Road, the Project would be single pole structures. Along Firing Center Road, single pole structures with distribution underbuild would be constructed. These sections would result in strong-moderate or moderate-weak structure contrasts (Configuration # 3, Table 4.8-3). Because the Project would follow Firing Center Road, no new roads would be constructed and landscape contrasts would not occur. Landscape contrast would be strong where existing vegetation would be removed adjacent to the Parade Field, resulting in moderate Project contrast along this portion of the segment (MP 2.4 - 2.7). Along Firing Center Road, Project contrasts would typically be moderate, as shown in shown in Appendix C-4: KOP 3s.

Pulling and tensioning sites would also cause short-term landscape and structure contrasts. The presence of a helicopter during the stringing of the transmission line would cause short-term structure contrasts. The temporary structure work areas, turn-around areas, and staging areas would cause low impacts due to the duration of landscape and structure contrasts.

Scenic Quality Impacts and Development Character

Impacts on scenic quality and development character created by route segment NNR-2 primarily relate to the compatibility with the residential and JBLM YTC residential and industrial character area and scenery impacts on the undeveloped JBLM YTC areas crossed by the Project. The existing Pomona-Wanapum 230 kV transmission line visually influences the residential and undeveloped scenic character causing low to moderate impacts on the southern and northern portions of the line that is less developed. The Project would generally be in character with most of the JBLM YTC cantonment area because the Project would parallel existing lines or would be in intensive use areas of the base (Appendix C-4: KOP 3s and Appendix C-3).

Sensitive Viewer Impacts

Visual impacts on sensitive viewers would result from strong-moderate to moderate contrasts being seen from residences and travelers in the immediate foreground distance zone from Sage Trail Road, Temple Lane area, Shotgun Lane, and E. Pomona Road area, primarily. The Project would generally be seen in the context of the JBLM YTC military facilities (e.g., Vagabond Army Heliport, lodging areas, administrative structures, Armed Forces Reserve Center), the existing Ellensburg-Moxee No.1 115 kV transmission line, and other urban development in the cantonment area (see KOP 2s Contrast Rating Form located in Appendix C-5). However, topographical screening often block views of much of the cantonment area and a row of trees that soften views to the cantonment area would be removed from on the south of Firing Center Road along Shotgun Lane, increasing impacts in this area. The implementation of PDF VR-7, span matching with existing structures would reduce the impacts of the line in this location. Residences along Sage Trail Road would be impacted by the presence of the new transmission line in the direction of Yakima Ridge (northeast).

Views along Firing Center Road from adjacent residences, lodging areas of JBLM YTC, and by travelers using the road would generally be seen in the context of the existing development of the cantonment area and moderate to low impacts would occur along this section of the route segment (Appendix C-4: KOP 3a Contrast Rating Form is located in Appendix C-5). From residences located along and near E. Pomona Road, impacts on views of the undeveloped area of JBLM YTC in the direction of the Project would be high due to the lack of existing transmission lines in the viewshed. Impacts along this portion of the segment would be high.

Travelers using I-82 would also view the Project in the immediate foreground briefly, primarily from the eastbound direction. Westbound I-82 travelers would have a very brief view of NNR-2 due to travelling orientation and screening provided by vegetation and buildings, with the I-82 dead-end crossing structure (see Figure 4.8-1) being most prominent in the viewshed in the this direction. Given the low intensity of development in this area and lack of existing transmission and other infrastructure along this portion of the route segment, high impacts would occur for a short distance in the vicinity of the of the interstate.

Agency Management Compliance

There are no federal or state lands crossed by this route segment. The Project would be consistent with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.3 Route Segment NNR-3

Visual Contrasts

Structure contrasts would be strong on the south end of the route segment in the vicinity of the I-82 crossing and at the Selah Canyon crossing. Some new road construction would be necessary on private land west of the Selah Creek Rest area and on WSDOT-owned land north of the rest area. The terrain between the south rim of Selah Canyon and the north side of I-82 slopes at less than eight percent and new access roads would need to be constructed on shrub dominated land causing moderate landscape contrast.

At the Selah Canyon crossing, dead-end structures would be used to span the canyon (Appendix C-4: KOP 5s views west and northwest) creating strong structure contrasts in these locations. Some new road construction from an existing road would be necessary on the north side on land dominated by Vegetation

Group 2 creating weak to moderate landscape contrast. Overall, strong-moderate to strong Project contrast would be created as a result of the Project is this area.

As the Project joins the existing Pomona-Wanapum 230 kV transmission line, contrasts would be reduced because the new line would be adjacent to the existing line (Configuration #4, Table 4.8-3) and the existing access roads would be used. Therefore, Project contrasts would be weak to moderate weak along most of this route segment.

Pulling and tensioning sites would also cause short-term landscape and structure contrasts. The presence of a helicopter during the stringing of the transmission line would cause short-term structure contrasts, potentially disrupting views or scenic vistas (e.g., toward the Cascade Mountains). The temporary structure work areas, turn-around areas, and staging areas would cause low impacts due to the duration of landscape and structure contrasts. Impacts from light sources would not occur because construction would be limited to daylight hours. The potential for glare from the transmission line conductors would be reduced with the use of non-specular conductors (PDF VIS-6).

Scenic Quality Impacts and Development Character

Impacts on scenic quality on the south end in undeveloped areas would be low to moderate as the Project would generally be compatible with the development character of the area. This segment is predominantly low density residential and agricultural, but is heavily influenced by the I-82 corridor. Scenic quality impacts would be greater in the vicinity the Selah Canyon crossing. However, to the north in areas inventoried by the BLM as Class A, the route segment is visually influenced by the presence of the Pomona-Wanapum 230 kV transmission line and communication facilities located on Selah Butte. As a result, the route segment would be compatible with the landscape is those locations. Overall, there would be some degradation of scenery along the segment paralleling the existing transmission line, but overall scenic quality impacts would be low.

WSDOT conducted a visual quality evaluation of the I-82 Crossing #1 south of the eastbound Selah Creek Rest Area and from KOP 5s based on the FHWA's Visual Impact Assessment for Highways methodology. Existing visual quality, rated on a scale of 1 to 7, was rated as 4.08 (moderately high) at the highway crossing. With the implementation of the Project, the visual quality of the highway in the area of the highway would drop to 3.50 (average). At KOP 5s, existing visual quality was rated 4.42 (moderately high). With the implementation of the Project, visual quality from KOP 5s would drop to 3.67 (average). There would be some degradation of visual quality in the area of the transmission towers, but visual impacts would not reach a substantial level (WSDOT 2014).

Sensitive Viewer Impact

Impacts on moderately sensitive travelers using I-82 would generally be low due to the duration and distance of views, but would be moderate in the area of the Selah Creek Rest Area crossing as the Project is viewed briefly in the immediate foreground. North of the Redmon Memorial Bridge, weak to moderate-weak contrasts would generally be intermittently seen in the middleground and background, causing low impacts on I-82 travelers. From the Selah Creek Rest Area overlook, impacts would be moderate to high depending on the viewing orientation of observers and the location of the transmission structures within the view. These observers primarily look down the canyon to the northwest. The visual simulations looking west and northwest from KOP 5s (Appendix C-4) show that the conductors would be lower than the line of sight (KOP Contrast Rating Form is located in Appendix C-5). Although the existing Pomona-Wanapum 203 kV transmission line, Selah Butte communications facilities, the Redmon Memorial Bridge and I-82 corridor, and other infrastructure are within the overall viewshed from this location, the presence of the line and the structures would moderately degrade views of the canyon area. The implementation of PDF VIS-7, span matching with existing structures, would reduce the impacts of the line in this location.

From the Selah Cliffs Natural Area Preserve trail at the base of the canyon, views of the Project would be from the inferior position. The crossing structure located on the immediate north side of the Selah Creek (refer the structure located at the bottom of the photo simulation, Appendix C-4, KOP 5s-Northwest) would be near the bottom of the canyon and the most prominent in the viewshed. This portion of the route segment would create high impacts.

Impacts would also occur on views from the Selah Butte Recreation Destination Route and adjacent residences would also occur. Impacts on residents would be low because the Project would be viewed in the context of the existing Pomona-Wanapum 230 kV transmission line (weak structure contrasts) in the middleground and background with the existing line being closer and more prominent within the viewshed. Topography would screen the Project except in the area of the Selah Cliffs crossing. Therefore, impacts on residences viewing the Project from this area would be low. From the Selah Butte Recreation Destination Route, recreationists accessing the area would view moderate-weak to weak contrasts of the Project adjacent to the existing line in the immediate foreground and foreground. High impacts would also occur on travelers located on Burbank Creek Road. These impacts would be reduced with the implementation of mitigation measure VR-2.

Impacts on views from the Selah Butte Watchable Wildflower Area would also occur (see KOP 6s Contrast Rating Form located in Appendix C-5). However, the viewing orientation is generally toward Yakima Canyon and topography typically screens views of the Project. Because this is a dispersed recreation use area, views of the Project may occur depending on the viewer location within the area. Due to the distance, topographical screening, and moderate to weak landscape and structure contrasts, impacts would be low.

The Yakima River Canyon Scenic Byway, Umtanum Ridge Water Gap National Natural Landmark (NNL) (access road on the east side of SR 821) and associated recreation areas are located in the middleground and background within the Project area, but views are screened by topography. Therefore, low or no impacts are anticipated on these NNLs and the byway.

Agency Management Compliance

BLM Interim VRM Class III lands are crossed between MP 1.0 and MP 4.9. Project contrasts would be weak to moderate-weak. The Project would be compliant with the Interim VRM Class III from KOP 6s and the Selah Butte Recreation Destination Route, the nearest viewpoints, because weak and weak-moderate contrasts would be seen in the immediate foreground and foreground distance zones. From KOP 5s (Selah Creek Rest Area), moderate-weak and weak contrasts would be seen in the middleground or background, respectively, and the Project would be compliant with the Interim VRM Class III from both KOPs.

The Project would also be consistent with the visual standards identified in the Yakima County Comprehensive Plan and Kittitas County Comprehensive Plan.

4.8.5.4 Route Segment NNR-4o/4u

Visual Contrasts

Overhead Design Option
Structure contrasts would be weak for route segment NNR-4o because the line follows the existing Pomona-Wanapum 230 kV transmission line (see Configuration #4, Table 4.8-3 Structure Contrast

Matrix). Similarly, because of the level of new access road construction (Access Level 2 and 3) and minimal disturbance to shrub vegetation, landscape contrasts would be moderate to weak. Overall, NNR-4o would create weak to moderate-weak Project contrasts.

For the Overhead Design Option, pulling and tensioning sites would also cause short-term landscape contrasts and structure contrasts. The presence of a helicopter during the stringing of the transmission line would cause short-term structure contrasts, potentially disrupting views or scenic vistas (e.g., toward the Cascade Mountains). The temporary structure work areas, turn-around areas, and staging areas would cause low impacts due to the duration of landscape and structure contrasts. Impacts from light sources would not occur because construction would be limited to daylight hours. The potential for glare from the transmission line conductors would be reduced with the use of non-specular conductors (PDF VIS-6).

Underground Design Option

Structure contrasts created as a result of NNR-4u would be limited to the presence of the overhead to underground transition stations located adjacent to I-82 and at the beginning and end of the route segments. In these areas, structure and landscape contrasts would be strong, resulting in strong Project contrasts. Along the underground section of the route segment, contrasts would be the result of duct bank and access grading in steep terrain where underlying soils and geology would be exposed in potentially expansive hillside cut areas. In these areas, sagebrush or rabbitbrush vegetation removal would also increase visual contrasts. Overall, route segment NNR-4u would result in moderate-weak to moderate Project contrasts.

Scenic Quality Impacts and Development Character

Overhead Design Option

Scenic quality in the area of the Project is influenced by the presence of the existing Pomona-Wanapum 230 kV transmission line. Because Project contrasts are typically weak to moderate-weak scenic quality impacts would be low to moderate.

WSDOT conducted a visual quality evaluation of the I-82 Crossing #2 south of Exit 11 based on the FHWA's Visual Impact Assessment for Highways methodology. Existing visual quality was rated as 4.83 (high) at the highway crossing. With the implementation of the Project, the visual quality of the highway in the area of the highway would drop to 4.25 (moderately high). There would be some degradation of visual quality in the area of the transmission towers, but visual impacts would not reach a substantial level (WSDOT 2014).

Underground Design Option

As with the Overhead Design Option, scenic quality in the area of the Project is influenced by the presence of the existing Pomona-Wanapum 230 kV transmission line. However, because of the presence of the transition stations and potentially large areas of cut and fill, moderate to low scenic quality impacts would also result from the Project.

Sensitive Viewer Impacts

Overhead Design Option

The primary viewers of the Overhead Design Option of NNR-4o would be travelers using I-82 who would briefly view the Project as it crosses the highway at MP 1.2 - 1.3 adjacent to the existing Pomona-Wanapum 230 kV transmission line. Moderate impacts would result from the crossing structures in the vicinity of the highway and they would be less apparent and blend in with the existing structures. The implementation of mitigation measures VR-2 and PDF VIS-7 would reduce the visual impact on the residences and inhabitants in this location. The implementation of PDFs, such as the rehabilitation of vegetation following construction would minimize the visual impacts on I-82 travelers at this crossing.

The route would also be viewed from residence located within Badger Pocket on the east end of the route (Appendix C-3: KOP 7s). Weak and moderate Project contrasts would be viewed from this area as the Project parallels and then crosses behind the existing Pomona-Wanapum 230 kV transmission line in the middleground and background. Impacts on residences would be low to moderate.

Underground Design Option
Because primary viewers of this route segment are limited to I-82 travelers and NNR-4u would require the installation of five-acre transition stations that would create stronger structure and landscape contrasts than the Overhead Design Option, higher impacts are expected in this section of the route segment (MP 1.0 - 1.4). Along most of the rest of the route segment, because it crosses slightly sloping terrain (> 8%), landscape contrasts would be largely screened by the heavy sagebrush vegetation as viewed by most travelers, although landscape contrasts may be moderate. Therefore, beyond the transition stations, impacts would be lower compared to the Overhead Design Option.

From the Badger Pocket residential area, the transition station located on the extreme east end of the route segment would cause strong to strong-moderate contrasts and be seen in the middleground or background. Viewed behind the existing Pomona-Wanapum 230 kV transmission line, the landscape and structure contrasts near the end of the line created by the presence of a five-acre transition station that substantially deviates from the existing infrastructure would cause higher impacts than the Overhead Design Option in this location.

Agency Management Compliance

Overhead Design Option
The Project would be consistent with the visual standards identified in the Kittitas County Comprehensive Plan.

Underground Design Option
The Project would be consistent with the visual standards identified in the Kittitas County Comprehensive Plan.

4.8.5.5 Route Segment NNR-5

Visual Contrasts

Route segment NNR-5 is a short segment that deviates from the existing Pomona-Wanapum 230 kV transmission line. Therefore, structure contrasts would be strong along most of the route segment except in the areas near the existing line on the east end. Because the line follows a portion of the existing fire break road and is adjacent to other roads on JBLM YTC in an area of relatively flat terrain, landscape contrast would be weak. Overall, Project contrast would be strong-moderate.

Pulling and tensioning sites would also cause short-term landscape and structure contrasts. The presence of a helicopter during the stringing of the transmission line would cause short-term structure contrasts, potentially disrupting views or scenic vistas (e.g., toward the Cascade Mountains). The temporary structure work areas, turn-around areas, and staging areas would cause low impacts due to the duration of landscape and structure contrasts. Impacts from light sources would not occur because construction would be limited to daylight hours. The potential for glare from the transmission line conductors would be reduced with the use of non-specular conductors (PDF VIS-6).

Scenic Quality Impacts and Development Character

Strong-moderate contrasts would cause moderate scenic quality impacts outside of the visual influence area of the existing transmission line. On the east side of the segment where the Project crosses the existing line, the Project would be compatible with the development character of the corridor.

Sensitive Viewer Impacts

This route segment would also be within the viewshed of residences in the Badger Pocket area. Residential viewers currently see the existing Pomona-Wanapum 230 kV transmission line in the foreground. The Project is in a slightly superior position relative to the closest residences and strong-moderate Project contrasts would be seen in the middleground (see KOP 8s Contrast Rating Form located in Appendix C-5). Therefore, moderate impacts on residences would result from the Project.

Agency Management Compliance

This route segment crosses land managed by JBLM YTC, who has no policies related to the management of visual resources.

4.8.5.6 Route Segment NNR-6o/6u

Visual Contrasts

Overhead Design Option
As with NNR-4 and NNR-3 where the Project parallels the existing Pomona-Wanapum 230 kV transmission line, structure contrast for the Overhead Design Option (NNR-6o) would be weak (Configuration # 4, Table 4.8-3). Similar terrain and vegetation are crossed, as well, resulting in typically weak landscape contrasts. Some moderate landscape contrast would occur in steeper areas dominated by Group 3 vegetation. Overall, Project contrasts would be weak or moderate-weak.

For the Overhead Design Option, pulling and tensioning sites would also cause short-term landscape and structure contrasts. The presence of a helicopter during the stringing of the transmission line would cause short-term structure contrasts, potentially disrupting views or scenic vistas (e.g., toward the Cascade Mountains). The temporary structure work areas, turn-around areas, and staging areas would cause low impacts due to the duration of landscape and structure contrasts. Impacts from light sources would not occur because construction would be limited to daylight hours. The potential for glare from the transmission line conductors would be reduced with the use of non-specular conductors (PDF VIS-6).

Underground Design Option
Structure contrasts created as a result of NNR-6u would be limited to the presence of the overhead to underground transition stations located at the beginning and end of the route segments. In these areas, structure and landscape contrasts would be strong, resulting in strong Project contrasts. Along the underground section of the route segment, contrasts would be the result of duct bank and access grading in steep terrain, where underlying soils and geology would be exposed in potentially expansive hillside cut areas. In these areas, sagebrush or rabbitbrush vegetation removal would also increase visual contrasts. Steep terrain crossed by the Project would increase moderate-weak as compared to the Overhead Design Options. Overall, route segment NNR-6u would create weak to moderate-weak Project contrasts.

Scenic Quality Impacts and Development Character

Overhead Design Option

Scenic quality in the area of the Project is influenced by the presence of the existing Pomona-Wanapum 230 kV transmission line. Because Project contrasts are typically weak to moderate-weak, scenic quality impacts would be moderate to low.

Underground Design Option
As with the Overhead Design Option, scenic quality in the area of the Project is influenced by the presence of the existing Pomona-Wanapum 230 kV transmission line. However, because of the presence of the transition stations and potentially large areas of cut and fill, low to moderate scenic quality impacts would result from the Project.

Sensitive Viewer Impacts

Overhead Design Option
Sensitive viewers, residences and John Wayne Pioneer Trail (JWPT) users, would typically see Project contrasts in the seldom seen or background distance zone. On the west end of the route segment, the Project would be seen in the middleground by residences (see KOP 8s Contrast Rating Form located in Appendix C-5) and on the east end in the middleground by JWPT users. Therefore, Project impacts on sensitive viewers would be low.

Underground Design Option
As with the Overhead Design Option, sensitive viewers would typically see Project contrasts in the seldom seen or background distance zone. Because the landscape contrasts would be greater for the Underground Design Option in steep terrain on the west end of the route segment and ROW cut areas would be seen axially from residences, slightly higher impacts would result as compared to the overhead design option. High impacts on JWPT users in the area of the transition station would occur.

Agency Management Compliance

Overhead Design Option
This route segment crosses land managed by JBLM YTC, who has no policies related to the management of visual resources.

Underground Design Option
This route segment crosses land managed by JBLM YTC, who has no policies related to the management of visual resources.

4.8.5.7 Route Segment NNR-7

Visual Contrasts

The western portion of this segment of the Project parallels the existing Pomona-Wanapum 230 kV; the eastern portion parallels the existing Pomona-Wanapum 230 kV, Wanapum-Wind Ridge 230 kV, Vantage-Schultz No.1 500 kV, and Schultz-Wautoma No.1 500 kV transmission lines. As a result, structure contrast for NNR-7 would be weak. Similar terrain and vegetation are crossed, as well, resulting in typically weak landscape contrasts; some moderate landscape contrast would occur in steeper areas dominated by Group 3 vegetation. Overall, Project contrasts would be weak along the entire route segment.

Pulling and tensioning sites would also cause short-term landscape and structure contrasts. The presence of a helicopter during the stringing of the transmission line would cause short-term structure contrasts, potentially disrupting views or scenic vistas (e.g., toward the Cascade Mountains). The temporary structure work areas, turn-around areas, and staging areas would cause low impacts due to the duration of landscape and structure contrasts. Impacts from light sources would not occur because construction would be limited to daylight hours. The potential for glare from the transmission line conductors would be reduced with the use of non-specular conductors (PDF VIS-6).

Scenic Quality Impacts and Development Character

Scenic quality in the area of the Project is influenced by the presence of the existing Pomona-Wanapum 230 kV transmission line and other transmission lines. Because Project contrasts are typically weak to moderate-weak, scenic quality impacts would be low to moderate.

Sensitive Viewer Impacts

Huntzinger Road travelers and JWPT users would view weak Project contrasts in the immediate foreground and foreground. From the north, the Project would be viewed behind the existing Pomona-Wanapum 230 kV, Wanapum-Wind Ridge 230 kV, Vantage-Schultz No.1 500 kV, and Schultz-Wautoma No.1 500 kV transmission lines from the JWPT where the trail generally parallels the Project. At the JWPT crossing of the Project (Appendix C-3: KOP 9s), low impacts are expected due to the existing transmission lines visual influence and weak contrasts. Ginkgo Petrified Forest NNL (Wanapum SP boat launch) is located in the in the seldom seen distance zone within the Project area, and views are typically screened by topography. Therefore low or no impacts on the NNL is expected from NNR-7.

Agency Management Compliance

This route segment crosses land managed by JBLM YTC, who has no policies related to the management of visual resources.

4.8.5.8 Route Segment NNR-8

Visual Contrasts

Structure contrasts are also weak for this segment because the Project would parallel the Pomona-Wanapum 230 kV, Wanapum-Wind Ridge 230 kV, Vantage-Schultz No.1 500 kV, and Schultz-Wautoma No.1 500 kV transmission lines. Landscape contrasts are highest in areas of sagebrush and rabbitbrush where the existing road would require improvements. Also, the lattice structures would be similar to the four existing Columbia River crossing structures, creating weak contrasts. Typically, Project contrast is weak or moderate-weak along the entire route segment.

Scenic Quality Impacts and Development Character

Scenic quality in the area of the Project is influenced by the presence of the existing Pomona-Wanapum 230 kV transmission line and other transmission lines. Because Project contrasts are typically weak to moderate-weak, scenic quality impacts would be low and the Project would be in character with the existing development.

WSDOT conducted a visual quality evaluation of SR 243 based on the FHWA’s Visual Impact Assessment for Highways methodology. Existing visual quality was rated as 1.5 (low) at the highway crossing. With the implementation of the Project, the visual quality of the highway in the area of the highway would remain 1.5 (WSDOT 2014).

Pulling and tensioning sites would also cause short-term landscape and structure contrasts. The presence of a helicopter during the stringing of the transmission line would cause short-term structure contrasts, potentially disrupting views or scenic vistas. The temporary structure work areas, turn-around areas, and staging areas would cause low impacts due to the duration of landscape and structure contrasts. Impacts from light sources would not occur because construction would be limited to daylight hours. The potential for glare from the transmission line conductors would be reduced with the use of non-specular conductors (PDF VIS-6).

Sensitive Viewer Impacts

Huntzinger Road travelers, recreationists using the Columbia River corridor below Priest Rapids Dam, and JWPT users would view weak Project contrasts in the immediate foreground and foreground. From the north, the Project would be viewed behind the existing Pomona-Wanapum 230 kV, Wanapum-Wind Ridge 230 kV, Vantage-Schultz No.1 500 kV, and Schultz-Wautoma No.1 500 kV transmission lines from the JWPT where the trail crosses the Project. Low impacts are expected due to the existing transmission lines visual influence and weak contrasts (see KOP 9s Contrast Rating Form located in Appendix C-5).

On the east side of the Columbia River, impacts would result from SR 243 travelers viewing the Project briefly as line crosses the highway, and residences viewing the Project from Wanapum Village (see KOP 10s Contrast Rating Form located in Appendix C-5). Both sensitive views would view the Project in the context of the Priest Rapids Dam and existing transmission line corridor industrial development character. Low impacts would result on these viewers. Ginkgo Petrified Forest NNL (Wanapum SP boat launch) is located in the in the seldom seen distance zone within the Project area, and views are typically screened by topography. Therefore low or no impacts on the NNL are expected from NNR-7.

Agency Management Compliance

BLM Interim VRM Class III lands are crossed between MP 0.0 and MP 0.4. The Project would be compliant with the Interim VRM Class III from KOP 9s and Huntzinger Road, the nearest viewpoints, because weak and weak-moderate contrasts would be seen in the immediate foreground and foreground distance zones. Therefore, the Project would be compliant with the Interim VRM Class III.

The Project would be consistent with the Kittitas County Comprehensive Plan and Grant County PUD 2010 Final Shoreline Management Plan.

4.8.5.9 Route Segment MR-1

Visual Contrasts

Structure contrasts would typically be strong along most of this route segment because no existing transmission lines or similar infrastructure is located in the vicinity of the Project. Landscape contrasts are variable depending on the route segment’s proximity to existing roads, slope, and dominant vegetation cover. Most of the route segment would create strong-moderate or strong Project contrast.

Pulling and tensioning sites would also cause short-term landscape contrasts and structure contrasts. The presence of a helicopter during the stringing of the transmission line would cause short-term structure contrasts, potentially disrupting views or scenic vistas (e.g., toward the Cascade Mountains). The temporary structure work areas, turn-around areas, and staging areas would cause low impacts due to the duration of landscape and structure contrasts. Impacts from light sources would not occur because construction would be limited to daylight hours. The potential for glare from the transmission line conductors would be reduced with the use of non-specular conductors (PDF VIS-6).

Scenic Quality Impacts and Development Character

Scenic quality impacts would be moderate to high due to the level of Project contrast. In lower scenic quality areas, moderate impacts would occur due to the level of change in the undeveloped landscape.

Low impacts are expected where the Project would require minimal new road construction in gently sloping areas dominated by annual or perennial grassland.

WSDOT conducted a visual quality evaluation of the I-82 Crossing #3 based on the FHWA's Visual Impact Assessment for Highways methodology. Existing visual quality was rated as 4.83 (high) at the highway crossing. With the implementation of the Project, the visual quality of the highway in the area of the highway would drop to 4.25 (moderately high). There would be some degradation of visual quality in the area of the transmission towers, but visual impacts would not reach a substantial level (WSDOT 2014).

Sensitive Viewer Impacts

Residences, I-82 travelers and Manastash Ridge Viewpoints would be impacted by the Project. I-82 travelers would have very brief and limited views of the Project as it crosses the highway near the Manastash Ridge westbound viewpoint due to the elevated position of the crossing and the topographic screening where the highway cuts through steep terrain at the crossing. However, more extended duration views would occur to the west of the highway where the Project would parallel it to the south. Due to the distance from the highway, a minimum of approximately 0.5 mile, the Project contrasts would not be dominant in the viewshed. Therefore, impacts on I-82 travelers would be moderate.

At the closest Manastash Ridge Viewpoint on westbound I-82, the Project would be within the immediate foreground of viewers. The primary orientation of views from the rest area is toward the Kittitas Valley to the north. The Project would cross the highway at the entrance to the rest area, away from the primary viewing orientation, with several structures being visible from the overlook. The Project would be screened by topography after it turns to the south and parallels the JBLM YTC boundary adjacent to Badger Pocket. The implementation of mitigation measure VR-2 would reduce the impacts of the line in this location.

From the I-82 eastbound viewpoint, the Project would be seen from a superior position and at a greater distance. More of the Project would be seen as it follows the JBLM YTC boundary at Badger Pocket and strong or moderate contrasts would be seen in the middleground or background. As with the westbound viewpoint, viewing orientation is not in the direction of the Project and impacts would be moderate to low.

From the Badger Pocket residential and agricultural area, the Project would be skylined and viewed against Manastash Ridge in an area that is undeveloped on JBLM YTC (see KOP 7s Contrast Rating Form located in Appendix C-5). Strong or moderate-strong contrasts would be seen in the immediate foreground or foreground, respectively, from these high sensitivity areas causing high impacts along most of this portion of the route segment.

The Umtanum Ridge Water Gap NNL (access road on the east side of SR 821) is located in the background within the Project area, and views are typically screened by topography. Therefore, there would be low or no impacts on the NNL.

Agency Management Compliance

This route segment crosses land managed by JBLM YTC, who has no policies related to the management of visual resources.

TABLE 4.8-8 RESIDUAL VISUAL IMPACT SUMMARIES BY ROUTE SEGMENT AND DESIGN OPTION

VISUAL IMPACT	ROUTE SEGMENT (MILES OF IMPACT)										
	NNR-1	NNR-2	NNR-3	NNR-4o	NNR-4u	NNR-5	NNR-6o	NNR-6u	NNR-7	NNR-8	MR-1
Impacts on Viewers											
Residential (High Sensitivity)											
High	2.2	1.3	0.5	0	*0.2*	0	0	0	0	0	4.2
Moderate	0.2	2.0	0.4	0.2	0.1	1.7	0	0.2	0	0	2.6
Low	0	1.7	8.4	4.4	4.3	0.1	6.4	6.2	8.2	2.7	5.1
Recreational and Travelers (High Sensitivity)											
High	0	0	0.5	0	0	0	0	0.2	0	0	1.2
Moderate	0	2.9	0.4	0	0	0	0	0.1	0	0	0.4
Low	2.4	2.1	8.4	4.6	4.6	1.8	6.4	6.1	8.2	2.7	10.3
Recreational and Travelers (Moderate Sensitivity)											
High	0.8	1.0	0.4	0	*0.2*	0	0	0	0	0	0.7
Moderate	1.4	1.2	0.6	0	0.5	0	0	0	0	0	4.0
Low	0.2	2.8	8.3	4.6	3.9	1.8	6.4	6.4	8.2	2.7	7.2
Impacts on Scenic Quality											
High	-	0	0	-	-	0	-	-	-		*4.9*
Moderate	-	0.1	0.6	-	-	1.4	-	-	-		3.8
Low	-	0.1	0.2	-	-	0	-	-	-		2.6
Interim VRM Class III Compliance											
Compliant	-	-	3.9	-	-	-	-	-	-	0.4	-
Non-Compliant	-	-	0	-	-	-	-	-	-		-

4.8.6 Mitigation Measures

The following mitigation measures have been identified to reduce, avoid, minimize, or rectify adverse impacts to visual resources. These mitigation measures would be implemented where warranted, are anticipated to be effective, and are summarized in Table 4.8-9 below.

TABLE 4.8-9 VANTAGE-POMONA HEIGHTS TRANSMISSION PROJECT MITIGATION MEASURES

MITIGATION MEASURE	DESCRIPTION
VR – 1: Avoid Interference with Prominent Views (Micro-siting)	To minimize visual impacts to sensitive views and within standard engineering practices and to the extent feasible, the final locations of transmission structures would be adjusted to avoid locations that place the structures in the middle of the line of sight toward important views from residences, roads, trails and other key observation areas.
VR – 2: Maximize Span Length at Linear Feature Crossings	At highways, trails, canyons or other sensitive feature crossings, structures shall be placed at the maximum feasible distance from the crossing within standard structure design, and in conformance with engineering and Pacific Power requirements to reduce visual impacts and potential impacts on recreation values and functions, and to increase safety at these locations.

4.8.7 Residual Impacts

To minimize potential impacts to visual resources, selective mitigation measures described in Table 4.8-9 above would be implemented. Residual impacts for all of the route segments are presented in Table 4.8-10.

To minimize the effects of potential view obstruction, mitigation measure *VR-1: Avoid Interference with Prominent Views (Micro-siting)* would be implemented in specific locations as necessary. Mitigation measure VR-1 would be effective at reducing impacts by siting structures in areas that are not within the line of sight to landscape focal points from specific locations as identified in consultation with the landowner, and would reduce impacts from high to moderate or from moderate to low. This mitigation measure would be implemented in the following locations:

- Route Segment NNR1: MP 0.8 - 2.4

To minimize the effects of structure dominance as seen from sensitive viewpoints, mitigation measure *VR-2: Maximize Span Length at Linear Feature Crossings* would be implemented in specific locations as necessary. Mitigation measure VR-2 would be effective at reducing impacts by placing the structures at the maximum feasible distance from the viewpoint to reduce their dominance in the landscape, and would reduce impacts from high to moderate or from moderate to low. This mitigation measure would be implemented in the following locations:

- Route Segment NNR-3: MP 5.1 - 5.2
- Route Segment NNR-4: MP 1.2 - 1.3
- Route Segment MR-1: MP 5.1 - 5.2

TABLE 4.8-10 PROJECT RESIDUAL IMPACTS BY ROUTE SEGMENT AND DESIGN OPTION

ROUTE SEGMENT	RESIDUAL IMPACTS (MILES)		
	LOW	MODERATE	HIGH
NNR-1 2.4 miles	0	0.2	2.2
NNR-2 5.0 miles	1.7	1.4	1.9
NNR-3 9.3 miles	8.3	0.3	0.7
NNR-4o 4.5 mile	4.4	0.1	0
NNR-4u 4.5 mile	3.8	0.4	0.3
NNR-5 1.8 miles	0.1	1.7	0
NNR-6o 6.4 miles	6.4	0	0
NNR-6u 6.4 miles	5.9	0.3	0.2
NNR-7 8.2 miles	8.2	0	0
NNR-8 2.7 mile	2.7	0	0
MR-1 11.9 miles	0.4	2.2	9.3

4.8.8 Impact Summary by Alternative

4.8.8.1 No Action Alternative

Under the No Action Alternative, the Project would not be built and no visual impacts would occur. Scenic quality would not be affected and no change would occur to views from residences, recreation areas, travel corridors, or other sensitive viewpoints.

4.8.8.2 Route Alternatives

Table 4.8-11 presents a summary of the residual impact levels for each alternative following the implementation of mitigation measures.

The DEIS Agency Preferred Alternative would have the highest total mileage of high impacts on visual resources while the NNR Alternative - MR Subroute-Overhead Design Option would have the lowest. Higher impacts between the NNR Alternative - MR Subroute-Overhead Design Option and the NNR Alternative-Underground Design Option are a result of the higher contrasts in localized areas as a result of the installation of underground-to-overhead transition stations near sensitive viewers. Among the NNR alternative options, the NNR Alternative - MR Subroute would have the highest total mileage of high impacts. All Alternatives would be compliant with Interim VRM Class III designation.

TABLE 4.8-11 VISUAL RESOURCE RESIDUAL IMPACT SUMMARY BY ALTERNATIVE AFTER MITIGATION

ALTERNATIVE	RESIDUAL IMPACTS (MILES)		
	LOW	MODERATE	HIGH
NNR Alternative -Overhead Design Option NNR-1, NNR-2, NNR-3, NNR-4 NNR-5, NNR-6, NNR-7, NNR-8 40.4 miles	31.9	3.7	4.8
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6, NNR-7, NNR-8 47.7 miles	27.8	5.8	14.1
NNR Alternative -Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u NNR-5, NNR-6u, NNR-7, NNR-8 40.4 miles	30.8	4.3	5.3
DEIS AGENCY PREFERRED ALTERNATIVE 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	18.1	31.7	16.5

4.9 SOCIOECONOMICS

4.9.1 Methods and Impact Types

The socioeconomic impact analysis used data on wages, employment, purchases of goods and services, and total value for the Project Alternatives. These characteristics would be the primary stimulants to the local economy. Workers deriving income from the construction and operation of the Project would spend a portion of their wages in the Study Region (defined as Yakima, Kittitas, and Grant Counties). These spent wages would then circulate in the local economy, creating multiplier or ripple effects, whereby the ultimate increase to local employment and income would be a multiple of the original stimulus (number of jobs, wages of Project workers, or purchases of goods and services needed for construction). These impacts were quantified through the application of the IMPLAN model (MIG, Inc. 2011) to develop estimates of the initial employment, income, and expenditures for goods and services for the Alternatives. IMPLAN is an economic input-output model that is widely used to evaluate the impacts of projects on their regions' economies, providing estimates of impacts on employment, income, and other economic indicators.

The socioeconomic impacts of operation would be minimal because the constructed line would require relatively little operation and maintenance (O&M) expenditure. O&M would largely consist of visual inspection via helicopter and road vehicles, and periodic repair and/or replacement of worn components. The roughly 45 miles of new transmission line would be a small proportion of the Proponent's total transmission line mileage and, thus, O&M would likely be performed by existing crews with any apportionment of cost to the Project Alternatives being very small (on the order of one job per year). Therefore the socioeconomic impact analysis did not address impacts during the operating period, except for its payment of local taxes.

The socioeconomic impact analysis used a prototype project, rather than specifically analyzing the New Northern Route (NNR) Alternative and Manastash Ridge (MR) Subroute, because both are so close to one another in terms of total investment and work forces. The primary distinction among the Alternatives (NNR Alternatives and the Draft Environmental Impact Statement [DEIS] Agency Preferred Alternative) in terms of their impacts on employment and income would arise from their locations. The Alternatives with activities on the east side of the Columbia River, in Grant County, would create some of their impacts in Grant County (DEIS Agency Preferred Alternative) while the NNR Alternatives would create impacts in Yakima and Kittitas counties with very little effect in Grant County. To facilitate a comparison of impacts among all Alternatives, differences were qualitatively assessed, based on the impacts of the prototype project.

4.9.2 Estimated Construction Cost (by Alternative)

Estimated construction costs vary slightly between both Project alternatives due to their different lengths, configuration of poles and roads, and terrain. Estimates of the total cost of construction of the NNR Alternative and the NNR Alternative with the MR Subroute are $17.3 million and $19.8 million, respectively. Construction costs are summarized in Table 4.9-1. These estimates show that approximately $7.3 to $8.3 million of the total cost would be for purchases of goods and services.

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TABLE 4.9-1 SUMMARY OF MILEAGE BY COUNTY, CONSTRUCTION COSTS, AND LABOR FORCE, BY ALTERNATIVE

ALTERNATIVE	TOTAL MILES	MILES IN GRANT COUNTY	MILES IN KITTITAS COUNTY	MILES IN YAKIMA COUNTY	TOTAL COST	COST PER MILE	LABOR COST	ENGINEERING COST	COST OF PURCHASES	AVERAGE ON-SITE WORKFORCE (PERSONS)	WAGES AND BENEFITS TO WORKERS	WAGES PAID TO LOCALLY-HIRED WORKERS
NNR Alternative	40.4	2.2	27.6	10.6	$17,276,424	$427,634	$8,882,827	$1,130,233	$7,263,364	26.4	$4,033,823	$288,130
NNR Alternative with Manastash Ridge Subroute	47.7	2.2	34.9	10.6	$19,780,301	$414,681	$10,175,696	$1,294,038	$8,310,567	30.2	$4,620,934	$330,037
DEIS Agency Preferred Alternative	66.3	22.8	0	40.3	$28,908,071	$436,019	$13,701,858	$1,891,182	$13,315,031	40.7	$6,161,064	$440,076

Source: POWER 2011a, and calculations by Economic Planning Resources (EPR). EPR assumptions include $35/hour average basic wage rate, average 50-hour work weeks with double-time pay for work over 40 hours, 40 percent value of worker benefits, and 2.2 overhead multipliers by construction contractors.

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4.9.3 Workforce Requirements

The socioeconomic analysis assumed that construction of the Project would require approximately 45 workers on-site at its peak (Table 2-5) and periodic presence of off-site management and inspection personnel. Construction would take one year from start to completion, assumed to occur during calendar year 2015. During that year, the average number of on-site workers would be 23.7 and 30.2 (average of 26.4) construction workers for NNR and MR Subroute, respectively, plus approximately five visiting personnel for both alternatives.

These workers will not all be present at precisely the same location. Construction activities will likely occur at more than one location at a time as is necessary with transmission line construction. Sequencing of access road construction, foundation installation, transmission structure erection, line stringing, testing, and reclamation means that the work site is constantly moving. Construction phasing plans have not been developed, but could entail an overall approach of (1) beginning construction at one substation and proceeding sequentially to completion at the other terminal substation, (2) beginning at both substations and proceeding to a middle point, or (3) construction activities scattered over the route, depending on factors such as terrain, water crossing, weather, and timing restrictions.

4.9.4 Local Spending on Goods and Services

Local spending for Project construction and by its workers will add to demand for local goods and services, causing further increases in employment and income attributable to the Project as the expenditures are spent, circulating in the local economy. Purchases of goods and services such as transmission towers, wires, and most electronic components are expected to be made outside the Study Region, and would therefore not contribute to increased local demand. Similarly, wages paid to itinerant workers would mostly increase demand in their home areas, rather than locally, except for their local spending.

4.9.4.1 Project Construction Goods and Services

Very little of the approximately $7.2 to $8.3 million in expenditures on materials and services for construction would be spent in the Study Region. This is because major capital items needed for transmission lines and substations are generally not manufactured or sold in the Region, but will be purchased from vendors located elsewhere. Local purchases for signage, advertising, aggregate for roads and foundations, construction trailers, and miscellaneous business and government services are likely, but would be relatively small. Only $1.1 to 1.2 million of the total project materials and services costs would be for locally-provided goods and services. The amounts assumed to be purchased locally are shown in Table 4.9-2.

TABLE 4.9-2 ASSUMED SPENDING ON LOCAL GOODS AND SERVICES FOR CONSTRUCTION

INDUSTRY	PERCENT OF TOTAL NON-LABOR, NON-ENGINEERING COST[1]	PERCENT IN STUDY REGION	TOTAL LOCAL EXPENDITURE		IMPLAN SECTOR #
			NNR	NNR-Manastash Ridge Subroute	
Aggregate	0.01	100	$80,000	$90,000	26
Fencing and security	0.29	100	$20,770	$23,769	323
Preformed concrete	0.27	50	$9,586	$10,971	162
Electrical materials	79.58	2	$114,333	$130,842	266
Misc materials	0.02	75	$1,198	$1,371	330
Real estate	1.36	100	$97,461	$111,533	360
Equipment rental	14.08	50	$505,679	$578,694	365
Research	0.20	100	$14,380	$16,456	376

INDUSTRY	PERCENT OF TOTAL NON-LABOR, NON-ENGINEERING COST[1]	PERCENT IN STUDY REGION	TOTAL LOCAL EXPENDITURE		IMPLAN SECTOR #
			NNR	NNR-Manastash Ridge Subroute	
Advertising and printing	0.76	50	$27,161	$31,083	377
Signage	0.07	75	$3,595	$4,114	378
Management consultants	0.56	25	$9,986	$11,428	374
Temporary hires	1.36	100	$97,461	$111,533	382
Misc services	0.04	100	$3,195	$3,657	389
Fees	1.42	50	$51,127	$58,509	432
Totals	100.0		$1,055,934	$1,193,961	

[1]Source: Wagner 2010, with adjustments to reflect percentages of non-labor, non-engineering costs. Percent local purchases assessed by Economic Planning Resources.

4.9.4.2 Construction Worker Spending

The construction work force was assumed to consist of 90 percent itinerant specialized transmission line construction workers and 10 percent local hires. Itinerant workers would move to the area for the length of their employment at the site, living primarily in transient accommodations (hotels and RV parks), although a few may seek rental housing. This is an important consideration because wages paid to itinerant workers would mostly be saved with some of the per diem expenses (for lodging, food, and miscellaneous) paid for by the construction contractor(s). The itinerant workers' saved wages would ultimately be spent outside the Study Region, where the itinerant workers usually live, with only day-to-day living expenses being spent in the Study Region. Locally-hired workers would spend higher proportions of their wages in the Study Region.

In sum, local spending by transient construction workers and site visitors is estimated to total $1.2 to 1.4 million during the year of construction (assumed to be 2015). The assumptions for local spending are shown in Table 4.9-3.

TABLE 4.9-3 SPENDING BY ITINERANT CONSTRUCTION AND OTHER VISITING PERSONNEL

CATEGORY	DAILY EXPENDITURES NNR/NNR-Manastash	CONSTRUCTION TOTAL		IMPLAN SECTOR
		NNR	NNR-Manastash Ridge Subroute	
Number workers	23.7/30.2	23.7	30.2	
Number visitors	5	5	5	
Lodging	$40	$419,706	$512,498	411
Restaurants	$20	$209,853	$257,149	413
Entertainment	$10	$104,927	$128,574	410
Food Stores	$15	$157,390	$192,862	324
Misc (gas, etc.)	$20	$209,853	$257,149	330
Car rental (visitors only)	$50	$91,250	$91,250	362
Total spending onsite workers	$155	$155	$155	
Total daily spending	$4,017	$4,456	$5,460	
Annual spending		$1,192,979	$1,441,982	

4.9.5 Impact Types

4.9.5.1 Employment

Construction of the Project would provide an average of 23.7 to 30.2 jobs (peak of 45) for the NNR and MR Subroute, respectively, directly on-site for the one year of construction. As the workers spend their incomes in the Study Region and suppliers of goods and services needed to construct the facilities receive additional incomes and spend their increases in income on Study Region goods and services, firms in the area would hire more employees to service increased demand. These multiplier, or ripple effects, would lead to an increase in area employment above the 45 jobs provided on-site.

4.9.5.2 Income

Like impacts on employment, impacts on income would occur due to spending of wages earned by on-site construction workers and related visitors and through purchases of local goods and services needed to construct the Project. While construction wages tend to be very high compared to wages in most other industries, a relatively low proportion of construction workers would be hired from the local labor force. Similarly, purchases of local goods and services for construction would be fairly low, since most of the materials (e.g., transmission structures, electrical, and electronic components) would need to be purchased from out-of-area vendors.

4.9.5.3 Population and Housing

The increases in employment on-site and its multiplier effects in the Study Region would increase the employment base in the Study Region, thereby increasing opportunities for in-migration and reducing opportunities for out-migration). Some in-migrating workers would bring dependents (or persons who otherwise would leave the region with their dependents would remain). Therefore, the population impact of the Project would include both workers and their dependents.

Changes in migration, and hence population, would be limited due to three factors:

1) 90 percent of the jobs on-site would be filled by itinerant personnel, who do not typically bring dependents with them for temporary work assignments;
2) Unemployment levels in the region in 2015, the assumed year of construction, are expected to remain relatively high by historical standards, making it more likely that some jobs would be filled from the local labor force than by persons in-migrating (10 percent; local hires was assumed herein, but could be higher); and
3) The employment increases, like the construction period, would be temporary.

These factors would limit both population increases and demands for long-term rental and owner housing. Increased demand for transient housing (hotels and RV spaces) could be noticeable compared to limited availability in the local area.

4.9.5.4 Government Revenue

Local taxes paid due to construction and operation of the facilities will consist of sales and use taxes for materials used in construction, ad valorem property taxes on the value of the facilities, and the Washington Public Utilities Tax. In addition, lease payments for rights-of-way (ROWs) on public lands would be made, including to the U.S. Bureau of Land Management (BLM), the military for use of Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) lands, U.S. Bureau of Reclamation (Reclamation), and Washington State Department of Transportation (WSDOT).

4.9.6 Impact Results and Summary by Alternative

4.9.6.1 No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed or operated. No impacts on socioeconomics would occur.

4.9.6.2 NNR Alternative Impacts

Employment

Impacts on employment would be generally very small under any Route Alternative. The impacts of 23.7 to 30.2 direct jobs would transfer, including all ripple effects, to a total of 58.9 to 66.3 jobs for the NNR and MR Subroute, respectively based on the IMPLAN analysis. This indicates a relatively high employment multiplier of 2.23 and 2.20. These impacts are displayed in Table 4.9-4. This would be minimal in the context of total employment in the Study Region of about 170,000 persons.

It is notable that the ripple effects on employment are relatively high. This is because the relatively high union wages paid to construction workers and accompanying high local spending would create a substantial impact per worker as their expenditures recycle in the Study Region economy. Also, much of the impact would be from spending by itinerant workers in restaurants, hotels, and food stores which pay much lower wages than construction. Thus, a fairly large number of jobs would be supported by a fairly low number of on-site workers.

TABLE 4.9-4 SUMMARY OF IMPACTS ON EMPLOYMENT, INCOME, VALUE ADDED, AND OUTPUT USING IMPLAN

CATEGORY	EMPLOYMENT	LABOR INCOME	TOTAL VALUE ADDED	OUTPUT
Project Alone				
NNR	23.7	$2,881,302	$8,874,410	$17,276,424
NNR w/Manastash Ridge Subroute	30.2	3,300,667	10,166,054	19,780,301
Ripple Effects				
Direct Effect (suppliers)				
NNR	24.0	$711,967	$1,233,984	$2,187,328
NNR w/Manastash Ridge Subroute	26.6	793,135	1,372,718	2,434,541
Indirect Effect (supply chain)				
NNR	3.2	$142,559	$217,396	$406,740
NNR w/Manastash Ridge Subroute	3.6	158,797	242,242	452,604
Induced Effect (re-spending of household income)				
NNR	5.2	$201,116	$351,862	$579,080
NNR w/Manastash Ridge Subroute	5.9	225,723	394,916	649,933
Total Ripple Effects				
NNR	32.5	$1,055,641	$1,803,242	$3,173,148
NNR w/Manastash Ridge Subroute	36.1	1,177,655	2,009,877	3,537,077
Total Impact				
NNR	58.9	$3,936,943	$10,884,287	$20,449,572

CATEGORY	EMPLOYMENT	LABOR INCOME	TOTAL VALUE ADDED	OUTPUT
NNR w/Manastash Ridge Subroute	66.3	4,478,322	12,175,931	23,317,378
Impact Multiplier				
NNR	2.23	1.37	1.23	1.18
NNR w/Manastash Ridge Subroute	2.20	1.36	1.20	1.18

The impacts described in Table 4.9-4 are totals for the overall Study Region. Some differences in impacts among Counties would exist due to the Columbia River which acts to constrict movement between Yakima, Kittitas, and Grant counties. With most of the construction taking place in Kittitas County and with workers most likely living for the longest time in the Ellensburg area, Kittitas County would likely experience the most beneficial impacts.

Income

The impacts of the Project on labor income would be lower, compared to the original labor income derived from construction, than the impacts on employment. This is due primarily to (1) the lower average wage in affected industries described in the previous section and (2) to the Project's purchases of labor and materials largely from outside the Study Region (i.e., approximately 10 percent of labor and materials expenditures would be injected into the local economy). Total labor income would increase by $3,936,943 to $4,478,322 compared to wage and benefit payments of $2,881,302 / $3,300,667 for an income multiplier of 1.36 to 1.37 for the NNR and MR Subroute, respectively.

Population and Housing

Only about three of the on-site construction jobs would be filled by workers from the Study Region labor supply. The remainder, plus the average of five visiting personnel, would be filled by in-migrating or visiting workers who would not bring dependents and who would choose transient housing. It is also likely that the firms directly supplying goods and services for construction (aggregate, business services, etc., shown in Table 4.9-2) would recognize the sales to the Project as temporary and either increase the hours of existing employees or make temporary hires that would be unlikely to be filled by in-migrants.

The remaining jobs created by Project construction may not be recognized by firms as temporary due to construction and some in-migration could occur in response to this increase in employment, but would be limited by the presence of substantial numbers of unemployed local persons who would be more likely to take these jobs. A high estimate is that approximately 15 jobs created by the Project could be filled by in-migrants or by local persons who otherwise would leave the Study Region. This estimate includes the three jobs expected to be filled by local hires, and the 9 to 10 jobs created by induced and indirect effects shown in Table 4.9-4. As the Study Region employment base increases over time, these persons could remain as permanent residents even after the temporary demand increase due to Project construction is done.

Average household size in the Study Region was 2.88 in 2010 (Table 3.9-4, Section 3.9.2.3). If in-migrants bring with them households of this size, the population impact of the Project would be approximately 43 persons. This estimate is high because persons who migrate for employment opportunities generally have smaller household sizes than the general population according to 2010 Census data on household sizes of recent migrants are as yet unavailable. This represents an unnoticeable increase in the 2013 Study Region population of 380,950 (0.01 percent).

The supply of rental housing in the Study Region is somewhat tight and is expected to remain so, as the housing construction sector nationally is expected to continue to recover very slowly. However, with 4,149 vacant units for sale or for rent in 2010, of which 2,686 were for rent (Table 3.9-4, Section 3.9.2.3), the local rental and ownership housing supply can readily accommodate an increase in demand of an estimated 15 units.

Itinerant workers at the site would add to the temporary population of the Study Region, particularly in nearby communities that have available transient housing. These persons would number an average of approximately 45 persons: 40 in-migrating construction workers on-site, plus about five visitors; during the peak period of construction. Some of the itinerant construction workers would travel via RVs, increasing demand for RV spaces, with the remainder seeking hotel rooms or a few renting temporary housing.

As described in Section 3.9.2.3, RV and hotel spaces close to the Alternative Routes are likely to be available in Yakima, Ellensburg, and Vantage. If demand for RV and hotel units originates in one location along the route (such as if construction proceeds from one end to the other), the demand increase due to the Project could strain the nearby supplies, and workers may have to find hotel or RV spots at greater distance, such as in the Moses Lake and Quincy (Grant County) areas and possibly in the Richland area in Benton County, or share hotel rooms. If construction activities occur at two or more locations such as proceeding simultaneously from each terminus, demand increases would be spread to a larger area of nearby supply and impacts on hotel and RV supply and demand would be substantially less. Because hotel and RV supplies experience frequent full occupancy, especially in the popular tourist months of summer, some upward pressure on nightly rates can be expected due to construction of either Alternative; thus, this increase is mitigated by the market mechanism of pricing. However, the increased demand would be quite small proportionately compared to baseline demands, as would any resultant price increases.

Revenue and Fiscal Effects

Sales and Use Taxes

Sales and use taxes would be paid to the state of Washington and to the counties in which the facilities are constructed. These taxes would apply to the value of purchases of material goods for Project construction and by workers at jobs created due to the Project. Although beneficial to the receiving jurisdictions, the projected sales and use tax revenues would be very small relative to total jurisdiction revenues.

An estimated $188,244 in sales and use taxes are expected to be paid due to the project, shown in Table 4.9-5. These estimates are based on the local and state sales and use tax rates, the value of local purchases of Project construction in Table 4.9-1 and itinerant worker spending effects shown in Table 4.9-4 and are adjusted to reflect likely locations of purchases. The estimates are conservative, however, since they do not include spending arising due to the multiplier effects on personal income or spending by local residents who work on the construction site. As a result of construction, the MR Subroute would result in approximately 18 percent more total sales and use tax revenues than the NNR Alternative.

TABLE 4.9-5 SALES AND USE TAXES PAID TO COUNTIES

AREA / REGION	TAX RATE	CONSTRUCTION PURCHASES %	PER DIEM SPENDING %	SALES AND USE TAX REVENUE					
				CONSTRUCTION PURCHASES		PER DIEM SPENDING		TOTAL TAXES	
				NNR	NNR-MANASTASH	NNR	NNR-MANASTASH	NNR	NNR-MANASTASH
Grant County	0.014	10%	10%	$1,183	$1,337	$1,670	$2,018	$2,853	$3,355
Kittitas County	0.015	50%	55%	$6,336	$7,164	$9,842	$11,891	$16,178	$19,054
Yakima County	0.014	30%	30%	$3,548	$4,012	$5,011	$6,053	$8,558	$10,065
State	0.065	100%	100%	$54,909	$62,086	$77,544	$93,683	$132,452	$155,769
Total				$65,975	$74,599	$94,066	$113,645	$160,041	$188,244

Note: Assumes 80% of total project purchases of $1,816,594 are spent on taxable items and the entire total of $1,695,527 of per diem spending is subject to sales and use tax.

Property Taxes

Transmission facilities spanning more than one county in Washington are assessed by the Washington Department of Revenue (WDOR) Utility Section. Property taxes accrue to the counties in which the assessed values are assigned. For preliminary property tax estimating, the capital costs of the facilities shown in Table 4.9-1 are used as proxies for the value of the ultimate assessment by WDOR, along with mileage of ROW in each county. Property tax rates discussed in Section 3.9.2.5 were used, with only the overall county property tax rates used. Additional property taxes would be paid to special districts in which Project facilities are located. The resulting estimates of property taxes use current rates and are for the first year of tax payments only. After the first year, assessments would change as factors such as revenue assignable by the state to the facilities and depreciation become important in the actual assessments. The estimates in Table 4.9-6 indicate a total of $92,711 to $191,063 in property taxes would be paid to the counties and the state in the first taxable year. The DEIS Agency Preferred Alternative would result in the most property tax payments and the NNR Alternative the least.

TABLE 4.9-6 PROPERTY TAXES PAID TO COUNTIES AND STATE, BY ALTERNATIVE ROUTE[1]

AREA / REGION	NNR ALTERNATIVE	NNR ALTERNATIVE WITH MANASTASH RIDGE SUBROUTE	DEIS AGENCY PREFERRED ALTERNATIVE*
Total Cost	$17,276,424	$19,780,301	$28,908,071
Total Miles	40.4	47.7	66.3
Grant	2.2	2.2	22.8
Kittitas	27.6	34.9	0
Yakima	10.6	10.6	40.3
Percent in County			
Grant	5.4%	4.6%	34.4%
Kittitas	68.3%	73.2%	0.0%
Yakima	26.2%	22.2%	60.8%
Property Taxes			
Grant	$4,167	$4,040	$44,028
Kittitas	$27,663	$33,920	$0
Yakima	$19,223	$18,641	$74,517
Total Counties	$51,052	$56,601	$118,544
State	$41,659	$47,473	$72,519
Total State and Counties	$92,711	$104,074	$191,063

*Agency Preferred Alternative [1]Note: Property Tax Rates (per $1,000); Grant - 4.428782; Kittitas - 2.343744; Yakima - 4.240756; State - 2.855378, 2.337409, and 2.511611 for Grant, Kittitas, and Yakima counties, respectively.

Public Utility Taxes

Public Utility Taxes would accrue to the state due to operation of the Project. However, the impact is assessed as zero. This conclusion follows from the nature of the Public Utility Tax, which is paid on the basis of electricity sales to customers. Electric service is provided according to local demand. The Project Alternatives would have no effect on ultimate demand for electricity because, if no action were undertaken, other methods to deliver electricity to customers would almost certainly be implemented. Thus, Public Utility Taxes would not change under any of the Project Alternatives or the No Action Alternative.

Right-of-Way Lease Payments

Payments for use of public lands would be made under each alternative primarily for use of lands under management by Reclamation, BLM, JBLM YTC, and WSDOT. At this preliminary time, no estimates of the amounts of payments to Reclamation or WSDOT can be made. This is because Reclamation and WSDOT calculates its lease payment based on the appraised value of land which is done at the time of an application and cannot be known at this time. However, very little Reclamation or WSDOT land is crossed under any alternative.

The BLM publishes its ROW rent payment schedule. Based on this schedule, an assumed average ROW width of 150 feet and estimated mileage of BLM land crossed under each Alternative Route, the annual rent payments in 2015 are shown in Tables 4.9-7 and 4.9-8. The rental rates escalate each year by 1.9 percent. These estimates indicate $7,806 in rent payments to BLM under both NNR alternatives.

TABLE 4.9-7 BLM ROW BY ALTERNATIVE

COUNTY	2013 RENT PER ACRE	DISTANCE (MILES)		
		NNR ALTERNATIVE	NNR ALTERNATIVE WITH MANASTASH RIDGE SUBROUTE	DEIS AGENCY PREFERRED ALTERNATIVE
Grant	$68.97	0	0	4.4
Kittitas	$172.43	1.8	1.8	0
Yakima	$51.73	2.3	2.3	1

Source: BLM 2011.

TABLE 4.9-8 ANNUAL ROW RENTAL PAYMENTS TO BLM, 2015

COUNTY	NNR ALTERNATIVE	NNR ALTERNATIVE WITH MANASTASH RIDGE SUBROUTE	DEIS AGENCY PREFERRED ALTERNATIVE
Grant	$0	$0	$5,517
Kittitas	$5,643	$5,643	$0
Yakima	$2,163	$2,163	$940
Total	$7,806	$7,806	$6,457
Average ROW width (feet)	150	150	150
Acreage per mile of ROW	18.18	18.18	18.18

Source: BLM 2011.

Substantial line distances would traverse the JBLM YTC. In order to develop the rental price for substantial usage, the U.S. Army Corp of Engineers (USACE) Seattle District, which is responsible for real estate transactions at the JBLM YTC, would need to assess the fair market value of the land within the ROWs. For non-substantial ROW usage, the BLM price schedule used in Table 4.9-7 could be used as a proxy for the ultimate charges for ROW usage on JBLM YTC lands (Petersen 2011).

By using the BLM schedule in Table 4.9-7 and the distances in the JBLM YTC for each alternative (see Table 2-2), it was determined that BLM fees would likely be well under $10,000 annually. This non-substantial use means that the BLM schedule of costs would probably be a good proxy for the ultimate price charged by the USACE for JBLM YTC ROWs for the Project.

The Project would have nearly imperceptible impacts on hospitals, schools and law enforcement as the Project would not cause a noticeable increase in the permanent population (totaling approximately 43 people in the three-county Study Region). Project construction and maintenance activities have the potential to introduce a fire risk in a high-danger zone, primarily dry grassland that is susceptible to wildfire and sparsely populated. Best management practices would be followed by construction and maintenance workers to reduce risk of fires. Low to negligible impacts on local or regional fire fighting services would be expected for all alternatives. O&M activities would have no impacts on socioeconomic resources.

Substation equipment upgrades would occur within the existing Pomona Heights and Vantage substation footprints and would have no impact on socioeconomic resources.

4.9.4.2 Impact Summary by Alternative

Table 4.9-9 presents a summary of the impacts for the NNR Alternative and the DEIS Agency Preferred Alternative.

Socioeconomic impacts on the Study Region economy would be predominantly beneficial, as job opportunities increase due to any of the Project Alternatives. Impacts as a whole would not greatly vary between the Alternatives. This lack of distinction arises because (1) impacts are so low as to be nearly imperceptible themselves and (2) the scale of construction (duration, employment, and purchases of local goods and services) varies only moderately between the NNR Alternative options, as was shown in Table 4.9-1. Average on-site employment would total between 23.7 and 30.2 workers among alternatives, and the total cost of construction would range from $17.2 million to $19.8 million. The distinction in the impacts between the NNR Alternative options arises from the 7.3 miles in added length of the NNR Alternative -MR Subroute, which means slightly more investment and employment would be needed. However, such small differences in the initial stimuli to the regional economy caused by the alternatives would not create discernibly different socioeconomic impacts, when viewed region-wide or even by community.

Long-term housing supplies (rental and owner housing) are adequate to accommodate small increases in demand under any alternative. However, the Grant County supply of transient housing (RV spaces and hotel rooms) near the Alternate Routes is considerably lower than is the case in Yakima and Kittitas counties. Therefore some demand for accommodations for transient workers may not be met by available supplies in peak season (summer and fall) for RV parks and hotels if construction activities are near the Vantage terminus at this time. At such times, longer commutes from more distant housing may be required, potentially higher prices, and/or sharing of quarters may become necessary for some transient workers. In any event, this impact would be very temporary, and not significant.

TABLE 4.9-9 SOCIOECONOMIC IMPACT SUMMARY OF ALTERNATIVES

ALTERNATIVES	IMPACT ON EMPLOYMENT AND INCOME	IMPACT ON POPULATION	IMPACT ON HOUSING	IMPACT ON GOVERNMENT REVENUE[1]
NNR Alternative – Overhead and Underground Design Options NNR-1, NNR-2, NNR-3, NNR-4 NNR-5, NNR-6, NNR-7, NNR-8 40.4 miles	Total of 58.9 jobs and $3.9 million in personal income.	An impact of an increase in population of 43; nearly imperceptible in light of baseline population.	Temporary and very slight increase in demand and potential slight crowding and/or price increases during peak tourist season of summer and fall.	Very small increases to sales and use and property taxes, as well as to BLM, Reclamation, and JBLM YTC fees for ROW.

ALTERNATIVES	IMPACT ON EMPLOYMENT AND INCOME	IMPACT ON POPULATION	IMPACT ON HOUSING	IMPACT ON GOVERNMENT REVENUE[1]
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6, NNR-7, NNR-8 47.7 miles	Total of 66.3 jobs and $4.5 million in personal income.	Impacts approximately equal to NNR Alternative.	Slightly greater impacts on crowding and prices in hotels and RV parks than NNR with no MR, but minimal.	Slightly greater government tax revenues than NNR Alternative, but still minimal.
DEIS AGENCY PREFERRED ALTERNATIVE 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	Temporary increase to Study Region employment of 88 jobs. Noticeable proportion of jobs in Grant County.	Temporary increase to Study Region labor income of $5.5 million. Noticeable proportion of jobs in Grant County.	Temporary increase of demand for long-term housing of up to 20 units. Increase in demand for transient (RV or hotel) accommodations of up to 50 spaces/rooms. Potential excess demand in Grant County.	County Property Tax:$118,544 -State Property Tax;$72,519 -BLM ROW Rent:$6,457

[1]Reliable estimates of the total costs of ROW payments for alternatives that would use JBLM YTC land cannot be made at this time because actual field appraisals by the USACE for JBLM YTC crossings needs to be performed for all alternatives.

4.9.7 Mitigation Measures

Impacts on socioeconomic resources are assessed as generally negligible. Impacts that may occur are mostly characterized as positive (increased demand for local goods and services, employment and income). Some potential for excess demand for transient housing (RV spaces and hotel rooms) could occur to the Alternative Routes in the peak summer/fall months, but such impacts would be temporary and ameliorated by market mechanisms if providers raise prices in response to increased demand. Since no appreciable socioeconomic impacts would occur, mitigation measures would not be needed.

4.9.8 Property Values

4.9.8.1 General Property Effects and Compensation

Construction of the proposed Project would require new ROWs that would involve a combination of ROW grants and easements between the Proponent and federal, state, and local governments; other companies (e.g., utilities); and private landowners. ROWs for transmission facilities on private lands would be obtained in fee simple or perpetual easement by Pacific Power.

The effect that a transmission line easement may have on property is an issue that would be negotiated between the land owner and the Proponent during the easement acquisition process. The easement acquisition process is designed to provide fair compensation to the landowner for the right to use the property for transmission line construction and operations. Pacific Power would establish land valuation for affected lands based on county assessor valuation, market research, parcel appraisal, and zonal appraisal information.

The required transmission line easements may encumber the affected ROW area with land use limitations. Each easement would specify the extent of any encumbrances. Typical transmission line easement conditions include the right to clear the ROW and keep clear of trees, structures, including structure-supported crops, brush, vegetation and other potential fire and electrical hazards. Some non-structure supported agricultural crops may be allowed on some easement properties, depending on height.

The impact of introducing a new ROW for transmission structures and lines can vary depending on the placement on the ROW in relation to the property's size, shape, and the location of existing improvements. A transmission line may affect the utility of a portion of property if the line effectively severs an area from the remaining property. The introduction of a new transmission line can also have impacts on farms by reducing the acreage available for cultivation and in some cases disrupting existing harvest patterns with new transmission line structures affecting the farmer's ability to maneuver equipment in the vicinity of the immediately affected area. A new transmission line also has the potential to affect farm operations that employ pivot irrigation systems (see Section 4.4 - Land Use and Section 4.16 - Public Health and Safety). The Proponents would work with individual landowners to coordinate the timing of construction so as to minimize short-term impacts to agriculture.

The placement of a transmission line across a property also affects the visual quality. Each individual landowner has their own perception of what is visually acceptable or unacceptable (see Section 4.8 - Visual Resources). These factors, as well as any other elements unique to the property, are generally taken into consideration during the easement acquisition process.

4.9.8.2 Property Value Impacts

Research into the relationship between electric transmission facilities and local property values has employed research methods that can, for the most part, be divided into surveys and opinion-based studies or quantitative studies which are largely based on comparisons of market data. These studies have resulted in a wide range of findings that reflect the different study approaches employed, as well as the unique characteristics of the particular case or cases being evaluated. From the 1950s to the late 1980s, almost all reported research concluded that transmission lines have little or no effect on property values. More recently, the popular press and academic and professional literature have tended to support the idea that proximity to transmission lines may affect the desirability and, therefore, the value of residential property (Colwell 1990; Delaney and Timmons 1992; Hamilton and Schwann 1995; Cowger et al.1996). Some observers linked this general change in perspective to increased concerns regarding potential electric and magnetic field-related health effects, but a nationwide survey of real estate appraisers suggest that, for the most part, potential negative effects on property values tend to be related to the visual impact of transmission line facilities (Delaney and Timmons 1992). This nationwide survey found that 84 percent of the surveyed appraisers believed that property values are negatively affected by transmission facilities, with an average decrease in value of 10 percent. Ten percent of those surveyed felt transmission lines did not affect property values, while the remaining six percent felt they had a positive impact (Delaney and Timmons 1992).

A study "Power Lines and Property Values Revisited" (Pitts and Jackson 2007) concluded that impacts of high voltage transmission lines on the value of residential property has been studied extensively and the impacts are not easily measureable. The study states that research shows the effects of high voltage transmission lines on residential properties are varied and are determined by five interplaying factors: proximity to towers and lines; the view of towers and lines; the type of structures; the size of structures; and the appearance of easement landscaping and surrounding topography. Many studies indicate that transmission lines have no significant effect on residential property values. Other studies, however, have shown a small diminution in value attributable to the close proximity of the transmission line. Studies report an average discount of between one and ten percent of property value. Reasons cited for the diminution in value include: visual unattractiveness of the lines; potential health hazards; disturbing sounds; and safety concerns. The impacts diminish as the distance from the line increases and disappear at a distance of approximately 200 feet from the lines (Pitts and Jackson 2007).

Pitts and Jackson (2007) also interviewed realtors and appraisers in several central California communities. Approximately half of the realtors and appraisers interviewed said they had not observed negative impacts on either residential sale prices or days on the market due to the presence of power lines. The remaining realtors and appraisers had observed negative impacts on homes adjacent to a power line

ROW, with price discounts ranging on average between two and seven percent. Many realtors and appraisers indicated that some buyers may consider power lines an eyesore and a nuisance, but that other buyers did not. One realtor stated that "external factors such as power lines have less of an effect on lower-end homes than on luxury properties." The Pitts and Jackson study (2007) concluded that the impacts from power lines, as well as other negative externalities, depend on many factors, including market condition, location and personal preference.

Another study, "Electric Transmission Lines: Is There an Impact on Rural Land Values?" (Jackson 2010), addresses the potential impacts of transmission lines to rural land used for agriculture or recreational purposes. Jackson studied several hundred sales of rural land in central Wisconsin that involved properties with a transmission line easement for lines ranging in voltage from 115 kV to 345 kV. The general finding of this study showed that there were small (1.11 to 2.44 percent) discounts that could be attributable to the presence of the lines and the encumbrances of the properties by the easements. Neither of these small differences was considered statistically significant.

In a publication, "Environmental Impacts of Transmission Lines" (Public Service Commission of Wisconsin 2009), the Commission indicated that data from studies from the 1950s evaluating the potential change in property values due to the proximity to a new transmission line is often inconclusive. The publication states that a review of the studies indicates that transmission lines have the following effects on property values:

- The estimated reduction in the sale price for single-family homes has ranged from 0 to 15 percent;
- Adverse effect on the sale price of smaller properties could be greater than effects on larger properties;
- Other factors, such as schools, jobs, lot size, house size, neighborhood characteristics, and recreational facilities tend to have a greater effect on sale price than the presence of a transmission line;
- Sale prices can increase where the transmission line ROW is attractively landscaped or developed for recreation (i.e., hiking, hunting, snowmobiling);
- Effects on price and value appear to be greatest immediately after a new transmission line is built or an existing ROW is expanded. These effects appear to diminish over time and over generations of property owners;
- Effects on sale price have most often been observed on property crossed by or adjacent to a transmission line, but effects have been observed for properties farther away from a line; and
- Agricultural values are likely to decrease if the transmission line structures are in a location that inhibits farm operations.

Few studies have addressed the impacts of transmission lines on the value of commercial and industrial properties. Those that have done so generally find the impacts are less than the impacts of residential properties. In interviews with appraisers, real-estate brokers, and owners and managers of commercial and industrial parks, Chapman (2005) found for the most part that the presence of a transmission line had little effect on market prices for commercial and industrial properties.

A 2003 Electric Power Research Institute (EPRI) study, " Transmission Lines and Property Values: State of the Science," stated that differences in location and time of data collection, as well as research design, make direct comparisons of results from the various studies very difficult. Although quantitative generalizations from studies cannot be reliably made, the following conclusions from studies seem to be similar across the board (EPRI 2003):

- There is evidence that transmission lines have the potential to decrease nearby property values, but this decrease is usually small.
- Lots adjacent to the ROW often benefit. Lots next to adjacent lots often have value reduction.
- Higher-end properties are more likely to experience a reduction in selling price than lower-end properties.
- The degree of opposition to an upgrade project may affect size and duration of the sales-price effects.
- Setback distance, ROW landscaping, shield of visual and aural effects, and integration of the ROW into the neighborhood can significantly reduce or eliminate the impacts of transmission structures on sales prices.
- Although appreciation of property does not appear to be affected, proximity to a transmission line can sometimes result in increased selling times for adjacent properties.
- Sales-price effects are more complex than they have been portrayed in many studies. Even grouping adjacent properties may obscure results.
- Effects of a transmission line on sales process of properties diminish over time and all but disappear in five years.
- Opinion surveys of property values and transmission lines may not necessarily overstate negative attitudes, but they understate or ignore positive attitudes.

The EPRI (2003) study points out that one of the difficulties in determining the impact of property values is the wide range of methodologies used to measure impacts. Unique project characteristics that need to be taken into consideration when assessing the potential effects of transmission line structures on property values include the type and height of the structures, the distance and view from the potentially affected property, intervening topography and vegetation, and the property market and type of landscape involved.

4.10 ENVIRONMENTAL JUSTICE

4.10.1 Methods and Impact Types

Following the guidelines for environmental justice (EJ) evaluations (EPA 2010), the objective of the impact analysis was to identify any populations of minorities or low-income persons that could be disproportionally affected by the Project New Northern Route (NNR) Alternatives. The results of analyses of race/ethnicity and low-income statuses for Census Block Groups in which the Alternative Routes are located or are within three miles were summarized in Section 3.10. The primary outcomes of the analysis were that (1) overall, the NNR Alternative route segments traverse some Block Groups with substantially above-average presence of Latinos, but not other minorities and low-income persons, relative to the Study Area (comprised of Grant, Kittitas, and Yakima counties) and (2) because the set of Census Block Groups traversed by the NNR Alternative without the Manastash Ridge (MR) Subroute and the NNR Alternative with the MR Subroute are identical, there are no distinctions between the two at the Census Block Group level. There are also no distinctions between the Design Options; therefore, the NNR Alternative without the MR Subroute Design Options are not distinguished in the discussion below.

This section provides more detail on EJ impacts by identifying the Census Block Groups that have particularly high proportions of minority or low-income populations and identifying any specific communities within those Census Block Groups.

4.10.2 Impact Level

4.10.2.1 Minority Populations

As previously discussed in Section 3.10, the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute segments are all within three miles of the same Census Block Groups. Furthermore, the only difference in the routes, MR-1, is not within three miles of any communities. Therefore, no differences between the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute exist in terms of EJ impacts.

The Block Groups with particularly high proportions of minority populations were identified. Census Block Groups with 150 percent of the proportion of minority groups in the Study Area reference region were identified. The resulting list of potentially affected Block Groups included only the Block Groups with over 60 percent Latino population. These were (1) the Block Groups within Census Tracts 2 and 6 entirely within the City of Yakima and with their closest areas to the alternative routes being about three miles south and southeast of the Pomona substation and (2) Block Group 4, Census Tract 114.02, in Grant County which contains the Vantage substation terminus of both NNR alternative routes. In between the Vantage and Pomona Substations, no appreciable EJ populations exist. Table 3.10-1 shows these Census Block Groups. Thus, given the substation location already established, it would not be possible to route the transmission line anywhere without being within three miles of these Census Block Groups. Therefore, no impact on EJ populations would exist in these communities.

At the eastern terminus at the Vantage substation, the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute route would be within Block Group 4, Census Tract 114.02 in Grant County, but this Block Group is extremely large. The nearest concentrations of population are in Mattawa and Vantage, both of which are greater than three miles from the Project area. Therefore, no impacts on EJ populations in this Block Group would occur.

4.10.2.2 Low Income Populations

As described in Section 3.9.4, overall, the Project area has somewhat more poverty than the Study Area (Grant, Kittitas, and Yakima counties). The Study Area population included 19.2 percent of persons who had incomes below the poverty level in 1999. For all Census Block Groups within three miles of the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute, the percentage was slightly lower, at 18.2 percent. As with the racial and ethnic analysis, there was no difference between the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute in terms of what Census Block Groups are within three miles.

As with the analysis for race and ethnicity, the next step in the evaluation was to examine each Alternative Route and develop lists of potentially affected Block Groups. Block Groups with 150 percent of the proportion of persons with incomes below the poverty threshold were selected as potentially affected. With the Study Area proportion being 19.2 percent, the selection of Block Groups with over 28.8 percent of their population with incomes below the poverty level is the 150 percent threshold; similarly, Census Block Groups with over 36.3 percent of population being under twice the poverty threshold were included.

The resulting list of potentially affected Block Groups was the same for the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute. Eight Census Block Groups were included under these criteria: the same Census Block Groups as identified under the race and ethnicity analysis, plus one Census Block Group in Census Tract 1 in the City of Yakima (south of Census Tract 2). Table 3.10-2 shows these Census Block Groups. The Census Block Groups with unusually high proportions of population in poverty are located greater than three miles, to the south and southeast, from the Pomona Heights Substation and at the Vantage Substation terminus.

The result was that in no case were there appreciable low-income communities within three miles of the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute. The nearest communities nearest the eastern terminus, in Block Group 1, Census Tract 9814, in Grant County, are Vantage and Mattawa, both of which are more than three miles from the Project area. Therefore, there would be no impacts on EJ populations from a low-income perspective from development of either of the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute.

4.10.3 Impact Results and Summary by Alternative

4.10.3.1 No Action Alternative

Since no construction or operations would occur, no impacts on EJ would occur under the No Action alternative.

4.10.3.2 Impact Summary by Alternative

Because the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute and areas within a three mile radius include identical Census Block Groups, at the Block Group level of analysis, no differences in impacts on EJ populations would occur. At a more detailed geographic level, the same result pertains: the impacts are the same and insignificant. These impacts are summarized in Table 4.10-3.

Census Block Groups in rural areas such as most of the local area are very large. In many cases most of the area of the Block Groups is outside a three mile distance from the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute. Thus, the presence of a substantially large proportion of minority and/or low-income persons in the Block Groups does not necessarily mean that there are concentrations of such communities actually in proximity to the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute. Upon closer examination of the potentially affected Census Block Groups, it was determined that no significant impacts on EJ populations would occur under with either the NNR Alternative without the MR Subroute or the NNR Alternative with the

MR Subroute. The DEIS Agency Preferred Alternative would have a slightly higher impact due to the inclusion of one additional potentially affected Block Group of minority and/or low-income persons.

TABLE 4.10-1 EJ IMPACT SUMMARY OF ALTERNATIVES

ALTERNATIVES	QUANTITATIVE DATA	
	IMPACT ON RACIAL OR ETHNIC MINORITIES	IMPACT ON LOW-INCOME PERSONS
NNR Alternative - Overhead and Underground Design Options NNR-1, NNR-2, NNR-3, NNR-4 NNR-5, NNR-6, NNR-7, NNR-8 40.3 miles	No significant impact.	No significant impact.
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6, NNR-7, NNR-8, MR-1, 47.7 miles	No significant impact.	No significant impact.
DEIS AGENCY PREFERRED ALTERNATIVE 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	No significant impact. Slightly higher impact from DEIS Agency Preferred Alternative, due to inclusion of one additional potentially affected Block Group of minority persons	No significant impact. Slightly higher impact from DEIS Agency Preferred Alternative, due to inclusion of one additional potentially affected Block Group of low-income persons.

4.10.4 Conclusion

No significant impacts on minority or low-income populations are expected with the implementation of either the NNR Alternative without the MR Subroute or the NNR Alternative with the MR Subroute. Although, some of the Census Block Groups within three miles of the Alternatives do contain substantial populations of minority and low-income populations, appreciable concentrations of such populations are more distant than two miles, limiting the potential impact of the NNR Alternative without the MR Subroute and the NNR Alternative with the MR Subroute to insignificant. There would be no differences in impacts among the NNR Alternative without the MR Subroute, the NNR Alternative with the MR Subroute, and the DEIS Agency Preferred Alternative.

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4.11 CULTURAL RESOURCES AND NATIVE AMERICAN CONCERNS

4.11.1 Methods and Impact Types

4.11.1.1 Analysis Methods

The impact assessment methods used in this section are consistent with the requirements of the National Environmental Policy Act (NEPA), the Washington State Environmental Policy Act (SEPA), and Section 106 of the National Historic Preservation Act (NHPA), the principal federal law protecting cultural resources. Under 36 Code of Federal Regulations (CFR) Part 800, the regulations implementing Section 106, federal agencies are encouraged to coordinate compliance with Section 106 and NEPA (36 CFR Part 800.8(a)(1)). Under both NEPA and Section 106, the process entails identifying cultural resources potentially impacted by a project, determining the impacts of that project, and identifying measures to avoid, reduce, or otherwise mitigate those impacts.

The results of the first step, identifying cultural resources known to exist near each alternative, were presented in Section 3.11 and in Tables 3.11-2 and 3.11-3.

Under Section 106, a federal agency must consider the effects of its undertakings on historic properties (properties that are listed in or eligible to the National Register of Historic Places [National Register]). Cultural resources that are not eligible to the National Register may also be considered under one or more of other cultural resource authorities (e.g., Archaeological Resources Protection Act; Native American Graves Protection and Repatriation Act; American Indian Religious Freedom Act; and Executive Order 13007, Indian Sacred Sites). For this analysis, resources that are listed in or eligible to the Washington Heritage Register are also considered.

The National Register is a list of the nation's historically significant properties determined to be worthy of preservation, although not all properties worthy of preservation are listed in the National Register. To be considered eligible to the National Register, resources must meet one or more of four criteria established by the Secretary of the Interior in 36 CFR Part 60.4:

A. Are associated with events that have made a significant contribution to the broad patterns of history;
B. Are associated with the lives of persons significant in the past;
C. Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; or
D. Have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in, or determined eligible for listing in, the National Register not only must a cultural resource meet one or more of the four criteria, it must also possess integrity. Integrity is defined as the authenticity of a resource’s prehistoric or historic identity based on the survival of physical characteristics that existed during its period of use. The National Register recognizes seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. Integrity of location means that the resource has not been moved from its historical location. Integrity of design, materials, and workmanship mean that the resource’s original building materials, plan, shape, and design elements remain intact. Integrity of setting means that the surrounding landscape has changed very little since the resource’s period of importance. Integrity of feeling and association means the resource retains a link to an earlier time and place and is able to evoke that era.

Cultural resources must generally be at least 50 years old to be eligible to the National Register; however, certain cultural resources associated with more recent, exceptionally important events (e.g., the development of nuclear energy) may also be considered eligible.

Because most of the cultural resources in the Study Area have not been evaluated for National Register eligibility (see Tables 3.11-2 and 3.11-3), for this analysis unevaluated cultural resources are assumed to be eligible to the National Register unless they have been determined by a federal agency or the Washington State Historic Preservation Officer (SHPO) to be ineligible or if they are isolated artifacts (e.g., a single tin can, a single chipped stone tool). Isolated artifacts are usually determined ineligible to the National Register.

The second step, assessing impacts, includes describing impact criteria and the types of impacts to cultural resources caused by construction of an overhead or underground transmission line and related facilities (Sections 4.11.1.2 and 4.11.1.3). This step also includes a summary of the cultural resources that could potentially be impacted (Section 4.11.4).

Section 4.11.5 presents the third step, mitigation measures.

4.11.1.2 Impact Criteria

For cultural resources, including archaeological sites, architectural resources, traditional cultural properties (TCP), and other sites of concern to Native Americans, an adverse effect (equivalent to an impact under NEPA) occurs when a project may affect, directly or indirectly, any of the characteristics of the resource that qualify it for inclusion in the National Register. Adverse effects include, but are not limited to:

- Physical destruction of or damage to all or part of the property;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, which is not consistent with the *Secretary of the Interior’s Professional Standards for the Treatment of Historic Properties* and applicable guidelines;
- Removal of the property from its historic location;
- Change of the character of the property’s use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian Tribe or Native Hawaiian organization; and
- Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

For the Project, the mostly likely types of adverse effects are: 1) physical destruction or damage (physical impacts); 2) change in the resource’s character or setting (visual impacts); and 3) the introduction of visual elements that diminish the resource’s integrity (visual impacts).

Cultural resources that are eligible or potentially eligible to the National Register under Criteria A (event), B (person), or C (distinctive characteristics) may be subject to both physical impacts (or effects) and visual impacts (or effects). Most resources eligible under these three criteria are architectural resources and TCPs; less frequently are they archaeological sites. Cultural resources that are eligible to the National

Register only under Criterion D (information) are usually not impacted by visual intrusions because changes in visual setting would not be expected to reduce a cultural resource's potential to yield information important in prehistory or history. Archaeological sites are usually evaluated under Criterion D and sometimes under A; architectural resources and TCPs are less frequently evaluated under Criterion D.

4.11.1.3 Impact Types

Cultural resources within the Project area could be subject to both direct and indirect impacts; although the nature of impacts would vary depending on whether the transmission line would be overhead or underground.

For the proposed Project (New Northern Route [NNR] Alternative - Overhead Design Option, NNR Alternative-Underground Design Option, or the NNR Alternative with the Manastash Ridge [MR] Subroute), construction would include both short-term or temporary ground disturbance and long-term or permanent ground disturbance (see Chapter 2). Because cultural resources are non-renewable, any ground disturbance, whether short-term or long-term, results in permanent damage to or destruction of the resource.

Impacts related to changes in visual setting would be most likely to occur when cultural resources are visually sensitive, including archaeological sites and TCPs with petroglyphs, pictographs, burials, talus pits, rockshelters, and rock features (e.g., cairns, linear alignments). Some types of architectural resources (e.g., an undisturbed cluster of nineteenth century ranch buildings, an isolated building with a distinctive design) could also be visually impacted by the presence of a transmission line.

Indirect physical impacts to cultural resources may occur when public accessibility is increased to a previously remote area because of improved roads. Improved access may lead to increased vandalism at archaeological sites, architectural resources and TCPs.

For an overhead transmission line, direct physical impacts could result from ground disturbing activities associated with installing single pole and H-frame structures; grading or widening access roads; preparing and using pulling and tensioning sites, staging areas, and other temporary use areas; geotechnical drilling; and implementing restoration and re-vegetation measures. Ground disturbance could disturb archaeological sites and TCPs. Architectural resources could also be subject to physical disturbance, but no buildings and structures have been identified in areas of potential ground disturbance for the Project.

For an overhead transmission line, direct visual impacts could result when single-pole and H-frame structures are installed near visually sensitive TCPs and architectural resources that have retained their integrity of setting.

New and improved access along an overhead and underground transmission line may lead to increased vandalism at archaeological sites, architectural resources, and TCPs unless access is otherwise restricted, such as at the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC).

For an underground transmission line, direct physical impacts could result from ground disturbing activities associated with trenching; grading or widening access roads; staging areas and other temporary use areas; geotechnical drilling; and implementing restoration and re-vegetation measures. Ground disturbance could disturb archaeological sites and TCPs. Architectural resources could also be subject to physical disturbance, but no buildings and structures have been identified in areas of potential ground disturbance for the Project.

For an underground transmission line, direct visual impacts could result in areas that have been cleared of vegetation, changing the setting of visually sensitive cultural resources nearby. There would also be some locations (e.g., river crossings, highway crossings) where overhead lines might still be used.

New and improved access along an underground transmission may lead to increased vandalism at archaeological sites, architectural resources, and TCPs, unless access is otherwise restricted.

For this analysis, it is assumed that cultural resources within 75 feet of the centerline of a route segment would potentially be subject to both physical and visual impacts. It is assumed that cultural resources more than 75 feet from the centerline could potentially be subject to visual impacts and indirect physical impacts (i.e., vandalism), but not direct physical impacts. Overall, the amount of ground disturbance would likely be much greater for an underground transmission line than for an overhead line. However, the likelihood of there being changes in visual setting would be less for an underground transmission line, in which clearance of vegetation would be the most visible evidence, than for an overhead transmission line, in which there would be cleared right-of-way (ROW), tall structures, and conductors visible from nearby cultural resources.

The Washington Department of Archaeology and Historic Preservation (DAHP) Washington Information System for Architectural and Archaeological Records Data (WISAARD) database was the initial primary source of information on archaeological and architectural resources in the Project area. In this analysis it is acknowledged that:

- Boundaries of previously recorded sites are sometimes not well defined; and
- Site data may change as nearby projects increase the number of known sites in the Project vicinity.

The Yakama Nation Cultural Resources Program (YNCRP) recently conducted cultural resource surveys on federal land along the NNR and Alternative D (Camuso and Lally 2014).

Previously undocumented archaeological sites discovered during construction (see Section 4.11.5) may require that construction activities be shifted more than 75 feet from the centerline to avoid impacts. Studies have been performed by the YNCRP and are being performed by the Confederated Tribes of the Colville Nation to identify TCPs and other culturally sensitive locations within the Project area. Because of the extreme confidentiality of these studies, only limited information is available about TCPs that could be impacted by Project route segments.

4.11.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

The impact levels for the cultural resource impact assessment are defined as follows:

High
A high level of impact to cultural resources would result if the construction, operation, or maintenance of the transmission line has the potential to cause a substantial ground disturbance or adverse visual change to known cultural resources that are listed in or eligible for the National Register, to cultural resources that have not been evaluated for National Register eligibility, and on land with a high potential for containing cultural resources that has not been surveyed for cultural resources.

Moderate
A moderate impact to cultural resources would result if the construction, operation, or maintenance of the proposed Project would cause ground disturbance or visual changes on land with a moderate potential for containing cultural resources that has not been surveyed for cultural resources.

Low
A low impact to cultural resources would result if the construction, operation, or maintenance of the proposed Project would potentially cause any amount of ground disturbance or visual change on land that has been surveyed for cultural resources and appears not to contain any cultural resources or land that has not been surveyed for cultural resources and has a low potential for containing any.

No Identifiable
No identifiable impact would be indicated where no measurable or suspected adverse impact would occur to any cultural resources. These areas would include only land where past disturbance, either human-caused or natural, precludes any possibility of containing intact cultural resources.

Other factors could be used to differentiate the level of impacts on cultural resources (e.g., site density, site size, site type). However, inconsistencies over the past 50 years in how data were recorded by archaeologists means that such an analysis might not be reliable.

4.11.3 Impacts Common to All Route Segments and Design Options

Physical Impacts
It can be assumed that the Project has the potential to cause physical damage to archeological sites in each of the route segments. Even after areas have been surveyed for cultural resources, there would still be potential for undiscovered cultural resources because some archaeological sites are obscured by vegetation or are deeply buried. Physical damage to architectural resources is not expected to occur in any of the route segments because there would be no buildings within 75 feet of the centerline of any route segment except for the Vantage Substation.

Physical impacts could occur at TCPs within the 150-foot ROW of a route segment.

Visual Impacts
As most archaeological sites that are determined to be eligible to the National Register have received that determination because of their potential to contain important information about our past (Criterion D), changes in visual setting at an archaeological site would be unlikely to be considered an impact. Therefore, none of the route segments would have visual impacts on archaeological sites that are eligible to the National Register only under Criterion D.

Visual impacts to as yet undocumented architectural resources and to TCPs that are eligible to the National Register are possible near some of the route segments.

Native American Concerns
Transmission structures have the potential to cause physical and visual impacts on TCPs and other resources of special concern to Native Americans. Such resources have been identified at some, but not every, route segment. Consultation by the U.S. Bureau of Land Management (BLM) is on-going. Refer to Section 3.11.4.5 for more information on Native American Rights and Interests.

4.11.4 Impacts to Specific Route Segments and Design Options

4.11.4.1 Route Segment NNR-1

Route Segment NNR-1 is 2.4 miles long. Most of the land is privately owned and some is managed by the Bureau of Reclamation (Reclamation). Route Segment NNR-1 is very similar to Route Segment 1a as described in the Draft Environmental Impact Statement (DEIS).

Physical Impacts
The total amount of land within 75 feet of the centerline is 44 acres. Short-term and long-term ground disturbance along this route segment would total 10.9 acres. None of the land within 75 feet of the centerline of Route Segment NNR-1 has been surveyed for cultural resources. This route segment crosses a portion of one recorded prehistoric archaeological site, although the boundaries of this site are not well defined. Because of the generally low density of prehistoric archaeological sites in nearby areas, physical impacts are anticipated to be low with a somewhat higher probability of encountering sites near drainages.

No architectural resources have been identified within 75 feet of the centerline. No TCPs have been reported within 75 feet of the centerline, although TCP studies are on-going.

Overall, the potential for physical impacts to archaeological resources along Route Segment NNR-1 is moderate. There are no identifiable physical impacts to architectural resources. The potential for physical impacts to TCPs along Route Segment NNR-1 is anticipated to be low, although TCP studies are on-going.

Visual Impacts
None of the land within 250 feet of the centerline of Route Segment NNR-1 had been previously surveyed for cultural resources prior to the completion of this Supplemental Draft Environmental Impact Statement (SDEIS). There is one previously recorded cultural resource, an unevaluated prehistoric archaeological site, within 250 feet of the centerline. Archaeological sites are typically not sensitive to visual impacts. This particular site is very large and contains features that may be visually sensitive, although it is unknown where these features are in relation to the Project.

Undiscovered archaeological sites, should they exist, would probably not be visually sensitive and there are no documented architectural resources in the area. Also, the presence of the existing Pomona-Wanapum 230 kilovolt (kV) transmission line, Pomona Heights to Union Gap 230 kV transmission line, and Pomona Heights Substation would likely have already compromised integrity of setting for visually sensitive resources identified in the future.

No TCPs have been identified within 250 feet of the centerline of Route Segment NNR-1, but there is a previously documented TCP approximately three miles away.

Overall, visual impacts to cultural resources are anticipated to be low to moderate, depending on the location of visually sensitive features in relation to the centerline.

Native American Concerns
The YNCRP has identified a TCP located approximately three miles from the centerline of Route Segment NNR-1. No TCPs have been reported within 250 feet of the centerline. The integrity of the visual setting has been compromised by residential development near the city of Selah, Interstate (I) 82, the Burlington Northern and Santa Fe railroad, and JBLM YTC. Therefore, impacts to the resource are at this time expected to be low (Lally and Camuso 2013; Camuso and Lally 2014), although TCP studies in the area are on-going.

4.11.4.2 Route Segment NNR-2

Route Segment NNR-2 is 5.0 miles long. All of the land crossed by the segment is on JBLM YTC. All the land within 250 feet of the centerline has been surveyed for cultural resources.

Physical Impacts
The total amount of land within 75 feet of the centerline is 92 acres. Short-term and long-term ground disturbance along this route segment would total 20.3 acres. All the land within 75 feet of the centerline of Route Segment NNR-2 has been surveyed and there are no recorded archaeological or architectural resources within 75 feet of the centerline. If undiscovered archaeological resources exist along Route Segment NNR-2, they would most likely be along drainages.

One TCP has been identified within 75 feet of the centerline.

Potential physical impacts to archaeological resources along Route Segment NNR-2 are low and there are no identifiable physical impacts to architectural resources. The potential for physical impacts to TCPs is considered at this time to be moderate to high, although TCP studies are on-going.

Visual Impacts
All of the land within 250 feet of the centerline of Route Segment NNR-2 has been surveyed for cultural resources. No archaeological resources have been identified and even if sites are discovered in the future, they are unlikely to be sensitive to changes in visual setting.

No architectural resources have been identified within the 250 feet of the centerline. One TCP is crossed by Route Segment NNR-2. TCP studies are on-going.

Visual impacts of Route Segment NNR-2 are anticipated to be moderate to high because one TCP exists within 250 feet of the centerline.

Native American Concerns
The YNCRP has identified one TCP within 75 feet of the centerline of Route Segment NNR-2. Physical and visual impacts to this TCP are expected to be moderate to high. TCP studies are on-going.

4.11.4.3 Route Segment NNR-3

Route Segment NNR-3 is 9.3 miles long. Some of the land crossed is under the jurisdiction of JBLM YTC, BLM, and Washington State Department of Transportation (WSDOT), but a majority of Route Segment NNR-3 crosses private land.

Physical Impacts
The total amount of land within 75 feet of the centerline is 169 acres. Short-term and long-term ground disturbance along this route segment would total 34.8 acres. A relatively small amount (51 acres, 31percent) of the land within 75 feet of the centerline of Route Segment NNR-3 has been surveyed for archaeological resources. Archaeological resources recorded in the area include four unevaluated prehistoric sites (two with talus pits, one with a cairn, and the other with a lithic scatter and talus pits) and five prehistoric isolated finds that are considered not eligible to the National Register.

There are no architectural resources within 75 feet of the centerline. Two TCPs are crossed by Route Segment NNR-3.

Overall, the potential for physical impacts to archaeological resources is low to moderate, with a somewhat higher potential for impacting archaeological sites near drainages. There would be no identifiable physical impacts to architectural resources. The potential for physical impacts to TCPs is assumed to be moderate to high, although TCP studies are on-going.

Visual Impacts
One hundred twenty-one acres (21 percent) of the land within 250 feet of the centerline of Route Segment NNR-3 have been surveyed for archaeological resources. The only recorded archaeological resources, three prehistoric sites and eight isolated finds, are usually unlikely to be sensitive to changes in visual setting. However, sites with talus pits may be visually sensitive.

The YNCRP has identified two TCPs in the vicinity of NNR-3 that may be visually sensitive. Overall, visual impacts of Route Segment NNR-3 are anticipated to be moderate to high because of the presence of two TCPs.

Native American Concerns
Two TCPs have been identified along Route Segment NNR-3. Physical and visual impacts to the TCPs are expected to be moderate to high. TCP studies are on-going.

4.11.4.4 Route Segment NNR-4o/4u

Route Segment NNR-4o/4u is 4.5 miles long. The area crossed is a combination of private property and land managed by JBLM YTC and WSDOT.

Physical Impacts
The total amount of land within the 75 feet of the centerline is 84 acres. Out of these 84 acres, at least 61 acres (71 percent) have been surveyed for archaeological resources. Seven archaeological resources are recorded within this area, two unevaluated prehistoric lithic scatters and five prehistoric isolated finds that are assumed to be not eligible to the National Register. There are no architectural resources within 75 feet of the centerline. One TCP has been identified, although TCP studies are on-going.

Overhead Design Option Impacts
Short-term and long-term ground disturbance along this design option would total 17.6 acres. Because of the presence of two archaeological sites, no architectural resources and one TCP along this segment, physical impacts to cultural resources from the construction the Overhead Design Option are expected to be moderate to high. Resources may still be identified during on-going or future archaeological and TCP studies.

Underground Design Option Impacts
Short-term and long-term ground disturbance along this design option would total 33.5 acres. Because of the presence of two archaeological sites (although no architectural resources or TCPs) along this segment, physical impacts to cultural resources from the construction the Underground Design Option are expected to be moderate to high. However, the potential for impacts to known sites and impacts resulting from the unanticipated discovery of archaeological resources may be somewhat higher than under the Overhead Design Option because the amount of ground disturbance would be greater.

Visual Impacts
At least 205 acres (71 percent) of the land within 250 feet of the centerline of Route Segment NNR-4o/4u have been surveyed for cultural resources. The two known archaeological sites are unlikely to be sensitive to changes in visual setting. No architectural resources have been identified. On-going TCP studies have identified one TCP in this area.

Visual impacts are anticipated to be moderate to high because Route Segment NNR-4 would cross a TCP.

Overhead Design Option Impacts
Because of the known TCP along this segment, visual impacts to cultural resources from the construction of the Overhead Design Option are expected to be high.

Underground Design Option Impacts
Because of the known TCP along this segment, visual impacts to cultural resources from the construction of the Underground Design Option are expected to be moderate to high. However, the potential for visual impacts resulting from the unanticipated discovery of cultural resources may be somewhat lower under this option rather than the Overhead Design Option because there would be few H-frame or monopole structures used.

Native American Concerns
One TCP has been identified along Route Segment NNR-4o/4u. At this time, physical and visual impacts are expected to be moderate to high, although TCP studies are on-going.

4.11.4.5 Route Segment NNR-5

Route Segment NNR-5 is 1.2 miles long. This segment is entirely on JBLM YTC land.

Physical Impacts
The total amount of land within 75 feet of the centerline is 33 acres. Short-term and long-term ground disturbance along this route segment would total 7.6 acres. All of the land within 75 feet of the centerline of Route Segment NNR-5 has been surveyed for cultural resources and there are no recorded archaeological or architectural resources identified within 75 feet of the centerline. However, one TCP is crossed by Route Segment NNR-5.

Despite the absence of archaeological and architectural resources along this segment, physical impacts to cultural resources are expected to be moderate to high because of the presence of a TCP.

Visual Impacts
All of the land within 250 feet of the centerline of Route Segment NNR-5 has been surveyed for cultural resources and there are no recorded architectural and archaeological resources within 250 feet. Undiscovered archaeological sites, should they exist, would typically not be visually sensitive.

One TCP has been reported that would be crossed by Route Segment NNR-5. Because of the presence of a TCP, visual impacts may be moderate to high.

Native American Concerns
The YNCRP has identified one TCP crossed by Route Segment NNR-5. Therefore, visual impacts may be moderate to high, depending on the results of on-going TCP studies.

4.11.4.6 Route Segment NNR-6o/6u

Route Segment NNR-6o/6u is 6.4 miles long. This route segment is entirely within the boundaries of JBLM YTC.

Physical Impacts
The total amount of land within 75 feet of the centerline is 118 acres. All the land has been surveyed for cultural resources. Inventories identified seven archaeological sites and four isolated finds: two prehistoric and two historic. Also, one TCP has been identified in the area and TCP studies are on-going.

Overhead Design Option Impacts
Short-term and long-term ground disturbance along this design option would total 24.0 acres. Because the segment would cross at least seven archaeological sites and one TCP, physical impacts to cultural resources from the construction the Overhead Design Option are expected to be moderate to high.

Underground Design Option Impacts
Short-term and long-term ground disturbance along this design option would total 47.3 acres. Physical impacts to cultural resources from the construction the Underground Design Option are expected to be moderate to high. The potential for impacts resulting from construction near known resources and from the unanticipated discovery of archaeological resources may be somewhat higher than under the Overhead Design Option because the amount of ground disturbance would be greater.

Visual Impacts
Three hundred ninety-five acres (100 percent) of the land within 250 feet of the centerline of Route Segment NNR-6o/6u have been surveyed for cultural resources

Visual impacts to archaeological and architectural resources are anticipated to be low. Known archaeological sites and undiscovered archaeological sites, should they exist, would probably not be visually sensitive, and there are no recorded architectural resources.

The YNCRP has identified one TCP in the vicinity of NNR-6o/6u that may be visually sensitive. Visual impacts to this TCP may be moderate to high, depending on the results of on-going TCP studies.

Overhead Design Option Impacts
Visual impacts to archaeological and architectural resources from the construction the Overhead Design Option would be low. Visual impacts to the TCP may be moderate to high.

Underground Design Option Impacts
Visual impacts to the TCP from the construction the Underground Design Option are expected to be moderate to high. However, the potential for impacts may be lower than under the Overhead Design Option because there would be few H-frame or monopole structures used.

Native American Concerns
Because one TCP would be crossed by Route Segment 6o/6u, visual impacts are expected to be moderate to high. TCP studies are on-going.

4.11.4.7 Route Segment NNR-7

Route Segment NNR-7 is 8.2 miles long. The segment is entirely on JBLM YTC.

Physical Impacts
The total amount of land within 75 feet of the centerline is 150 acres. Short-term and long-term ground disturbance along this route segment would total 30.9 acres. Within 75 feet of the centerline of Route Segment NNR-7, 100 percent of the land has been surveyed for archaeological and architectural resources. Inventories identified eight prehistoric sites, two multi-component sites, and three prehistoric isolated finds. The sites have not been evaluated for National Register eligibility. For this analysis, the isolated finds are considered not eligible. No architectural resources have been identified. One TCP is crossed by Route Segment NNR-7.

Because the segment would cross at least 10 archaeological sites and one TCP, physical impacts to cultural resources from the construction the Route Segment NNR-7 are expected to be moderate to high.

Visual Impacts
All of the land within 250 feet of the centerline has been surveyed for cultural resources. The archaeological resources identified include seven prehistoric lithic scatters, one prehistoric lithic quarry and scatter, two multi-component sites (sites include lithic debitage and historic artifacts including sanitary and hole-in-top cans) and three prehistoric isolated finds, none of which have been evaluated for National Register eligibility. For this analysis, the isolated finds are considered not eligible. Archaeological resources are typically not adversely affected by changes in visual setting.

Because there are no architectural resources in the vicinity, there would be no visual impacts on this class of cultural resource. One TCP would be crossed by Route Segment NNR-7 and TCP studies are on-going. Visual impacts to this TCP may be moderate to high.

Native American Concerns
The YNCRP has identified one TCP along Route Segment NNR-7 and TCP studies are on-going. Visual impacts to this TCP may be moderate to high.

4.11.4.8 Route Segment NNR-8

Route Segment NNR-8 is 2.7 miles long. The segment crosses the Columbia River and includes the Vantage Substation. The land crossed by this segment is a mixture of BLM, Reclamation, WSDOT, and private land.

Physical Impacts
The total amount of land within 75 feet of the centerline is 50 acres. Short-term and long-term ground disturbance along this route segment would total 11.0 acres. Of this total, about 13 acres (26 percent) of the land within 75 feet of the centerline of Route Segment NNR-8 has been surveyed for cultural resources. Sixteen archaeological resources have been documented within 75 feet of the centerline of Route Segment NNR-8. These include 13 sites and three isolated finds. The archaeological sites are unevaluated except for one that has been determined not eligible to the National Register by the DAHP and the isolated finds are assumed to be not eligible.

The Vantage Substation, the only architectural resource along this segment, has been determined eligible to the National Register, but the interconnection of a new transmission line would not have an adverse effect on this facility.

One TCP and one culturally sensitive area would be crossed by Route Segment NNR-8. TCP studies are on-going. Because of the limited amount of survey, the density of known sites near the Columbia River, and the presence of a TCP and a culturally sensitive area, physical impacts of Route Segment NNR-8 would be high.

Visual Impacts
A relatively small amount (42 acres, 25 percent) of the land within 250 feet of the centerline of Route Segment NNR-8 has been surveyed for cultural resources. In addition to the archaeological sites and isolated finds mentioned above, other sites include rock cairns, can scatters, and a metal forging area. Archaeological resources are typically not sensitive to changes in visual setting, although the cairns and linear rock features may be sensitive.

The Vantage Substation has been determined eligible to the National Register, but the tie-in of a new transmission line would not have a visual impact on this existing facility.

One TCP and one culturally sensitive area have been identified. Visual impacts may be high. TCP studies are on-going. Therefore, visual impacts of Route Segment NNR-8 on cultural resources would be high.

Native American Concerns
The YNCRP has identified one TCP and one culturally sensitive area along Route Segment NNR-8. Physical and visual impacts may be high. TCP studies are on-going.

4.11.4.9 Route Segment MR-1

Route Segment MR-1 is 11.9 miles and is on Manastash Ridge. This segment is on JBLM YTC, Washington State Department of Natural Resources, WSDOT, and private land.

Physical Impacts
The total amount of land within 75 feet of the centerline is 216 acres. Short-term and long-term ground disturbance along this route segment would total 45.2 acres. In all, 56 percent of the land within 75 feet of the centerline of Route Segment MR-1 has been surveyed by archaeologists. Archaeological resources include two historic debris scatters, neither of which was evaluated for the National Register. Undiscovered resources may exist in the unsurveyed portion of this segment.

There are no architectural resources within 75 feet of Route Segment MR-1, so there would be no direct physical impacts to architectural resources. One TCP has been reported in this area. TCP studies are on-going.

Although the density of archaeological sites in the surveyed portion of this route segment is low and no known architectural resources occur, the route crosses a TCP. Therefore, the potential for physical impacts on cultural resources by Route Segment MR-1 is expected to be moderate to high.

Visual Impacts
Approximately 56 percent of the land within 250 feet of the centerline of Route Segment MR-1 has been previously surveyed by archaeologists. Archaeological resources include two historic debris scatters and stacked rock features, none of which were evaluated for National Register eligibility. However, archaeological resources are typically not sensitive to changes in visual sitting.

One TCP has been reported in this area. There are no identified architectural resources near this route segment. Therefore, visual impacts of Route Segment MR-1 on cultural resources would be moderate to high.

Native American Concerns
One TCP was reported near Route Segment MR-1. Physical and visual impacts may be high. TCP studies are on-going.

4.11.5 Mitigation Measures

As part of the Section 106 process, a Programmatic Agreement (PA) is being prepared. The PA will set forth the procedures for identifying, evaluating, and managing cultural resources along the selected alternative. The parties to the agreement will include BLM, JBLM YTC, Reclamation, Bonneville Power Administration, the Washington SHPO, other agencies, Pacific Power, and possibly other interested parties. Among other things, this PA will likely include: 1) the process for defining the area of potential effects (APE) for the selected route; 2) procedures for completing cultural resource surveys within the APE; 3) procedures for evaluating the National Register and Washington Heritage Register eligibility of identified cultural resources; 4) steps in assessing effects of the proposed Project on eligible cultural resources; 5) appropriate measures for mitigating adverse effects on eligible cultural resources that cannot be avoided; 6) when, how, where, and by whom construction monitoring would be carried out; 7) appropriate responses to the discovery of unanticipated cultural resources or human remains during construction; 8) the contents and schedule for technical reports resulting from surveys, test excavations, data recovery excavations, and other studies; 9) procedures for ensuring timely review by appropriate agencies throughout the process; and 10) a commitment to continue consultation efforts with affected Native American groups. By completing and implementing the PA, the Section 106 process would be complete, although specific activities would still need to be carried out by the BLM and Pacific Power. Procedures for evaluating National Register eligibility, assessing effects, and mitigating adverse effects at specific cultural resources will be addressed in a Historic Properties Treatment Plan prepared after the cultural resource survey has been completed.

4.11.6 Residual Impacts – All Segments

Physical Impacts
Implementation of the requirements outlined in the PA would ensure mitigation of impacts through avoidance or other measures. While there would be no residual impacts related to physical impacts to known cultural resources, buried archaeological sites may not be identified until construction. On-site construction monitoring and implementation of an Unanticipated Discovery Plan would reduce impacts, but the nature of residual impacts to unanticipated discoveries cannot be determined at this time.

Visual Impacts
Implementation of the requirements outlined in the PA would ensure efforts are made to identify and, if possible, mitigate visual impacts to cultural resources through redesign or other measures. In many cases, mitigation may reduce but not eliminate visual impacts. Residual impacts could exist at some cultural resources, but the level of impact can be identified only on a case-by-case basis.

Native American Concerns
The BLM will continue the government-to-government consultation process to ensure that concerns by the Yakama, Wanapum, Colville and other interested Native American groups are taken into consideration throughout Project planning and construction. Avoidance is expected to be the preferred mitigation measure. The amount of residual impacts to TCPs and other resources of special concern to Native Americans will be assessed only though the on-going consultation process.

4.11.7 Impact Summary by Alternative

4.11.7.1 No Action

Under the No Action Alternative, construction of a new 230 kV transmission line and changes to the existing Pomona Heights and Vantage substations would not occur. Current, on-going operation and maintenance activities for existing facilities in the Project area would continue.

Under No Action, there would be no ground disturbance associated with the construction of the Vantage to Pomona Heights transmission line, such as clearing vegetation, grading of access roads, improving existing access roads, installing tower foundations, assembling and erecting towers, stringing and tensioning conductors, and restoration and re-vegetation measures. No cultural resources would be adversely affected.

Also, under No Action, there would be no new visual impacts to cultural resources resulting from modern structures being introduced into visual settings of cultural resources.

There would also be no change in public accessibility to a previously remote area so there would be no increase potential for vandalism of cultural resources.

Overall, the No Action Alternative would result in no impacts to archaeological and architectural resources and there would be no impacts to sites of Native American concern.

4.11.7.2 Route Alternatives

Physical Impacts
For this SDEIS, physical impacts to cultural resources are related to the number and types of cultural resources in an area and to the amount of ground disturbance in the same area. Because short-term or temporary ground disturbance and long-term or permanent ground disturbance both cause permanent damage to, or destruction of, cultural resources, Table 4.11-1 summarizes the combined short-term and long-term ground disturbance for the NNR Alternative -Overhead Design Option, NNR Alternative -Underground Design Option, or the NNR Alternative with the MR Subroute. Note that the acreage of short-term ground disturbance usually includes acreage that is permanently disturbed as well, so the total acres disturbed is equivalent to the acreage of short-term disturbance.

Table 4.11-2 includes cultural resources that have been previously documented within 75 feet of the alternative centerlines. Note that the resources classified as Not Eligible to the National Register include isolated finds that have not been formally evaluated for National Register eligibility.

TABLE 4.11-1 TOTAL GROUND DISTURBANCE BY ALTERNATIVE AND DESIGN OPTION

ALTERNATIVE	TOTAL ACRES DISTURBED
NNR Alternative -Overhead Design Option NNR-1, NNR-2, NNR-3, NNR-4o NNR-5, NNR-6o, NNR-7, NNR-8	157.1
NNR Alternative Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8	196.2
NNR Alternative with MR Subroute NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6, NNR-7, NNR-8	202.3
DEIS Agency Preferred Alternative	249.7

TABLE 4.11-2 CULTURAL RESOURCES WITHIN 75-FEET OF THE CENTERLINE BY ROUTE SEGMENT AND ALTERNATIVE

ROUTE SEGMENT	TOTAL CULTURAL RESOURCES	RESOURCE TYPE					NATIONAL REGISTER STATUS[1]		
		TCPs[3]	DISTRICTS	ARCHAEOLOGICAL SITES	ISOLATED FINDS	ARCHITECTURAL RESOURCES	DETERMINED ELIGIBLE	DETERMINED OR ASSUMED NOT ELIGIBLE[2]	NO DETERMINATION
NNR-1	1			1					1
NNR-2	1	1							1
NNR-3	11	2		4	5			5	6
NNR-4o/4u	8	1		2	5			5	3
NNR-5	1	1							1
NNR-6o/6u	12	1		7	4			4	8
NNR-7	14	1		10	3			3	11
NNR-8	19	2		13	3	1	1	4	14
MR-1	3	1		2					3
ALTERNATIVE									
NNR Alternative - Overhead Design Option	63[5]	5		38	20	1	1	21	42
NNR Alternative – Underground Design Option	63[5]	5		38	20	1	1	21	42
NNR Alternative with MR Subroute	59[5]	5		38	15	1	1	16	42
DEIS Agency Preferred Alternative[4]	47	4		27	15	2	2	15	30

[1]National Register status determined by Washington DAHP.
[2]'Not Eligible' includes resources determined not eligible by DAHP and all isolated finds.
[3]Includes culturally sensitive area.
[4]Includes YNCRP preliminary survey results for DEIS Agency Preferred Alternative.
[5]Alternative totals are not equal to the sum of route segment totals because some TCPs occur in more than one segment.

NNR Alternative - Overhead Design Option
A total of 63 cultural resources have been recorded within 75 feet of the NNR Alternative centerline. These include four TCPs, one culturally sensitive area, 38 archaeological sites, 20 isolated finds, and one architectural resource. Forty-four of these resources have either been determined eligible to the National Register or are unevaluated but are assumed to be eligible for this analysis. Over 67 percent of the land within 75 feet of the centerline has been previously surveyed for cultural resources and it is likely that additional cultural resources may be found in the unsurveyed areas and possibly in areas that are resurveyed prior to construction.

Out of the total acreage of 740 acres within 75 feet of the centerline, there would be approximately 157 acres of likely ground disturbance (21 percent).

NNR Alternative - Underground Design Option
A total of 63 cultural resources have been recorded within 75 feet of the NNR Alternative centerline. These include the same resources mentioned above for the Overhead Design Option. Over 67 percent of the land within the corridor has been previously surveyed for cultural resources and it is likely that additional cultural resources may be found in the unsurveyed areas and possibly in areas that are resurveyed prior to construction.

Nine known archaeological sites, nine isolated finds and two TCPs are within the route segments (NNR-4, NNR-6) in which the Underground Design Option would be used. Nearly 90 percent of the land within these two segments has been previously surveyed for cultural resources.

Out of the total corridor acreage of 740 acres, there would be approximately 196 acres of likely ground disturbance (26 percent), roughly 25 percent more than with the Overhead Design Option. Furthermore, it would not be possible for the Underground Design Option to avoid physically impacting historic properties (National Register-eligible cultural resources) by spanning them.

NNR Alternative with MR Subroute
A total of 59 cultural resources have been recorded within 75 feet of the NNR Alternative with MR Subroute centerline. These include four TCPs, one culturally sensitive area, 38 archaeological sites, 15 isolated finds, and one architectural resource. Forty three of these resources have either been determined eligible to the National Register or are unevaluated but assumed to be eligible for this analysis. Over 64 percent of the land within 75 feet of the centerline has been previously surveyed for cultural resources and it is likely that additional cultural resources may be found in the unsurveyed areas and possibly in areas that are resurveyed prior to construction.

Out of the total acreage of 740 acres within 75 feet of the centerline, there would be approximately 157 acres of likely ground disturbance (21 percent).

DEIS Agency Preferred Route Alternative
Alternative D (Segments 1a, 1b, 2a, 2c, 2d, 3a, 3c) is the DEIS Agency Preferred Alternative. Recently, the YNCRP, under contract with Pacific Power, completed cultural resource surveys of the portions of the area within 75 feet of the centerline for this alternative that crossed federal land. Results of the YNCRP survey have been added to previously recorded cultural resources. A total of 44 cultural resources have been identified. These include 27 archaeological sites (17 prehistoric, five historic, four with both prehistoric and historic components, and one of unknown age); 15 isolated finds (seven prehistoric, seven historic, and one unknown); and two historic structures. The two historic structures, a transmission line and the Vantage Substation, have been determined eligible to the National Register. The other cultural

resources have not been evaluated, but for this SDEIS it is assumed that the 15 isolated finds are not eligible.

Visual Impacts

For this SDEIS, visual impacts to cultural resources are related to the number and types of visually sensitive cultural resources within 250 feet of the centerline of each route segment and for overhead or underground design options being analyzed. Table 4.11-3 includes the number of visually sensitive cultural resources that have been previously documented within 250 feet of the route segment and NNR Alternative centerlines. For this SDEIS, it is assumed that visually sensitive resources include TCPs, culturally sensitive area, and archaeological sites that include burials, prehistoric rock features (cairns, alignments), talus pits, rock art (pictographs and petroglyphs), and rockshelters.

NNR Alternative - Overhead Design Option

Four TCPs, a culturally sensitive area, and six visually sensitive archaeological sites are within 250 feet of the proposed centerline for the NNR Alternative without MR Subroute - Overhead Design Option. Visual impacts are considered high.

NNR Alternative - Underground Design Option

Four TCPs, a culturally sensitive area, and six visually sensitive archaeological sites are within 250 feet of the proposed centerline for the NNR Alternative without MR Subroute - Underground Design Option. Visual impacts are considered high compared to the Overhead Design Option because only one resource, a TCP, is located in along a segment where the Underground Design Option would be used. All of the other 9 resources would be equally affected by both options.

NNR Alternative with MR Subroute

Four TCPs, a culturally sensitive area, and six visually sensitive archaeological sites are within 250 feet of the proposed centerline for the NNR Alternative with MR Subroute, the same resources as the NNR Alternative without the subroute. For this reason, visual impacts are considered high.

DEIS Agency Preferred Route Alternative

Four TCPs and four visually sensitive archaeological sites are within 250 feet of the proposed centerline for Alternative D, plus three other TCPs are more than 250 feet from the centerline. For this reason, visual impacts are considered high.

Native American Concerns

NNR Alternative - Overhead Design Option

Four TCPs and a culturally sensitive area are crossed by the NNR Alternative without the MR Subroute - Overhead Design Option. Visual and physical impacts are considered high. TCP studies of the NNR are ongoing.

NNR Alternative - Underground Design Option

Four TCPs and a culturally sensitive are crossed by the NNR Alternative without the MR Subroute - Underground Design Option. Physical and visual impacts are considered as high because two TCPs are located in segments where the Underground Design Option is being analyzed. All of the other three resources would be equally affected by both options. TCP studies of the NNR are ongoing.

NNR Alternative with MR Subroute

Four TCPs and a culturally sensitive area are within 250 feet of the proposed centerline for the NNR Alternative with MR Subroute, the same resources as the alternative without the subroute. For this reason, visual impacts are considered high. TCP studies of the NNR are ongoing.

DEIS Agency Preferred Route Alternative
Four TCPs are within 250 feet of the proposed centerline for Alternative D, plus three other TCPs are more than 250 feet from the centerline. For this reason, visual impacts are considered high.

TABLE 4.11-3 CULTURAL RESOURCES WITHIN 250-FEET OF CENTERLINES BY ROUTE SEGMENT AND ALTERNATIVE****

ROUTE SEGMENT	TOTAL CULTURAL RESOURCES	RESOURCE TYPE				NATIONAL REGISTER STATUS[1]		
		TCPs	ARCHAEOLOGICAL SITES	ISOLATED FINDS	ARCHITECTURAL RESOURCE	DETERMINED ELIGIBLE	DETERMINED OR ASSUMED NOT ELIGIBLE	UNEVALUATED
NNR-1	1	0	1	0	0	0	0	1
NNR-2	1	1	0	0	0	0	0	1
NNR-3	12	2	3	7	0	0	7	5
NNR-4o/4u	7	0	2	5	0	0	5	2
NNR-5	1	1	0	0	0	0	0	1
NNR-6o/6u	7	1	4	2	0	0	2	5
NNR-7	4	1	2	1	0	0	1	3
NNR-8	35	2	23	9	1	1	10	24
MR-1	3	0	3	0	0	0	0	3
ALTERNATIVE								
NNR Alternative -Overhead Design Option	64	4	35	24	1	1	25	38
NNR Alternative -Underground Design Option	64	4	35	24	1	1	25	38
NNR Alternative with MR Subroute	60	4	36	19	1	1	20	39
DEIS Agency Preferred Alternative	81	4	49	26	2	2	28	51

[1]National Register status determined by the DAHP.

** Excludes cultural resources with only DAHP buffers extending into the corridors.

TABLE 4.11-4 VISUALLY SENSITIVE CULTURAL RESOURCES WITHIN 250-FEET OF CENTERLINES BY ROUTE SEGMENT AND ALTERNATIVE**

ROUTE SEGMENT	POSSIBLE VISUALLY SENSITIVE CULTURAL RESOURCES[1]
NNR-1	1
NNR-2	1
NNR-3	4
NNR-4o/4u	0
NNR-5	1
NNR-6o/6u	1
NNR-7	1
NNR-8	6
MR-1	0
ALTERNATIVE	
NNR Alternative	11
NNR Alternative with MR Subroute	11
DEIS Agency Preferred Alternative	8

[1]Includes TCPs, culturally sensitive areas, and sites with burials, petroglyphs, pictographs, rockshelters, cairns, talus pits, or rock features.
** Excludes cultural resources with only DAHP buffers extending into the corridors.

4.12 WILDLAND FIRE ECOLOGY AND MANAGEMENT

4.12.1 Methods and Impact Types

4.12.1.1 Analysis Methods

The impact analysis for wildland fire ecology and management focused on whether the proposed Project would alter the effectiveness of firefighting, would increase the risk of a wildfire event, and increase ignition potential. Refer to Chapter 2 for a description of the disturbance model and to Section 4.2 (Vegetation and Special Status Plant Species) for a discussion of the impacts specific to vegetation.

4.12.1.2 Impact Types

The general types of impacts caused by the construction, operation, and maintenance of the Project to wildland fire ecology and management include:

- Increased wildland fire ignition through construction, operation, and maintenance activities (e.g., welding, vehicle ignition), the presence of energized transmission lines (e.g., arc ignition), and increased off-highway vehicle (OHV) usage;
- Increased wildland fire ignition potential and rate of spread through the introduction of non-native plants (e.g., cheatgrass) and the loss of native plant communities; and
- Increased complexity of fire suppression operations due to the presence of energized transmission lines.

4.12.2 Impact Levels

Impact levels are assigned based on resource sensitivity, resource quality (i.e., the existing condition of the resource), resource quantity (i.e., the amount of the resource potentially affected), and the type and duration of impact (i.e., short- or long-term). These criteria were applied to develop impact level categories of high, moderate, low and no identifiable.

High
Impacts would be classified as high if the proposed Project would result in one or more of the following:

- Disturbance would occur where highly flammable vegetation (e.g., cheatgrass), is the dominant vegetation cover type, increasing the risk of wildland fire ignition; and/or
- Added complexity and increased safety hazard for firefighters due to the presence of multiple transmission lines (e.g., transmission bounded islands).

Moderate
Impacts would be classified as moderate if the proposed Project would result in one or more of the following:

- Disturbance would occur in areas where highly flammable vegetation (e.g., annual grasses) is present, but the plant community is dominated by native vegetation (e.g., riparian vegetation, perennial grasses, shrubs); and/or
- No other transmission lines occur in the area; however, the presence of a new overhead transmission line would increase the complexity of firefighting, but does not pose an increased safety hazard for firefighters.

Low
Impacts would be classified as low if the proposed Project would result in one or more of the following:

- Disturbance would occur in a plant community that is dominated by native vegetation; and/or
- The presence of new overhead transmission lines would not affect the effectiveness or safety of firefighting.

No Identifiable
Impacts would be classified as no identifiable if the proposed Project would result in the following:

- Disturbance to vegetation would be completely avoided; and/or
- Fire suppression effectiveness and safety would not be altered (e.g., underground transmission lines).

4.12.3 Impacts Common to All Route Segments

This section presents information on impacts common to all route segments for the Overhead Design Option. Impacts to wildland fire from the Underground Design Option are discussed individually in Section 4.12.4 for Route Segments NNR-4u and NNR-6u.

Impacts from construction, operation, and maintenance of the proposed Project could impact wildland fire ecology and management in the Project area. Potential fire risk is increased by fuel availability, construction activities, the presence of energized transmission lines, and increased ignition potential through OHV usage, recreational shooting of firearms, hunting and camping.

It is anticipated that some construction activities would occur during summer months when the weather is hot and dry and the potential for wildland fires is high. Heat or sparks from construction vehicles or equipment use (e.g., grinding, welding) have the potential to ignite dry vegetation and cause a fire.

New access roads combined with new ground disturbance could lead to an increased potential for the proliferation of non-native species. The risk of wildfire increases in areas with established populations of cheatgrass and other non-native annual species. Non-native plants, such as cheatgrass, create a more continuous fuel bed than native bunchgrasses, resulting in an increase in fire frequency and intensity (Brown 2000; Paysen et al. 2000). Increased use of access roads and rights-of-way (ROW) established for the Project could lead to an increase in the number of human-caused ignitions in the Project area. Increased fire danger can result from activities by unauthorized users on or near the Project ROW from a variety of means including campfires, un-extinguished cigarettes, and vehicle exhaust systems coming into contact with dry vegetation.

The addition of linear features and developments in the Project area would further fragment the landscape. However, access roads could also be used as fire breaks and access for fire suppression vehicles. Project Design Features (PDFs) would be implemented to reduce the potential for wildland fire to be ignited by human-use of the new access roads. New or improved access (e.g., blading, widening existing access) roads not required for maintenance would be closed or rehabilitated following construction. Closing access roads would protect the resources in that area from further disturbance resulting from the spread of noxious weeds or fire by limiting new or improved accessibility by OHVs and other motorized vehicles.

Wildland fires in the vicinity of distribution or transmission power lines, can cause potential conflicts, and risks to wildfire suppression tactics, and increase the complexity of fire suppression operations. Transmission bounded islands are identified when two or more transmission lines create an enclosed area surrounded by transmission lines. These bounded islands could reduce the effectiveness of fire suppression efforts and create an area that poses a threat to firefighter safety. Power line hazards, such as electrical shock and/or reduced aerial and ground tactics, have potential impacts to wildfire suppression efforts and firefighter safety. Aerial and ground attacks can be restricted when overhead power lines are present. Aerial operations can be complicated by the risk of aircraft and/or water buckets colliding with towers and/or conductors during smoky, reduced-visibility conditions. Wildland firefighters working around energized power lines are exposed to electrical shock hazards including direct contact with downed power lines, contact with electrically charged materials and equipment due to broken lines, contact with smoke that can conduct electricity between lines and the use of solid-stream water applications around energized lines (National Institute for Occupational Safety and Health 2002). PDFs would be implemented to minimize the potential impacts the proposed Project could have on fire suppression operations (e.g., increased complexity and safety hazards), including initiating discussions with local fire districts, and state and regional fire prevention staff, BLM and Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) fire personnel prior to construction to provide transmission line safety training, including safety procedures for conducting fire suppression near a power line. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs.

It would be unlikely the Project facilities would cause fires except in the rare case of arcing from the power line to the ground or nearby vegetation. In the event of a lightning strike, ground wires on the structures ground the current. Wildland fires have the potential to affect the operation of the Project facilities and, consequently, the reliability of the transmission system in the region. Smoke and hot gases from a large fire under or near a power line can create a conducting path between conductors and the ground, initiating arcing. Fires can also damage steel support structures and overhead conductors and can destroy wood pole support structures.

To minimize the potential for wildland fire, all applicable fire laws and regulations would be observed during the construction, operation, and maintenance periods. Personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires. A Fire Protection and Control Plan would be developed and incorporated into the Plan of Development (POD). This Plan would include practices such as operating all internal and external combustion engines (e.g., OHV, chainsaws, generators, heavy equipment) with qualified spark arresters; fueling all highway-authorized vehicles off-site to minimize the risk of fire; restricting smoking to designated area; restricting equipment parking to sites cleared of all flammable material; training Pacific Power and/or its contractors on fire safety, minimizing fire hazards, and to safely suppress a fire until firefighters can respond; and equipping vehicles with appropriate fire suppression equipment.

A Noxious Weed and Invasive Plant Management Plan would be developed and included in the POD. Areas dominated by native and non-native vegetation that are disturbed during construction, operation, and maintenance activities would be revegetated following activities. Revegetating disturbed areas and implementing noxious weed control practices would reduce the potential for the spread of noxious weeds and changes in plant community composition and structure. In addition, the blading of native plant communities would be minimized during construction, operation, and maintenance. Minimizing disturbance to native plant communities would reduce the potential for the loss of native vegetation and the spread of noxious weeds. These practices are expected to minimize the potential for changes to plant community composition that could lead to increased fire risk.

Although trees are generally scarce within the Project area, to prevent fires and other hazards a safe clearance would be maintained between the tops of trees and overhead power lines. In most cases, trees would not be allowed to grow over 20 feet high in the ROW corridor. Trees that could fall into the overhead power lines (e.g., danger or hazard trees) would also be cleared from the ROW.

4.12.4 Impacts Specific to Route Segments

Impacts to wildland fire ecology and management were assessed for each route segment and are discussed in detail in the following sections. Impacts specific to vegetation cover types are discussed in detail in Vegetation and Special Status Plants (Section 4.2) and are not discussed in this section.

4.12.4.1 Route Segment NNR-1

Route Segment NNR-1 parallels Sage Trail Road and an existing distribution line. Construction of Route Segment NNR-1 would occur in annual grasslands for only 0.1 mile. No recent fires have been documented along Route Segment NNR-1. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3). As discussed above, wildland fire risk would be reduced along this route segment by developing and implementing a Fire Protection and Control Plan and a Noxious Weed and Invasive Plant Management Plan, revegetating disturbed areas following construction, and closing access roads that are no longer needed following construction.

Route Segment NNR-1 is not anticipated to have any impacts on fire suppression operations. Existing roads are paralleled for the majority of this route segment. In addition, discussions would be initiated with local fire districts, regional fire prevention staff, and BLM and JBLM YTC fire personnel prior to construction to provide transmission line safety training, including safety procedures when conducting fire suppression near a power line. With the implementation of PDFs, impacts to wildland fire ecology and management would include 0.5 mile of no identifiable, 1.8 miles of low, and 0.1 mile of moderate levels of wildfire risk based on vegetative fuels that could be ignited during construction activities.

4.12.4.2 Route Segment NNR-2

Construction of Route Segment NNR-2 would occur in annual grasslands for approximately 1.2 miles. The majority of this route segment parallels an existing JBLM YTC fire break road, existing roads and Bonneville Power Administration’s (BPA’s) existing Ellensburg-Moxee No.1 115 kV transmission line. Several fires have occurred east of Route Segment NNR-2 within JBLM YTC in 1989, 1990, and 2003. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3).

Route Segment NNR-2 is not anticipated to have any impacts on fire suppression operations. The surrounding area has experienced fire activity in the past and could be more susceptible to fire damage due to the type and intensity of training that occurs at the JBLM YTC; however, the incidence of fire ignition and spread at the JBLM YTC has been declining since 1996 due to improvements to their fire management policy, increased wildland fire fighting training, and enhancement of fire suppression support teams. Improvements include annual Prescribed Burn Plans, implementation of the Fire Risk Assessment, pyrotechnic restrictions during periods of high fire danger, and remote sensing and fire history monitoring (Nissen, P. and R. Melcher 2004). In addition, the JBLM YTC annually maintains over 240 miles of firebreaks to serve as a barrier to limit the potential spread of wildland fires and provide access for fire suppression crews (JBLM YTC 2002). BPA’s existing Ellensburg-Moxee No.1 115 kV transmission line intersects this route segment, but is not anticipated to add complexity to fire suppression efforts. With the implementation of PDFs, impacts to wildland fire ecology and management would include 1.5 miles of no identifiable, 2.4 miles of low, and 1.2 miles of moderate levels of wildfire risk based on vegetative fuels that could be ignited during construction activities.

4.12.4.3 Route Segment NNR-3

Construction of Route Segment NNR-3 would occur in annual grasslands for approximately 0.1 mile. Fire history records indicate that Route Segment NNR-3 is within 0.5 mile of a fire that burned on BLM-managed land in 1997 and one that burned within JBLM YTC in 2003. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3). Route Segment NNR-3 parallels Pacific Power's existing Pomona-Wanapum 230 kV line for 8.3 miles and is not anticipated to have any impacts on fire suppression operations. With the implementation of PDFs, impacts to wildland fire ecology and management would include 0.1 mile of no identifiable, 9.1 miles of low, and 0.1 mile of moderate levels of wildfire risk based on vegetative fuels that could be ignited during construction activities.

4.12.4.4 Route Segment NNR-4o/NNR-4u

The majority of Route Segment NNR-4o/NNR-4u is located with the JBLM YTC. Construction of this route segment would occur in annual grasslands for approximately 0.3 mile. Fire history records indicate that two fires occurred within one mile of Route Segment NNR-4o/NNR-4u, both within JBLM YTC. The first fire was located just north of Route Segment NNR-4o/NNR-4u occurred in 2002 and the second fire occurred south of Route Segment NNR-4o/NNR-4u in 2010. Route Segment NNR-4o/NNR-4u continues to parallel the existing Pacific Power Pomona-Wanapum 230 kV transmission line for its entire length.

<u>Overhead Design Option</u>
Route Segment NNR-4o is not anticipated to have any impacts on fire suppression operations. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and NNR-2. With the implementation of PDFs, impacts to wildland fire ecology and management from construction of Route Segment NNR-4o would include 4.3 miles of low and 0.3 mile of moderate levels of wildfire risk based on vegetative fuels that could be ignited during construction activities.

<u>Underground Design Option</u>
Route Segment NNR-4u is not anticipated to have any impacts on fire suppression operations. In addition to impacts described above in Section 4.12.3, additional underground construction disturbance and potential spread of noxious weeds and invasive species would occur through open cut trenching and excavation for the installation of underground duct bank, splice vaults, and construction of access roads and temporary work sites. Undergrounding NNR-4u would not decrease any power line hazards to firefighters, such as electrical shock and/or reduced aerial and ground tactics, due to the presence of the existing Pacific Power Pomona-Wanapum 230 kV transmission line. Undergrounding the line could reduce the potential for fires cause by the arcing of the power line to the ground or nearby vegetation; however, this is a rare occurrence. With the implementation of PDFs, impacts to wildland fire ecology and management from construction of Route Segment NNR-4u would include 4.3 miles of low and 0.3 mile of moderate levels of wildfire risk based on vegetative fuels that could be ignited during construction activities.

4.12.4.5 Route Segment NNR-5

Route Segment NNR-5 occurs entirely within JBLM YTC. Construction of this short route segment would not occur in areas dominated by annual grasslands. Fire history records indicate that no recent fires have occurred along Route Segment NNR-5. Fire suppression efforts may be reduced for the length of this short 1.8-mile segment where the route segment deviates approximately 0.5 mile south of the existing Pomona-Wanapum 230 kV transmission line to avoid crossing private agricultural land. These two lines would form a transmission bounded island. These bounded islands could reduce the effectiveness of fire suppression efforts and create an area that poses a threat to firefighter safety; however, as existing transmission lines on JBLM YTC (e.g., BPA Schultz-Wautoma No.1 500 kV, BPA Vantage-Schultz No.1 500 kV, and Pacific Power Pomona-Wanapum 230 kV) currently create transmission bounded islands, the new line is not likely to create an additional obstruction. Discussions with local fire districts, regional fire prevention staff, and BLM and JBLM YTC fire personnel prior to construction to provide transmission line safety training, including safety procedures when conducting fire suppression near a power line, are anticipated to reduce impacts to wildland fire suppression efforts and danger to firefighters. With the implementation of PDFs, impacts to wildland fire ecology and management would be moderate for 1.8 miles based on vegetative fuels, transmission bounded islands and other potential fire suppression barriers.

4.12.4.6 Route Segment NNR-6o/NNR-6u

Route Segment NNR-6o/NNR-6u occurs entirely within JBLM YTC. Construction of this route segment would not occur in areas dominated by annual grasslands. Fire records indicate that a small fire occurred north of Route Segment NNR-6o/NNR-6u in 2001 and a second, larger fire occurred north of the route segment in 2008. Route Segment NNR-6o/NNR-6u continues to parallel the existing Pomona-Wanapum 230 kV transmission line.

Overhead Design Option
Route Segment NNR-6o is not anticipated to have any impacts on fire suppression operations. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and NNR-2. With the implementation of PDFs, impacts are anticipated to be low for the entire length of this 6.5-mile route segment.

Underground Design Option
Route Segment NNR-6u is not anticipated to have any impacts on fire suppression operations. In addition to impacts described above in Section 4.12.3, additional underground construction disturbance and potential spread of noxious weeds and invasive species would occur through open cut trenching and excavation for the installation of underground duct bank, splice vaults, and construction of access roads and temporary work sites. Undergrounding NNR-6u would not decrease any power line hazards to firefighters, such as electrical shock and/or reduced aerial and ground tactics, due to the presence of the existing Pacific Power Pomona-Wanapum 230 kV transmission line. Undergrounding the line could reduce the potential for fires cause by the arcing of the power line to the ground or nearby vegetation; however, this is a rare occurrence. With the implementation of PDFs, impacts are anticipated to be low for the entire length of this 6.5-mile route segment.

4.12.4.7 Route Segment NNR-7

Route Segment NNR-7 occurs entirely within JBLM YTC. Construction of this route segment would not occur in areas dominated by annual grasslands. Fire history data indicates that three small fires occurred within JBLM YTC north of Route Segment NNR-7 in 2010. Route Segment NNR-7 continues to parallel the existing Pomona-Wanapum 230 kV transmission line and is not anticipated to have any impacts on fire suppression operations. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3). With the implementation of PDFs, impacts are anticipated to be low for the entire length of this 8.3-mile route segment.

4.12.4.8 Route Segment NNR-8

Route Segment NNR-8 crosses JBLM YTC, BLM, private and Reclamation land. Construction of Route Segment NNR-8 would occur in annual grasslands for approximately 0.6 mile. Fire history records indicate that no fires have occurred within or near Route Segment NNR-8. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3). Route Segment NNR-8 continues to parallel the existing Pomona-Wanapum 230 kV transmission line and is not anticipated to have any impacts on fire suppression operations. With the implementation of PDFs, impacts to wildland fire ecology and management would include 0.4 mile of no identifiable, 1.8 miles of low, and 0.6 mile of moderate levels based on vegetative fuels that could be ignited during construction activities.

4.12.4.9 Route Segment MR-1

Route Segment MR-1 crosses private, state, and JBLM YTC land. Construction of Route Segment MR-1 would occur in annual grasslands for approximately 4.9 miles. Fire history records indicate that three fires have occurred near Route Segment MR-1, two on JBLM YTC and one on private land. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3). Route Segment MR-1 deviates from the existing Pomona-Wanapum 230 kV transmission line to circumnavigate Manastash Ridge and is not anticipated to have any impacts on fire suppression operations. With the implementation of PDFs, impacts to wildland fire ecology and management would include 2.6 miles of no identifiable, 4.4 miles of low, and 4.9 miles of moderate levels based on vegetative fuels that could be ignited during construction activities.

4.12.5 Mitigation Measures

PDFs described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

4.12.6 Impact Summary by Alternative

4.12.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to wildland fire ecology and management would occur; however, wildland fire ecology and management would continue to be affected by current use and conditions in the area.

4.12.6.2 Route Alternatives

Table 4.12-1 presents a summary of the level of impacts to wildland fire ecology and management with the implementation of PDFs for each alternative and design option.

The DEIS Agency Preferred Alternative has the highest number of miles with moderate impacts (21.4 miles) compared with the NNR Alternative. The NNR Alternative - MR Subroute has over twice as many miles of moderate impacts compared with the NNR Alternative – Overhead Design Option and NNR Alternative -Underground Design Option (8.7 miles compared with 4.1 miles). High impact levels are not anticipated for any of the alternative options.

TABLE 4.12-1 IMPACT SUMMARY OF ALTERNATIVES FOR WILDLAND FIRE ECOLOGY AND MANAGEMENT

ALTERNATIVES	IMPACT LEVELS[1]			
	HIGH	MODERATE	LOW	NO IDENTIFIABLE
NNR Alternative – Overhead Design Option NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.3 miles	0	4.1	33.7	2.5
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.7 miles	0	8.7	33.9	5.1

ALTERNATIVES	IMPACT LEVELS[1]			
	HIGH	MODERATE	LOW	NO IDENTIFIABLE
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.3 miles	0	4.1	33.7	2.5
DEIS AGENCY PREFERRED ALTERNATIVE 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	0	21.4	26.5	18.4

Notes: [1]Impact levels in linear miles. Areas with no identifiable impacts include water, developed, agriculture, and rock.

4.13 CLIMATE AND AIR QUALITY

4.13.1 Methods and Impact Types

This section describes the potential impacts to local and regional air quality from construction, operation, and maintenance of the proposed Project and summarizes the state of knowledge and science regarding global climate change.

4.13.1.1 Analysis Methods

The assessment of potential impacts to air quality considered the following factors:

- Type of construction, operation, and maintenance activities;
- Potential sources and types of emissions;
- Location and duration of construction, operation, and maintenance activities;
- Presence of sensitive receptors in the Project area;
- Regional air quality attainment status; and
- Project Design Features (PDFs) to reduce or minimize impacts to air quality.

4.13.1.2 Impact Types

The primary types of air pollution during construction, operation, and maintenance would be:

- Combustion pollutants from equipment and vehicle exhaust;
- Fugitive dust particles from disturbed soil associated with auguring holes or foundations for structure installation (overhead design option);
- Fugitive dust particles from disturbed soil associated with land clearing, top soil removal, as well as trenching and backfilling (underground design option);
- Fugitive dust from grading and earth moving associated with access road construction; and
- Fugitive dust from construction, operation, and maintenance vehicles traveling on unpaved roads becoming airborne.

4.13.2 Impact Levels

Potential impacts to air quality were assessed considering the following impact levels.

High
Impacts would be considered high where the Project would:

- Cause a cumulatively considerable net increase of any criteria pollutant for which an area is in non-attainment under an applicable federal or state ambient air quality standard.

Moderate
Impacts would be considered moderate where the Project would:

- Expose sensitive receptors (residences, schools, hospitals) to prolonged air pollution from construction, operation, and maintenance activities.
- Impact local and regional air quality that could only be partially reduced or minimized by the implementation of PDFs for air quality.

Low
Impacts would be considered low where the Project would:

- Result in a short-term reduction in air quality confined to a construction, operation, and maintenance site or area of ground disturbance; and/or
- Impact to local air quality that could be effectively reduced, minimized, or eliminated by the implementation of PDFs for air quality.

4.13.3 Impacts Common to All Route Segments

Air quality impacts from construction activities would be similar for all route segments and Design Options. Impacts on air quality would be short-term and low during construction and localized to the general area of activity. A Fire Protection and Control Plan would be developed to reduce the risk of fire and associated impacts (see Section 4.12 - Wildland Fire Ecology and Management). During construction, sources of air emissions would be particulate matter emissions (e.g., fugitive dust) from construction operations and tailpipe emissions from vehicles and gasoline- or diesel-powered construction equipment. Emissions would be transient as construction progresses and would not occur in one area for a long duration. Most of the proposed Project would be constructed in rural areas with few residences located near the alternative route segments (see Section 4.4 - Land Use). The primary emission sources associated with the operational and maintenance phase of the Project include fugitive dust from vehicles using unpaved access roads and vehicle emissions during periodic maintenance or emergency repair activity. Quantities of emissions would be very small, temporary, and localized. Air quality impacts during operation and maintenance of the proposed Project would be low or none.

Particulate matter emissions associated with construction of the transmission line would result predominately from fugitive dust. Construction activities that could create fugitive dust include road building and grading, on-site travel on unpaved surfaces, work area clearing and preparation, and soil disrupting operations such as auguring holes or foundations for structure installation associated with the overhead design option. For the underground design option, construction activities that could create fugitive dust include vegetation removal, cutting and filling, trenching, backfilling, blasting, track out onto roads, bulk material loading, hauling and unloading, and use of material storage piles. The amount of dust generated is related to the type and duration of construction activities, silt and moisture content of the soil, wind speed, frequency of precipitation, vehicle traffic, vehicle types, and roadway characteristics. Fugitive dust generation would be greater in fine-textured soils during drier summer and autumn months. Wind erosion of disturbed areas would also contribute to fugitive dust. Fugitive dust impacts are expected to be short-term, localized, and low and would be controlled with dust control PDFs, such as developing a Dust Control Plan.

Heavy equipment and vehicles, including those with diesel and internal combustion engines, would emit pollutants such as carbon monoxide, carbon dioxide, sulfur oxides, particulate matter <2.5 microns ($PM_{2.5}$), oxides of nitrogen, volatile organic hydrocarbons, aldehydes, and polycyclic aromatic hydrocarbons. The amount of pollutants emitted from construction vehicles and equipment would be relatively small and comparable to current conditions with the operation of military training vehicles and equipment at Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) and operation of agricultural equipment in the vicinity. The Project would not be considered a major source of pollution and, as such, would not be required to obtain a Prevention of Significant Deterioration permit from the Washington Department of Ecology.

The PDFs (as described in Section 2.5) would limit emissions during both construction and operation. Prior to construction, a Dust Control Plan would be developed as part of the Plan of Development (POD). The Dust Control Plan would identify dust control measures to be implemented during construction. In addition, fugitive dust emissions would be reduced by the following design features: limiting ground disturbing activities during construction; rehabilitating new or improved access roads, where practicable;

utilizing water trucks to control dust during construction; and covering construction materials that are a source of blowing dust (e.g., dirt piles and open pits). Proper equipment maintenance and the use of equipment that meets current U.S. Environmental Protection Agency (USEPA) emission standards would reduce tailpipe emissions and associated impacts on air quality.

Impacts on air quality would be short-term during Project construction and maintenance, and dispersion of pollutants would be localized to the vicinity of construction activity and would quickly disperse or settle. Impacts on air quality would not be anticipated to result in the exceedence of the National Ambient Air Quality Standards. The Project area is not located in a USEPA designated non-attainment area for any criteria pollutant (see Section 3.13). Impacts to air quality are expected to be short-term and low.

High voltage transmission lines themselves can cause limited air emissions. The high electric field strength of transmission lines causes a breakdown of air at the surface of conductors called corona. The corona effect is most pronounced in humid or wet weather and less so in dry or arid conditions. Corona has a popping sound that is most easily heard during rain storms. When corona occurs, the air surrounding the conductors is ionized and chemical reactions take place which generate small amounts of ozone and nitrogen oxides which are generally too small to be measured. The ozone concentration would be similar to background levels and fluctuations. Since the Project area has an arid climate, which minimizes corona, ozone generation would likewise be minimized. See Section 4.16.3 for more information on corona.
The corona effect would not be a concern for the Underground Design Option because the energized conductors are fully enclosed in a semi-conducting layer within the insulated cables that equalize the electrical gradient.

4.13.4 Impact Summary by Alternative

4.13.4.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed and there would be no impact to air quality.

4.13.4.2 Route Alternatives

Implementation of any of the New Northern Route (NNR) Alternative without the Manastash Ridge (MR) Subroute (Overhead and Underground Design Options) and the NNR Alternative with the MR Subroute would have similar emissions and impacts on air quality. The same or similar construction equipment would be used and construction would occur over approximately the same time frame. Potential differences could occur in the amount of fugitive dust generated from earth-moving operations associated with Overhead and Underground Design Options because these options would have varying amounts of surface disturbance. Underground construction activities would disturb more land than overhead construction activities due to total vegetation removal and trenching of the right-of-way for installation of the underground cable duct bank (see Chapter 2 for construction disturbance calculations). Impacts to air quality are expected to be short-term, localized and low.

4.13.5 Mitigation Measures

The PDFs described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

4.13.6 Global Climate Change

The assessment of climate changing pollutant emissions and climate change is in its formative phase; therefore, it is not yet possible to know with confidence the net impact to climate. However the Intergovernmental Panel on Climate Change (IPPC 2007) concluded that “warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-twentieth century is very likely due to the observed increase in anthropogenic (man-made) green house gas concentrations."

The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. The U.S. Bureau of Land Management's (BLM) Instruction Memorandum OR-2010-012 states that when information is not available, the analysis should state this and further analysis should not be attempted (BLM 2010). Therefore, climate change analyses for the proposed Project are limited to the accounting and disclosing of factors that contribute to greenhouse gas emissions. As stated in the Council on Environmental Quality (CEQ) *Draft National Environmental Policy Act (NEPA) Guidance on Consideration of the Effects of Climate Change and Green House Gas Emissions*,"[i]n accordance with NEPA's rule of reason and standards of obtaining information regarding reasonably foreseeable significant adverse effects on the human environment, action agencies need not undertake exorbitant research or analysis of projected climate change impacts in the Project area or on the Project itself, but may instead summarize and incorporate by reference the relevant scientific literature" (CEQ 2010).

Potential impacts related to greenhouses gases would generally be the same for NNR Alternative route configuration and design options. Implementation of any of the NNR Alternative route configuration or design options would contribute to greenhouse gas concentrations in several ways. Carbon dioxide, methane, and nitrogen dioxide emission levels would incrementally increase as vegetation and soils are removed and/or disturbed during construction, operation, and maintenance of the transmission line (Kessavalou et al. 1998). 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. Soil disturbance would occur throughout the Project area, as holes are excavated for structure installation and access and spur roads are constructed for the overhead design option. Vegetation removal and trenching of a portion of the ROW for installation of the cable duct bank would occur for the underground design option. Although, recognized as a contribution to overall greenhouse gas emissions, measurement of emissions from soil disturbance is difficult. However, research has shown that emissions as a result of soil disturbance are short-lived and return to background levels after several hours (Kessavaluo et al. 1998). Emissions from construction related vehicles also would impact atmospheric greenhouse gas concentrations incrementally because construction equipment and vehicles would be fueled by gasoline and diesel.

Impacts to global climate change associated with implementation of the proposed Project cannot be determined because established mechanisms to accurately predict the effect of resource management-level decisions do not exist. It should be noted that because the proposed Project would result in minimal long-term emissions of greenhouse gases, primarily associated with maintenance activities, the long term impacts would not be considered adverse.

4.14 WATER RESOURCES

4.14.1 Methods and Impact Types

4.14.1.1 Analysis Methods

The impact analyses for water resources involved calculating the number of miles traversed by the transmission line route segments by water resource type. Once the mileage was obtained, the rates of disturbance from the disturbance model were applied to these distances to generate estimates of the number of acres of impact per mile of transmission line by water resource type. Refer to Chapter 2 for a description of the disturbance model.

Several assumptions were made in this analysis. For the Overhead Design Option, the analysis assumed that the transmission line would span all streams and drainage courses and no structures would be placed in active channels. This means that direct impacts to water resources from the Overhead Design Option may occur only through construction of access road crossings. For the Underground Design Option, the analysis assumed that open cut trenching would be used for stream and drainage course crossings. This method was selected as open cut trenching is the most common method of construction for underground transmission line installation. Also, for the Underground Design Option, it was assumed that underground splice vaults would not be placed in or near stream or drainage course crossings.

For access roads, the following assumptions were made for both the Overhead and Underground Design Options:

- New access roads, improving existing dirt roads and overland travel may require modification of the stream channels to allow crossing by heavy equipment. Modification could include installation of temporary culverts, bank modification, or temporary bridges.
- The use of existing roads may require minor improvements. Existing culverts may need to be replaced or improved to accommodate construction traffic.

4.14.1.2 Impact Criteria

Sensitivity classifications were assigned to water resources that occur within the Project area. These sensitivity classifications served as the basis for the assignment of impact levels. Criteria used to assign resource sensitivity included state and federal designation (e.g., floodplain, impaired water body) and water resource type (e.g., wetland, stream, river). Table 4.14-1 summarizes the resource sensitivity classification for water resources that occur in the Project area.

TABLE 4.14-1 WATER RESOURCE SENSITIVITY CLASSIFICATION

WATER RESOURCE	SENSITIVITY
Wetland	High
Perennial Stream	Moderate
River	Moderate
100-Year Floodplain	Moderate
Canal/ditch	Low
Intermittent Stream	Low

4.14.1.3 Impact Types

The duration of impacts to water resources can be short-term or long-term. Impacts are considered short-term if they affect water resources during construction, but are generally returned to pre-construction conditions within three years following construction. Impacts are considered long-term if they would affect water resources for greater than three years following construction. Impacts to water resources from the construction of the proposed Project (Overhead Design Option) could result from placement of transmission line structures, construction of access roads, improvement of existing roads, and temporary work sites. The proposed Project would not alter the flow in any streams or rivers. With the Overhead Design Option, the transmission line would span all streams, drainage courses, and rivers and no structures would be placed in active channels. Construction could require the removal of riparian vegetation and/or the placement of temporary fill. Other impacts could include accidental spills of environmentally harmful materials, increased sedimentation, and contamination of water resources from construction-related disturbance, fugitive dust deposition, increased soil erosion from vegetation removal, or the introduction of noxious weeds and invasive species.

In addition to impacts described above, impacts to water resources from the implementation of the Underground Design Option for Route Segments NNR-4u and NNR-6u could occur due to excavation for the installation of underground facilities (duct bank and splice vaults), construction of access roads, and temporary work sites. The Underground Design Option could impact intermittent streams through drainage pattern alteration, increased erosion and sedimentation, and vegetation and soil removal. Impacts for the Underground Design Option are described in more detail in Section 4.14.4 for NNR-4u and NNR-6u.

4.14.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Impact levels are based on vegetation types that occur along the assumed transmission line centerline (route number and milepost). Impact levels are assigned based on resource sensitivity (e.g., special status plant or sensitive habitat), resource quality (context or the existing condition of the resource), resource quantity (the amount of the resource potentially affected), and the type and duration of impact (short- or long-term). These criteria were applied to develop impact level categories of high, moderate, low and no identifiable.

High – A high level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause a significant adverse change or stress to water resources that have a high sensitivity.

Moderate – A moderate level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause some change or stress (ranging between significant and insignificant) to water resources that have moderate sensitivity.

Low - A low level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause an insignificant or minor change or stress to water resources that have low sensitivity.

No Identifiable - No identifiable impact would be indicated where no measurable impact would occur to water resources.

4.14.3 Impacts Common to All Route Segments

This section presents information on impacts common to all route segments for the Overhead Design Option. Impacts to water resources from the Underground Design Option are discussed individually in Section 4.14.4 for Route Segments NNR-4u and NNR-6u.

Direct impacts to water resources would be caused by access road construction and improvements, ROW clearing, and site preparation for structures and other facilities such as pulling and tensioning sites, and potentially, maintenance activities.

Transmission structures would not be located in intermittent or perennial streams or wetland areas. Transmission line structures may be placed within the 100-year floodplain; however, placement of structures within the floodplain and constructing access roads to these structures is not expected to affect the function and flood storage of the floodplain, or impede or redirect flood flows. Depending upon final design, some access road improvements or new access roads may impact intermittent and perennial water courses; however, existing paved and unpaved roads and trails would be used where possible.

To reduce impacts to water resources, standard erosion and sediment control measures would be implemented. These measures may include using certified weed-free straw wattles and bale barriers and silt fencing placed at construction boundaries and where soil would be disturbed near a wetland or waterbody. Temporary culverts of appropriate size or temporary work bridges would be installed where needed to minimize stream bank degradation, erosion, and sediment deposition into the waterway. These temporary structures would be removed following completion of construction. Specific erosion and sediment control measures and locations will be specified in a Stormwater Pollution Prevention Plan (SWPPP) as part of the Plan of Development (POD).

Riparian areas can be particularly vulnerable to disturbance. The removal of vegetation along waterways can cause an increase in water temperature, increased water velocity, and decreased wildlife habitat. Disturbance of soil in or near riparian areas could lead to erosion of the stream bank and increase the deposition of sediment into waterways. In addition, removal of protective vegetation could also expose soil to potential wind and water erosion. This can result in further loss of soil and vegetation, as well as an increase in sediment input to water resources. Impacts to other resources are discussed in Section 4.2 - Vegetation and Special Status Plants; Section 4.3 - Wildlife and Special Status Wildlife Species; and Section 4.15 - Soils and Geology.

Impacts to water resources through vegetation removal would be minimized by implementing site specific erosion and sediment control measures to be specified in the SWPPP, reseeding following construction, minimizing vegetation removal, and implementing a Noxious Weed and Invasive Plant Management Plan.

Wetlands within the Project area are not extensive and would be avoided by transmission structures and roads. No impacts to wetlands are anticipated to occur. Wetland delineations have not been conducted for the Project at this time but, if needed, would be performed prior to construction to support Clean Water Act (CWA) Section 404 permitting and to minimize Project impacts. The delineation would identify both wetland and non-wetland waters of the United States that would be affected by the Project.

Some construction activities would occur in steeply sloped terrain, which would increase soil exposure and potential impacts to water resources on a short-term basis. Construction in steep areas could impact intermittent streams through vegetation removal, localized increases in erosion, runoff and sedimentation. Where possible, crossing of water resources would utilize existing roads. Where new access roads are required, vegetation removal would occur, the soil surface would be disturbed, and erosion, runoff, and sedimentation could increase in nearby watercourses. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods (specified in the SWPPP). Culverts of appropriate size would be installed where needed and disturbed areas would be reseeded. In addition, all construction and maintenance activities would be conducted in a manner that would minimize disturbance to vegetation, drainage channels, and stream banks.

Short-term impacts to groundwater could result from spills of fuel, oils, hydraulic fluid, or other substances. For example, pollutants could be introduced from improper equipment use. Contamination of water resources through spills would be minimized by Project Design Features (PDF) identified in

Section 2.5 such as: providing spill prevention kits and other practices described in the Spill Prevention, Control, and Countermeasure Plan, included as part of the POD. If refueling and maintaining equipment must occur onsite, these activities will occur outside a 100-foot radius of a waterbody, a 200-foot radius of all identified private water wells, and a 400-foot radius of all identified municipal or community water supply wells. In addition, for route segments on the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), refueling would not occur within 656 feet of any drainage, wet or dry, and parking or staging of vehicles would be at least 328 feet from drainages. Impacts to groundwater from the application of herbicide for weed control would be avoided by following procedures outlined in the Noxious Weed Control Plan, a part of the POD, including applying herbicides according to the label instructions, using certified pesticide applicators, and maintaining no-spray buffer zones along streams.

Excavation for transmission line foundations could encounter groundwater that is close to the surface. Foundation excavation could temporarily alter groundwater flows and could require dewatering to remove excess water from the construction worksite. Dewatering could impact the level of the water table, increase soil erosion, and increase the presence of surface water down slope from foundation excavation areas. If groundwater is encountered, dewatering would be performed in accordance with authorizations from applicable regulatory agencies and as detailed in the SWPPP. Dewatering procedures may involve discharge to catch basins, temporary settling basins, temporary holding tanks, or vacuum trucks. Soil compaction from access roads and work areas could alter ground surface percolation rates which would alter groundwater recharge to underlying aquifers. Impacts to groundwater are anticipated to be short-term and would be minimized by erosion and sediment control measures, tilling to reduce soil compaction, and restricting construction vehicle movement to pre-designated access locations.

No long-term impacts to water resources are anticipated to occur as a result of the proposed Project. Water resources would not be permanently affected due to implementation of PDFs described above and in Section 2.5, such as erosion control and other measures outlined in the SWPPP, minimizing vegetation removal, and revegetating disturbed areas. All waterbody disturbances would be completed under the terms of a U.S. Army Corp of Engineers (USACE) CWA Section 404 permit, the National Pollutant Discharge Elimination System Construction Stormwater Permit (CWA 402), and State 401 water quality certification requirements that govern activities within any waters of the United States. At this stage of design, the proposed Project does not identify exact locations of stream crossings.

4.14.4 Impacts Specific to Route Segments

Long-term impacts to water resources were assessed for each route segment and are presented in Table 4.14-2. Impacts for each route segment are discussed in detail in the following sections.

4.14.4.1 Route Segment NNR-1

No water resources would be disturbed on a short- or long-term basis through the construction of Route Segment NNR-1 (Table 4.14-2). Existing roads are present for the entire length of the route segment and the construction of new access roads would not be required. No identifiable impacts to water resources would occur for the entire length of the route segment (2.4 miles).

TABLE 4.14-2 LINEAR MILES CROSSED AND LONG-TERM DISTURBANCE TO WATER RESOURCES BY ROUTE SEGMENT (ACRES)

ROUTE SEGMENT	WATER RESOURCE TYPE (LINEAR MILES CROSSED AND ACRES OF LONG-TERM DISTURBANCE)[1]										TOTAL MILES OF WATER RESOURCES CROSSED	TOTAL ACRES OF LONG-TERM DISTURBANCE TO WATER RESOURCES[2]
	CANAL / DITCH		INTERMITTENT STREAM / GULLY		PERENNIAL STREAM		RIVER		WETLAND			
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac
NNR-1 2.4 miles	0	0	0	0	0	0	0	0	0	0	0	0
NNR-2 5.0 miles	0	0	0	0	0	0	0	0	0	0	0	0
NNR-3 9.3 miles	0	0	0.6	0	0	0	0	0	0	0	0.6	0
NNR-4o 4.5 miles	0	0	0.1	0	0	0	0	0	0	0	0.1	0
NNR-4u 4.5 miles	0	0	0.1	0	0	0	0	0	0	0	0.1	0
NNR-5 1.8 miles	0	0	0.1	0	0	0	0	0	0	0	0.1	0
NNR-6o 6.4 miles	0	0	0.3	0	0	0	0	0	0	0	0.3	0
NNR-6u 6.4 miles	0	0	0.3	0	0	0	0	0	0	0	0.3	0
NNR-7 8.2 miles	0	0	0	0	0	0	0	0	0	0	0	0
NNR-8 2.7 miles	0	0	0	0	0	0	0.1	0	0	0	0.1	0
MR-1 11.9 miles	0	0	2.5	0	0	0	0	0	0	0	2.5	0

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance. [2]Acres of short-term disturbance are presented in the discussion section for each route segment.

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4.14.4.2 Route Segment NNR-2

No short- or long-term disturbance to water resources would occur with the construction of Route Segment NNR-2 (Table 4.14-2). Existing access roads will be utilized and no new access roads would be required. No identifiable impacts to water resources would occur for the entire length of Route Segment NNR-2 (5.0 miles).

4.14.4.3 Route Segment NNR-3

With Route Segment NNR-3, short-term disturbance would occur to approximately 2.2 acres of water resources. Short-term ground disturbance would occur through improving existing road crossings through six unnamed intermittent streams and a 100-year floodplain associated with Lmuma Creek. Transmission line structures are not anticipated to be placed within Lmuma Creek's 100-year floodplain; however, if structures are placed within the floodplain, constructing access roads to these structures is not expected to affect the function and flood storage of the floodplain or impede or redirect flood flows.

Selah Creek, Burbank Creek, and Lmuma Creek are crossed by this route segment; however, no impacts to these perennial streams would occur because existing access roads would be utilized, the transmission line would span all streams, and no structures would be placed in active channels. Disturbance along this route segment would be minimized by PDFs such as: using existing roads to the extent possible; implementing erosion and sediment control; installing culverts of adequate size where needed; reseeding following construction; and implementing a Noxious Weed and Invasive Plant Management Plan. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs.

Following the implementation of PDFs, no long-term disturbance to water resources would occur with the construction of Route Segment NNR-3 (Table 4.14-2). Impacts to water resources from the construction of Route Segment NNR-3 would include 8.7 miles of no identifiable and 0.6 mile of low impacts.

4.14.4.4 Route Segment NNR-4o/NNR-4u

<u>Overhead Design Option</u>
Construction of Route Segment NNR-4o would result in approximately 0.4 acre of short-term ground disturbance to water resources. Short-term disturbance would occur at one unnamed intermittent stream crossing where existing access roads would require some improvement. The flow in this intermittent stream would not be altered and no structures would be placed in active channels. Short-term impacts for Route Segment NNR-4o would be similar to those described above for all route segments (Section 4.14.3). Disturbance along this route segment would be minimized by PDFs such as implementing erosion and sediment control, reseeding following construction, and implementing a Noxious Weed and Invasive Plant Management Plan to reduce potential spread of noxious weeds. Following the implementation of PDFs, no long-term disturbance to water resources would occur with the construction of Route Segment NNR-4o (Table 4.14-2). Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs. Impacts to water resources from the construction of Route Segment NNR-4o would include 4.4 miles of no identifiable impacts and 0.1 mile of low impacts.

<u>Underground Design Option</u>
Construction of the Underground Design Option for NNR-4u would result in approximately 0.7 acre of short-term ground disturbance to water resources. In addition to disturbance types described above in Section 4.14.3, additional underground construction disturbance types would include potential diversion of streams during construction, altering drainage patterns, and altering groundwater flows and water table levels through dewatering. Short-term disturbance would occur due to open cut trenching for the installation of underground duct bank, splice vaults, and construction of access roads and temporary work

sites. Blasting could be required in areas where mechanical equipment cannot break-up or loosen the rock or where shallow soils are underlain by bedrock. Blasting could potentially damage water wells, springs and seeps, and unstable slopes. In addition to PDFs above for NNR-4o, the following additional PDFs would be implemented for the Underground Design Option: trenching would occur in the intermittent stream during dry or low flow periods, where practical; culverts or temporary work bridges would be installed where needed and trenched topsoil would be salvaged, stored separately from subsoil, and spread during rehabilitation; excavated trench material will be placed way from streams; and the stream bank would be restored to its preconstruction contours or to a stable slope. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs. Following the implementation of PDFs, no long-term disturbance to water resources would occur with the construction of NNR-4u (Table 4.12-2). Impacts to water resources from the construction of this route segment would include 4.4 miles of no identifiable impacts and 0.1 mile of low impacts.

4.14.4.5 Route Segment NNR-5

With Route Segment NNR-5, short-term disturbance would occur to approximately 0.4 acre of water resources. Short-term ground disturbance would occur through new road construction through Badger Creek, an intermittent stream. The transmission line would span Badger Creek and no structures would be placed in its active channel. Disturbance along this route segment would be minimized by PDFs such as: implementing erosion and sediment control; installing culverts of appropriate size where needed; reseeding following construction; and implementing a Noxious Weed and Invasive Plant Management Plan. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs. Following the implementation of PDFs, no long-term disturbance to water resources would occur with the construction of Route Segment NNR-5 (Table 4.14-2). Impacts to water resources from the construction of Route Segment NNR-5 would include 1.7 miles of no identifiable and 0.1 mile of low impacts.

4.14.4.6 Route Segment NNR-6o/NNR-6u

Overhead Design Option
Construction of Route Segment NNR-6o (Overhead Design Option) would result in approximately 1.1 acre of short-term ground disturbance to water resources. Short-term disturbance would occur at three unnamed intermittent stream crossing where existing access roads would require some improvement. The flow in these intermittent streams would not be altered and no structures would be placed in active channels. Short-term impacts for Route Segment NNR-6o would be similar to those described above for all route segments (Section 4.14.3). Disturbance along this route segment would be minimized by PDFs such as implementing erosion and sediment control, reseeding following construction, and implementing a Noxious Weed and Invasive Plant Management Plan to reduce potential impacts from noxious weed establishment. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs. Following the implementation of PDFs, no long-term disturbance to water resources would occur with the construction of Route Segment NNR-6o (Table 4.14-2). Impacts to water resources from the construction of Route Segment NNR-6o would include 6.1 miles of no identifiable impacts and 0.3 mile of low impacts.

Underground Design Option
Construction of the Underground Design Option for NNR-6u would result in approximately 2.2 acres of short-term ground disturbance to water resources. In addition to disturbance types described above in Section 4.14.3, additional underground construction disturbance types would include potential diversion of streams during construction and altering drainage patterns which can change floodwater flows and can increase erosion and sedimentation. Short-term disturbance would occur due to open cut trenching for the installation of underground duct bank, construction of access roads and temporary work sites. Blasting could be required in areas where mechanical equipment cannot break-up or loosen the rock or where shallow soils are underlain by bedrock. Blasting could potentially damage water wells, springs and seeps, and unstable slopes. In addition to PDFs above for NNR-6o, the following additional PDFs would be

implemented for the Underground Design Option: trenching would occur in the intermittent stream during dry or low flow periods, where practical; trenched topsoil would be salvaged, stored separately from subsoil, and spread during rehabilitation following construction; excavated trench material will be placed way from streams; and the stream bank would be restored to its preconstruction contours or to a stable slope. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs. Following the implementation of PDFs, no long-term disturbance to water resources would occur with the construction of NNR-6u (Table 4.12-2). Impacts to water resources from the construction of this route segment would include 6.1 miles of no identifiable impacts and 0.3 mile of low impacts.

4.14.4.7 Route Segment NNR-7

No short- or long-term disturbance to water resources would occur with the construction of Route Segment NNR-7 (Table 4.14-2). Existing access roads will be utilized and no new access roads would be required. No identifiable impacts to water resources would occur for the entire length of Route Segment NNR-7 (8.2 miles).

4.14.4.8 Route Segment NNR-8

With Route Segment NNR-8, short-term disturbance would occur to approximately 1.3 acres of water resources. The transmission line would span the Columbia River and no structures would be placed in its active channel. The 100-year floodplains associated with the Columbia River occur along a 0.1 mile section of this route segment; however, existing access roads will be utilized and it is expected that the structures would not alter the storage capacity, grade or course that flood waters would take.

Disturbance along this route segment would be minimized by PDFs such as: implementing erosion and sediment control; installing culverts of appropriate size where needed; reseeding following construction; and implementing a Noxious Weed and Invasive Plant Management Plan. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs. Following the implementation of PDFs, no long-term disturbance to water resources would occur with the construction of Route Segment NNR-8 (Table 4.14-2). Impacts to water resources from the construction of Route Segment NNR-8 would include 2.6 miles of no identifiable and 0.1 mile of low impacts.

4.14.4.9 Route Segment MR-1

With Route Segment MR-1, short-term disturbance would occur to approximately 9.5 acres of water resources. Short-term ground disturbance would occur through access road construction in very steep terrain and improving existing road crossings for 25 intermittent stream crossings. Scorpion Creek Coulee is crossed by this route segment; however, no impacts to this perennial stream would occur because existing access roads would be utilized, the transmission line would span the stream, and no structures would be placed in its active channel. Disturbance along this route segment would be minimized by PDFs such as: using existing public roads to the extent possible; implementing erosion and sediment control; installing culverts of appropriate size where needed; reseeding following construction; and implementing a Noxious Weed and Invasive Plant Management Plan. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs. Following the implementation of PDFs, no long-term disturbance to water resources would occur (Table 4.14-2). Impacts to water resources from the construction of Route Segment MR-1 would include 9.4 miles of no identifiable and 2.5 miles of low impacts.

4.14.5 Mitigation Measures

The PDFs and environmental protection measures described in Section 2.5 (Project Design Features Common to Action Alternatives) have been incorporated into the Project design and would be implemented during construction, operation, and maintenance of the proposed Project. These measures are designed to avoid or minimize environmental impacts from Project construction, operation, and maintenance activities. These are items that Pacific Power has committed to implement as part of the Project development; therefore, at this time, no additional mitigation for water resources would be required; however, additional mitigation may be required as part of the permitting process. During the Section 404 permitting process, the USACE would evaluate whether wetlands have been avoided to the extent practical and whether losses have been adequately mitigated. The permitting process would also identify additional requirements, as necessary, to comply with USACE regulations. These could include the necessity for compensatory mitigation to offset unavoidable adverse impacts to wetlands, streams and other aquatic resources authorized by CWA Section 404 permits and other USACE permits. In addition, Washington State Department of Natural Resource's aquatic use authorization for the crossing of state-owned aquatic land may require additional mitigation measures to be implemented.

4.14.6 Impact Summary by Alternative

4.14.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to water resources would occur; however, water resources would continue to be affected by current use in the area.

4.14.6.2 Route Alternatives

Table 4.14-3 presents a comparison of the long-term impacts and impact levels following the implementation of PDFs for the New Northern Route (NNR) Alternative – Overhead Design Option, NNR Alternative – Manastash Ridge (MR) Subroute, NNR Alternative -Underground Design Option, and the DEIS Agency Preferred Alternative.

With the implementation of PDFs, no long-term disturbance to water resources would occur with the construction, operation, and maintenance of the NNR Alternative – Overhead Design Option, NNR Alternative - MR Subroute, NNR Alternative -Underground Design Option, or the Draft Environmental Impact Statement (DEIS) Agency Preferred Alternative. Differences in impact levels are very similar for the NNR Alternative design options and the DEIS Agency Preferred Alternative, with the majority of the impacts categorized as no identifiable. Ninety-seven percent of the impacts for the NNR Alternative – Overhead Design Option (39.1 miles) and the NNR Alternative -Underground Design Option (39.1 miles) are classified as no identifiable. Ninety-two percent of the impacts for NNR Alternative - MR Subroute (44.1 miles) and the DEIS Agency Preferred Alternative (60.8 miles) are classified as no identifiable. No moderate or high impacts to water resources are anticipated for any of the alternative options.

TABLE 4.14-3 IMPACTS TO WATER RESOURCES AND IMPACT SUMMARY OF ALTERNATIVES

ALTERNATIVES	WATER RESOURCE TYPE (LINEAR MILES AND ACRES OF LONG-TERM DISTURBANCE)[1]										TOTAL AMOUNT OF WATER RESOURCES CROSSED (MILES) AND LONG-TERM DISTURBANCE (ACRES)		IMPACT LEVELS[2]			
	CANAL / DITCH		INTERMITTENT STREAM / GULLY		PERENNIAL STREAM		RIVER		WETLAND				HIGH	MODERATE	LOW	NO IDENTIFIABLE
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	mi	mi	mi
NNR Alternative – Overhead Design Option NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.3 miles	0	0	1.1	0	0	0	0.1	0	0	0	1.2	0	0	0	1.2	39.1
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.7 miles	0	0	3.5	0	0	0	0.1	0	0	0	3.6	0	0	0	3.6	44.1
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.3 miles	0	0	1.1	0	0	0	0.1	0	0	0	1.2	0	0	0	1.2	39.1
DEIS AGENCY PREFERRED ALTERNATIVE 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	0	0	4.6	0	0.3	0	0	0	0	0	4.9	0	0	0	4.9	61.4

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance. [2]Impact levels are in linear miles. Impact levels are based on: resource sensitivity, resource quality, resource quantity, and the type and duration of impact (i.e. short- or long-term). Areas with no identifiable impacts include areas where no water resources are present. Rivers and wetlands would be spanned and no miles of impact would occur.

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4.15 GEOLOGY AND SOILS

4.15.1 Methods and Impact Types

4.15.1.1 Analysis Methods

Geology and soil resources may be affected by the construction, operation, and maintenance of the Project. The impact analyses for geology and soil involved calculating the number of miles traversed by the transmission line route segments by resource type. Once the mileage was obtained, the rates of disturbance from the disturbance model were applied to these distances to generate estimates of the number of acres of impact per mile of by route segment and Design Option. Refer to Chapter 2 for a description of the disturbance model.

Several assumptions were made in this analysis. For the Overhead Design Option, the analysis assumed that the transmission line would span faults and slide areas if possible, and no structures would be placed in active slide areas. This means that direct impacts to geology and soils from the Overhead Design Option occur primarily through construction of access road crossings and local areas of structure installation. For the Underground Design Option, the analysis assumed that open cut trenching would be used for fault crossings, crossing known landslide areas, and in areas of surface rock. Open cut trenching is the most common method of construction for underground transmission line installation.

4.15.1.2 Impact Criteria

Relative sensitivity classes were developed for soils and geology/geohazards based on their occurrence and key physical characteristics. The geologic evaluation focused on geohazards including mapped landslide areas and faults. The presence or absence of mapped or potential geohazards resulted in high, moderate, or low sensitivity and potential impacts. The overall sensitivity of soils was determined by using a combination of water erosion potential (i.e., Kw Factor), wind erosion potential (i.e., Wind Erosion Index), and restoration potential. Table 4.15-1 summarizes geologic and soil resource sensitivity and potential impacts in the Project area.

TABLE 4.15-1 GEOLOGY AND SOIL RESOURCE SENSITIVITY CLASSIFICATIONS

FEATURE	SENSITIVITY	RESTORATION POTENTIAL	POTENTIAL IMPACTS
Known landslide areas	High (O,U)	N/A	N/A
High wind erosion soils	High (O)	Low Moderate High	High Low Low
	High (U)	Low Moderate High	High Moderate Moderate
High water erosion soils	High (O)	Low Moderate High	High Low Low
	High (U)	Low Moderate High	High Moderate Moderate
Very steep terrain (30%+)	High (O,U)	N/A	High
Moderate wind erosion potential soils	Moderate (O)	Low Moderate High	Moderate Low Low

FEATURE	SENSITIVITY	RESTORATION POTENTIAL	POTENTIAL IMPACTS
	Moderate (U)	Low Moderate High	Moderate Moderate Moderate
Moderate water erosion potential soils	Moderate (O)	Low Moderate High	Moderate Low Low
	Moderate (U)	Low Moderate High	Moderate Moderate Moderate
Steep Terrain (15-30%)	Moderate (O)	N/A	Low
	Moderate (U)		Moderate
Low wind erosion potential soils	Low (O)	Low Moderate High	Low Low Low
	Low (U)	Low Moderate High	Moderate Moderate Low
Low water erosion potential soils	Low (O)	Low Moderate High	Low Low Low
	Low (U)	Low Moderate High	Moderate Moderate Low
Sloping to flat terrain (<15%)	Low (O)	N/A	Low
	Low (U)		Moderate

O = Overhead Design Option
U = Underground Design Option

4.15.1.3 Impact Types

The duration of impacts to geology and soils can be short-term or long-term. Impacts are considered short-term if they affect soil and geologic resources for a period of several weeks to one year following construction. Impacts are considered long-term if they would affect soil and geologic resources for greater than one year following construction.

Geologic hazards could directly and indirectly affect the construction, operation, and maintenance of the Project. Geohazard impact types would include:

- Loss of equipment or injury to personnel as a result of landslides, especially in steep terrain;
- Construction activities triggering geohazards that impact other resources and/or structures such as homes, highways, canals, etc.; and
- Loss of electric transmission service as a result of seismic activity or landslides.

Soil impact types would include:

- Increased soil erosion in areas where construction activities have disturbed or altered the land surface by exposing soils (temporary);
- Construction of permanent access roads potentially resulting in accelerated wind and water erosion rates (permanent);
- Degradation of the land surface and loss of soils resulting from accelerated soil erosion (temporary to permanent); and
- Soil compaction resulting from construction activities, such as heavy construction equipment use and the stockpiling of excavated material (temporary to permanent).

Impacts on Prime Farmland are addressed in Section 4.4 Land Use.

4.15.2 Impact Levels

Potential impacts to geologic and soil resources were assessed along the centerline of the proposed 230 kilovolt (kV) transmission line and access roads. Impact levels are assigned based on resource sensitivity, resource quality (i.e., context or the existing condition of the resource), resource quantity (i.e., the amount of the resource potentially affected), and the type and duration of impact (i.e., short- or long-term). These criteria were applied to develop impact level categories of high, moderate, low, and no identifiable. Geology and soil impacts resulting from open cut trenching would be greater than those that would occur from an Overhead Design Option (New Northern Route [NNR] Alternative without Manastash Ridge [MR] Subroute-Overhead and NNR Alternative with MR Subroute) as the area that would be disturbed is larger. Impact levels were defined as follows:

High
For both the Overhead and Underground Design Options, impacts would be classified as high, lasting greater than one year, if Project Design Features (PDFs) would be ineffective at reducing impacts and if the proposed Project were to be constructed in areas with the following conditions:

- Landslides are considered a potential high hazard and risk;
- High susceptibility to wind erosion and low soil restoration potential;
- High susceptibility to water erosion and low soil restoration potential; and
- Construction takes place in areas of very steep terrain (i.e., 30 percent slope or greater; Access Level 7, see Section 2.4.3.2).

In general, the Project would cause long-term (i.e., greater than one year) increases in wind or water erosion rates following soil disturbance prior to the effective establishment of erosion control measures and natural re-vegetation. Structures or access roads near water bodies would be constructed in highly erodible soils in areas of steep to very steep terrain (i.e., 15 to greater than 30 percent slopes; Access Levels 6 and 7) with some clearing. Structures or access roads near water bodies would be constructed near water banks and sediment would be likely to reach the water. Road and facility construction and clearing would be required on soils with high erosion hazard and the potential for restoration would be low using standard erosion control and restoration methods. Erosion levels would increase after construction.

Moderate
Impacts would be classified as moderate, lasting from one month to one year, if PDFs would be effective at reducing impacts and if the proposed Project were to be constructed in areas with the following conditions:

Overhead Design Option

- Moderate susceptibility to wind erosion and low soil restoration potential;
- High susceptibility to water erosion and moderate to high soil restoration potential; and
- Moderate susceptibility to water erosion and low soil restoration potential.

Underground Design Option

- High susceptibility to wind erosion and moderate to high soil restoration potential;
- Moderate susceptibility to wind erosion and low to high soil restoration potential;
- Low susceptibility to wind erosion and a low to moderate soil restoration potential;
- Moderate susceptibility to water erosion and low to high soil restoration potential;
- Low susceptibility to water erosion and a low to moderate soil restoration potential; and
- Construction takes place in areas of steep terrain (i.e., 15 to 30 percent slope; Access Level 6 or 7) and sloping to flat terrain (i.e., less than 15 percent slope; Access Levels 4 and 5).

In general, the Project would cause impacts lasting from one month to one year by increasing wind or water erosion rates following soil disturbance prior to the effective establishment of erosion control measures and re-vegetation. Structures or access roads near water bodies would be constructed in moderately erodible soils in areas of flat to steep terrain (i.e., less than 15 percent slope/Access Levels 4 and 15 to 30 percent slope/Access Level 6) with some clearing. Structures or access roads near water bodies would be constructed away from water banks and little sediment would be likely to reach the water. Road and facility construction and clearing would be required on soils with moderate erosion hazard and the potential for restoration would be moderate using standard erosion control methods. Erosion levels would be near normal after construction.

Low

Impacts would be classified as low, generally lasting from several weeks to one month, if PDFs would be effective and the proposed Project were to be constructed in areas with the following conditions:

Overhead Design Option

- Low susceptibility to wind erosion and low to high soil restoration potential;
- High susceptibility to water erosion and moderate to high soil restoration potential;
- Moderate susceptibility to water erosion and moderate to high soil restoration potential;
- Low susceptibility to water erosion and low to high soil restoration potential; and
- Construction takes place in areas of sloping to flat terrain (i.e., less than 15 percent slope; Access Levels 4 and 5).

Underground Design Option

- Low susceptibility to wind erosion and high soil restoration potential; and
- Low susceptibility to water erosion and high soil restoration potential.

In general, the Project would cause short-term (i.e., several weeks to one year) increases in wind or water erosion rates following soil disturbance prior to the effective establishment of erosion control measures and natural re-vegetation. Structures or access roads near water bodies would be constructed in low erodibility soils in areas of sloping to flat terrain (i.e., less than 15 percent slopes; Access Levels 4 and 5) with little or no clearing. Structures or access roads near water bodies would be constructed away from water banks and little or no sediment would be likely to reach the water. Road and facility construction and clearing would be required on soils with low erosion hazard and the potential for restoration would be high using standard erosion control methods. Erosion levels would be at or near normal during or after construction.

No Identifiable

No identifiable impact would occur where open water areas are crossed or the Overhead Design Option spans sensitive features.

4.15.3 Impacts Common to All Route Segments Design Options

4.15.3.1 Geology

This section presents information on impacts common to all route segments for the Overhead Design Option. Impacts to geologic resources from the Underground Design Option are discussed individually in Section 4.15.4 for Route Segments NNR-4u and NNR-6u.

Construction of access roads and transmission structures would alter the landscape in all route segments causing long-term impacts. Geologic hazards are found along the route segments as described below (also see Appendix A - Geohazards Map). In general, potential mass movement (e.g., landslide) areas would present the greatest risk for potential injury to construction personnel or the public and equipment loss or damage. Landslides might be trigged by seismic events, but could also occur as a result of significant rainfall events or construction activities such as road construction that may de-stabilize these areas.

Liquefaction occurs when soils lose shear strength and deform during an earthquake, acting like quicksand which is capable of causing great damage to structures in the area. Liquefaction typically occurs in areas of loose sandy soils that are saturated with water, such as low-lying coastal areas, lakeshores, and river valleys. Liquefaction susceptibility maps have been prepared for each county in the state of Washington, including Yakima, Grant, and Kittitas counties (WDGER 2010a). These maps provide an estimate of the likelihood that soil would liquefy as a result of earthquake shaking based on the physical characteristics of the soil, (e.g., grain texture, compaction, and depth of groundwater). Liquefaction susceptibility maps depict the relative hazard in terms of low, low to moderate, and moderate to high liquefaction susceptibility (Geohazards Map - Appendix A). Liquefaction potential is described for each route segment and alternative below and summarized in Tables 4.15-2 and 4.15-3.

The potential for impact created as a result of seismic activity and resulting soil liquefaction impact is expected to be low for all route segments because geotechnical investigations would be undertaken prior to construction and would provide a basis for engineering of the structures, therefore, the chance for failure of the transmission line as a result of seismic activity would be very low. Were a seismic activity to occur, transmission line structures are likely to survive settlement associated with liquefaction with little damage other than leaning. The Columbia River crossing structures would be engineered with deep foundations, soil densification, avoidance, or other measures where liquefaction risk is determined to be an issue during geotechnical investigations.

As with soil liquefaction, the presence of active faults is not likely to affect the construction, operation or maintenance of the transmission line unless an unmapped fault is present or an unmapped surface rupture is visible, efforts to locate structures to avoid all potential surface faults are not considered practicable. Where pre-construction geotechnical investigations identify evidence of surface ruptures, the line would span or avoid these areas if possible and appropriate engineering would minimize hazards to the operation of the transmission line. For the Underground Design Option, geotechnical evaluation would further determine and characterize the hazard and risk level and determine engineering requirements to address the risk. All practicable precautions would be taken to construct the Project facilities to withstand the projected ground shaking, lurching, lateral spreading, differential settlement and other hazards produced from a Maximum Probable Earthquake event.

The PDFs would be implemented during construction and operation and are anticipated to be effective at minimizing impacts to geologic resources (refer to Section 2.5 - Project Design Features Common to Action Alternatives). The PDFs include: geotechnical engineering report will be prepared prior to construction; a pre-construction field verification of landslide prone areas and potential design changes to roads; using existing public roads to the extent possible; minimizing blading of native plant communities; reseeding following construction; and implement erosion control measures as detailed in the Stormwater Pollution Prevention Plan (SWPPP).

4.15.3.2 Soils

Ground disturbance, changes in grade and changes in soil stability from construction activities can significantly impact soils susceptible to wind and water erosion. The Natural Resources Conservation Service (NRCS) considers slope and soil properties such as cohesion, drainage, and organic content in determining the soil erosion potential of soils.

Restoration potential is a measure of a soils ability to recover from degradation. The NRCS provides soil restoration potential ratings for each soil type, from low to high restoration potential. Soils with the ability to recover from degradation would have the best potential for revegetation and restoration once a construction project has been completed. Soil resilience is dependent upon adequate stores of organic matter, good soil structure, low salt and sodium levels, adequate nutrient levels, microbial biomass and diversity, adequate precipitation for recovery, and other soil properties. Soil restoration potential for the Project area is shown on both the Soil Erosion Potential by Water and Soil Erosion Potential by Wind Maps in Appendix A.

All soil types crossed by the Project route segments would be subject to some type and level of disturbance due to structure construction and road building. Soil surface disturbance, compaction, and relocation would occur to varying degrees. These disturbances would likely result in the potential for a small increase in wind and water erosion and compaction levels. Erosion rates would be estimated in the SWPPP and Best Management Practices would be specified to reduce and control wind and water erosion for the approved route alternative. The SWPPP would be prepared as part of the Plan of Development (POD). Direct impacts to soil resources would primarily be related to road building activities and construction work areas. New roads, the clearing and grading of building pads in areas over eight percent slope, and structure base and foundation areas are expected to be permanent disturbances.

Construction activities that remove vegetation and cause soil surface disturbance would potentially result in increased soil erosion rates. Erosion rates depend on site-specific characteristics including soil type, slope, and climatic conditions. Water erosion would generally be associated with localized precipitation events. Rapid snowmelt would have the potential to contribute to water erosion. The potential for wind erosion would be relatively similar across seasons, except when there is snow cover. Work areas and pulling and tensioning sites are expected to cause short-term impacts by temporarily increasing soil erosion in areas where construction activities have disturbed or altered the land surface by exposing soils.

Soil types within the Project area have varying potentials for wind and water erosion. Detailed soil mapping units in the Project corridor have potential wind and water erosion risks ranging from low risk to high risk (see Appendix A - Soil Erosion Potential by Wind and Soil Erosion Potential by Water maps). Wind and water erosion could result in: loss of soil organic matter; reduced vegetation production due to soil loss; increased precipitation run-off; sediment loading to streams; and flooding. Wind and water erosion impacts would generally be short-term in duration.

Soil compaction could occur as a result of construction activities, such as heavy construction equipment use and soil/rock stockpiling. Rubber-tired vehicles generally compact soils more than tracked vehicles. The extent of compaction would depend in large part on soil moisture content and the physical characteristics of a particular affected soil type. Compaction tends to be most severe when soils are moist to wet. Very dry and very wet soils generally do not compact as severely. Compaction impacts would generally be short-term in duration, but would have the potential to affect soil resources in the long-term if compaction is deeper than six inches. Compacted soil could reduce precipitation infiltration and increase the rate and amount of soil erosion.

Soil rutting could occur as a result of Project-related construction activities. In general, rutting is a concern when vehicle or construction equipment travel occurs during wet conditions. Rutting can restrict the movement of water through and across soil thus altering soil/water dynamics. Both tracked- and rubber-tired vehicles can cause rutting; however, standard rubber-tired vehicles typically have more potential for rutting than tracked or flotation tire equipment vehicles.

Project related construction activities would likely cause soil displacement. Soil resources may be directly displaced by construction equipment during road improvement, new road construction, and transmission structure placement. These impacts would be localized and limited in terms of the effects to Project corridor soil resources.

The effective implementation of PDFs would minimize potential impacts to soils by minimizing disturbance in sensitive areas, implementing surface stabilization and erosion control, the re-establishment of native vegetation, segregation of topsoil from sub-soils, and limiting construction operation during periods of high soil moisture or saturation. Refer to Chapter 2, Section 2.5 for a complete list and description of PDFs.

Table 4.15-2 summarizes impacts to geologic and soil resources by route segment.

4.15.4 Impacts Specific to Route Segments and Design Options

4.15.4.1 Route Segment NNR-1

Route Segment NNR-1 would cross no mapped faults, no mapped landslides, and 2.0 miles of the 2.4-mile route segment crosses slopes between 15 and 30 percent, and 0.3 mile would be located on slopes over 30 percent. However, minimal new access road construction would occur along this route segment because existing roads would be utilized. The route segment would create disturbances of 2.3 acres on moderate wind erosion potential soils and 2.3 acres on high water erosion potential soils. Impacts on 1.6 acres of low restoration potential soils and 0.7 acre of moderate restoration potential would also occur. As described above for impacts common to all route segments, the effective implementation of PDFs (Section 2.5) would minimize potential impacts to soil and geologic resources. The PDFs used for this segment would include: using existing public roads to the extent possible; minimizing blading of native plant communities; reseeding following construction; geotechnical engineering report will be prepared prior to construction; implementing erosion and sediment control measures as detailed in the SWPPP; construction operations will avoid, to the extent feasible, disturbance of soil during the wet season; and limiting ground disturbance. With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment NNR-1 would be moderate to low.

4.15.4.2 Route Segment NNR-2

Route Segment NNR-2 crosses no mapped faults or landslides. This area also is mapped as low and moderate-high potential for liquefaction. A total of 3.5 miles of the 5.0-mile route segment would cross slopes less than 15 percent, 1.2 miles would cross slopes between 15 and 30 percent, and 0.4 mile would be located on slopes over 30 percent. However, new access road construction would not occur in the steepest areas. The steepest areas along the route centerline would be spanned and this route segment would generally follow existing roads (Firing Center Road and the JBLM YTC firebreak road). The route segment would disturb 3.1 acres of moderate wind erosion potential soils as well as 2.6 acres and 0.5 acre on high and moderate water erosion potential soils, respectively. Impacts on 1.1 acres of low restoration potential soils and 2.8 acres of disturbance on moderate restoration potential soils would occur. As described above for impacts common to all route segments, the effective implementation of PDFs (Section 2.5) would minimize potential impacts to soil and geologic resources. With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment NNR-2 would be moderate to low.

4.15.4.3 Route Segment NNR-3

Route Segment NNR-3 crosses four mapped faults and no mapped landslides. A portion of this route segment is mapped as moderate-high potential for liquefaction. A total of 4.6 miles of the 9.3-mile route segment crosses slopes greater than 30 percent, 3.7 miles crosses slopes between 15 and 30 percent, and 1.0 mile would be located on slopes less than 15 percent. However, access road and transmission line construction would not occur in the steepest areas and existing roads located along Pacific Power's Pomona-Wanapum 230 kV transmission line would be upgraded and utilized (Access Level 3) with the steepest areas along the route centerline spanned. The route segment would create disturbances of 6.2 acres on moderate wind erosion potential soils, as well as, 0.9 acre and 7.0 acres on high and moderate water erosion potential soils, respectively. Impacts on 9.3 acres of low restoration potential soils and 6.6 acres of disturbance on moderate restoration potential soils would occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of PDFs (Section 2.5). With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment NNR-3 would be moderate to low.

4.15.4.4 Route Segment NNR-4o/4u

<u>Overhead Design Option</u>
Route Segment NNR-4o crosses two mapped faults and no mapped landslides. A total of 1.6 miles of the 4.5-mile route segment crosses slopes between 15 and 30 percent and 2.5 miles crosses slopes less than 15 percent. Steep slopes over 30 percent account for 0.5 mile of the route segment. However, access road and transmission line construction would not occur in the steepest areas and existing access roads located along the Pomona-Wanapum 230 kV transmission line would be used (Access Levels 2 and 3), with the steepest areas along the route centerline spanned. The route segment would create disturbances of 1.9 acres on moderate wind erosion potential soils, as well as, 0.3 acre and 3.6 acres on high and moderate water erosion potential soils, respectively. Impacts on 2.3 acres of low restoration potential soils and 3.1 acres of disturbance on moderate restoration potential soils would occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of PDFs (Section 2.5). With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment NNR-4o would be moderate to low.

<u>Underground Design Option</u>
Route Segment NNR-4u would be constructed along the same alignment as NNR-4o and would cross the same terrain and faults as NNR-4o; however, open cut trenching would be utilized along the entire length of the segment (except at the transition stations adjacent to Interstate 82 and across the highway), with significant grading activities (cut and fill) occurring in steep terrain. Existing access roads that follow the contours of the terrain could not be used for access in steeper terrain. For the Underground Design

Option, a comprehensive geotechnical investigation would be required along the entire route segment in order to: 1) determine subsurface soil/rock content for construction purposes; and 2) to better evaluate the risks associated with geohazards (faults, seismic activity, liquefaction, etc.) and their potential effects on an underground line.

Geology and soil impacts resulting from open cut trenching are also significantly greater than those that would occur from the Overhead Design Option because the total area that would be disturbed is larger and the volume of soil and rock moved would be greater to accommodate the duct bank and the splice vaults. Approximately 88,800 cubic yards of soil/bedrock would need to be excavated for this route segment. Soil conditions and engineering requirements of the trench would affect the amount of excavated material that could be re-buried (backfilled). Excavated material would need to be hauled away under any circumstance which would not typically be necessary for the Overhead Design Option due to the significantly lower volume of excavated material associated with auguring for direct-imbed poles or foundation installation.

Underground construction would result in disturbance of the natural topography due to grading and trenching for the installation of the duct bank. More extensive grading would be required in uneven terrain and where the ROW traverses steep slopes and side slopes.

When rock or rocky formations are encountered for the excavation of the trench, tractor-mounted mechanical rippers or rock trenchers would need to be used to fracture the rock prior to excavation. Blasting could be required in areas where mechanical equipment cannot break-up or loosen the rock or where shallow soils are underlain by bedrock. Blasting could potentially damage water wells, springs and seeps, and unstable slopes.

Grading, trenching, and backfilling could cause the mixing of soil horizons. Mixing of topsoil with subsoil could leave less productive soil in the root zone, which could lower soil fertility and decrease the ability of disturbed areas to revegetate successfully. Additionally, operating heavy equipment under wet soil conditions could cause deep soil compaction.

With the Underground Design Option, the route segment would create disturbances of 7.8 acres on moderate wind erosion potential soils, as well as, 0.6 acre and 10.7 acres on high and moderate water erosion potential soils, respectively. Impacts on 3.6 acres of low restoration potential soils and 14.3 acres of disturbance on moderate restoration potential soils would occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of PDFs (Section 2.5). With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment NNR-4u would generally be moderate.

4.15.4.5 Route Segment NNR-5

Route Segment NNR-5 crosses no mapped faults or landslides. A total of 1.5 miles of the 1.8-mile route segment would cross slopes less than 15 percent and 0.3 mile would cross slopes between 15 and 30 percent. The proposed route segment does not cross steep slopes over 30 percent. Access road and transmission line construction would not occur in the steepest areas along the route centerline spanned. The route segment would create disturbances of 1.5 acres on moderate wind erosion potential soils, as well as, 0.9 acre and 0.5 acre on high and moderate water erosion potential soils, respectively. Impacts on 0.2 acre of low restoration potential soils and 1.3 acres of disturbance on moderate restoration potential soils would also occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of PDFs (Section 2.5). With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment NNR-5 would be moderate to low.

4.15.4.6 Route Segment NNR-6o/6u

Overhead Design Option
Route Segment NNR-6o crosses two mapped faults and six mapped landslide areas totaling 1.6 miles of this 6.4-mile route. This route segment crosses areas mapped as low-moderate potential for liquefaction. A total of 3.3 miles of the route segment cross slopes greater than 30 percent, 2.2 miles cross slopes between 15 and 30 percent, and 1.0 mile crosses slopes less than 15 percent. Access road and transmission line construction would not occur in the steepest areas and the existing Pomona-Wanapum 230 kV transmission line access roads would be used (Access Level 2 or 3), with the steepest areas along the route centerline spanned. The route segment would create disturbances of 1.5 acres on moderate wind erosion potential soils, as well as, 1.1 acres and 0.3 acre on high and moderate water erosion potential soils, respectively. Impacts on 0.3 acre of low restoration potential soils and 5.6 acres of disturbance on moderate restoration potential soils would occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of PDFs (Section 2.5). With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment NNR-6o would be moderate to low.

Underground Design Option
Route Segment NNR-6u would be constructed along the same alignment as NNR-6o and would cross the same terrain, landslide areas and faults as NNR-6o; however, open cut trenching would be utilized along the entire length of the segment, with significant grading activities (cut and fill) occurring in steep terrain. Existing access roads that follow the contours of the terrain could not be used for access in steeper terrain. Route Segment NNR-6u crosses two faults. For the Underground Design Option, a comprehensive geotechnical investigation would be required along the entire route segment in order to: 1) determine subsurface soil/rock content for construction purposes; and 2) to better evaluate the risks associated with geohazards (faults, seismic activity, liquefaction, etc.) and their potential effects on an underground line.

Geology and soil impacts resulting from open cut trenching are also significantly greater than those that would occur from the Overhead Design Option because the total area that would be disturbed is larger and the volume of soil and rock moved would be greater to accommodate the duct bank and the splice vaults. Approximately 126,000 cubic yards of soil/bedrock would need to be excavated for this route segment. Soil conditions and engineering requirements of the trench would affect the amount of excavated material that could be re-buried (backfilled). Excavated material would need to be hauled away under any circumstance, which would not typically be necessary for the Overhead Design Option due to the significantly lower volume of excavated material associated with auguring for direct-imbed poles or foundation installation.

Underground construction would result in disturbance of the natural topography due to grading and trenching for the installation of the duct bank. More extensive grading would be required in uneven terrain and where the right-of-way traverse steep slopes and side slopes.

When rock or rocky formations are encountered for the excavation of the trench, tractor-mounted mechanical rippers or rock trenchers would need to be used to fracture the rock prior to excavation. Blasting could be required in areas where mechanical equipment cannot break-up or loosen the rock or where shallow soils are underlain by bedrock. Blasting could potentially damage water wells, springs and seeps, and unstable slopes.

Grading, trenching, and backfilling could cause the mixing of soil horizons. Mixing of topsoil with subsoil could leave less productive soil in the root zone, which could lower soil fertility and decrease the ability of disturbed areas to revegetate successfully. Operating heavy equipment under wet soil conditions could cause deep soil compaction.

With the Underground Design Option, the route segment would create disturbances of 7.0 acres on moderate wind erosion potential soils, as well as, 4.3 acres and 2.6 acres on high and moderate water erosion potential soils, respectively. Impacts on 0.3 acre of low restoration potential soils and 15.1 acres of disturbance on moderate restoration potential soils would occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of PDFs (Section 2.5). With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment NNR-6u would generally be moderate.

4.15.4.7 Route Segment NNR-7

Route Segment NNR-7 crosses six mapped faults, one mapped landslide area totaling 0.5 mile of the route, and 0.3 mile of the route mapped as low-moderate potential for liquefaction. A total of 5.9 miles of the 8.2-mile route segment crosses slopes between 15 and 30 percent, 1.5 miles crosses slopes greater than 30 percent, and 0.9 mile crosses slopes less than 15 percent. Access road and transmission line construction would not occur in the steepest areas and the existing Pomona-Wanapum 230 kV transmission line access roads would be used (Access Level 2), with the steepest areas along the route centerline spanned. The route segment would create disturbances of 5.3 acres on moderate wind erosion potential soils, as well as, 0.3 acre and 6.2 acres on high and moderate water erosion potential soils, respectively. Impacts on 3.1 acres of low restoration potential soils and 4.1 acres of disturbance on moderate restoration potential soils would occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of PDFs (Section 2.5). With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment NNR-7 would be moderate to low.

4.15.4.8 Route Segment NNR-8

Route Segment NNR-8 crosses no mapped faults or landslides. A total of 1.4 miles of this area is mapped as low-moderate to moderate high potential for liquefaction. A total of 2.2 miles of the 2.7-mile route segment is located on slopes less than 15 percent. Steep slopes over 30 percent account for 0.2 mile of the route segment and slopes between 15 percent and 30 percent account for 0.4 mile. Access road and transmission line construction would not occur in the steepest areas and the existing Pomona-Wanapum 230 kV transmission line access roads would be used (Access Level 2 or 3), with the steepest areas along the route centerline and the Columbia River spanned. This route segment would involve the construction of steel lattice structures on the east and west side of the Columbia River. A comprehensive geotechnical investigation would be required in the area of the crossing to determine subsurface soil/rock content for foundation engineering and to better evaluate the risks associated with geohazards (faults, seismic activity, liquefaction, etc.) and their potential effects on steel lattice structures. The amount of excavated material and stockpiling or hauling requirements would depend on the results of the geotechnical investigation (e.g., foundation size and depth).

The route segment would create disturbances of 1.4 acres and 0.8 acre on high and moderate wind erosion potential soils, respectively. Impacts on 2.3 acres of low restoration potential soils would occur. No impacts would occur across the Columbia River. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of PDFs (Section 2.5). With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment NNR-8 would be moderate to low.

4.15.4.9 Route Segment MR-1

Route Segment MR-1 crosses one mapped fault and one mapped landslide area totaling 0.8 mile of the route. A total of 2.1 miles of this area also is mapped as low to low-moderate potential for liquefaction. A total of 5.2 miles of the 11.9-mile route segment would cross slopes between 15 and 30 percent, 3.5 miles would cross slopes greater than 30 percent, and 3.2 miles would cross slopes less than 15 percent. Access road and transmission line construction would not occur in the steepest areas because the line would span the steepest areas. Extensive new road construction would be necessary in the generally steep terrain. Because of new road construction and steep terrain, this route segment would create disturbances of 23.7 acres on moderate wind erosion potential soils, as well as, 2.9 acres and 24.7 acres on high and moderate water erosion potential soils, respectively. Impacts on 5.0 acres of low restoration potential soils and 20.4 acres of disturbance on moderate restoration potential soils would also occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of PDFs (Section 2.5). With the effective implementation of PDFs, impacts to soil and geologic resources from the construction of Segment MR-1 would be moderate to low.

TABLE 4.15-2 LONG-TERM DISTURBANCE TO GEOLOGIC AND SOIL RESOURCES BY ROUTE SEGMENT

ALTERNATIVE	GEOLOGIC RESOURCES AND HAZARDS									SOIL RESOURCES (LINEAR MILES CROSSED, ACRES LONG-TERM DISTURBED, AND % OF RESOURCE TYPE DISTURBED BY TOTAL ROUTE SEGMENT)[1]																	
	FAULTS (# CROSSED)	SLOPE % (MILES CROSSED)				MAPPED LANDSLIDES (HIGH HAZARD: MILES CROSSED)	LIQUEFACTION POTENTIAL (MILES CROSSED)			SOIL ERODIBILITY POTENTIAL												RESTORATION POTENTIAL					
										WIND						WATER											
										HIGH			MODERATE			HIGH			MODERATE			LOW			MODERATE		
		0-8	8-15	15-30	30+		LOW	LOW-MODERATE	MODERATE-HIGH	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%
NNR-1 2.4 miles	0	0.0	0.1	2.0	0.3	0	0	0	0	0	0	0	2.4	2.3	100	2.4	2.3	100	0	0	0	1.7	1.6	70.8	0.7	0.7	29.2
NNR-2 5.0 miles	0	2.8	0.7	1.2	0.4	0	1.7	0	0.2	0	0	0	4.1	3.1	80.4	3.5	2.6	68.6	0.6	0.5	11.8	1.4	1.1	27.5	3.7	2.8	72.5
NNR-3 9.3 miles	4	0.3	0.7	3.7	4.6	0	0	0	0.1	0	0	0	3.4	6.2	36.6	0.9	0.9	9.7	3.5	7.0	37.6	4.7	9.3	50.5	3.7	6.6	39.8
NNR-4o 4.5 mile	2	1.2	1.3	1.6	0.5	0	0	0	0	0	0	0	1.9	1.9	41.3	0.3	0.3	6.5	3.0	3.6	65.2	1.2	2.3	26.1	3.4	3.1	73.9
NNR-4u 4.5 mile	2	1.2	1.3	1.6	0.5	0	0	0	0	0	0	0	1.9	7.8	41.3	0.3	0.6	6.5	3.0	10.7	65.2	1.2	3.6	26.1	3.4	14.3	73.9
NNR-5 1.8 miles	0	0.9	0.6	0.3	0.0	0	0	0	0	0	0	0	1.7	1.5	94.4	1.0	0.9	55.6	0.7	0.5	38.9	0.1	0.2	5.6	1.7	1.3	94.4
NNR-6o 6.4 miles	2	0.1	0.9	2.2	3.3	1.6	0	0.9	0	0	0	0	1.7	1.5	26.2	1.3	1.1	20	0.4	0.3	6.2	0.3	0.3	4.6	5.6	5.6	86.2
NNR-6u 6.4 miles	2	0.1	0.9	2.2	3.3	1.6	0	0.9	0	0	0	0	1.7	7.0	26.2	1.3	4.3	20.	0.4	2.6	6.2	0.3	0.3	4.6	5.6	15.1	86.2
NNR-7 8.2 miles	6	0.1	0.8	5.9	1.5	0.5	0	0.3	0	0	0	0	6.1	5.3	73.5	0.3	0.3	3.6	7.1	6.2	85.5	3.6	3.1	43.4	4.7	4.1	56.6
NNR-8 2.7 mile	0	1.8	0.4	0.4	0.2	0	0	0.4	1.0	1.8	1.4	64.3	0.5	0.8	17.9	0	0	0	0	0	0	2.4	2.3	85.7	0	0	0
MR-1 11.9 miles	1	0.3	2.9	5.2	3.5	0.8	1.3	0.8	0	0	0	0	7.6	23.7	63.9	1.1	2.9	9.2	8.1	24.7	68.1	2.2	5	18.5	6.9	20.4	58

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of soil type or restoration potential disturbed compared to the total amount of disturbance for the Route.

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4.15.5 Mitigation Measures

The PDFs and environmental protection measures described in Section 2.5 (Project Design Features Common to Action Alternatives) would be incorporated into the Project design and would be implemented during construction, operation, and maintenance of the proposed Project. These PDFs and environmental protection measures are designed to reduce, avoid, or minimize environmental impacts to soils and geologic resources from Project construction, operation, and maintenance activities and are items that Pacific Power has committed to implement as part of the Project development; therefore, no additional mitigation would be required.

4.15.6 Impact Summary by Alternative

4.15.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to soils and geologic resources would occur; however soils and geologic resources would continue to be affected by current use and conditions in the area.

4.15.6.2 Route Alternatives

Table 4.15-3 presents a comparison of impacts following the implementation of PDFs for the NNR Alternative without MR Subroute-Overhead, the NNR Alternative without MR Subroute-Underground, NNR Alternative with MR Subroute, and the Draft Environmental Impact Statement (DEIS) Agency Preferred Alternative (Alternative D).

With the implementation of PDFs, no long-term disturbance to geologic and soil resources would occur with the construction of the NNR Alternative without MR Subroute-Overhead, the NNR Alternative without MR Subroute-Underground, NNR Alternative with MR Subroute, or the DEIS Agency Preferred Alternative. Overall impact levels are similar for all of the overhead alternatives with the majority of the impacts categorized as moderate to low; however, the NNR Alternative without MR Subroute-Underground would create more moderate impacts as compared to other alternatives due to the displacement of greater volumes of soil as a result of excavated areas. Geology and soil impacts resulting from open cut trenching are expected to be greater than those that would occur from an Overhead Design Option as the area that would be disturbed is larger. It is estimated that approximately 215,000 cubic yards) of soil/bedrock would need to be excavated for the Underground Design Option. This is approximately equal to 13,400 standard, double-axle dump truck loads (assuming 16 cubic yards per load). In addition to the impact caused by trenching, excavated soil and bedrock must be stockpiled and/or transported during construction.

The risk to Project electric transmission service as a result of seismic activity or landslides would be substantially greater with the Underground Design Option than any of the other alternatives due to the inability to span discovered faults. The NNR Alternative without MR Subroute-Underground would affect a greater area of potentially moderate wind erodible soils and potentially high or moderate water erodible soils than the NNR Alternative without MR Subroute-Overhead. The NNR Alternative without MR Subroute-Underground also would affect substantially greater areas of moderate restoration potential soils compared to the NNR Alternative without MR Subroute-Overhead, but would affect a similar area as the other routes. The DEIS Agency Preferred Alternative would cause similar low to no identifiable impact levels as the NNR Alternative without MR Subroute-Overhead and NNR Alternative with MR Subroute, but the DEIS Agency Preferred Alternative would create disturbance in larger areas of potential high wind erosion soils.

Each of the NNR Alternatives crosses 14 faults while the DEIS Agency Preferred Alternative only crosses two. The NNR Alternative without MR Subroute-Overhead and NNR Alternative without MR

Subroute-Underground would cross 2.1 miles of high landslide areas, the NNR Alternative with MR Subroute would cross 2.9 miles of high landslide areas, and the DEIS Agency Preferred Alternative would cross 3.0 miles of high landslide areas. While geotechnical investigations are included in the PDFs, a more comprehensive geotechnical investigation would be required along the entire NNR Alternative without MR Subroute-Underground as compared to the overhead alternatives.

TABLE 4.15-3 LONG-TERM DISTURBANCE TO GEOLOGIC AND SOIL RESOURCES BY ALTERNATIVE

ALTERNATIVE	GEOLOGIC RESOURCES AND HAZARDS									SOIL RESOURCES (LINEAR MILES CROSSED, ACRES LONG-TERM DISTURBED, AND % OF RESOURCE TYPE DISTURBED BY TOTAL ROUTE SEGMENT)[1]																	
	FAULTS (# CROSSED)	SLOPE % (MILES CROSSED)				MAPPED LANDSLIDES (HIGH HAZARD: MILES CROSSED)	LIQUEFACTION POTENTIAL (MILES CROSSED)			SOIL ERODIBILITY POTENTIAL												RESTORATION POTENTIAL					
										WIND						WATER											
										HIGH			MODERATE			HIGH			MODERATE			LOW			MODERATE		
		0-8	8-15	15-30	30+		LOW	LOW-MODERATE	MODERATE-HIGH	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%
NNR Alternative without MR Subroute-Overhead NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.4 miles	14	7.2	5.5	17.3	10.8	2.1	1.7	1.6	1.3	1.8	1.4	4.4	21.8	22.5	53.4	9.7	8.3	23.8	15.3	18.2	37.5	15.4	20.2	37.7	23.5	24.1	57.6
NNR Alternative without MR Subroute-Underground NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.4 miles	14	7.2	5.5	17.3	10.8	2.1	1.7	1.6	1.3	1.8	1.4	4.4	21.8	33.8	53.4	9.7	11.8	23.8	15.3	27.5	37.5	15.4	21.8	37.7	23.5	44.8	57.6
NNR Alternative with MR Subroute NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6o, NNR-7, NNR-8 47.7 miles	14	6.3	7.1	20.9	13.8	2.9	3.0	2.4	1.3	1.8	1.4	3.7	27.5	44.3	57.2	10.5	10.9	21.8	20.4	39.2	42.4	16.4	22.9	34.1	27	41.4	56.1
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	2	43.7	12.4	7.2	3.0	3.0	8.9	7.5	3.0	12.7	15.0	18.9	24.3	32.6	41.0	26.0	36.9	46.4	14.9	17.5	22.0	17.0	21.9	27.5	26.8	37.9	47.7

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of soil type or restoration potential disturbed compared to the total amount of disturbance for the Alternative.

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4.16 PUBLIC HEALTH AND SAFETY

This section provides an overview of electric and magnetic fields (EMF), corona effects (audible and radio noise), and the effects of construction noise. The EMF discussion presents the predicted levels of electric and magnetic fields for the proposed Project. This section also summarizes existing EMF guidelines and standards; provides an overview of EMF health studies; and discusses interference, audible noise, radio and television interference, potential or induced stray voltage from the transmission line, and potential impacts on equipment used near the line such as satellite receivers, global positioning system (GPS) units, and cell phones.

4.16.1 Regulatory Framework

Applicable guidelines or regulations that may apply to electric and magnetic fields, audible noise or radio noise, pacemakers, and induced currents and voltages are discussed in this section.

4.16.1.1 Electric and Magnetic Fields

Regulations that apply to transmission line electric and magnetic fields fall into two categories: safety standards/codes and field limits/guidelines. Safety standards or codes are intended to limit or eliminate electric shocks that could cause serious injury or cause fatalities. Field limits or guidelines are intended to limit electric and magnetic field exposures that can cause nuisance shocks, or that were developed to protect health and safety based upon reviews and evaluations of relevant health research.

The proposed Project would be designed to meet the National Electrical Safety Code ([NESC] C2-2012), which specifies proper clearances that transmission and distribution line conductors must be from the ground and other objects. The clearances specified in NESC provide safe distances that prevent harmful shocks to workers and the public. In addition, people who live and work near power lines must be aware of safety precautions to avoid electrical (which is not necessarily physical) contact with the conductors. For example, farmers should not up-end irrigation pipes under a transmission or other electrical line or direct the water stream from an irrigation system into or near the conductors. In addition as a matter of safety, NESC specifies that electric field induced currents from transmission lines must be below the five milliampere (mA) threshold deemed a lower limit for primary shock.

Field limits or guidelines have been adopted in several states and countries and by national and international organizations. Electric field limits have generally been based on minimizing nuisance shocks or field perception. The intent of magnetic field limits has been to limit exposure to existing level currently experienced by the public.

There are currently no national standards or federal regulations or guidelines for 60-hertz (Hz) electric and magnetic fields. The federal government performed an extensive review of field related issues in the 1990s that resulted in the decision that regulatory actions were not warranted (National Institute of Environmental Health Sciences [NIEHS] 1999).

Although there are no federal regulations on low frequency EMF in the United States, recommendations and guidelines exist in the international community. Table 4.16-1 lists the EMF guidelines recommend by the European Union, the International Committee on Electromagnetic Safety (ICES), and the International Commission on Non-Ionizing Radiation Protection, an affiliate of the World Health Organization (ICES 2002; ICNIRP 1998). Table 4.16-2 lists EMF regulations established in other states.

Seven states have adopted limits for electric field strength at the edge or within the right-of-way (ROW) of a transmission line. Only Florida and New York currently limit magnetic field levels from transmission lines. The magnetic field guidelines for these two states only apply at the edge of the ROW and were based on an objective of preventing field levels from increasing beyond levels currently experienced by the public.

TABLE 4.16-1 INTERNATIONAL GUIDELINES FOR ALTERNATING CURRENT (AC) EMF LEVELS

AGENCY	LOCATION	ELECTRIC FIELD	MAGNETIC FIELD
European Union General Public Exposure	Edge of ROW	4.2 kilovolt per meter (kV/m)	0.833 G (833 mG)
International Committee on Electromagnetic Safety Occupational Exposure	Within ROW	10 kV/m	27.1 G (27,000 mG)
General Public Exposure	Edge of ROW	5 kV/m	9.04 G (9,040 mG)
International Commission on Non-Ionizing Radiation Protection (ICNIRP) Occupational Exposure	Within ROW	8.3 kV/m	4.17 G (4,170 mG)
General Public Exposure	Edge of ROW	4.2 kV/m	0.833 G (833 mG)

1/ 20 kV/m in controlled occupation setting
Magnetic fields are measured in Gauss (G) and milliGauss (mG). Please note that 1 G = 1,000 mG.

TABLE 4.16-2 STATE REGULATED AC EMF LEVELS

STATE	LOCATION	ELECTRIC FIELD	MAGNETIC FIELD
Florida 500 kilovolt (kV) Lines - single circuit - double circuit 230 kV or less	 Within ROW Edge of ROW Within ROW Edge of ROW	 10 kV/m 2 kV/m 2 kV/m 8 kV/m 2 kV/m	 NA 200 mG 250 mG NA 150 mG
Minnesota	Within ROW	8 kV/m	NA
Montana	Within ROW – road crossing Edge of ROW	7 kV/m 1 kV/m[1]	NA NA
New Jersey	Within ROW Edge of ROW	NA 3 kV/m	NA NA
New York	Within ROW – open Within ROW – public road Edge of ROW	11.8 kV/m 7 kV/m 1.6 kV/m	NA NA 200 mG
North Dakota	Within ROW Edge of ROW	9 kV/m NA	NA NA
Oregon	Within ROW Edge of ROW	9 kV/m NA	NA NA

[1]Can be waived by landowner; NA = Not Applicable. No requirements.

4.16.1.2 Audible Noise

Federal, state, and county noise regulations, ordinances, and guidelines were reviewed to determine the regulatory context of audible noise within the Project area. With the exception of the United States Occupational Health and Safety Administration regulations that describe worker health and safety limits for noise exposure, there are no federal or state regulatory requirements for the audible noise level from transmission lines. Also, there are no standardized regulatory impact criteria for the assessment of construction noise directly applicable to this Project. The regulatory framework at the federal, state, and local levels is presented below.

Federal

The U.S. Environmental Protection Agency (USEPA) has developed widely accepted recommendations for long-term exposure to environmental noise with the goal of protecting public health and safety. Noise guidelines for similar linear construction projects have been developed by the U.S. Department of Transportation (USDOT).

U.S. Environmental Protection Agency

The USEPA has audible noise guidelines developed for the protection of public health and welfare that are widely accepted by state and local governments for the long-term exposure to environmental noise (USEPA 1974). The USEPA employs the equivalent sound level (L_{eq}) and day-night sound level (L_{dn}) metrics in its guidelines. The L_{eq} is the energy averaged sound level over a specified time, whereas the L_{dn} is a 24 hour average sound level that includes a 10 A-weighted decibels (dBA) penalty to sound levels during nighttime hours (10:00 p.m. – 7:00 a.m.). The USEPA guideline lists an L_{dn} of 55 dBA to protect the public from interference to activity or annoyance outdoors in residential areas. Table 4.16-3 provides a summary of USEPA audible noise guidelines.

TABLE 4.16-3 SUMMARY OF USEPA GUIDELINES FOR AUDIBLE NOISE

LOCATION	LEVEL	CONCERN
All public accessible areas with prolonged exposure	70 dBA $L_{eq\ (24\ hour)}$	Protection for safety/hearing loss
Outdoor at residential structures or other noise sensitive areas where large amounts of time spent	55 dBA L_{dn}	Protection against annoyance and activity interference
Outdoor areas where limited amounts of time are spent (parks, school yards, golf courses, etc.)	55 dBA $L_{eq\ (24\ hour)}$	
Indoor residential	45 dBA L_{dn}	
Indoor non-residential	45 dBA $L_{eq\ (24\ hour)}$	

U.S. Department of Transportation

The USDOT has identified criteria for the assessment of short- and long-term construction activities for both stationary and mobile projects and specifically for linear projects. The Federal Highway Administration recommends abatement of construction noise that exceeds maximum levels at Noise Sensitive Areas (NSA). These Project construction noise criteria take into account the daily pattern of construction activities, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. While these criteria were not developed to specifically address construction noise impact for power transmission line projects, the guidelines shown in Table 4.16-4 provide reasonable criteria for noise assessment. If these criteria are exceeded, adverse community reaction may result.

TABLE 4.16-4 SUMMARY OF USDOT SHORT-TERM DURATION CONSTRUCTION NOISE GUIDELINES

LOCATION	DAYTIME	NIGHTTIME
Short Duration Noise Guidelines		
NSAs (Residences)	90 dBA L_{eq} (8 hour)	80 dBA L_{eq} (8 hour)
Commercial	100 dBA L_{eq} (8 hour)	100 dBA L_{eq} (8 hour)
Industrial	100 dBA L_{eq} (8 hour)	100 dBA L_{eq} (8 hour)
Moderate Duration Noise Guidelines		
NSAs (Residences)	80 dBA L_{eq} (8 hour)	70 dBA L_{eq} (8 hour)
Commercial	85 dBA L_{eq} (8 hour)	85 dBA L_{eq} (8 hour)
Industrial	90 dBA L_{eq} (8 hour)	90 dBA L_{eq} (8 hour)

State

The Washington Administrative Code ([WAC] 173-60) provides noise limitation levels by class of property. These levels are based on the environmental designation for noise abatement (EDNA) that is defined as "an area or zone (environment) within which maximum permissible noise levels are established." There are three EDNA designations (WAC 173-60-030), which roughly correspond to residential, commercial/recreational, and industrial/agricultural uses:

- Class A: Lands where people reside and sleep;
- Class B: Lands requiring protection against noise interference with speech; and
- Class C: Non-residential lands where economic activities are of such a nature that higher noise levels are anticipated.

Section 173-60 of the WAC provides the applicable noise standards for Washington state, including Kittitas, Grant, Benton and Yakima Counties in addition to county standards (detailed below). The noise limits listed in WAC 173-60-40 are legal limits that cannot be exceeded without obtaining a variance from state regulations. Transmission lines are classified as industrial and can cause the maximum permissible operational noise level of 60 dBA to intrude into residential property. During nighttime hours (10 p.m. to 7 a.m.), the maximum permissible limit for noise from industrial to residential areas is reduced to 50 dBA. The latter level applies to transmission lines that operate continuously (see Corona Noise in Section 4.16.3.2).

The following are exempted from the limits detailed in WAC 173-60 (per WAC 173-60-050):

- Construction noise (including blasting) between the hours of 7 a.m. and 10 p.m.;
- Motor vehicles operated on public highways;
- Motor vehicles operated off public highways, except when such noise affects residential receivers; and
- Noise from electrical substations is exempted from the nighttime limits (WAC 173-60-050[2][a]).

County

All but one county crossed by the proposed Project have relevant noise ordinances in place. Kittitas County has not established independent state-approved noise standards, and instead relies on state nuisance regulations.

County Code Chapter 6.24 addresses nuisance noise in Grant County. Sounds created by helicopters and those created by the "installation or repair of essential utility services" are exempt from the provisions of the code at all hours. Between 7 a.m. through 10 p.m., sounds created as a result of blasting are exempt, and sounds "emanating from temporary construction sites" are exempt from 7 a.m. through 10 p.m. or when conducted beyond 1,000 feet of any residence where human beings reside and/or sleep, at any hour.

Similarly, County Code Chapter 6.28 addresses nuisance noise in Yakima County. Sounds are exempt from the provisions of the code include those created by "construction or refuse removal equipment" and those created by lawfully established "commercial and industrial uses." No other standards are applicable to the Project.

Chapter 6A.15 of the Benton County Code covers nuisance noise in the county. Sounds created by "construction or refuse removal equipment" are exempt from this ordinance. No other standards are applicable to the Project.

4.16.1.3 Radio Noise

Neither Washington nor any other state has limits for either radio interference or television interference. Electromagnetic interference from power transmission systems in the United States is governed by the Federal Communication Commission (FCC) Rules and regulations (FCC 1988). A power transmission line is categorized by the FCC as an “incidental radiation device.” It is defined as “a device that radiates radio frequency energy during the course of operation although the device is not intentionally designed to generate radio frequency energy.” Such a device “shall be operated so that the radio frequency energy that is emitted does not cause harmful interference. In the event that harmful interference is caused, the operator of the device shall promptly take steps to eliminate the harmful interference.” In this case “harmful interference” is defined as “any emission, radiation or induction which endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with this chapter” (FCC 1988).

Complaints related to corona-generated interference are infrequent. The advent of cable or satellite television with the move to digital broadcast television in June 2009 also reduces the possibility of corona-generated interference. Cable, satellite, and digital broadcast are generally not subject to corona-generated interference. Electric power companies have been able to work quite well under the present FCC rule because harmful interference can generally be eliminated or effectively mitigated.

4.16.2 Electric and Magnetic Fields

This section discusses basic EMF theory, presents EMF modeling assumptions, methods and results for the proposed Project, and a summary of EMF and health concerns.

4.16.2.1 Electric Fields

The potential or voltage on an object causes an electric field. Any object with an electric charge on it has a voltage at its surface, caused by the accumulation of more electrons on that surface compared with another object or surface. The voltage effect is not limited to the surface of the object, but exists in the space surrounding the object in diminishing intensity. Electric fields can exert a force on other electric charges at a distance. The change in voltage over distance is known as the electric field. The units describing an electric field are volts per meter (V/m) or kilovolts per meter (kV/m). These units are measures of the difference in electrical potential or voltage that exists between two points one meter apart. The electric field becomes stronger near a charged object and decreases with distance away from the object.

Electric fields are very common phenomena. Static electric fields can result from friction generated when taking off a sweater, sliding across a car seat or walking across a carpet. Body voltages as high as 16,000 volts have been measured as a result of walking on carpet (Chakravarti and Pontrelli 1976). The earth creates a natural static electric field in fair weather that is a result of the 300,000- to 400,000-volt potential difference between the ionosphere and the surface of the earth (Veimeister 1972). At ground level, the average value of the earth’s electric field is approximately 120 V/m, meaning that a six foot tall person would have a static potential of about 220 volts between the top and bottom of the body.

The normal fair weather static electric field of the earth varies from month to month, reaching a maximum of about 20 percent above normal in January, when the earth is closest to the sun and falling to about 20 percent below normal by July when the earth is farthest from the sun. Static electric potential can exist underneath storm clouds where the electric potential of clouds (with respect to earth) can reach 10 to 100 million volts. Natural static electric fields under clouds and in dust storms can reach 3 to 10 kV/m (Veimeister 1972).

All household appliances and other devices that operate on alternating current (AC) electricity create electric fields; however, these fields are different from the earth's static or direct current (DC) field and some comparison between DC and AC field may not be appropriate. Fields produced by electrical appliances that use AC reverse direction at a frequency of 60 cycles per second (60 Hz) in the United States. In many other countries, this frequency is 50 Hz. The electric field in this case is caused by the changing electric voltage of the appliance. The magnitude of the electric field decreases rapidly with distance from the device. The field caused by compact and small dimension household appliances generally attenuates more rapidly with distance than line source fields (such as from power lines). Appliances need not be in operation to create an electric field. Just plugging in an appliance into an outlet creates an electric field around it. Typical values of a field measured one foot away from some common appliances are shown in Table 4.16-5 (Carstensen 1985; Enertech Consultants 1985).

TABLE 4.16-5 TYPICAL ELECTRIC FIELD VALUES FOR APPLIANCES, AT 12 INCHES

APPLIANCE	ELECTRIC FIELD (KV/M)
Electric Blanket	0.25*
Broiler	0.13
Refrigerator	0.06
Iron	0.06
Hand Mixer	0.05
Coffee Pot	0.03

* 1 to 10 kV/m next to blanket wires.
Source: Carstensen 1985; Enertech Consultants 1985.

4.16.2.2 Transmission Line Electric Fields

In the United States, electric power transmission lines create 60 Hz electric fields. These fields result from the voltage of the transmission line. The higher the voltage on the line, the higher the electric field levels associated with that line. Electric field strengths from a transmission line decrease with distance away from the outmost conductor, typically at a rate of approximately one divided by the distance squared ($1/d^2$). As an example, in an unperturbed field, if the electric field strength is 10 kV/m at a distance of one meter away it will be approximately 2.5 kV/m at two meters away and 0.625 kV/m at four meters away.

In contrast, the electric field strength from a single conductor typically decreases at a rate of approximately one divided by the distance. As an example, an electric field strength of 10 kV/m at one meter away would decrease to approximately 5.0 kV/m at two meters away and 2.5 kV/m at four meters away. Electric field strengths for a transmission line remain relatively constant over time because the voltage of the line does not vary significantly.

Transmission line electric fields are affected by the presence of grounded and conductive objects. Trees and building for example, can significantly reduce ground level electric fields by shielding the areas nearby (Deno and Silva 1987).

4.16.2.3 Magnetic Fields

An electric current flowing in a conductor (such as electric equipment, household appliances, and power circuits) creates a magnetic field. The most commonly used magnetic field intensity unit of measure is the Gauss (G). For most practical applications, the Gauss is too large, so a much smaller unit, the milliGauss (mG) is used for reporting magnetic field magnitudes. One mG is one thousandth of a Gauss.

As a general reference, the earth has a natural static or DC magnetic field of about 0.570 G or 570 mG (Merrill and McElhinny 1983). As with electric fields, the magnetic fields from electric power facilities and appliances differ from static (DC) fields because they are caused by the flow of 60 Hz AC. Power frequency magnetic fields reverse direction at a rate of 60 cycles per second corresponding to the 60 Hz operating frequency of power systems in the United States.

Because the magnetic field is caused by the flow of an electric current, a device must be operated to create a magnetic field. The magnetic field strengths of a large number of common household appliances were measured by the Illinois Institute of Technology Research (1984) for the U.S. Navy (Gauger 1985), and by Enertech Consultants for the Electric Power Research Institute (EPRI) (Silva et al. 1989). Typical magnetic field values for some appliances have been measured as low as 0.3 mG to as high as 20,000 mG (Table 4.16.-6). These appliances operate at 60 Hz AC and produce power-frequency AC magnetic fields (as opposed to other devices such as Magnetic Resonance Imaging [MRI] machines that use DC magnetic fields or Computer Tomography scanners that use high frequency x-rays).

TABLE 4.16-6 SUMMARY OF USEPA GUIDELINES FOR MAGNETIC FIELD

APPLIANCE	MAGNETIC FIELD AT 12 INCHES AWAY (mG)	MAXIMUM MAGNETIC FIELD (mG)
Electric Range	3 to 30	100 to 1,200
Electric Oven	2 to 25	10 to 50
Garbage Disposal	10 to 20	850 to 1,250
Refrigerator	0.3 to 3	4 to 15
Clothes Washer	2 to 30	10 to 400
Clothes Dryer	1 to 3	3 to 80
Coffee Maker	0.8 to 1	15 to 250
Toaster	0.6 to 8	70 to 150
Crock Pot	0.8 to 1	15 to 80
Iron	1 to 3	90 to 300
Can Opener	35 to 250	10,000 to 20,000
Blender, Popper, Processor	6 to 20	250 to 1,050
Vacuum Cleaner	20 to 200	2,000 to 8,000
Portable Heater	1 to 40	100 to 1,100
Fans/Blowers	0.4 to 40	20 to 300
Hair Dryer	1 to 70	60 to 20,000
Electric Shaver	1 to 100	150 to 15,000
Fluorescent Light Fixture	2 to 40	140 to 2,000
Fluorescent Desk Lamp	6 to 20	400 to 3,500
Circular Saws	10 to 250	2,000 to 10,000
Electric Drill	25 to 35	4,000 to 8,000

Many sources of magnetic field are encountered in everyday activities. Typical sources of these fields include power lines (i.e., both transmission and distribution), home and office appliances, tools, building wiring, and currents flowing on water pipes. The importance of these sources to overall exposure varies considerably. For example, if a residence is very close, such as within 50 feet to a transmission line or even a distribution line, these sources could be the dominant, but not necessarily the only source of magnetic fields in the home. Depending on the circumstances, other sources may produce equal or greater magnetic field magnitudes. Several major research projects have been conducted to evaluate public exposure to ambient 60 Hz magnetic fields. This work was done to identify typical level encountered by people inside homes and elsewhere. A random survey of 1,000 residences in the United States reported that currents flowing on water pipes and on other components of house grounding systems are twice as likely as outside powerlines to be the source of the highest magnetic fields measured in homes (Zaffanella 1993). In another study, a large number of residences located throughout the United States were measured to determine the sources and characteristics of residential magnetic fields (Enertech 1993). During this study, spot (point-in-time) magnetic field measurements were taken in the rooms approximately 1,000 residences (Table 4.16-7). The average value for all rooms measured was 0.9 mG.

Another comprehensive study of contemporary magnetic field personal exposure was performed by the U.S. Department of Energy (Enertech 1998). The objective of this work was to characterize personal magnetic field exposure of the general population. This was accomplished by randomly selecting more than 1,000 people throughout the United States and recruiting them to wear a recording magnetic field meter during a typical 24-hour period, including all activity inside of, and away from, the place of residence. The measurement population (both genders) included about 874 adults and 138 children. People can experience a wide range of magnetic field exposures and sources. The United States 24-hour average for all people in the study was 1.25 mG. Most of the population was exposed to less than 1.0 mG (Table 4.16-8), but exposure levels also varied by occupation (Table 4.16-9).

TABLE 4.16-7 SUMMARY OF SPOT ROOM MEASUREMENTS IN THE UNITED STATES (992 RESIDENCES) (MG)

VALUES EXCEEDED IN:	ALL ROOMS MEDIAN	AVERAGE	KITCHEN	BEDROOM(S)	HIGHEST ROOM*
50% of Residences	0.5	0.6	0.7	0.5	1.1
25% of Residences	1.0	1.1	1.2	1.0	2.1
10% of Residences	1.7	2.1	2.4	2.0	3.8
5% of Residences	2.6	3.0	3.5	2.9	5.6
1% of Residences	5.8	6.6	6.4	7.7	12.2

* Any room in which spot field measurement had the highest value.
Source: Enertech 1993.

TABLE 4.16-8 PERCENTAGE OF U.S. POPULATION WITH AVERAGE FIELD EXPOSURE EXCEEDING GIVEN VALUES (BASED ON 1998 POPULATION OF 267 MILLION)

AVERAGE 24-HOUR FIELD	ESTIMATED PERCENTAGE OF POPULATION	95% CONFIDENCE INTERVAL (%)	POPULATION RANGE
>0.5 mG	76.3	73.8-78.9	197-211 million
>1 mG	43.6	41-46.5	109-124 million
>2 mG	14.3	11.9-17.2	31.8-45.9 million
>3 mG	6.3	4.8-8.3	12.8-22.2 million
>4 mG	3.35	2.4-4.7	6.4-12.5 million
>5 mG	2.42	1.67-3.52	4.5-9.4 million
10 mG	0.43	0.21-0.90	0.56-2.4 million
15 mG	0.1	0.02-0.55	50 thousand-1.5 million

Source: Enertech 1998; Silva 1999.

TABLE 4.16-9 AVERAGE MAGNETIC FIELD EXPOSURE DURING WORK FOR DIFFERENT OCCUPATIONS IN THE UNITED STATES

OCCUPATION	NUMBER OF PEOPLE	AVERAGE MAGNETIC FIELD AT WORK
Managerial, professional, specialty	204	1.64 mG
Technical, sales, administrative, support	166	1.58 mG
Service: Protective, food, health, cleaning	71	2.74 mG
Farming, forestry, fishing	19	0.91 mG
Precision production, craft, repair, operators, fabricators, laborers	128	1.73 mG
Electrical	16	2.15 mG

Source: Enertech 1998; Silva 1999.

4.16.2.4 Transmission Line Magnetic Fields

Electric power transmission lines also create magnetic fields. These fields are generated by the current (amperes) flowing on the phase conductors. Magnetic field levels depend primarily on the current, or load flowing on the line; as electricity demand increase and the current on the line increases, the magnetic field levels associated with the line generally increase. The magnetic field encircles the wire and the direction of the magnetic field is dependent upon the direction of current flow.

Similar to the electric field, magnetic field strengths decrease with the inverse square of the distance away from the power line. Unlike electric fields that vary little over time, magnetic fields are not constant over time because the current on any power line changes in response to increasing and decreasing electrical load. Magnetic fields are not easily shielded.

4.16.2.5 Electric and Magnetic Field Calculations

EMF from the proposed Vantage-Pomona Heights Transmission Line were calculated at the edge of ROW and within the ROW. The EMF analysis was performed using the Bonneville Power Administration Corona and Field Effects Program software on the various transmission line structure and conductor configurations.

EMF levels were calculated at a height of one meter above ground with phase conductors located at minimum conductor height. The minimum ground clearance used for the proposed Vantage-Pomona Heights 230 kV line, was 27 feet. The ground clearance is based on maximum sag conditions under maximum operating temperatures of conductors.

The proposed Project was modeled using the following characteristics for all cases:

- Single conductor per phase 1,272 kilo-circular mils (kcmil) aluminum conductor steel-reinforced cable Bittern
- 326 Amps of balanced current
- Maximum operating voltage of 247 kV

There are three cases that were investigated for different structure types. These cases are described below.

Case I
Case I is a single-circuit H-frame structure. The proposed structure would have a ROW width of 125 feet. Refer to Figure 4.16-1 for a drawing of this structure configuration.

Case II

Case II is single-circuit single pole structure. The proposed structure would have a ROW width of 75 feet. Refer to Figure 4.16-2 for a drawing of this structure configuration.

Case III

Case III is a single-circuit single pole with 12 kV underbuild (i.e., a lower voltage distribution circuit is included on the same pole and placed underneath the transmission circuit). The proposed structure would have a ROW width of 75 feet. Refer to Figure 4.16-3 for a drawing of this structure configuration.

The maximum EMF values in the ROW and at the edge of the ROW for the proposed 230 kV transmission line are provided for the three cases calculated at the minimum conductor clearance over the estimated ruling span for each case.

The maximum field values would be present only at locations directly under the line, near mid-span, where the conductors are at the minimum clearance. The conditions of minimum conductor clearance at maximum current and maximum voltage occur very infrequently. The calculated maximum EMF levels are rarely reached under real life conditions due to the following:

- The actual line height is generally above the minimum value used in the computer model.
- The actual voltage is below the maximum value used in the model.
- Vegetation within and near the edge of the ROW tends to shield the field at ground level.

Maximum electric fields on existing 230 kV corridors are typically 2.5 to 3.0 kV/m. On 500 kV transmission line corridors, the maximum electric fields range from 7.0 to 9.0 kV/m.

Calculated Values of Electric Fields

Table 4.16-10 presents the electric field results for the various configurations.

TABLE 4.16-10 ELECTRIC FIELD RESULTS FOR VARIOUS CONFIGURATIONS (KV/M)

CASE	ROW WIDTH (FEET)	LEFT EDGE OF ROW	RIGHT EDGE OF ROW	MAXIMUM
I	125	0.935	0.935	3.452
II	75	0.910	0.930	2.745
III	75	0.568	0.500	0.674

Case I
Figure 4.16-1 is a horizontal profile plot of the electric field levels for Case I. The maximum electric field level inside the ROW is 3.45 kV/m and the maximum electric field at the edge of ROW is 0.935 kV/m.

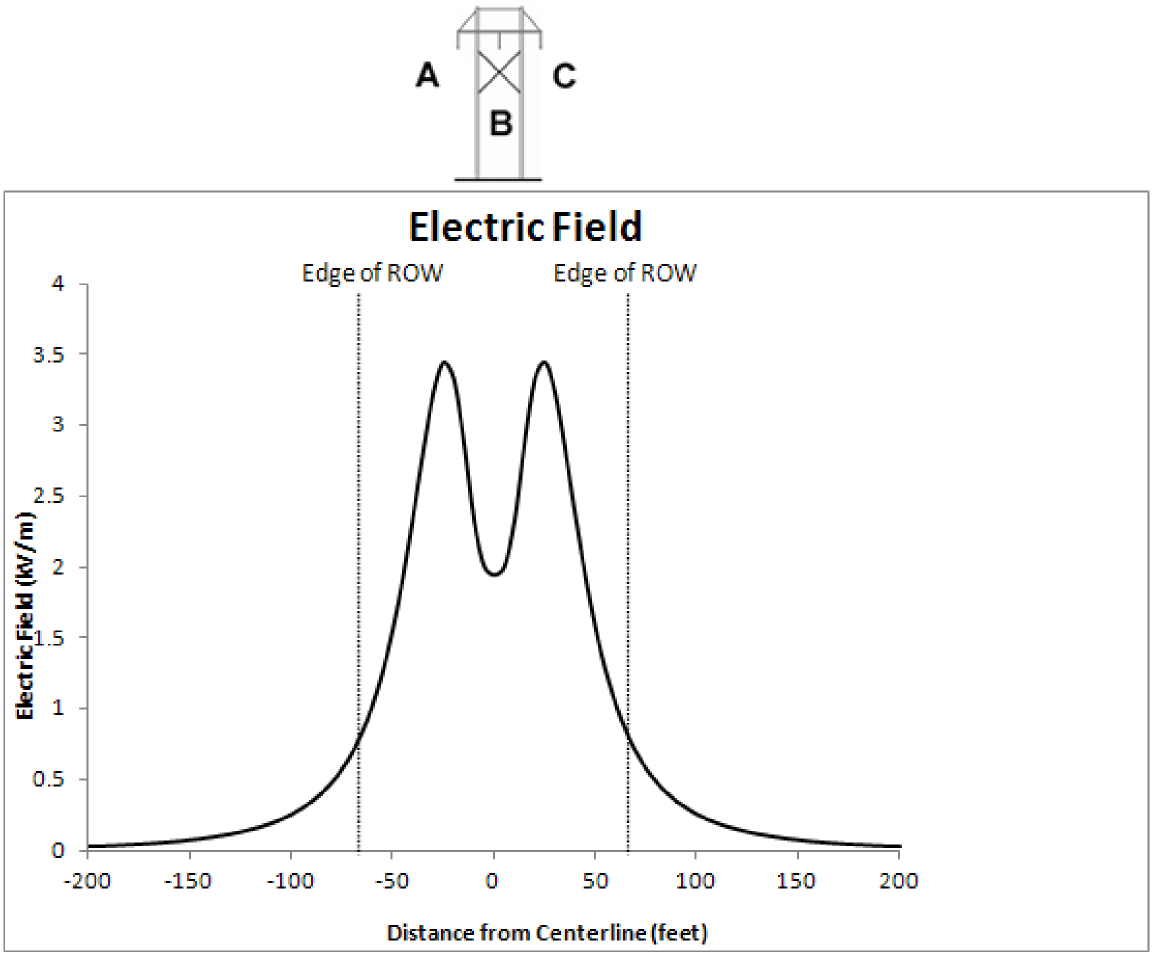


FIGURE 4.16-1 CASE I: H-FRAME HORIZONTAL CIRCUIT-ELECTRIC FIELD

Case II
Figure 4.16-2 is a horizontal profile plot of the electric field levels for Case II. The maximum electric field level inside the ROW is 2.75 kV/m and the maximum electric field at the edge of ROW is 0.93 kV/m.

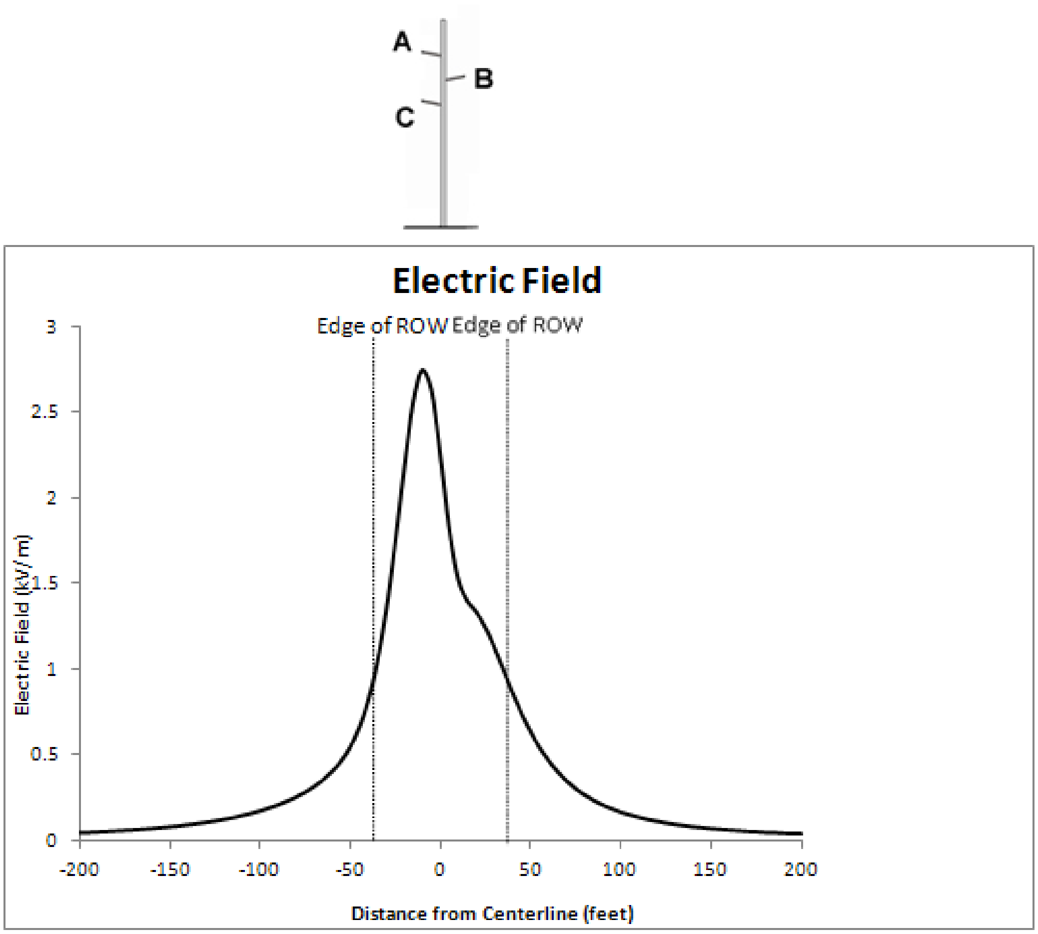


FIGURE 4.16-2 CASE II: SINGLE POLE VERTICAL CIRCUIT-ELECTRIC FIELD

Case III

Figure 4.16-3 is a horizontal profile plot of the electric field levels for Case III. The maximum electric field level inside the ROW is 0.67 kV/m and the maximum electric field at the edge of ROW is 0.57 kV/m.

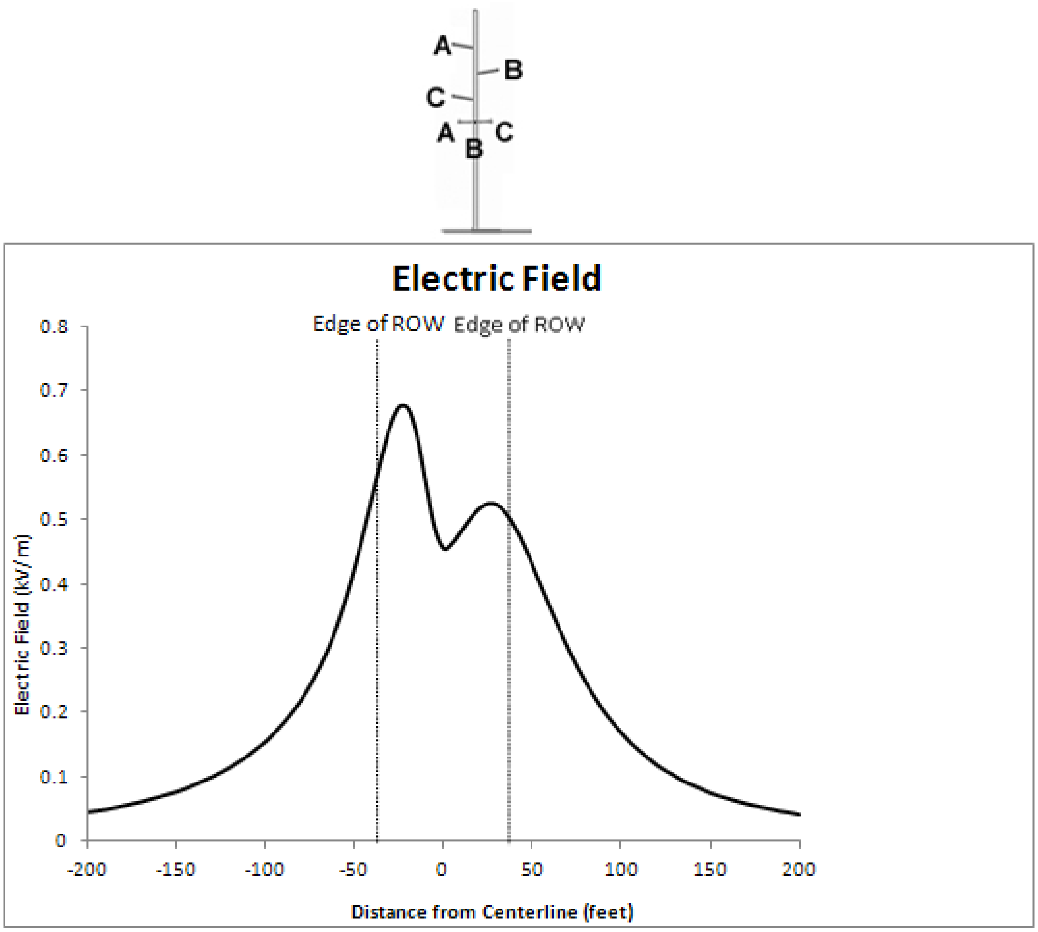


FIGURE 4.16-3 CASE III: SINGLE POLE WITH 12 KV UNDERBUILD-ELECTRIC FIELD

The electric fields from the proposed transmission line would meet the American Conference of Governmental Industrial Hygienists, ICNIRP, and Institute of Electrical and Electronics Engineers (IEEE) standards, provided wearers of pacemakers and similar medical-assist devices are discouraged from unshielded ROW use (a passenger in an automobile under the line would be shielded from the electric field). The estimated electric fields at the edge of the ROW for the proposed 230 kV line for all cases modeled would meet the limits of all states (see Table 4.16-2). There are no guidelines for the state of Washington for maximum or edge-of-ROW electric fields values.

Calculated Values of Magnetic Fields

Table 4.16-11 presents the calculated values of the magnetic field at 3.28 feet (one meter) height for proposed Project. Field values within the ROW and at the edge of the ROW of the 230 kV line are given for projected maximum currents and for minimum conductor clearances. The magnetic field levels and plots for the three cases are presented below (Figures 4.16-6 through 4.16-8).

TABLE 4.16-11 CALCULATED MAGNETIC FIELD RESULTS (MG)

CASE	ROW WIDTH (FEET)	LEFT EDGE OF ROW	RIGHT EDGE OF ROW	MAXIMUM
I	125	17.96	17.96	77.06
II	75	17.31	13.92	39.64
III	75	8.76	8.24	12.44

Case I

Figure 4.16-6 is a horizontal profile plot of the magnetic field levels for Case 1. The maximum magnetic field level inside the ROW is 77.06 mG and the maximum magnetic field at the edge of ROW is 17.96 mG.

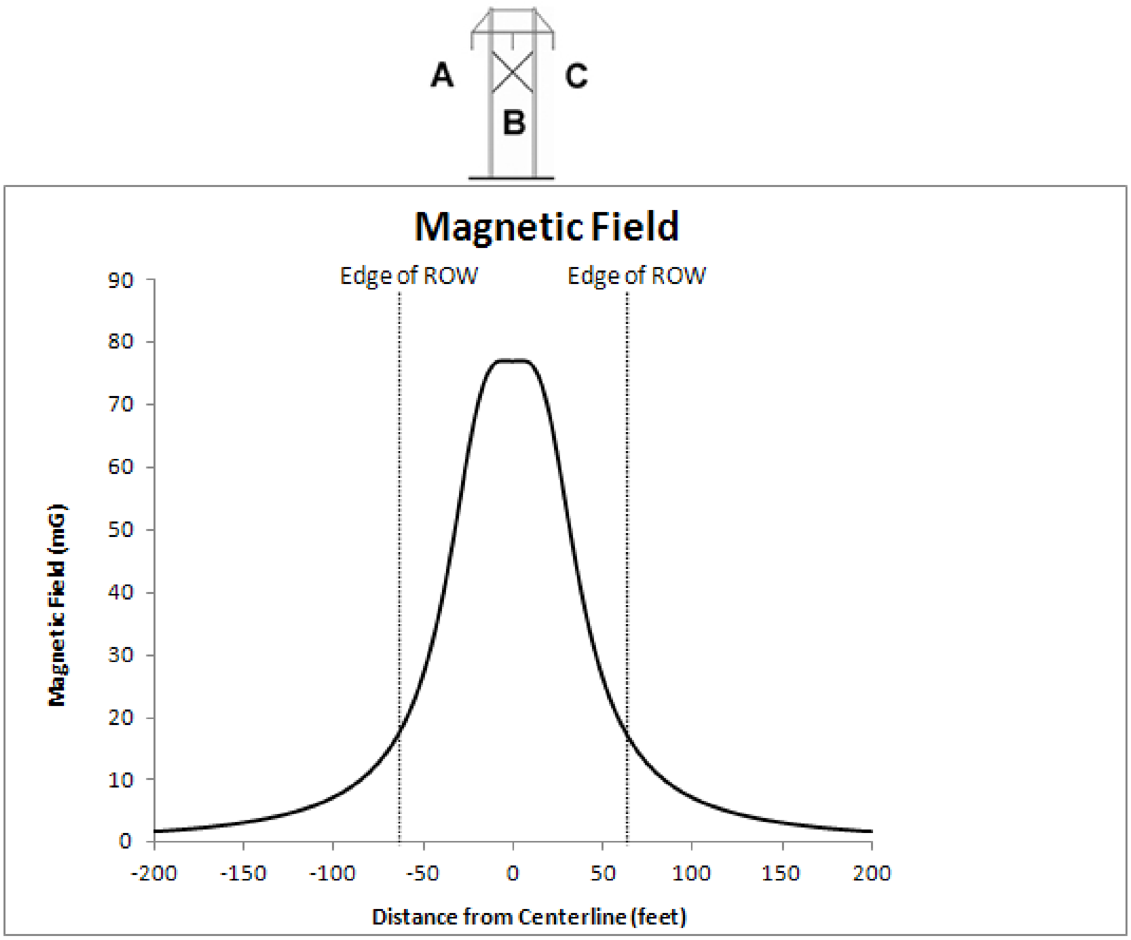


FIGURE 4.16-4 CASE I: H-FRAME HORIZONTAL CIRCUIT-MAGNETIC FIELD

Case II
Figure 4.16-7 is a horizontal profile plot of the magnetic field levels for Case 2. The maximum magnetic field level inside the ROW is 39.64 mG and the maximum magnetic field at the edge of ROW is 17.31 mG.

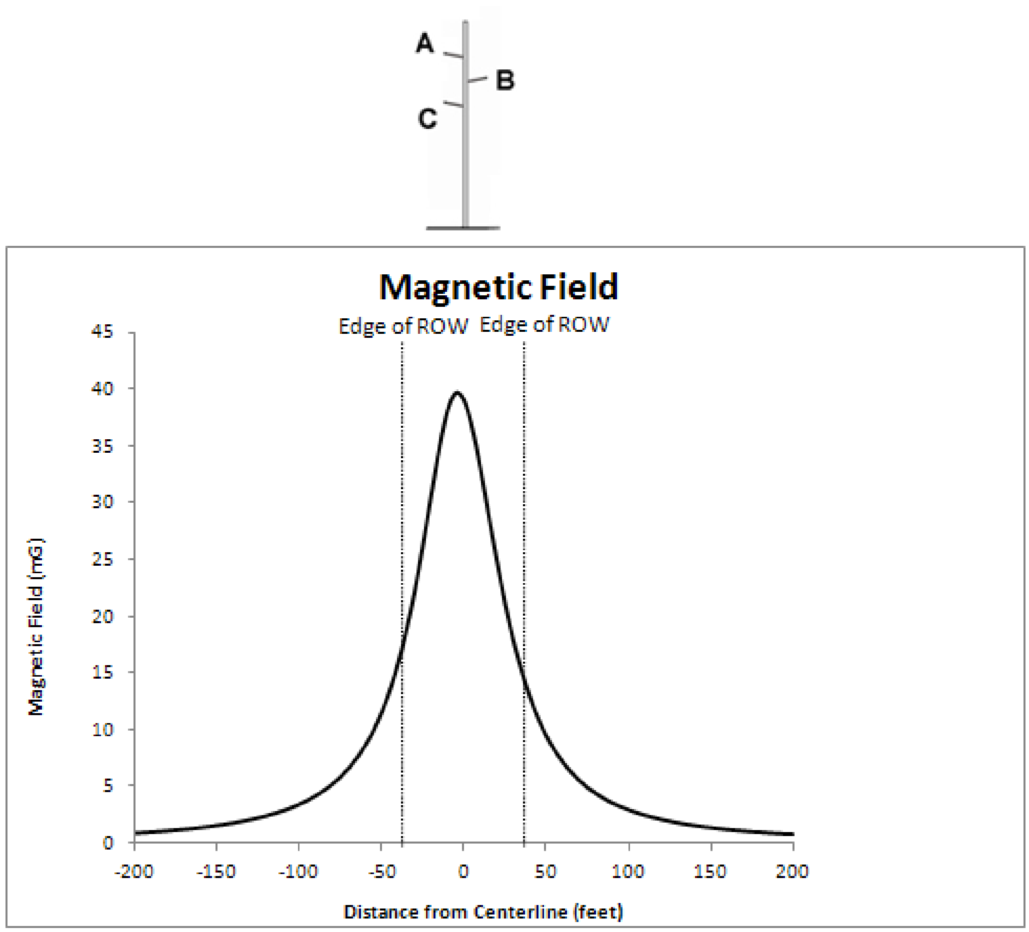


FIGURE 4.16-5 CASE II: SINGLE POLE VERTICAL CIRCUIT-MAGNETIC FIELD

Case III

Figure 4.16-8 is a horizontal profile plot of the magnetic field levels for Case 3. The maximum magnetic field level inside the ROW is 12.44 mG and the maximum magnetic field at the edge of ROW is 8.76 mG.

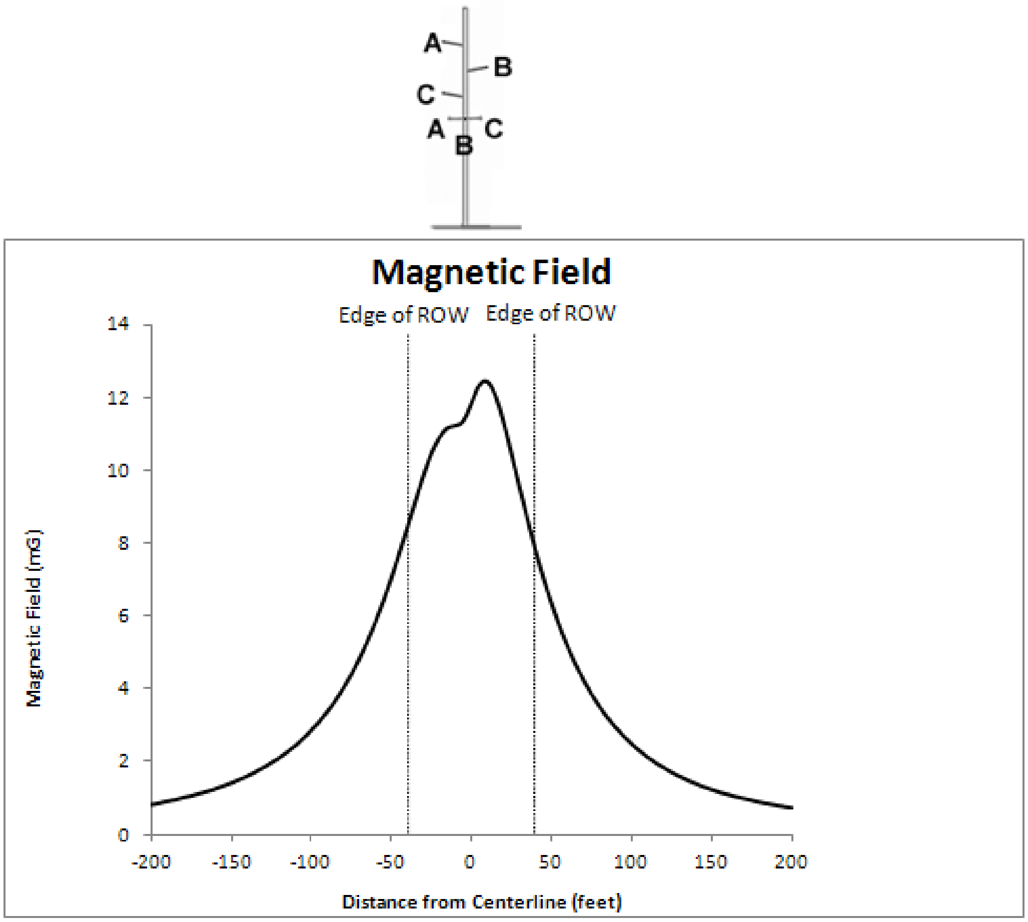


FIGURE 4.16-6 CASE III: SINGLE POLE WITH 12 KV UNDERBUILD-MAGNETIC FIELD

The magnetic fields from the proposed line would be within the regulatory limits of the two states (Florida and New York) that have established them and within guidelines for public exposure established by ICNIRP and IEEE. The state of Washington does not have limits for magnetic fields from transmission lines.

4.16.2.6 EMF Health and Ecological Effects Concerns

Health Concerns

For more than 30 years, questions have been asked about the potential effect of EMF from powerlines on people. Early studies focused on electric fields. Magnetic fields began receiving increased attention in the late 1970s. A substantial amount of research has been conducted in the United States and around the world over the past several decades examining whether exposures to power frequency EMF have health or environmental effects.

Epidemiology studies have addressed many of the issues raised about EMF and health. Multidisciplinary reviews express the consensus in the scientific community that the epidemiologic evidence is weak and insufficient to demonstrate a causal relationship between extremely low frequency (ELF; pertaining to power frequency) magnetic fields and adverse health effects. These reviews include those made the NIEHS (NIEHS 1998, 1999, 2002) National Academy of Sciences ([NAS] 1999), the Health Council of the Netherlands ([HCN] 2001, 2004), the National Radiological Protection Board of Great Britain ([NRPB] 2004), World Health Organization ([WHO] 2007) and the International Agency for Research on Cancer ([IARC] 2002). The reviews agree that there is little evidence to suggest EMF is associated with adverse health effects, including most forms of adult and childhood cancer, heart disease, Alzheimer's disease, depression, and reproductive effects. However, all of the assessments conclude that epidemiological studies in total suggest an association between magnetic fields at higher time-weighted average exposure levels (greater than 4.0 mG) and childhood leukemia. Nevertheless, all agree that the experimental laboratory data do not support a causal link between EMF and adverse health effects, including leukemia, and have not concluded that EMF is in fact the cause of any disease. The conclusions of these multidisciplinary reviews are presented below.

National Institute of Environmental Health Sciences

The NIEHS' 1999 report concluded:

> "The scientific evidence suggesting that ELF EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults. While the support from individual studies is weak, the epidemiological studies demonstrate, for some methods of measuring exposure, a fairly consistent pattern of a small, increase risk with increasing exposure that is somewhat weaker for chronic lymphocytic leukemia than childhood leukemia. In contrast, the mechanistic studies and the animal toxicology literature fail to demonstrate any consistent pattern across studies although sporadic findings of biological effects have been reported. No indication of increased leukemia in experimental animals has been observed."

> "The lack of connection between the human data and the experimental data (animal and mechanistic) severely complicates the interpretation of these results. The human data are in the right species and tied to real life exposures and shoe some consistency that is difficult to ignore. This assessment is tempered by the observation that given the weak magnitude of these increased risks, some other factor of common source of error could explain these findings. However, no consistent explanation other than exposure to ELF EMF has been identified."

> "Epidemiological studies have serious limitation in their ability to demonstrate a cause and effect relationship whereas, laboratory studies, by design, can clearly show cause and effect are possible. Virtually all of the laboratory evidence in animals and humans, and most of the mechanistic work in cells fails to support a causal relationship between exposure to ELF EMF at environmental levels and changes in biologic function or disease status. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF EMF, but it cannot completely discount the epidemiological findings."

The NIEHS concludes the ELF EMF exposure cannot be recognized at this time as entirely safe because of the weak scientific evidence that exposure may pose a leukemia hazard. The conclusion of this report is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and is therefore routinely exposed the ELF EMF, passive regulatory action is warranted such as continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or noncancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

The NIEHS 2002 report concluded:

> "For most health outcomes, there is no evidence that EMF exposures have adverse effects. There is some evidence from epidemiology studies that exposure to power-frequency EMF is associated with an increased risk for childhood leukemia. This association is difficult to interpret in the absence of reproducible laboratory evidence or a scientific explanation that links magnetic fields with childhood leukemia."

World Health Organization

In October 2005, WHO convened a task group of scientific experts to assess any risks to health that might exist from exposure to ELF EMF in the frequency range >0 to 100,000 Hz (100 kilohertz [kHz]). While the IARC examined the evidence regarding cancer in 2002, this task group reviewed evidence for a number of health effects and updated the evidence regarding cancer. The conclusions and recommendations of the task group are presented in a WHO Environmental Health Criteria monograph (WHO 2007). Following a standard health risk assessment process, the WHO task group concluded that no substantive health issues are related to ELF EMF at levels generally encountered by members of the public.

National Academy of Sciences

The NAS 1999 report concluded:

> "An earlier Research Council assessment of the available body of information on biologic effects of power-frequency magnetic fields led to the conclusion the current body of evidence does not show that exposure to these fields presents a human health hazard. Specifically, no conclusive and consistent evidence shows that exposure to residential electric and magnetic fields produces cancer, adverse neurobehavioral effects, or reproductive and developmental effects. The new largely unpublished contributions of the EMF for Research and Public Information Dissemination (EMF-RAPID) program are consistent with that conclusion. We conclude that no finding from the EMF-RAPID program alters the conclusions on the previous review on the Possible Effects of Electromagnetic Fields on Biologic Systems (National Research Council 1997). In view of the negative outcomes of EMF-RAPID replication studies, it now appears even less likely that magnetic fields in the normal domestic or occupational environment produce important health effects, including cancer."

National Radiological Protection Board of Great Britain

NRPD reports (2001, 2004) concluded:

> "Laboratory experiments have provided no good evidence that [ELF EMF] are capable of producing cancer, nor do human epidemiological studies suggest that they cause cancer in general. There is, however, some epidemiological evidence that prolonged exposure to higher levels of power frequency magnetic fields is associated with a small risk of leukemia in children. In practice, such levels of exposure are seldom encountered by the general public in the UK [or in the US]."
>
> "Because of the uncertainty…and in absence of a dose response relationship, NRPB has concluded that the date concerning childhood leukemia cannot be used to derive quantitative guidance on restricting exposure."

Health Council of the Netherlands

The 2004 HCN report concluded:

> "Because the association is only weak and without a reasonable biological explanation, it is not unlikely that it [an association between ELF exposure and childhood leukemia] could also be explained by chance…The Committee therefore sees no reason to modify its earlier conclusion that the association is not likely to be indicative of a causal relationship."
>
> "The Committee, like the IARC itself, points out that there is no evidence to support the existence of a causal relationship here. Nor has research yet uncovered any evidence that a causal relationship might exist."

International Agency for Research on Cancer

The 2002 IARC report concluded:

> "Studies in experimental animals have not shown consistent carcinogenic or co-carcinogenic effects or exposures to ELF magnetic fields, and no scientific explanation has been established for the observed association of increased childhood leukemia risk with increasing residential ELF magnetic field exposure" IARC categorized EMF as a "possible carcinogen" for exposures at high levels, based on the meta-analysis of studies of statistical links with childhood leukemia at levels above 3 to 4 mG.

Ecological Effects

The exposure of animals to EMF has been investigated for over 30 years. Vegetation in the form of grasses, shrubs, and small trees largely shields small ground-dwelling species such as mice, rabbits, foxes, and snakes from electric fields. Species that live underground, such as moles, woodchucks, and worms, are further shielded from electric fields by the soil; aquatic species are shielded from electric fields by water. Large species such as deer and domestic livestock have greater potential exposures to electric fields since they can stand taller than the surrounding vegetation. However, the duration of exposure for deer and other large animals is limited to foraging bouts or the time it takes them to cross under the line. All species would be exposed to higher magnetic fields under or near a transmission line than elsewhere, because vegetation and soil do not provide shielding from this aspect of the transmission-line electrical environment.

Field studies have been performed to monitor the behavior of large mammals in the vicinity of high-voltage transmission lines. No effects of EMF were evident in two studies from the northern United States on big game species, such as deer and elk, exposed to a 500 kV transmission line (Goodwin 1975; Picton et al. 1985).

Much larger populations of animals that might spend time near a transmission line are livestock that graze under or near transmission lines. To provide a more sensitive and reliable test for adverse effects than informal observation, scientists have studied animals continuously exposed to fields from high-voltage lines in relatively controlled conditions. For example, grazing animals such as cows and sheep have been exposed to high-voltage transmission lines and their reproductive performance examined (Lee et al. 1996). No adverse effects were found among cattle exposed to a 500 kV direct-current overhead transmission line over one or more successive breeding events (Angell et al. 1990). Compared to unexposed animals in a similar environment, the exposure to 50 Hz fields did not affect reproductive functions or pregnancy of cows (Algers and Hennichs 1985; Algers and Hultgren 1987). Sheep and cattle exposed to EMF from transmission lines exceeding 500 kV were examined and no effect was found on the levels of hormones in the blood, weight gain, onset of puberty, or behavior (Stormshak et al. 1992; Lee et al. 1993; Lee et al. 1995; Thompson et al. 1995; Burchard et al. 1998; Burchard et al. 2004).

Greenberg et al. (1981) studied honeybee colonies placed near 765 kV transmission lines. They found that hives exposed to AC electric fields of 7.0 kV/m had decreased hive weight, abnormal amounts of propolis (a resinous material) at hive entrances, increased mortality and irritability, loss of the queen in some hives, and a decrease in the hive’s overall survival compared to hives that were not exposed. Placing the hive farther from the line, shielding the hive, or using hives without metallic parts eliminates this problem.

Numerous studies have been carried out to assess the effect of exposure of plants to transmission-line EMF. These studies have involved both forest species and agriculture crops. Researchers have found no adverse effects on plant responses, including seed germination, seedling emergence, seedling growth, leaf area per plant, flowering, seed production, germination of the seeds, longevity, and biomass production (Lee et al. 1996).

4.16.3 Audible and Radio Noise

Corona and radio noise occur when the 60 Hz electric fields at the surface of power line conductors are large enough to cause a local breakdown in the insulating properties of the air. This electrical breakdown of the air or ionization of the air, at the surface of the conductor is called corona. Corona is a small spark or electrical breakdown in the air surrounding the conductor. This small spark into the air produces audible and radio noise. If there is sufficient corona activity, audible noise and radio/television noise can be noticeable within a few hundred feet of the transmission line, and small amounts of ozone and nitrous oxide can be released. These effects are most pronounced directly underneath the line conductors and decrease with distance from the transmission line. Other audible noise would occur as a result of construction activities.

4.16.3.1 Affected Environment

The Project area acoustical setting generally has relatively low ambient noise levels due to its rural setting. Higher noise levels occur primarily near highway crossings and in agricultural areas. Additional noise is also created by military operations occurring at the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), and noise levels are somewhat higher near the Interstate 82 corridor and the more urbanized area of Yakima and Selah. Overall, the Project area typically ranges from very quiet with natural sounds such as birds, insects, and wind dominating to noisy in localized areas during periods of military operations at JBLM YTC, agricultural operations, shooting, and other outdoor activities generating isolated and periodic peaks of higher levels of noise.

4.16.3.2 Corona Noise

Corona activity depends on a number of factors such as altitude, line voltage, conductor size, conductor geometry, and weather conditions. The breakdown strength of air is 30 kV per centimeter at sea level and decreases with increasing altitude. For a particular altitude, conductor size and line voltage are taken into consideration when designing a transmission line so that the electric fields at the conductor surface do not exceed the breakdown potential of air. However, for lines with a voltage equal to or greater than 345 kV, any irregularities on the conductor surface (e.g., nicks, water droplets, or debris) may create points where the electric field is intensified sufficiently to produce corona. In inclement weather, moisture such as raindrops or snowflakes accumulating on the conductor surface would also act as points for corona inception. Corona activity is, therefore, most likely to occur on high-voltage transmission lines at higher altitudes during inclement weather. High-voltage transmission lines are designed to avoid corona levels that would be likely to cause electronic or audible interference. These factors can be addressed and mitigated if necessary through design choices for the transmission line such as conductor size and bundling as well as general geometry of the transmission.

The air breakdown or small spark caused by corona at the surface of a transmission line conductor is accompanied by a snapping sound. If there is sufficient corona activity on a high-voltage line, many small snaps from corona sources along a conductor may be sufficient, in combination, to produce discernible audible noise or crackle at the edge of the ROW. At lower system voltages (voltages below 230 kV), audible noise from the transmission-line conductors is typically not formally evaluated because of the very low levels of corona activity and correspondingly low occurrence of corona effects. For lines at higher voltages (345 kV and above) with higher conductor-surface gradients, corona activity is more likely and audible noise more frequent, particularly in inclement weather, and is therefore taken into account in the design of the transmission line.

Sound intensity is measured in decibels referenced to 20 micropascals, which is approximately the pressure threshold of human hearing at 1.0 kHz. The range of audible frequencies for the human ear is from approximately 20 Hz to 20 kHz, with peak sensitivity near 1.0 kHz. The change in sensitivity of the human ear with frequency is reflected in measurements by weighting the contribution of sound at different frequencies. The weighting of sound over the frequency spectrum to account for the sensitivity of the human ear is called the A-weighted sound level. When the A-weighting scale is applied to a sound-pressure measurement, the level is often reported as dBA.

The sound intensity of typical human speech is approximately 60 to 70 dBA and background levels of noise in rural environments are about 30 to 40 dBA. Specific identifiable noises such as birdcalls, neighborhood activity, and traffic can produce background audible noise levels of 40 to 70 dBA or higher (Industrial Noise Control, Inc. 2010).

Audible noise levels from the transmission line itself would not occur until the line is energized. During construction audible noise related to the line would consist of construction noise and be limited to localized areas that have active construction activities. Once the lines are energized, the AC audible noise would vary depending on the weather conditions, with foul weather producing increased levels of audible noise. Little or no audible noise is contributed by 230 kV transmission lines in fair weather, although their audible noise may increase in foul weather (up to 60 dBA); however, it is less than or similar to the audible noise produced by rain and wind (up to 60 dBA, depending on rainfall rate and wind velocity; Industrial Noise Control, Inc 2010).

4.16.3.3 Construction Noise

Construction noise can be created from on-site and off-site sources. On-site noise sources would principally consist of the operation of heavy-duty diesel and gasoline-powered construction equipment.

Off-site noise sources would include vehicles commuting to and from the job site, as well as from trucks transporting material to the staging areas or construction ROW. These sources are described below. Construction of the transmission line and substation expansion areas would generate temporary noise that could affect nearby residences and recreationists. Daytime construction activities are excluded from USEPA, state, and county noise regulations.

Transmission line construction would occur as a series of sequential events distributed over several miles along the Project route at any one time. Construction of the Project transmission lines would be completed in stages as described in Section 2.4.3.

The Project construction phases would produce noise as heavy equipment would be required to build the proposed transmission line. Short-term use of equipment such as helicopters, backhoes, cranes, front-end loaders, bulldozers, graders, excavators, compressors, generators, and various trucks would be needed for mobilizing crew, transporting and use of materials, line work, and site clearing and preparation. Construction of spur roads and access roads would require use of earthmoving equipment such as bulldozers and graders. Construction noise is usually made up of intermittent peaks and continuous lower levels of noise from equipment cycling through use. Noise levels associated with ground equipment would generally range between 65 to 93 dBA, with helicopter noise peaking at about 100 dBA. Table 4.16-12 summarizes maximum noise levels produced by such equipment at 50 feet. Sound dampening would occur at greater distances and is a function of frequency, temperature, and humidity.

It is estimated that heavy-duty construction equipment such as graders and trucks would be on-site along the Project alignment for approximately twelve months, during which construction activities would mostly involve material delivery, road grading, and direct embed pole auguring and blasting in bedrock (when needed), foundation installation, and restoring the ROW. The underground design option would involve open cut trenching for installation of the underground cable duct banks. For the Columbia River crossing structures, additional activities generating noise would include assembling and installing the lattice structures and clipping in the conductor. Activities in any specific area would be short term as activities progressed along the ROW.

TABLE 4.16-12 CONSTRUCTION EQUIPMENT NOISE LEVELS

Type of Equipment	Maximum dBA[1] at 50 Feet
Earth Moving	
Front Loaders	66-93
Backhoes	72-92
Tractors, Dozers	68-93
Scrapers, Graders	72-92
Trucks	65-92
Rollers	66-83
Material Handling	
Concrete Mixers	67-86
Concrete Pumps	68-81
Cranes (movable)	70-92
Cranes (derrick)	80-83
Forklifts	76-82
Tensioners	76-86
Cable Pullers	74-81
Pneumatic Tools	

Type of Equipment	Maximum dBA[1] at 50 Feet
Pneumatic Wrenches	84-88
Jack Hammers and Rock Drills	72-93
Compactors	80-83
Helicopters	90-100

[1] Decibels (A weighted)

Noise would also be generated along the Project route, access roads, structure sites, pull sites, staging and maintenance areas, helicopter fly yards, and substation sites. Additional noise sources may include commuting workers and trucks and helicopters moving material to and from the work sites. The noise impacts at NSAs from construction would depend on the type of equipment used, the mode of operation of the equipment, the length of time the equipment is in use, the amount of equipment used simultaneously, and the distance between the sound source and NSA. Two types of noise are associated with on-site construction activities: intermittent and continuous. When determining noise levels, an L_{eq} is generally accepted as the average sound level. Noise levels would vary for different construction tasks and type of equipment used.

Off-site noise during construction would occur primarily from commuting workers and from various truck trips to and from the construction sites. The means for bringing personnel, materials, and equipment to each structure site would vary along the route alignment. It is also assumed that truck trips would be required to haul structures, conductor line, and other materials to the construction sites. The peak noise levels (approximately 70 to 75 dBA at 50 feet) associated with passing trucks and commuting worker vehicles would be short-term in duration.

Blasting could be required in rocky areas where augering or trenching is not possible due to underlying geologic and soil conditions. Where blasting might occur, the explosion would produce a short noise like a thunderclap that could be audible for half a mile or more.

Helicopters would be used in specific areas as necessary, such as in areas of difficult accessibility due to terrain. In particular, helicopters would be used in areas where access is limited or where there are environmental constraints to accessing the Project area with standard construction vehicles or equipment. Project activities that would be facilitated by helicopters include equipment and materials to structure sites, structure placement, hardware installation, and wire stringing operations.

Helicopter operations would occur for short periods several times per day. Therefore, the USDOT 90 dBA one-hour Leq is the most appropriate criteria to assess the potential for adverse noise impacts. Operations would be limited to daytime working hours only and would be fairly short-term in nature. Therefore, short-term construction noise impacts from helicopter operations would be minor.

Helicopters generally fly at low altitudes; therefore, potential temporary increases to ambient sound levels would occur in the area where helicopters are operating as well as along their flight path. Typically, helicopters may generate noise levels of 89 to 99 dBA at 50 feet when in flight at 200 feet. Light-duty helicopters would also be used during the stringing phase of construction. It is anticipated that helicopter stringing activities would proceed at a rate of approximately 2,000 feet per day. Light duty helicopters would generate noise levels of approximately 80 dBA at 200 feet.

Helicopters would be used to string pilot lines for the new conductors and during periodic maintenance activities during line operation. A helicopter may be also be used to assist with tower installation for the Columbia River crossing. When a helicopter is used, towers would be preassembled at one or more central staging areas and then transferred by helicopter to tower sites. The helicopter would hover at central staging areas for two to five minutes per tower as it picked up each tower section and would then hover at each tower site for two to 10 minutes during a one hour period while the tower sections are placed on the foundation.

The installation of spherical markers on ground wires, should they be required over the Columbia River, could result in minimal additional construction noise impacts caused by helicopters. Some short-term impacts from the additional use of lifts or helicopters could occur, but due to the limited nature of these impacts, they are not expected to cause any noise significance thresholds to be exceeded or to change the impact assessment for noise.

Project Design Features (PDFs) would be used to minimize audible noise impacts. PDFs used during construction that would reduce noise impacts in the vicinity of NSAs include:

- LU-10 - Advanced notice of construction activities will be given to landowners and residents potentially affected by construction activities. Adequate access to existing land uses will be provided during periods of construction and landowners notified of alternative access. Nighttime construction near noise-sensitive land uses (e.g., residences) will be avoided.
- PHS-7 - Limit construction activities to daytime hours.
- PHS-11- Pacific Power will identify and provide a public liaison person before and during construction to respond to concerns of neighboring entities and persons, including residents, about noise and other construction disturbances and/or concerns.
- PHS-12 - Pacific Power will establish a toll-free telephone number and website for receiving questions or complaints during construction and develop procedures for responding to callers.

Refer to Section 2.5 (Project Design Features Common to Action Alternatives) for a complete list of PDFs to be implemented by the Project.

4.16.3.4 Radio Noise

The impulsive corona currents cause wide-band electric and magnetic “noise” fields. This radio noise spans the frequency spectrum from below 100 kHz to approximately 1,000 megahertz (MHz). Inclement weather and high altitude increase radio noise levels. This noise from transmission lines can produce interference to an AM signal such as a commercial AM radio audio signal (i.e., radio noise) or the video portion of a TV station (i.e., TV noise). FM radio stations and the audio portion of a TV station signal (which is also frequency modulated) are generally not affected by noise from a transmission line. Radio noise is measured in units of decibels based on its field strength referenced to a signal level of one microvolt per meter ([μV/m]; IEEE 1986). Like audible noise, since it is due to corona activity, radio noise is more likely for lines at higher voltages (345 kV and above) with higher conductor-surface gradients, particularly at higher altitudes and in inclement weather. Radio noise performance is considered in the design of higher voltage lines at 345 kV and above.

4.16.4 Electric and Magnetic Field Effects

4.16.4.1 Electric Field Effects

Short-term electric field effects involve potentials and currents that may be induced on objects such as conductive roofs or buildings, fences, vehicles, or agricultural equipment near high-voltage lines. These potentials and currents may result in perceptible shocks or current flow if sufficiently large. The magnitude of induced currents and potentials on objects or equipment under the proposed lines would depend on the magnitude of the electric field, the size and shape of the object, and the object’s connection (resistance) to ground. Grounding the object would reduce the induced potential to essentially zero and eliminate the object as a source of shocks or currents. Objects that are not grounded or poorly grounded may be a source of currents or shocks.

Fences or metal objects that are within the ROW would be grounded. Grounding would eliminate induced currents or potentials on these objects as a concern. Unlike fences or buildings, mobile equipment such as vehicles and agricultural machinery cannot be permanently grounded. The NESC requires that for high-voltage power lines, such as this proposed 230 kV line, sufficient conductor clearance to ground be maintained to limit the short-circuit current induced in the largest anticipated vehicle under the transmission line to 5.0 mA or less (NESC 2007). If necessary, this can be accomplished at locations where large vehicles are anticipated by increasing the transmission line height, providing shielding of the electric field, or by limiting access.

4.16.4.2 Magnetic Field Effects

Magnetic fields associated with transmission lines can induce voltage and current in long conducting objects that are parallel to the transmission line. As with electric-field induction, these induced voltages and currents are a potential source of shocks. A fence, irrigation pipe, pipeline, electrical distribution line, or telephone line forms a conducting loop when it is grounded at both ends. The earth forms the other portion of the loop. The magnetic field from a transmission line can induce a current to flow in such a loop if it is oriented parallel to the line. If only one end of a fence is grounded (possible loop), then an induced voltage appears across the open end of the loop. The possibility for a shock exists if a person closes the loop at the open end by contacting both the ground and the conductor. The magnitude of this potential shock depends on the following factors: the magnitude of the magnetic field; the length of the object (i.e., the longer the object, the larger the induced voltage); the orientation of the object to the transmission line (i.e., parallel as opposed to perpendicular; no induction occurs on perpendicular loops); and the amount of electrical resistance in the loop (i.e., high resistance limits the current flow).

Magnetically induced currents from power lines have been investigated for many years. Mitigating measures have been developed and are available. Studies of gas pipelines near transmission lines have developed prediction methods and mitigation techniques for induced voltages on pipelines (Dabkowski and Taflove 1979; Taflove and Dabkowski 1979). Similar techniques and procedures are available for irrigation pipes and fences. Grounding policies employed by utilities for long fences reduce the potential magnitude of magnetically induced voltage and currents.

Magnetic fields can cause distortion of the image on older style video display terminals and computer monitors (cathode-ray tubes). The threshold magnetic field for interference depends on the type and size of monitor and the frequency of the magnetic field. Interference has been observed for certain monitors at fields at or below 10 mG (Baishiki et al. 1990; Banfai et al. 2000). The problem typically arises when cathode-ray tube computer monitors are in use near electrical distribution or transmission facilities in large office buildings. This is becoming less of a concern with the advent of flat screen monitors, such as used in laptop computers. Flat screen monitors are not susceptible to AC magnetic fields. Some specialized equipment (for instance, certain medical equipment such as a MRIs or test equipment such as a scanning electron microscope) may be sensitive to even lower levels of magnetic field. However, equipment that is very sensitive to magnetic fields typically has shielding and is installed in a protected environment to shield them from the magnetic fields of one to 10 mG or higher that can be found in buildings due to their wiring, lights, and other equipment. Mitigation methods for magnetic fields are available and involve grounding practices, shielding, device geometry, and distance.

4.16.5 Field Induction (Induced Currents and Nuisance Shocks)

The electric fields associated with a transmission line can induce small electric currents in metallic objects adjacent to or under transmission lines. Metallic roofs, vehicles, equipment, and fences are examples of objects that can develop a small electric charge when in proximity to high-voltage transmission lines. The amount of induced charge depends on the characteristics and size of the object, its grounding, and the electric field strength. An electric current can flow when an object has an induced charge and a path to ground. The amount of current flow is determined by the impedance of the object to ground and the voltage induced between the object and ground. The amount of induced current that can flow is important for evaluating the potential for nuisance shocks to people and the possibility of other effects such as fuel ignition.

The threshold of perception is approximately 1.0 mA for humans (Dalziel and Mansfield 1950). If the current is increased sufficiently beyond a person's perception threshold, it can become bothersome and possibly startling. Larger currents can cause the muscles of the arm and hand to involuntarily contract so that a person cannot let go of an object. The value at which 99.5 percent of men, women, and children can still let go of an object is approximately 9.0, 6.0, and 5.0 mA, respectively. Transmission lines are designed such that the maximum amount of current induced on the largest metallic object normally expected under the line would be less than 5.0 mA.

In the process of establishing contact with a vehicle or metallic object under a transmission line, a small arc may occur. This is often called a nuisance shock since it can be annoying. Nuisance shocks and induced currents can be eliminated by proper grounding of the object, shielding it from electric fields, or positioning it farther from the transmission line.

Grounding of fences and large metal structures under or near the lines would eliminate these objects as sources of potentials or currents. Agricultural activities can occur near or under transmission lines. However, mobile objects like vehicles or pieces of farm equipment cannot be grounded permanently and thus can develop a potential and currents while under or near the transmission line.

Placing a ground strap on vehicles or equipment would help ground the vehicle, mitigating induced currents or potentials. Dragging a log chain from large equipment that passes under high-voltage lines can be used to provide grounding. Simply avoiding stopping to enter or exit vehicles while under high-voltage lines is another common way to avoid induced potentials or currents.

4.16.6 Stray Voltage

Stray voltage refers to a phenomenon that is primarily of concern in wet environments usually involved with an AC distribution system. Transmission lines, such as the one proposed, are not normally associated with the phenomenon of stray voltage because the transmission line is a balanced, three-phase line without any direct electrical connection to end-user facilities.

Stray voltage or current is a problem whereby currents or potentials on conductive objects and metal work can come in contact and flow through humans or animals. Stray voltage is often a concern involving the farm electrical system and the local utility distribution system where a potential is developed on the grounded neutral system of the farm or utility. If an animal or human comes in contact with metal equipment that is at a different potential than the ground on which they are standing, a current may flow through the animal, or person, to ground and the potential be detected. Usually if this potential difference exists, it is too small to generate any physical or behavioral changes. In the case of nearby transmission lines, fences or piping that pass under or near the transmission line and connect back to a farm can be the source of currents and potentials on the farm. Stray voltage may be the result of corrosion or broken ground connections. Good grounding practices would reduce or eliminate this concern.

4.16.7 Cardiac Pacemakers

Concern has focused on potential interference to cardiac pacemakers and defibrillators. A cardiac pacemaker monitors the electrical activity of the heart. If the heart fails to beat, the pacemaker administers a small stimulus to trigger the “missing” beats. An implanted cardiac defibrillator similarly monitors the electrical activity of the heart but is designed to block disorganized contractions of the heart (i.e., arrhythmias) by administering a strong electrical shock to restore normal heart rhythms. Exposure to EMF could affect the function of these devices if induced signals on sensing leads are interpreted as natural cardiac activity (Griffin 1986; CCOHS 1988; Barold et al. 1991). However, the opportunities for exposure and interference from power lines are lower than for contact with ordinary household appliances.

Due to recent design improvements, many pacemakers in use would not be particularly susceptible to electrical fields. The manufacturers of pacemakers have designed their devices in various ways to minimize potential interference from external sources, including power line EMF. For example, the increasingly prevalent bipolar pacemaker models are virtually immune to interference. There remains a small possibility that some pacemakers, particularly those of older designs and with single-lead electrodes may sense potentials induced on the electrodes and leads of the pacemaker and provide unnecessary stimulation to the heart.

There are two general types of pacemakers: asynchronous and synchronous. The asynchronous pacemaker pulses at a predetermined rate. It is practically immune to interference because it has no sensing circuitry and is not exceptionally complex. The synchronous pacemaker, on the other hand, pulses only when its sensing circuitry determines that pacing is necessary. Interference resulting from transmission line EMF can cause a spurious signal in the pacemaker’s sensing circuitry. However, when these pacemakers detect a spurious signal, such as a 60 Hz signal, they are programmed to revert to an asynchronous or fixed pacing mode of operation and return to synchronous operation within a specified time after the signal is no longer detected. The potential for pacer interference depends on the manufacturer, model, and implantation method, among other factors.

Cardiovascular specialists do not consider prolonged asynchronous pacing to be a problem. Periods of operation in this mode are commonly induced by cardiologists to check pacemaker performance. Although the electric field within areas of a transmission line ROW may affect the operation of some models of pacemakers by causing them to revert to asynchronous pacing, this would only be for short duration while walking under the transmission line and is not considered harmful. The vehicle compartment of a car, truck, or the cab of agricultural equipment (e.g., combine or tractor) shields the occupant from the electric field and thus there would not be an effect on a pacemaker while in a vehicle or cab while under the transmission line. Pacemakers in areas outside the transmission line ROW would not be affected. Before walking under the conductors of a high-voltage transmission line on the ROW, those with pacemakers or defibrillators should check with their physician if they have concerns.

4.16.8 Global Positioning Systems, Satellite Receivers, and Cell Phones

GPS units, satellite receivers, cell phones, and community communication systems typically operate at high frequencies in the tens to hundreds of megahertz or even into the gigahertz range. These systems also often use FM or digital coding of the signals so that they are relatively immune to the electromagnetic interference from transmission line corona.

GPS units are used in a wide range of activities including agricultural activities such as monitoring pivot irrigation, tracking wheeled and tracked equipment movements during farming operation, and checking the orientation of aerial spraying aircraft. GPS units operate in the frequency range of 1.2 to 1.6 gigahertz. Tests with satellite receivers operate at frequencies from 3.4 gigahertz to 7.0 gigahertz and have shown no effect from transmission lines unless the receiver was trying to view the satellite through the transmission tower or the conductor bundle of the transmission line. Repositioning the receiver by a few feet was sufficient to eliminate the obstruction and reduced signal. Mobile phones operate in the radiofrequency range of about 800 million Hz, 1,900 million Hz, or higher frequencies. A million hertz is 1.0 MHz. EMF at these high frequencies have very different physical characteristics from 60 Hz power frequency EMF. Due to the frequencies used by these devices and the modulation and processing techniques used, interference effects are unlikely.

Modern farming equipment uses GPS to guide tractors used for planting, cultivation, and harvesting. Modern guidance systems have an accuracy of one to two inches. It should be noted that GPS accuracy can be impacted by many factors including atmospheric conditions; satellite constellation and geometry; the design, quality, and position of the GPS antennas and receivers; signal interference; and “multipath.” Of these, a transmission line and its structures could conceivably contribute to signal interference and multipath.

Signal interference occurs when other signals at the same frequency as the satellite signal are present. Multipath occurs when objects such as buildings or parts of the tractor itself reflect the GPS satellite signal so that the satellite signal arrives at the receiver later than it would have if it had followed a straight line from the satellite. A study commissioned by EPRI found that signal interference is “unlikely” based on the design of GPS receivers and their ability to separate the GPS signal from background noise (Silva and Olsen 2002). Another study compared the accuracy of real-time kinematic GPS receivers at different locations with respect to transmission lines and towers (Gibblings et al. 2001). This study concluded that multipath from transmission towers could result in GPS system initialization errors (i.e., the system reports the wrong starting location) 1.1 percent to 2.3 percent of the time. This study also reported that the GPS system software was able to identify and correct these initialization errors within the normal startup time. This study reported initialization errors due to electromagnetic interference from energized overhead transmission lines when the GPS receiver was located outside the vehicle, but concluded that “most, if not all of this effect can be eliminated by shielding the receiver and cables.” Placing the receiver inside the vehicle used in the study significantly reduced the initialization errors.

Corona-generated radio interference may cause disruption on AM communications bands in addition to AM radio such as the citizen’s band and some mobile bands. However, mobile-radio communications are not susceptible to transmission-line interference because they are generally FM. Similarly, cellular telephones operate at a frequency of 900 MHz or higher, which is well above the frequency where corona-generated radio noise is prevalent. GPS systems operate at a frequency of 1.57 gigahertz and have been shown to be unaffected by radio noise from high-voltage transmission lines (Silva and Olsen 2002). Satellite receivers operate at even higher frequencies in the 3 to 6 gigahertz band. For these higher frequency devices, the receiver has to be essentially looking directly at the conductor before it may be affected (Chartier et al. 1986). In the unlikely event that interference occurs with these or other communications, mitigation would be easily achieved with the techniques used for AM radio interference such as a slight antenna relocation or orientation. As digital signal processing has been integrated into these communication systems, the potential interference impact of corona-generated radio noise has decreased.

4.16.9 Aerial Spraying

Aerial spraying can involve dry applications (usually fertilizer) and liquid applications of fungicides and pesticides. An agricultural field can receive up to five to 10 applications per year depending on the type of crop and preferences of individual operators. While there are different makes of crop-spraying aircraft, a typical crop spray product load weighs approximately 275 to 300 pounds with an effective range of 25 to 30 miles.

Pilots typically spray with the aircraft 8 to 15 feet above ground level, with the height greater when crops are taller. Taking into account height above ground, size of aircraft and the nose-down angle, the maximum height of the tail of the aircraft is approximately 20 to 25 feet above ground surface. The presence of a transmission line could result in increased risk to crop duster pilots or others on the ground. Larger transmission lines like the one proposed for this Project are typically easier to see than smaller voltage lines. The presence of a transmission line could affect spray coverage. Spray is applied at a downward angle to reduce over-spray and, as a result, areas immediately adjacent to the transmission structures could receive less spray product than desired by the operator.

The extent of agricultural land in or adjacent to the Project area that currently receives aerial spraying is unknown, but this type of spraying is most likely to occur in areas where crops are grown, and to a much lesser degree, in areas of range where herbicides and insecticides are applied to control noxious weeds and insects.

The National Transportation Safety Board (2008) maintains a data base of aviation accidents. This data base indicated that over a six-year period, from January 1, 2003 to December 19, 2008, nationwide, there were a total of 484 agriculture-related accidents investigated, of which 49 (10 percent) were fatal. Most of these accidents were related to electrical power lines. Some were related to telephone wires, other aerial wires, or guy wires on other utility poles. The investigation reports do not specify the type of transmission line that was involved but considering details such as height from the ground, the number of lines in one location and visibility, the reports suggest that smaller lines are much more involved in aviation accidents than the 230 kV and 500 kV lines in the Project area.

The 230 kV proposed Project would be larger and more visible than smaller overhead lines and therefore higher and more visible to pilots. Currently, there are nine high voltage transmission lines (115 kV, 230 kV, and 500 kV) in the Project area. Aerial spraying pilots would need to be sensitive to their presence and skilled when conducting spraying operations near the lines.

4.17 CUMULATIVE EFFECTS

This section describes the potential cumulative effects associated with the Vantage-Pomona Heights Transmission Line Project (Project). The Project in combination with identified past, present, and reasonably foreseeable actions could potentially result in cumulative effects to the natural, physical, and human resources described in Sections 3.2 through 3.16 of this Supplemental Draft Environmental Impact Statement (SDEIS). The following sections describe the regulatory framework, the cumulative effects analysis methodology used, temporal and geographic scope of the analysis for each resource, actions considered and the cumulative effects analysis for each resource.

4.17.1 Regulatory Framework

The evaluation of potential cumulative effects associated with the Project is consistent with the following regulations and guidance:

- Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provision of the National Environmental Policy Act (NEPA)* (40 Code of Federal Regulations [CFR] Parts 1500-1508, 1978 as amended) (CEQ 1986);
- U.S. Environmental Protection Agency (USEPA) *Procedures for Implementing the Requirements of the CEQ on NEPA* (40 CFR Part 6 [2009]);
- CEQ *Considering Cumulative Effects under NEPA* (January 1997) (CEQ 1997);
- CEQ *Guidance on the Consideration of Past Actions in Cumulative Analysis* memorandum (June 24, 2005) (CEQ 2005);
- USEPA *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*, USEPA 315-R-99-002 (May 1999); and
- U.S. Bureau of Land Management (BLM) *NEPA Handbook*, H-1790-1 (2008).

4.17.2 Definition

Cumulative impact, as defined by the CEQ (40 CFR Part 1508.7), is the impact on the environment that 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 other such actions. As stated in the CEQ handbook, “Considering Cumulative Effects,” cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful (CEQ 1997).

4.17.3 Methodology

The analysis of cumulative effects was accomplished using four steps:

Step 1 - Identify Resources Affected
In this step, each resource affected by the New Northern Route (NNR) Alternative was identified. These are the same resources as described in the affected resources section in Chapter 3.

Step 2 - Establish Boundaries
In order to identify the past, present, and reasonably foreseeable actions to consider in the cumulative effects analysis, affected resource-specific spatial, and temporal boundaries must be identified. The spatial boundary is the area where past, present, and reasonably foreseeable future actions have, are, or could take place and result in cumulative impacts to the affected resource when combined with the impacts of the proposed Project. This boundary is defined by the affected resource and may be a different size than the proposed Project area. The temporal boundary describes how far into the past and forward

into the future actions should be considered in the impact analysis. Appropriate spatial and temporal boundaries may vary for each resource.

Step 3 - Identify Cumulative Action Scenario
In this step, the past, present, and reasonably foreseeable future actions to be included in the impact analysis for each specific affected resource are identified. These actions fall within the spatial and temporal boundaries established in Step 2.

Step 4 - Cumulative Effects Analysis
This final step involves the analysis of the impacts of the actions identified in Step 3 in addition to the impacts of the proposed Project. This will result in the total cumulative impact for each resource.

4.17.4 Scope of the Analysis

4.17.4.1 Introduction

The determination of what past, present, and reasonably foreseeable future actions to consider in the impact analysis is based on the resources being affected by the proposed Project. Guidance on determining what actions to consider in the cumulative impact analysis comes from a variety of sources.

The CEQ has produced several guidance documents including a document entitled “Guidance on Consideration of Past Actions in Cumulative Effects Analysis.” This document states that consideration of past actions is only necessary in so far as it informs agency decision making. Typically the only types of past actions considered are those that continue to have present effects on the affected resources. This present effect will dictate how far in the past actions are considered and the impacts of these past actions are largely captured in the discussion of the affected environment in Chapter 3 for each resource. The guidance states that “agencies are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effect of all past actions.” Agencies are allowed to aggregate the effects of past actions without “delving into the historical details of individual past actions.”

Present actions are those that are currently occurring and also result in impacts to the same resources as would be affected by the proposed Project.

Reasonably foreseeable future actions are those actions that are likely to occur and affect the same resources as the proposed Project. The determination of what future actions should be considered requires a level of certainty that they will occur. This level of certainty is typically met by the completion of a permit application, the subject of approved proposals or planning documents, or other similar evidence. Determining how far into the future to consider actions is based on the impact of the proposed Project. Once the impacts are no longer experienced by the affected resource, future actions would not need to be considered. For the purposes of this Environmental Impact Statement (EIS), the future actions being considered are those that will occur over the time it takes temporary impacts to be mitigated or eliminated. The expected physical operational service life of this transmission line for the requested grant of right-of-way (ROW) is approximately 50 years (ROW renewal and/or extensions are common beyond the typical 50-year ROW grant for transmission lines because of their operational longevity); however, except for traditional cultural properties (TCPs) and visual resources, this is not an appropriate time horizon in which to consider future actions because the impacts from construction of the transmission line are greatly reduced if not eliminated; the impacts from operation and maintenance are low and insignificant; and future actions over that period are speculative in nature. For TCPs and visual resources, consideration of future actions would be for the life of the line and any associated decommissioning and removal because while the line is present, impacts to these resources would potentially be occurring.

4.17.4.2 Geographic Scope

The geographic scope of the cumulative effects for each issue or resource was established to help bound the description of the affected environment. In most cases, the geographic scope was first based upon the Project area that would result in direct effects rather than jurisdictional boundaries. Then, as appropriate for each resource, a broader area was selected to include areas where potential indirect effects could occur. The geographic scope of cumulative effects (referred to as the CE Area) extends beyond the scope of direct effects, but not beyond the scope of the direct and indirect effects of the proposed Project. If the proposed Project would have no direct or indirect effects to a particular resource, a cumulative effects analysis was not conducted for that resource.

4.17.4.3 Timeframe of Analysis

For each resource, a timeframe was established for analyzing cumulative effects. The timeframe encompasses the full duration of anticipated effects. Timeframes, like geographic scope, vary by resource. These timeframes were based upon the duration of the direct and indirect effects of the proposed Project on each resource.

4.17.5 Past, Present and Reasonably Foreseeable Future Actions

Table 4.17-1 summarizes the past, present and reasonably foreseeable future actions that could affect the various resources. Those requiring additional explanation are discussed in the following narrative.

Past and present actions include:

- <u>Columbia River/Priest Rapids Hydroelectric Project</u> - The Priest Rapids Hydroelectric Project is part of a network of dams and reservoirs that comprise the single largest coordinated hydroelectric system in the country. This project consists of the Priest Rapids dam, the Wanapum dam, and their associated reservoirs and transmission lines and encompasses approximately 12,000 acres of shoreline lands and 58 miles of the Columbia River. Construction of the 1,755 megawatt (MW) Priest Rapids Project began in 1956 and the projects (Priest Rapids and Wanapum) went into commercial operation in 1964. The projects were built by the Public Utilities District No. 2 of Grant County.

  Since 1909, federal agencies have constructed 29 major water resource projects in the Columbia River watershed. Dozens of larger non-federal projects and hundreds of small impoundments have also been developed. Over time, the hydrologic regime of the Columbia River has been altered as a result of the construction of these major water storage projects. Collectively the dams and reservoirs provide power, flood control, irrigation, water supply, flow augmentation, navigation, fish habitat, and recreation.

  <u>Transmission Lines and Substations</u> - Numerous high voltage transmission lines and substations have been constructed since the completion of the Priest Rapids hydroelectric project in the 1960s by the Bonneville Power Administration (BPA), PacifiCorp, Grant County Public Utilities District (PUD), and Puget Sound Energy. There are over 15 transmission lines that are located in the CE Area that range in voltage, from 115 kilovolt (kV), 230 kV, and 500 kV. Major substations include: Midway Substation, Vantage Substation, Wautoma Substation, Moxee Substation, and Pomona Heights Substation. Operation and maintenance of these transmission

lines and substations would be considered present and reasonably foreseeable actions, as well as past actions.

TABLE 4.17-1 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS BY AFFECTED RESOURCE

AFFECTED RESOURCE	PAST ACTIONS	PRESENT ACTIONS	REASONABLY FORESEEABLE FUTURE ACTIONS
Wildlife	Agricultural conversion; livestock grazing operations; residential/subdivision development; road and railroad construction; hydroelectric power development; military training operations; construction of other transmission lines and substations; motorized recreation use; construction of communication sites; habitat loss/fragmentation; increased fire cycles; influx of noxious weeds/invasive species.	Agricultural activities; livestock grazing operations; military training operations and other ongoing land uses and practices; operation of electric transmission facilities, habitat loss/fragmentation; increased fire cycles; influx of noxious weeds/invasive species.	Ongoing agricultural activities; potential for new agricultural land conversion; residential/subdivision development depending on economic situation; ongoing military training activities at the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC); ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir, wildfire cycles.
Vegetation	Agricultural conversion; livestock grazing operations; residential/subdivision development; road and railroad construction; hydroelectric power development; military training operations; construction of other transmission lines and substations; motorized recreation use; construction of communication sites; habitat loss/fragmentation; increased fire cycles, influx of noxious weeds/invasive species.	Agricultural activities; livestock grazing operations; motorized recreation use military training operations and other ongoing land uses and practices; operation of electric transmission facilities habitat loss/fragmentation; increased fire cycles, influx of noxious weeds/invasive species.	Ongoing agricultural activities; potential for new agricultural land conversion; motorized recreation use residential/subdivision development depending on economic situation; ongoing military training activities at the JBLM YTC; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir; unknown communication sites; influx of noxious weeds/invasive species and their management, wildfire cycles, drought cycles
Land Use	Construction and operation of Columbia River dams and reservoirs; past agricultural activities; highway and railroad construction; construction of other transmission lines and substations; residential/subdivision development; military training operations; Conservation Reserve Program (CRP) land conversion.	Agricultural activities; military training operations and other ongoing land uses and practices; operation of electric transmission facilities.	Ongoing agricultural activities; potential for new agricultural land conversion; residential/subdivision development depending on economic situation; ongoing military training activities at the JBLM YTC; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir; unknown communication sites.

AFFECTED RESOURCE	PAST ACTIONS	PRESENT ACTIONS	REASONABLY FORESEEABLE FUTURE ACTIONS
Recreation	Construction and operation of Columbia River dams and reservoirs; past agricultural activities; livestock grazing operations; road development and construction and railroad construction; residential/subdivision development; off road motorized and other recreation use, transmission line and substation construction.	Agricultural activities; livestock grazing operations; residential and subdivision development and practices; off road motorized recreation use and present recreational land uses and practices, Yakima River Canyon State Scenic Byway, transmission line and substation construction, local road construction.	Future off-road recreation and other recreational land uses, Ongoing agricultural activities; potential for new agricultural land conversion; residential/subdivision development and practices depending on economic situation; ongoing military training activities at the JBLM YTC; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir; unknown communication sites, Yakima River Canyon State Scenic Byway activities, local road construction.
Transportation	Highway, local road, and railroad construction; construction and operation of Columbia River dams and reservoirs; construction of Desert Aire airstrip; residential, subdivision, and commercial development.	Ongoing road maintenance projects; transportation of freight and agricultural products by highways and roads; operation of the Desert Aire airstrip.	Ongoing road maintenance projects; transportation of freight and agricultural products by highways and roads and operation of the Desert Aire airstrip; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; residential/subdivision development depending on economic situation; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir, local road construction.
Visual	Construction and operation of Columbia River dams and reservoirs; past agricultural activities; local road, highway and railroad construction; construction of other transmission lines and substations; residential/subdivision development and practices; military training operations; communication sites, wildfire occurrence.	Agricultural activities; livestock grazing operations; military training operations and other ongoing land uses and practices; operation of electric transmission facilities; off-road motorized use; wildfire cycles; residential and subdivision development.	Ongoing agricultural activities; potential for new agricultural land conversion; residential/subdivision development and practices depending on economic situation; ongoing military training activities at the JBLM YTC; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir; unknown communication sites; Yakima River Canyon State Scenic Byway activities; off-road motorized use; local road construction; wildfire cycles.

AFFECTED RESOURCE	PAST ACTIONS	PRESENT ACTIONS	REASONABLY FORESEEABLE FUTURE ACTIONS
Socioeconomics	Construction and operation of Columbia River dams and reservoirs; agricultural activities; highway and railroad construction; construction of other transmission lines and substations; residential/subdivision development.	Agricultural activities and operations; livestock grazing operations; operation of Columbia River dams; operation of transmission infrastructure; maintenance of transportation infrastructure; operation of JBLM YTC.	Ongoing agricultural activities; potential for new agricultural land conversion; residential/subdivision development depending on economic situation; ongoing military training activities at the JBLM YTC; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir; unknown communication sites.
Cultural Resources	Construction and operation of Columbia River dams and reservoirs; agricultural activities; highway and railroad construction; construction of other transmission lines and substations; residential/subdivision development; military training operations.	Agricultural activities; military training operations and other ongoing land uses and practices; operation of electric transmission facilities.	Ongoing agricultural activities; potential for new agricultural land conversion; residential/subdivision development depending on economic situation; ongoing military training activities at the JBLM YTC; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir; unknown communication sites.
Air Quality	Construction and operation of Columbia River dams and reservoirs; agricultural activities; highway and railroad construction; construction of other transmission lines and substations; residential/subdivision development; military training operations.	Agricultural activities; ongoing road maintenance; motorized off road recreation; increased fire cycles; military training operation of electric transmission facilities.	Ongoing agricultural activities; potential for new agricultural land conversion; residential/subdivision development depending on economic situation; ongoing military training activities at the JBLM YTC; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir; unknown communication sites, wildfire cycles.
Water Resources	Construction and operation of Columbia River dams and reservoirs; agricultural development and irrigation.	Continuing hydroelectric operations; agricultural activities and irrigation.	Ongoing hydroelectric operations; agricultural activities and irrigation; proposed Wymer Dam and Reservoir.

AFFECTED RESOURCE	PAST ACTIONS	PRESENT ACTIONS	REASONABLY FORESEEABLE FUTURE ACTIONS
Soils and Geology	Agricultural activities; livestock grazing operations; gravel mining; military training operations; highway and railroad construction; construction of other transmission lines and substations; hydroelectric power development/Columbia Basin; residential/subdivision development.	Agricultural activities; livestock grazing operations; gravel mining; livestock grazing and ranching; military training operations and other ongoing land uses and practices.	Ongoing agricultural activities; potential for new agricultural land conversion; residential/subdivision development depending on economic situation; ongoing military training activities at the JBLM YTC; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir; unknown communication sites.
Public Health and Safety , and Noise	Construction and operation of Columbia River dams and reservoirs; agricultural activities; highway and railroad construction; construction of other transmission lines and substations; residential/subdivision development; military training operations; communication sites.	Agricultural activities; livestock grazing operations; military training operations and other ongoing land uses and practices; operation of electric transmission facilities.	Ongoing agricultural activities; potential for new agricultural land conversion; residential/subdivision development depending on economic situation; ongoing military training activities at the JBLM YTC; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Saddle Mountain West Wind Project; proposed Wymer Dam and Reservoir; unknown communication sites, wildfire cycles.

- Agriculture - European settlement began throughout the region including the Project area circa the mid-nineteenth century with economic activity in the region consisting primarily of raising livestock. A transition to agriculture and other industries occurred toward the latter part of the century with advances in irrigation technology. Agricultural development in the region improved significantly following the development of the hydroelectric power resources of the Columbia and Yakima River Basins. The availability of lower-cost hydroelectric power and affordable irrigation were crucial to agricultural development. More than 600,000 acres of agricultural land has been brought under irrigation by the Columbia River Project, mostly in Grant County. Agricultural production is diverse, with large numbers of orchards as well as field crops. As many as 69 row and tree crops are grown ranging from apple and cherry orchards to wheat, potatoes and many other vegetable crops. The extensive irrigation that is essential to the agricultural industry also supports the related industries of food processing, and wholesale trade and trucking. Agricultural activities would be considered present and reasonably foreseeable actions as well as past actions.

- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) - JBLM YTC is a U.S. Department of the Army (Army) training center for maneuver and live fire training within the vicinity of the Project area. It is bounded on the west by Interstate (I) 82, on the south by the city of Yakima, on the north by the city of Ellensburg and I-90, and on the east by the Columbia River. It comprises 327,000 acres of land, most of which consists of shrub-steppe, making it one of the largest areas of shrub-steppe habitat remaining in Washington State.

  From 1942 to 1946 the Army leased 160,000 acres of land in the area for the Yakima Anti-Aircraft Artillery Range. Then in 1951 the Army purchased 261,000 acres for the Yakima Firing Center, which would become the modern Yakima Training Center. As disclosed in the recent Grow the Army EIS there were significant impacts with all alternatives including the no action alternative for biological resources (sage-grouse and shrub-steppe habitat) and wildland fire (Army 2010).

  Table 4.17-2 lists recent, ongoing, and future actions on JBLM YTC and their approximate locations. JBLM YTC does not anticipate that any of these actions would impact the construction, operation, or maintenance of the Vantage-Pomona Heights 230 kV Transmission Line's NNR, nor will the location of the proposed transmission line impact the listed JBLM YTC actions (JBLM YTC 2014).

TABLE 4.17-2 RECENT, ONGOING AND FUTURE ACTIONS ON JBLM YTC

#	PROJECT NAME	TRAINING AREA #	DATE
1	JBLM YTC Combat Aviation Brigade Stationing Action	General increase in personnel	Ongoing Approved 2011
2	Fort Lewis Grow the Army Action	General increase in training all over	Ongoing Approved 2011
3	JBLM YTC Urban Operations Village	2 (east side, near JBLM YTC boundary)	Construction Completed 2012
4	JBLM YTC Range Development - Combined Arms Collective Training Facility	Undecided – possibly in 16 near the Central Impact Area	Planned 2019
5	Sniper Field Fire Range	11 (Range 4)	Completed 2013
6	Washington Army National Guard Tactical Unmanned Aerial System Training Facility	12 (next to Selah Airstrip)	2014
7	JBLM YTC Convoy Live Fire Range	12 (southeast of Selah Airstrip)	2014
8	JBLM YTC Counter-Rocket, Artillery, Mortar (C-RAM) Intercept (new weaponry training)	Central Impact Area	2014
9	JBLM YTC Unmanned Aerial Systems Shadow Landing Strip	4 (south side)	2015
10	Multi-purpose Machine Gun Range	11 (Range 5)	2015

- Residential/Subdivision/Commercial/Industrial - Residences are predominately single-family detached housing units in the CE Area. Small communities with a more densely populated area include the City of Mattawa as well as unincorporated communities of Selah, Desert Aire, Beverly, Wanapum Indian Village at Priest Rapids Dam, Schawna, and Vantage located near the Wanapum Dam where I-90 crosses the Columbia River.

  Mattawa has a number of retail businesses and government service facilities in the community. Industrial-type businesses and activities occurring within the CE Area are associated with light industry and agricultural processing, including food storage and processing facilities with large scale agriculture.

  Land uses within and adjacent to the CE Area are varied and consist of hydroelectric facilities, small suburban residential communities, wildlife management areas, transmission lines and substations, the JBLM YTC, agricultural areas, and a variety of recreation facilities. The majority of the land in the Project area is undeveloped open space.

  The predominant land uses would be considered past and present actions. There are no reasonable foreseeable projects or actions that would alter or dramatically change the present land use character of the Project area.

- Highway and Road Construction - Construction of local and state highways and I-82 bisected native grassland, shrub-steppe habitat, and agricultural lands. As the population grows or additional lands are converted to agricultural use (US Census 2014), construction and maintenance would be considered past and present as well as reasonably foreseeable.

Reasonably foreseeable actions include:

- BPA proposes to:
  - Conduct subsurface geotechnical testing in 2014 along its Ellensburg-Moxee No.1 115 kV transmission line in support of the future direct burial of an existing overhead fiber optic cable. The fiber optic cable has been susceptible to acts of vandalism and is needed to protect and maintain BPA's operational communications abilities. The geotechnical testing location is approximately one mile northwest of the line's Highway 821 crossing and 1.5 miles northwest of the NNR Alternative. BPA has determined that the testing meets their agencies requirements for a Categorical Exclusion and is excluded from further NEPA review and documentation.
  - Additional BPA actions associated with the Region of Influence (ROI) for the Draft Environmental Impact Statement (DEIS) Alternatives will be analyzed in the Final Environmental Impact Statement (FEIS).

- EDP Renewables (Horizon Wind Energy) Meteorological Monitoring and Saddle Mountain West Wind Farm
  On June 30, 2010, the BLM Wenatchee Field Office issued a ROW to Horizon Wind Energy (now EDP Renewables) for a wind testing and monitoring area on 22,095.51 acres of public lands in the Saddle Mountains. This ROW includes almost all of the BLM public lands in the Saddle Mountains. It authorized the placement of up to six meteorological towers for wind measurement. Ultimately, only two towers were installed on the eastern portion of the range. The BLM recently issued a renewal of ROW to EDP for a second three-year term. Besides the public land included in the ROW, EDP has a lease and meteorological towers on private lands located in the western portion of the Saddle Mountains.

  In compliance with BLM's Wind Energy Policy, when the renewal of the wind testing and monitoring area ROW was sought, Horizon/EDP Renewables also filed an application to develop a wind energy project in the Saddle Mountains. The development application was serialized as WAOR 66523 and proposes to construct a major project (up to 150 turbines, 1.5 to 3.0 MW each with a total capacity of 165 to 450 MW) on BLM and private land in the western half of the Saddle Mountains. The processing of the application is pending, awaiting completion of the BLM Spokane District Resource Management Plan (RMP) scheduled for late 2014 or early 2015. EDP Renewables will continue to operate two meteorological towers for wind measurement. See Figure 4.17-1 for the location of the proposed Saddle Mountain West Wind Farm.

- Saddle Mountain Wind Farm
  Horizon Wind Energy Northwest proposes to develop, construct, own and operate a wind power facility on Saddle Mountain in southwest Adams County. The proposed project would consist of approximately 4,540 acres of privately owned land approximately six miles southwest of Othello, Washington. The project is about a mile from BLM lands in Grant County.

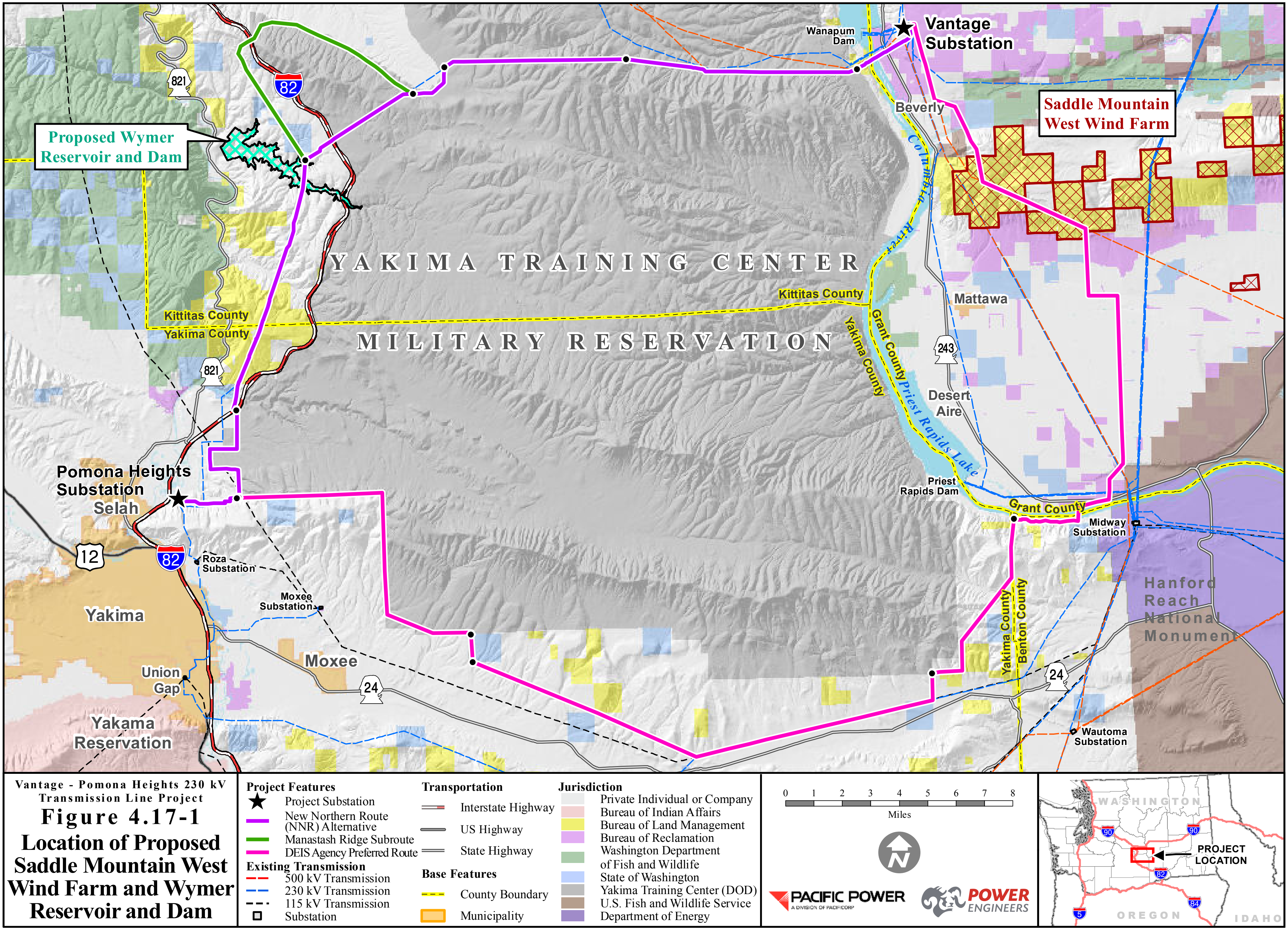
  The proposed wind energy facility would consist of a string of approximately 32 wind turbines extending approximately seven miles along the ridge-top of the eastern end of the Saddle Mountains. The project would use 3-MW turbines for a total wind farm size of 96 MW. The project is 50 miles east of the Vantage-Pomona Heights Transmission Line Project area. Due to its distance from the Project area, it is not considered in the cumulative analysis.

- Wymer Dam and Reservoir

  Federal legislation in 2003 authorizing the Yakima River Basin Water Storage Feasibility Study directed the U.S. Bureau of Reclamation (Reclamation) to conduct a feasibility study of options for additional water storage in the Yakima River basin. In 2007, Reclamation completed an appraisal assessment of likely configurations and costs of the proposed Wymer Project facilities needed to pump and store Yakima River water to increase storage capacity in the Yakima River basin. The conclusions reached in the appraisal assessment were that the proposed Wymer Dam and Reservoir should be included in the Plan Formulation Phase of the Yakima River Basin Water Storage Feasibility Study. The project was evaluated in the Yakima River Basin Water RMP Programmatic Environmental Impact Statement completed by Reclamation and the Washington Department of Ecology in March 2012. Project funding of approximately one billion dollars has not been authorized by Congress; however, the project is active in Reclamation's current 30 year plan and therefore is considered in this cumulative impact analysis.

  The proposed Wymer Dam and Reservoir would be constructed under Reclamation's Integrated Water Resource Management Plan to create a new off-channel storage facility in the intermittent channel of Lmuma Creek, which enters the Yakima River approximately eight miles upstream of the Roza Diversion Dam. The proposed reservoir site would be crossed by this proposed Project. The storage capacity of the reservoir would be approximately 162,500 acre-feet. The proposed reservoir site is currently under private ownership and would require the acquisition of approximately 4,000 acres of private land. See Figure 4.17-1 for the location and configuration of the dam and reservoir.

  The dam would be a concrete-faced rockfill embankment approximately 450 feet high with a full pool elevation of approximately 1,730 feet. An approximately 180-foot high central core rockfill dike would be constructed in a saddle on the north side of the reservoir. A spillway and stilling basin would be located on the south abutment of the dam to discharge water into Lmuma Creek. Outlet works on the south dam abutment, sized for approximately 1,600 cubic feet per second (cfs), would return flow to Lmuma Creek and the Yakima River. The reservoir would be filled by a pumping plant with a capacity of approximately 400 cfs that would withdraw water from the Yakima River.



Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 4.17-1

Location of Proposed Saddle Mountain West Wind Farm and Wymer Reservoir and Dam

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- Other Reasonably Foreseeable Future Projects
  There are no pending, anticipated, or foreseeable applications for projects in the CE Area of Yakima County, Grant County, or Kittitas County (Erickson 2011; Hooper 2011; D'Hondt 2011).

  There are no other pending, anticipated, or foreseeable projects on Reclamation-managed land (Loranger 2011 and 2014) beyond improvements within the Vantage Substation to accommodate the interconnection of the proposed Vantage-Pomona Heights 230 kV transmission line (Hutson 2011).

  Integrated Resource Plan
  The Grant County PUD has prepared an Integrated Resource Plan (IRP) that systematically considers supply side and demand side resources to meet current and projected load requirements for a planning period of 10 years (2010 through 2020). The IRP examined the PUD's current and future electric demand and future energy market conditions under a number of likely future scenarios. The planning effort concluded that the PUD has sufficient stable generation resources to meet projected demand and specific resource project additions would be studied further if required.

- Renewal of Operating License for Columbia Generating Station on the Hanford Reservation
  The Columbia Generating Station (an existing nuclear power plant) is located on the Department of Energy, Hanford Reservation over 25 miles southeast of the proposed Vantage-Pomona Heights Transmission Line Project area in Benton County. The Nuclear Regulatory Commission prepared an environmental report in 2010 addressing the renewal of the Columbia Generating Station operating license for an additional 20 years of plant operation beyond the current license operating period. License renewal would extend the facility operating license to December 20, 2043. The nature of the action is the renewal of an operating license. The generating station would continue operate as it has historically. No new development actions are associated with the license renewal and therefore this action is not considered in the cumulative impact analysis.

4.17.6 Cumulative Effects Analysis

This section provides the analysis of any cumulative impacts when potential impacts from the proposed Project are combined with past, present and reasonably foreseeable future actions, as listed on Table 4.17-1 and described in Section 4.17.5 above. The following analysis describes these potential cumulative impacts, in the order that the affected resources are presented in Sections 3.2 through 3.15 of this EIS. For each resource, a spatial boundary and temporal boundary are described in order to properly analyze the potential impacts. Table 4.17-3 presents a summary of the spatial and temporal boundaries by resource.

It is expected that the proposed Project will not substantially contribute to cumulative impacts given the scale and extent of the impacts created by past, present, and reasonably foreseeable projects. The proposed Project is expected to permanently disturb approximately 47 to 80 acres for the NNR Alternative and 80 acres for the DEIS Agency Preferred Route. Temporarily disturbance would be approximately 157 to 202 acres for the NNR Alternative and 250 acres for the DEIS Agency Preferred Route. Fifteen other major existing transmission lines are located within the overall cumulative effects spatial boundaries of the proposed Project, with each project affecting a much greater area within this boundary, perhaps thousands of acres. Wind Farm impacts are somewhat speculative to predict exact impacts and disturbances for site specific layouts, equipment, because pertinent information is not known. Based on similar projects using 3-MW turbines, the permanent disturbance for the proposed Saddle Mountains West Wind Farm is estimated to be as much as 675 acres or more. The proposed Wymer Dam and Reservoir project would consist of a reservoir with an active storage capacity of approximately 162,500 acre-feet and would require the acquisition of approximately 4,000 acres of private land. This represents a relatively large geographical area of impact and disturbance compared to the Vantage-Pomona Heights Transmission Line Project, which is a linear facility with disturbance primarily associated with access and spur roads. Each of the 500 proposed H-frame structures would disturb less than three square feet per pole (resulting in permanent impact) and proposed temporary disturbance for the NNR is estimated at less than 205 acres. The access and spur road construction, where necessary, would add about another 75 acres of permanent disturbance. Including work areas and other permanent disturbances, a total of up to 80 acres would be permanently disturbed with the proposed Project NNR or DEIS Agency Preferred Route. Assuming 675 acres of disturbance associated with the proposed Saddle Mountains West Wind Farm and 4,000 acres of disturbance associated with the proposed Wymer Dam and Reservoir project, disturbances associated with the proposed Project would represent two percent (with the proposed Wymer Dam and Reservoir) to less than 12 percent (with the proposed Saddle Mountains West Wind Farm) of the total cumulative disturbance area when added to the effects of future agricultural, urban and military land conversion. The proposed Project will marginally contribute to cumulative impacts to most resources due to committed Project Design Features (PDFs) described in the Project description (see Chapter 2); required agency coordination prior to any construction activities; resource protection plans in the Plan of Development (POD); and the small amount of cumulative disturbance the proposed Project would introduce. However, overall impacts of all reasonably foreseeable actions is not anticipated to substantially alter resource conditions within the study area from existing conditions or trends.

TABLE 4.17-3 SPATIAL AND TEMPORAL BOUNDARIES BY RESOURCE

RESOURCE	SPATIAL BOUNDARY	TEMPORAL BOUNDARY
Wildlife	The full extent of the Project area, reasonably foreseeable projects, and the broader geographic region.	The 50-year operational life of the proposed Project for the requested ROW (ROW renewal and/or extensions are common beyond the typical 50 year ROW grant for transmission lines because of their operational longevity).
Vegetation	The full extent of the Project area, as well as reasonably foreseeable future actions.	The 50-year operational life of the proposed Project for the requested ROW (ROW renewal and/or extensions are common beyond the typical 50 year ROW grant for transmission lines because of their operational longevity).
Land Use	Area in the vicinity of the route alternatives and more broadly the three counties that would be crossed by the route segments (Yakima, Grant, and Kittitas counties).	Three to five years based on the general planning timeframes established for the affected counties under their respective county comprehensive plans.
Recreation	Four miles either side of the centerline of the route alternatives. This boundary was selected to be consistent with the cumulative impact analysis area for visual resources.	Three to five years based on the general planning timeframes established for the affected counties under their respective county comprehensive plans.
Transportation	Area in the vicinity of the route alternatives and more broadly the three counties that would be crossed by the route segments (Yakima, Grant, and Kittitas counties).	Limited to Project construction because the operation of the proposed Project would not be expected to noticeably affect local transportation patterns.
Visual	Four miles either side of the centerline of the route segments. This boundary was selected to allow the assessment of cumulative impacts in all directions from areas approximately four miles from the alternatives.	The 50-year operational life of the proposed Project for the requested ROW (ROW renewal and/or extensions are common beyond the typical 50 year ROW grant for transmission lines because of their operational longevity).
Socioeconomics	Spatial boundary consists of the three counties that would be crossed by the route segments (Yakima, Grant, and Kittitas counties) because this is the area where the majority of the potential socioeconomic impacts are expected to occur.	The 50-year operational life of the proposed Project for the requested ROW (ROW renewal and/or extensions are common beyond the typical 50 year ROW grant for transmission lines because of their operational longevity).
Cultural Resources	Four miles either side of the centerline of the route alternatives. This boundary was selected to allow the assessment of cumulative impacts in all directions from areas approximately four miles from the alternatives to account for potential visual impacts on cultural resources.	The temporal boundary for archaeological resources is expected to be limited to Project construction and access roads. Mitigation for new access roads would be completed and operation and maintenance of the line is not anticipated to require new roads. The temporal boundary for traditional cultural properties is expected to be the 50-year operational life of the line.
Air Quality	Area in the vicinity of the route alternatives and more broadly the three counties that would be crossed by the route segments (Yakima, Grant, and Kittitas counties).	The temporal boundary is expected to be limited to Project construction because operation of the proposed Project would not be expected to affect air quality.

RESOURCE	SPATIAL BOUNDARY	TEMPORAL BOUNDARY
Water Resources	The full extent of the Project area, as well as reasonably foreseeable future actions within portions of five Water Resource Inventory Areas (WRIAs) within the Yakima River basin, including Esquatzel Coulee (WRIA 36), Lower Yakima (WRIA 37), Upper Yakima (WRIA 39), Alkali/Squilchuck (WRIA 40) and Lower Crab (WRIA 41).	The 50-year operational life of the proposed Project for the requested ROW (ROW renewal and/or extensions are common beyond the typical 50 year ROW grant for transmission lines because of their operational longevity).
Soils and Geology	Includes the portion of the Columbia Plateau physiographic province that occurs within the Project area.	The 50-year operational life of the proposed Project for the requested ROW (ROW renewal and/or extensions are common beyond the typical 50 year ROW grant for transmission lines because of their operational longevity).
Public Health and Safety and Noise	Area in the vicinity of the route alternatives and more broadly the three counties that would be crossed by the route alternatives (Yakima, Grant, and Kittitas counties).	The 50-year operational life of the proposed Project for the requested ROW (ROW renewal and/or extensions are common beyond the typical 50 year ROW grant for transmission lines because of their operational longevity).

Wildlife

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects analysis for wildlife extends beyond the proposed Project area that was defined for the analysis of direct effects and encompasses the broader geographic region surrounding the Project, approximately 50 miles (CE Area). The timeframe for this analysis extends from the historical past when European settlement began to alter the landscape by actions such as farming and livestock grazing and extends into the future to include the 50-year operational life of the proposed Project.

Existing Wildlife and How it Has Been Affected by Past and Present Actions

Existing wildlife present within the CE Area includes reptiles, amphibians, mammals, raptors, waterfowl and shorebirds, and a variety of other birds. In grassland and shrub-steppe habitats, long-billed curlew, burrowing owl, and northern pocket gopher are found. The basalt cliffs and exposed rock habitats provide important nesting and cover habitats for a variety of wildlife species such as bighorn sheep, sagebrush lizard, western rattlesnake, stripped whipsnake, and gopher snake. Within the CE Area, riparian habitats are associated the Yakima and Columbia Rivers and a small wetland is located in the JBLM YTC Cantonment Area. These riparian and wetland areas are used by a variety of species, including bald eagle (winter only), red-tailed hawk, American kestrel, great horned owl, and European starling.

Six species listed as endangered, threatened, or candidate under the Endangered Species Act (ESA) occur or may occur within the CE Area. These include: bull trout, Chinook salmon, greater sage-grouse, gray wolf, steelhead, and Washington ground squirrel. Sixty-four special status species occur or may occur within the Project area. These include state of Washington-listed (endangered, threatened, critical, and vulnerable) species, BLM Sensitive species, and U.S. Fish and Wildlife Service (USFWS) Animal Species of Concern.

Wildlife in the CE Area have been impacted by past and present actions such as: agricultural conversion; livestock grazing operations; road and railroad construction, operation, and maintenance; hydroelectric power development, operation and maintenance; military training operations; construction, operation and maintenance of other transmission lines and substations; motorized recreation use; construction, operation, and maintenance of communication sites. The CE Area lies within the Columbia Plateau ecoregion, an arid sagebrush steppe and grassland that is surrounded by ecoregions that are typically moister, forested, and mountainous (USEPA 2010). Before the arrival of settlers in the early 1800s, approximately 15 million acres of steppe habitat existed in eastern Washington (Daubenmire 1970; Stinson et al. 2004). Currently, it is estimated that about 50 percent, approximately 7.4 million acres, remains in Washington. The majority of the shrub-steppe habitat has been lost to agricultural cropland; however, roads, residential, and commercial development and inundation by reservoirs have also contributed to the reduction in shrub-steppe habitat (Stinson et al. 2004).

In addition, past and present military training operations at JBLM YTC and the presence of existing roads in the CE Area have led to increased disturbance from human activities, displaced wildlife from suitable habitat, increased habitat loss and fragmentation, and facilitated the spread of noxious weeds and invasive species. In addition, the JBLM YTC has experienced a higher incidence of fire compared with adjacent lands and naturally occurring fire cycles due to their training operations. Fires in these areas have resulted in further habitat loss and degradation (JBLM YTC 2002).

Within the CE Area, the primary special status species that has been impacted by past actions and is at risk of being impacted by present actions is the greater sage-grouse, an ESA candidate species. Sage-grouse in the JBLM YTC population have been impacted by past and present actions such as: agricultural conversion; livestock grazing operations; road and railroad construction, operation, and maintenance; hydroelectric power development and associated transmission infrastructure; military training operations; construction, operation, and maintenance of other transmission lines and substations; motorized recreation use; construction, operation, and maintenance of communication sites. Refer to Sections 3.3 and 4.3 for more information on the status and regional overview of sage-grouse.

The greater sage-grouse population in Washington has been in overall decline since 1970 (Stinson et al. 2004). Habitat loss was probably the most important factor in the elimination of sage-grouse from most of their range in Washington; however, over harvesting (of sage-grouse while they were a game species prior to 1988) may have aggravated the impacts of habitat fragmentation and accelerated local extinctions (Stinson et al. 2004). The greater sage-grouse in the Project area are a portion of the Columbia Basin Distinct Population Segment (DPS). A DPS is the smallest division of a taxonomic species permitted to be protected under the ESA. The JBLM YTC supports one of two Washington populations remaining in the Columbia Basin DPS. The second population is located in Douglas and Grant Counties. The populations of greater sage-grouse in Washington are isolated from each another, as well as the surrounding populations in Idaho and Oregon. Within the JBLM YTC, sage-grouse occupy about 124,000 acres and have been given designated protection (limitations on training) on 44,320 acres, approximately 13.5 percent of the JBLM YTC. Annual surveys for leks and lek counts have been conducted by JBLM YTC personnel to monitor trends and assess population status. Ten leks have been active since 1999. In 2013, the sage-grouse population at JBLM YTC was estimated to be at 221 birds, the highest population estimate since the 2006 estimate of 229 sage-grouse (SEE 2013). The sage-grouse population at JBLM YTC is currently above JBLM YTC's management goal of 200 for the second time in the last seven years (SEE 2013; JBLM YTC 2002). The 24 year average population estimate for JBLM YTC is 273 sage-grouse, although there has been an overall annual decline in the population. From 2007 through 2010 and again in 2012, population estimates were below 200. This may have been a result of habitat loss from fires (2006-2009); however, since 2009, little existing sage-grouse habitat has been lost to fire and areas that burned from 2006-2009 have experienced grass and shrub recovery due to JBLM YTC's restoration efforts (SEE 2013).

The small size of the two remaining greater sage-grouse populations in Washington makes viability and persistence likely dependent upon recovery efforts. Small populations are affected by loss of genetic variability, inbreeding, and predation pressure, and are at risk from extreme weather conditions or fires (Stinson et al. 2004). The two remaining sage-grouse populations at the JBLM YTC and in Douglas and Grant counties are too small to be considered secure (Stinson et al. 2004). Sage-grouse recovery efforts are focused on maintaining and increasing current populations, expanding populations into adjacent areas, and reestablishing additional populations. A key factor to sage-grouse recovery success is habitat, specifically protecting remaining habitat and restoring additional habitat (Stinson et al. 2004).

Effects of Reasonable Foreseeable Future Actions on Wildlife without the Proposed Project
Reasonably foreseeable actions in the CE Area consist of the proposed Saddle Mountain West Wind Farm, Subsurface geotechnical testing in 2014 along the BPA Ellensburg-Moxee No.1 115 kV transmission line in support of the future direct burial of an existing overhead fiber optic cable, and the proposed Wymer Dam and Reservoir project proposed by Reclamation.

Saddle Mountain West Wind Farm
Based on Gap Analysis Program (GAP) data, habitat in the proposed Saddle Mountain West Wind Farm consists primarily of disturbed arid grasslands, typically dominated by cheatgrass. Smaller amounts of the following cover types are also present: relatively undisturbed arid steppe, typically sagebrush, bluebunch wheatgrass and Sandberg bluegrass; disturbed arid steppe dominated by sagebrush and cheatgrass or a mixture of bluebunch wheatgrass, sagebrush, Sandberg bluegrass and cheatgrass; riparian areas

dominated by herbs, shrubs, and hardwoods; and agriculture. According to available Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) data, prairie falcon, golden eagle, and a priority species regional area for chukar occur near the proposed Saddle Mountain West Wind Farm area.

Operation of the wind turbines associated with the proposed wind energy project could cause mortality to bat and bird species from collisions with the turbines. The proposed Saddle Mountain West Wind Farm is within the known range of three special status bat species: pallid bat, spotted bat, and Townsend's big-eared bat. It is anticipated that surveys for birds and bats would be required at the proposed Saddle Mountain West Wind Farm prior to construction to estimate impacts to bird and bat species.

The development of the wind energy project facilities, including new transmission lines, construction of new access roads, would permanently convert small portions of shrub-steppe to facility use which could increase habitat fragmentation for a variety of species, including fragmenting a Priority Species Regional Area for chukar, a WDFW PHS species. The presence of wind turbines associated with the proposed Saddle Mountain West Wind Farm would also directly displace individual animals from developed areas, such as by reducing available habitat for chukar; however, the specific locations of wind turbines, transmission lines, and access roads are not known at this time. It is likely that waterfowl and shorebirds would be affected only minimally by the proposed Saddle Mountain West Wind Farm because of the lack of suitable habitat at the project site and the presence of extensive open water and wetlands away from the proposed Saddle Mountain West Wind Farm site.

Noise and human activity associated with construction, operation, and maintenance would displace individuals temporarily (during construction) and throughout the year (during operation and maintenance). Special status raptor species that could occur in the proposed Saddle Mountain West Wind Farm area include golden eagle and peregrine falcon. If suitable habitat for these species exists on the proposed wind energy project site, these species could be displaced during construction and operation, including ongoing use of access roads. Less mobile or burrowing non-game species would be susceptible to mortality from increased vehicular use on each site. If required by the wind farm, spring maintenance vehicles would disrupt the breeding of some species; however, available WDFW PHS data does not indicate that the proposed Saddle Mountain West Wind Farm occurs within wintering or breeding habitat for mule deer or has raptor nests present. It is assumed that potential impacts from the proposed wind energy project would be reduced through measures such as seasonal restrictions and buffers to avoid key habitat during nesting or wintering periods for WDFW and BLM identified species, adherence to reasonable speed limits in construction areas, closing all new or improved access roads that are not required for maintenance, fire prevention and suppression, and implementing noxious weed control measures and reseeding disturbed areas.

JBLM YTC telemetry and incidental observation data indicates very little use of the proposed Saddle Mountain West Wind Farm area by sage-grouse. The proposed wind farm area lies outside of the USFWS sage-grouse Priority Area for Conservation (PAC). It is within the WDFW Saddle Mountain Management Unit, designated as Occasionally Occupied Habitat, meaning that it may be occupied on a seasonal or irregular basis. No leks are known to occur within four miles of the proposed wind farm development so courtship and breeding would not likely be affected by the proposed wind project. Known leks (the WDFW JBML YTC sage-grouse Management Unit designated as Regularly Occupied Habitat) are located to the west and across the Columbia River from the proposed Saddle Mountain West Wind Farm area. The presence of wind turbines and transmission infrastructure associated with the proposed Saddle Mountain West Wind Farm would potentially reduce the likelihood of sage-grouse expanding or dispersing into or through the Saddle Mountains east of the JBLM YTC population. The area was identified as providing connectivity among sagebrush steppe areas, but not among sage-grouse populations. The proposed wind farm area lies within the Lower Crab Creek Linkage Zone generally linking JBLM YTC sagebrush steppe with the Braided Scablands Swath of relatively intact sagebrush steppe in eastern Washington (WHCWG 2012). There currently are no sage-grouse populations in or near the Braided Scablands area in eastern Washington and the Saddle Mountains were not identified as an important linkage zone for sage-grouse (Robb and Schroeder 2012). The specific locations of wind turbines, transmission lines, and access roads are not known at this time. Potential impacts to sage-grouse will include direct and indirect habitat loss, behavioral avoidance, impairment of connectivity, disturbance, and death from collision with the turbines, associated power lines, and vehicles. It is assumed that potential impacts to sage-grouse would be reduced or avoided with proper planning, construction, timing, reclamation, fire prevention and suppression, and weed control strategies, similar to those identified for the proposed Project.

Wymer Dam and Reservoir Project
The proposed Wymer Dam and Reservoir project would permanently impact wildlife and wildlife habitat within the Lmuma Creek drainage. The proposed Wymer Dam and Reservoir project would inundate and permanently remove approximately 1,400 acres of vegetation for access roads and dam facilities, consisting of shrub-steppe (approximately 80 percent), grassland (approximately 15 percent), riparian (approximately five percent), and forest (less than one percent) vegetation communities Although the proposed dam/reservoir project area has been grazed, it consists of relatively undisturbed shrub-steppe habitat, and permanent vegetation removal would further reduce shrub-steppe habitat in the Yakima basin. Shrub-steppe communities in the proposed dam/reservoir area provide habitat for a number of species, including greater sage-grouse, ferruginous hawk, sage sparrow, Brewer’s sparrow, bighorn sheep, mule deer, jackrabbit, and numerous other birds and small mammals (Reclamation and Department of Ecology 2012).

According to the Yakima River Basin Integrated Water Resource Management Plan Final Programmatic EIS (Reclamation and Department of Ecology 2012), the reservoir, dam, and access roads could result in some loss of wildlife movement and could further isolate some populations. These impacts could contribute to regional declines in these wildlife communities; however, proposed land acquisition and habitat enhancement components are anticipated to result in a net improvement in conditions for greater sage-grouse and other wildlife species by protecting and enhancing existing high value habitat areas within the Yakima basin.

Indirect impacts to all wildlife could include habitat degradation through introduction of non-native invasive plants and increased fire danger. Given the fairly high level of recreational use occurring in the Yakima River Canyon downstream from the dam site, indirect impacts from recreational use is not expected to be substantial (Reclamation and Department of Ecology 2012).

No impacts to elk movement within the vicinity of the proposed Wymer Dam and Reservoir project are anticipated to occur. WDFW has identified the Wymer Dam and Reservoir project site as core wintering habitat for bighorn sheep and core habitat for mule deer. In addition, WDFW has identified a movement corridor of relatively undisturbed vegetation between JBLM YTC and the Yakima River used by priority species (Reclamation and Department of Ecology 2012).

Construction and operation of the proposed Wymer Dam and Reservoir project would provide additional storage to aid in meeting high-priority instream flow goals in the upper Yakima River above Lmuma Creek and in the Cle Elum River. The proposed dam/reservoir would assist in meeting goals for winter instream flow increases in some upstream reaches and also slightly reduce summer flows in some upstream reaches, which may benefit fish. Long-term operational impacts of a pump station in the Yakima River, upstream of Lmuma Creek, would be avoided by including fish screens and ensuring unimpeded upstream and downstream migration for all salmonids. Construction of a pump station on the Yakima River would result in the loss of some shoreline habitat, but is anticipated to be mitigated by the enhancement of native vegetation in the reach (Reclamation and Department of Ecology 2012).

The proposed Wymer Dam and Reservoir project lies entirely within the USFWS-designated JBLM YTC sage-grouse PAC and entirely within WDFW Umtanum Ridge sage-grouse Management Unit designated as Regularly Occupied Habitat. JBLM YTC telemetry and incidental observation data indicates that the project is located just beyond the edge of habitat that is occupied on a regular basis, though one telemetry bird was documented in the vicinity of the proposed reservoir area. The upstream edge of the reservoir, near I-82, would be approximately four miles from an active lek, and just under four miles from an inactive lek. Most of the impacts on sage-grouse by the proposed Wymer Dam and Reservoir project would be in the form of direct habitat loss on a long-term basis due to flooding required to create the reservoir. Loss of shrub-steppe habitat at the Wymer Dam and Reservoir project area could result in substantial impacts to sage-grouse movement corridors and habitat. Potential sage-grouse movement between the JBLM YTC and the Yakima River canyon would be restricted in the Lmuma Creek area and would require grouse to migrate to the north or south of the reservoir. The Programmatic Final EIS states that the Habitat/Watershed Protection and Enhancement Element of the Integrated Plan would acquire large tracts of shrub-steppe habitat to reduce impacts to residual habitat (Reclamation and Department of Ecology 2012).

Cumulative Effects on Wildlife from Reasonably Foreseeable Future Actions including the Proposed Project and Alternatives

Incremental cumulative effects upon general wildlife species and special status species could result from construction, operation, and maintenance of the proposed Vantage-Pomona Heights Project, the proposed Saddle Mountain West Wind Farm Project, and the proposed Wymer Dam and Reservoir project. The environmental effects would be both permanent (long-term operational effects) and temporary (associated with Project construction). The incremental cumulative effects would include increased collision hazard, habitat loss, displacement due to permanent project features (i.e., access roads, wind turbine and transmission towers, recreation use of reservoir), and restriction of wildlife movement. The temporary effects would include vegetation damage, increased noise during construction, operation, and maintenance, and human presence during construction, operation, and maintenance.

Habitat for species which utilize grassland and shrub-steppe habitats (e.g., sagebrush obligates such as the sage sparrow, Brewer’s sparrow, sage thrasher, sage-grouse, pygmy rabbit, sagebrush vole, sagebrush lizard, and pronghorns) is scattered throughout the area, but occurs primarily in locations adjacent to and within JBLM YTC. The proposed Project, expected to temporarily and permanently disturb approximately 204 to 266 acres of habitat (depending on NNR segment(s) and design option), represents a small fraction of cumulative past, present, and future project disturbances. It is assumed that the total disturbance for the proposed Saddle Mountains West Wind Farm might be as much as 675 acres or more and, if approved, construction, operation, and maintenance of the proposed Wymer Dam and Reservoir project would result in considerably more habitat loss (approximately 1,000 acres of shrub-steppe would be permanently inundated). The reservoir would fill in a portion of the Lmuma Creek canyon that would be spanned by Route Segment NNR-3 of the proposed NNR, and a side-canyon spanned by NNR-4. The flooded area would include habitat identified by the NNR habitat assessment as suitable during breeding, winter, and summer seasons, as well as habitat identified as marginal. These proposed projects represent a relatively large geographical area impact and disturbance area compared to the proposed Project which is a linear facility with disturbance primarily associated with access and spur roads. Added to the effects of wide-spread agricultural, urban and military land conversion, the proposed Project is not expected to significantly contribute to cumulative impacts to wildlife resources. The potential cumulative impacts to wildlife species or habitat would depend on project-specific measures to minimize habitat loss and fragmentation, disturbance and displacement from important habitats and mortality of individuals. Displacement of greater sage-grouse from suitable habitat (i.e., breeding, brood-rearing and wintering) could result from the reasonably foreseeable future actions, including the proposed Project. For the proposed Project, PDFs implemented during construction, operation, and maintenance are anticipated to be effective at reducing the scale of biological change to existing shrub-steppe habitat. PDFs include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. Protection measures for the proposed Saddle Mountain West Wind Farm are anticipated to be similar to this proposed Project. The Programmatic Final EIS identifies mitigation measures to reduce impacts to wildlife from the proposed Wymer Dam and Reservoir project including land acquisition and habitat enhancement (Reclamation and Department of Ecology 2012).

In addition to habitat loss, potential cumulative impacts to sage-grouse could occur from the proposed Project and the existing transmission lines that closely or approximately parallel the proposed NNR Alternative, particularly along NNR-6 and NNR-7 where a connectivity zone crosses the NNR Alternative (Robb and Schroeder 2012). Cumulative impacts could occur if there is a threshold at which an additional transmission line crossing a connectivity zone would substantially increase avoidance of the corridor. To date, no study has documented this kind of cumulative impact associated with multiple parallel transmission lines. It seems likely that the opposite effect would occur; locating the lines in close proximity to one another would effectively create a “sharing” of impacts that would result in a lower overall impact than if the transmission lines were more widely dispersed. For example, once a raptor or corvid perching or nesting site is present in the area, providing additional sites in close proximity to the first site is unlikely to provide much additional benefit to predators, especially raptors and ravens, especially since those species are territorial during the breeding season. It is expected that the proposed Project will not substantially contribute to cumulative impacts given the scale and extent of the impacts created by past, present and reasonably foreseeable projects.

Construction near Wanapum Reservoir could impact waterfowl concentrated in the area by causing injury and mortality through impact with transmission line. For the proposed Project, PDFs such as minimizing disturbance, seasonal restrictions, and buffers are anticipated to reduce most impacts. It is likely that waterfowl and shorebirds would be affected only minimally by the proposed Saddle Mountain West Wind Farm because of the lack of suitable habitat at the project site, and the presence of extensive open water and wetlands away from the proposed Saddle Mountain West Project Site. Waterfowl habitat would be created by the construction of the proposed Wymer Dam and Reservoir project. Waterfowl utilizing the proposed Wymer Reservoir could collide with the proposed Vantage-Pomona Heights transmission line if it bisects habitats (e.g., feeding and roosting); however, the proposed Project would conform to Avian Power Line Interaction Committee (APLIC) standards and PacifiCorp’s Bird Management Program Guidelines (APLIC 2012; PacifiCorp 2006).

With the construction of the Proposed Action, impacts to general wildlife and special status species such as bald and golden eagle, ferruginous hawk, and osprey would be reduced through seasonal restrictions and buffers to avoid key habitat during nesting or wintering periods. Adherence to reasonable speed limits in construction areas would reduce the incidence of collisions and disturbance from human interaction (PDFs BIO-13, BIO-15, BIO-16). Maintenance activities would occur for the life of the proposed Project, but impacts would be low and short-term. Closing all new or improved access roads that are not required for maintenance would reduce disturbance following construction by limiting human accessibility to off-highway vehicles (OHVs) and other motorized vehicles (PDF BIO-14). Implementing noxious weed control measures and reseeding disturbed areas will minimize the amount of habitat fragmentation and loss due to the construction of the proposed Project (PDFs BIO-5, BIO-9). It is anticipated that the proposed Saddle Mountain West Wind Farm would implement timing restrictions and buffers during critical time periods. It is unlikely that access roads would be closed following construction; however, it is likely that access would be restricted.

Overall, the additional disturbance and new roads associated with the proposed Project, the proposed wind energy project, and the proposed Wymer Dam and Reservoir project could result in cumulative impacts to wildlife resources, such as raptor nesting areas and sage-grouse, through the reduction in habitat (e.g., sagebrush steppe), disturbance and displacement, and direct mortality. However, it is assumed that potential impacts from the other reasonably foreseeable future projects would be reduced or avoided with proper planning, construction strategies, and mitigation similar to those identified for the proposed Project. In addition, consultation with federal, state, and local agencies would need to occur to assure compliance with applicable wildlife protection regulations and to assure the proper permits are acquired. The proposed Project will marginally contribute to cumulative impacts to grassland and shrub-steppe dependent species. Overall impacts of all reasonably foreseeable future actions, especially construction of the proposed Wymer Dam Project, will substantially alter resource conditions within the study area from existing conditions.

Vegetation

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis for vegetation, noxious weeds, and special status plants was limited to the full extent of the proposed Project, and encompasses the broader geographic region surrounding the Project, approximately 50 miles (CE Area). No direct or indirect effects would likely occur to vegetation, noxious weeds, or special status plants outside of this CE Area.

The timeframe for this analysis extends from the historical past when European settlement began to alter vegetation in the vicinity of the CE Area by actions such as farming and livestock grazing and extends into the future to include the 50-year operational life of the proposed Project for the requested ROW (ROW renewal and/or extensions are common beyond the typical 50-year ROW grant for transmission lines because of their operational longevity).

Existing Vegetation and How it Has Been Affected by Past and Present Actions

Past actions that have affected natural and human resources in the CE Area include: agricultural conversion; livestock grazing operations; road and railroad construction and maintenance; hydroelectric power development, operation, and maintenance; military training operations; construction, operation, and maintenance of other transmission lines and substations motorized recreation use; construction, operation, and maintenance of communication sites. Prior to European settlement, eastern Washington was covered by a relatively contiguous expanse of shrub-steppe habitat (Army 2010). Land use changes over the past century have resulted in the loss of over half of Washington's shrub-steppe habitat (Dobler 1996). Land use changes include: increases in dry-land agriculture; the use of irrigation to expand farming and orchards; and livestock grazing (BLM 1992; Yakima County 2007). These actions have resulted in the removal and permanent conversion of vegetation communities.

Vegetation in the CE Area is currently subject to the effects of residential development and agricultural activities, such as crops and livestock grazing operations. The influx of noxious weeds/invasive species has degraded habitat and increased fire cycles. Ongoing military training operations at JBLM YTC have also affected vegetation in the area by the use of munitions and weapons systems and off-road vehicle maneuvers that can increase the chance of wildfire ignition and may damage important resources (Army

2010). Ongoing agricultural activities, military training operations, livestock grazing, and other ongoing land uses and practices are expected to continue within the CE Area in the future.

Effects of Reasonable Foreseeable Future Actions on Vegetation without the Proposed Project
Reasonably foreseeable future actions in the CE Area consist of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir project. These projects would contribute to the influx of noxious weeds/invasive species and the degradation of habitat.

Saddle Mountain West Wind Farm
Based on GAP data, vegetation in the proposed Saddle Mountain West Wind Farm consists primarily of disturbed arid grasslands, typically dominated by cheatgrass. Smaller amounts of the following cover types are also present: relatively undisturbed arid steppe, typically sagebrush, bluebunch wheatgrass and Sandberg bluegrass; disturbed arid steppe dominated by sagebrush and cheatgrass or a mixture of bluebunch wheatgrass, sagebrush, Sandberg bluegrass and cheatgrass; riparian areas dominated by herbs, shrubs, and hardwoods; and agriculture. According to WDNR's Washington Natural Heritage Program (WNHP) database, the following special status plants are known to occur within the proposed Saddle Mountain West Wind Farm Project area: gray cryptantha, Snake River cryptantha, Nuttall's sandwort, fuzzytongue penstemon, Hoover's desert parsley, and Wanapum crazyweed.

Most of the effects from the wind project to vegetation, noxious weeds, and special status plants would likely occur from project construction, road building and maintenance. Effects from the disturbance to vegetation, noxious weeds, and special status plants could include changes to vegetation composition and structure, potential for the introduction and spread of noxious weeds and invasive weeds, increased fire potential and frequency, and destruction of special status species and their habitat.

Wymer Dam and Reservoir Project
The proposed Wymer Dam and Reservoir project would permanently remove vegetation for access roads and dam facilities. The proposed Wymer Dam and Reservoir project would inundate and permanently remove approximately 1,400 acres of vegetation for access roads and dam facilities, consisting of shrub-steppe (approximately 80 percent), grassland (approximately 15 percent), riparian (approximately five percent), and forest (less than one percent) vegetation communities Although the proposed reservoir project area has been grazed, it consists of relatively undisturbed shrub-steppe habitat and permanent vegetation removal would further reduce shrub-steppe habitat in the Yakima basin. Impacts from the proposed project could include changes to vegetation composition and structure, potential for the introduction and spread of noxious weeds and invasive weeds, and destruction of special status species and their habitat. According to the WNHP database, no special status plants are known to occur along Lmuma Creek on federal or states lands; however, as the proposed Wymer Dam and Reservoir project is located on private land, special status plant surveys are unlikely to have occurred in that area. Special status plants are known to occur within one mile of the proposed reservoir project (Reclamation and Department of Ecology 2012).

Cumulative Effects on Vegetation from Reasonably Foreseeable Future Actions including the Proposed Project and Alternatives
Vegetation in the Vantage-Pomona Heights Transmission Line Project area is comprised primarily of grassland and sagebrush shrublands. Grasslands in the proposed Project area include annual grasses, such as cheatgrass, and perennial grasses, such as crested wheatgrass, bluebunch wheatgrass, Sandberg bluegrass, Idaho fescue, squirreltail and Thurber's needlegrass. A summary of vegetation cover types within the Project area is presented in Section 3.2, Table 3.2-1. The proposed Project would affect vegetation communities through the temporary trampling of herbaceous vegetation, the partial removal of aboveground plant cover, and the complete removal of vegetation due to construction of the transmission

line structures, access roads and temporary work spaces. Short-term and long-term impacts to vegetation resources from the proposed Project would result from a variety of ground-disturbing activities, including construction of the transmission lines structures, work within existing substations, and access roads.

The potential effects from the proposed Project alternatives include the following:

- Long-term disturbance to vegetation ranges from 45.2 to 68.0 acres, depending on the NNR segment, subroute and/or design option, from the construction of the proposed Project.
- Direct or indirect impacts to special status plant species. Detailed descriptions of direct and indirect impact types are discussed in Section 4.2.
- Introduction and spread of noxious weeds and noxious weed control. Detailed descriptions of impact types associated with noxious weeds are discussed in Section 4.2.

PDFs implemented for the proposed Project would include:

- Best management practices (BMPs) and PDFs implemented to reduce impacts to the Project Sites.
- Noxious Weed and Invasive Plant Management Plan to prevent and control the noxious weeds and invasive plants.
- Plant Protection Plan to identify specific measures to protect vegetation resources.
- Reclamation, Revegetation, and Monitoring Framework Plan to identify the reclamation stipulations for revegetating disturbed areas.

Exotic plant species are found within the proposed Project area and are anticipated to occur within the proposed Saddle Mountain Wind Farm and proposed Wymer Dam and Reservoir project areas. The construction of the additional projects in the area could increase the spread of exotic plants, including noxious weeds; however, the implementation of PDFs such as limiting ground disturbance (BIO-6), revegetating disturbed areas (BIO-7), washing construction equipment before entering the proposed Project area (BIO-11), and closing access roads not required (BIO-14) as well as resource (specifically noxious weed control plans, restoration plan, etc.) protection plan developed in the POD would minimize the impacts from the proposed Project. It is assumed that the proposed Saddle Mountain Wind Farm and proposed Wymer Dam and Reservoir projects would implement similar measures to minimize impacts from exotic plants.

For the proposed Project, complete floristic pedestrian surveys for the targeted special status plants were conducted on accessible federal and state lands, which comprise approximately 75 percent of the total ROW corridor; the remaining 25 percent is composed of non-federal (private and county) land and was not surveyed. Of the 715.1 acres of federal and state lands within the 150-foot wide ROW corridor, 205.3 acres (29 percent) were accessible and surveyed. The remaining 509.8 acres of federal and state lands were not surveyed due to route adjustments made following surveys; restricted access on the JBLM YTC; access issues crossing private lands; dangerously steep terrain; and other logistic concerns. No known federally-listed plant species occur within the proposed Project area (according to the WNHP database); however, five species listed as endangered, threatened, or candidate are suspected to occur within the proposed Project area (according to WNHP database). In addition to federally-listed plant species, 21 Washington state-listed and BLM Sensitive plant species are known to occur within the proposed Project area. Three special status plant species were located during the special status plant surveys: hedgehog cactus, Hoover's desert-parsley, and Pauper milkvetch. As not all land within the NNR route segment corridors was surveyed, additional special status plant species and populations could occur within the proposed Project area. Populations of known special status plant species will be delineated on project maps as "Avoidance Areas," and will be marked in the field prior to the start of construction. If any new populations of special status plants are discovered on federal or state lands during Project surveys or construction, these findings will be reported within 48 hours to the authorized officer at the appropriate land management agency (and provided to the WNHP database) and will be treated the same as currently known populations. In cases where such species are identified, appropriate action will be taken to avoid adverse impacts on the species and their habitats. WNHP database indicates that special status species are known to occur within the proposed Saddle Mountain West Wind Farm area. It is anticipated that the proposed Saddle Mountain West Wind Farm would implement similar measures to minimize impacts to special status plants, including spanning and adjusting transmission pole and wind turbine placement. No special status plants are known to occur within the footprint of the proposed Wymer Dam and Reservoir project area; however, as the majority of the proposed project is located on private land, it is unlikely that surveys have been conducted. If special status plants occur within the project footprint for proposed Wymer Dam and Reservoir, it is unlikely that project adjustments could be made to avoid impacting these species.

Overall, the additional disturbance and new roads associated with the proposed Project, the proposed wind energy project, and the proposed Wymer Dam and Reservoir project could result in cumulative impacts to vegetation (e.g., sensitive habitats and special status plant occurrences) through habitat loss and degradation, and direct mortality. However, it is assumed that potential impacts from the other reasonably foreseeable future projects would be reduced or avoided with proper planning, construction strategies, and mitigation similar to those identified for the proposed Project. It is anticipated that the cumulative impacts to vegetation resources from the proposed Project combined with other reasonably foreseeable future actions will not vary substantially from current vegetation conditions and trends with the CE Area due to required agency coordination prior to any construction activities, resource protection plans in the Plan of Development.

Land Use

Geographic Scope and Timeframe of Analysis

The geographic scope for cumulative effects analysis for land use extends beyond the direct and indirect effects identified previously in this chapter related to impacts on agricultural, military, extractive/mining, and residential land uses. The CE Area boundary encompasses the broader regional area that includes reasonable foreseeable future actions that affects agricultural and range land, residential, military, and urbanized areas of the three counties in which the Project is located. This area generally extends into the west into the urbanized area of Yakima, north to Badger Pocket and extending to I-90, inclusive of JBLM YTC, south to Rattlesnakes Hills and I-82, east into the Hanford area and most of the Saddle Mountains, and north to I-90. The area generally encompasses substantial portions of the three counties of Yakima, Kittitas, and Grant Counties. The timeframe spans from the settling of the region by Europeans when the natural landscape was transformed from the essentially natural vegetation patterns to the agriculturally dominated, developed landscape of the latter part of the nineteenth century through the operational life (which is initially 50-years for the federal grant of ROW, with potential extension requests) of the Vantage-Pomona Heights 230 kV Transmission Line Project.

Existing Land Use and How it Has Been Affected by Past and Present Actions

Land use patterns have been changing over the course of the CE timeframe, but agriculture, including rangeland, has dominated over a significant portion of that period. Past actions that have affected land use in the vicinity of the proposed Project include construction, operation, and maintenance of the Columbia River dams and reservoirs (Priest Rapids and Wanapum dams), changing agricultural activities, highway and railroad construction, construction of numerous high voltage transmission lines and substations, residential and subdivision development and military training operations at JBLM YTC. Present and ongoing activities in the immediate vicinity of the proposed Project include agricultural land uses, primarily crop production and livestock grazing. Land use within the CE Area includes land used for crops and livestock grazing, residential development consisting primarily of rural residences, commercial activities primarily related to agriculture, military training activities at JBLM YTC and operation of the Priest Rapids hydroelectric project. Conversion of agricultural and grazing activities to non-agricultural uses within the CE Area has been the primary effect of past and present land use impacts. Other effects of past and present actions on existing military land use include the establishment of sage-grouse restrictions, the construction of other transmission lines in within the JBLM YTC boundaries, and surround urban growth. Modifications to the locations and intensity of training operations have occurred due to wildlife restrictions and adjacent urban growth. The construction of transmission lines within the geographical area of analysis has affected residential and agricultural land uses by physically displacing, preventing, and altering these land uses. Refer to Chapter 3.4 for a description of existing land uses in the Project area.

Effects of Reasonable Foreseeable Future Actions on Land Use without the Proposed Project
Reasonably foreseeable actions in the vicinity of the Project area consist of the proposed Saddle Mountain West Wind Farm, including both wind meteorological monitoring and the Wymer Dam and Reservoir project proposed by Reclamation.

Saddle Mountain West Wind Farm
The proposed Saddle Mountain West Wind Farm would primarily affect public (BLM) and private lands used primarily for rangeland/grazing. With unknown footprints, layouts, disturbance areas and extent of disturbance to grazing lands, quantification of land use impacts resulting from the construction, operation and maintenance of the wind farm are estimated to be approximately 675 acres. Generally, the implementation of the wind facility portion of project will reduce the land in the region for seasonal grazing of livestock. The footprints of industrial scale (1.5 to 3.0 megawatt) wind turbines taken together with the construction of access and string roads would result in overall low impacts considered at the regional (CE Area) level, because of the large areas of grazing lands available throughout the CE Area. Wind energy development would generally be compatible with the land use (e.g., grazing) currently occurring in those locations, although there would be some acreage losses. The extent of the interconnection requirements (additional transmission line facilities) is not known at this time, but would not likely be substantial due to their proximity to existing transmission lines. The short-term construction effects related to staging, laydown, tower erection and other temporary activities will not contribute to cumulative impacts. The preliminary meteorological monitoring aspects of the project would not cumulatively affect grazing land resources.

Wymer Dam and Reservoir Project
The proposed Wymer Dam and Reservoir project would be located in Kittitas County. The land surrounding the Wymer Dam and Reservoir site is entirely privately owned by one family. Land uses in this area are primarily open space and rangeland, with some residential use near SR 821/Canyon Road. Construction of the proposed Wymer Dam and Reservoir project would require the acquisition of approximately 4,000 acres of private land with negotiations occurring between Reclamation and the individual property owners. The pump station would affect the Yakima River which is a Shoreline of Statewide Significance. The project would entail a change in land use from open habitat and rangeland to water storage and associated infrastructure. The area that would be converted constitutes approximately 14 percent of the area zoned as Forest and Rangeland in Kittitas County. This conversion of land would be a potentially significant impact on land use. However, in addition to Forest and Rangeland, there are currently almost 500,000 acres of land zoned for other agricultural uses in Kittitas County. Land use trends in the Yakima River Canyon have been toward recreation and residential uses in recent years (Reclamation and Department of Ecology 2012). The Wymer Dam and Reservoir project would improve

the efficiency of existing irrigation systems allowing for improved water delivery and additional water to meet the needs of irrigators. Increased storage would also allow for more water to be carried over at the end of the irrigation seasons, increasing flexibility in drought years to meet irrigation demands. Also, increased supplies of irrigation water to some lands would likely increase the amount of irrigated crop lands and the production of crops from those lands.

<u>*Other Development*</u>
Zoning regulations established for parts of each county that are part of the Project area are designed to maintain the rural character of the area, by allowing land uses that are principally consistent with agricultural use, natural resource management, open space, conservation, or very low density rural development and Yakima County Comprehensive Plan (Yakima County 2007) and Yakima County Code, Title 15, Grant County Comprehensive Plan [Grant County 2006] and Grant County Code Title 23, and Kittitas County Comprehensive Plan [Kittitas County 2010] and Kittitas County Code Title 17).This suggests that future development that is not consistent with agriculture is likely to be concentrated in existing communities and other areas zoned for these types of uses.

Cumulative Effects on Land Use from Reasonably Foreseeable Future Actions including the Proposed Project and Alternatives
Cumulative land use resource impacts would come primarily from the construction of the wind farm and the Wymer Dam and Reservoir Project and not from the construction of the proposed NNR Alternative with subroute and/or design options. The approximately two to nine acres of impact (depending on NNR Alternative subroute and/or design options) on BLM and state grazing lease land (as identified in Section 4.4). Additional grazing impacts (quantity is unknown) resulting from private grazing land considered with the impacts on grazing resulting from other past, present and reasonable foreseeable projects would only be a small fraction of the overall impacts in the CE Area when cumulatively considered. The proposed NNR Alternative with subroute and/or design options is expected to permanently disturb approximately 80 acres and temporarily disturb approximately 250 acres, which represents a fraction of cumulative project disturbances. Fifteen other major existing transmission lines are located within the overall cumulative effects spatial boundaries of the proposed Project with each project affecting a much greater area within this boundary, perhaps thousands of acres.

Saddle Mountain West Wind Farm
It is assumed that the total disturbance for the proposed Saddle Mountains West Wind Farm might be 675 acres or more. Construction of the proposed Saddle Mountain West Wind Project would overlap spatially with the east edge of the proposed Project area in Grant County; however, it is unlikely to coincide in time with the proposed Project. Depending upon the size of the wind farm, it could directly impact a substantial amount of shrub steppe habitat and would change use of the land occupied by the wind farm. The overall cumulative impact to land use would be attributable to the wind farm rather than the proposed transmission line project. The wind farm would require the construction of a transmission line to interconnect the facility with the regional electrical grid which would result in the incremental addition of more transmission lines in the Saddle Mountain area when taken together with this proposed Project.

<u>*Wymer Dam and Reservoir Project*</u>
The proposed Wymer Dam and Reservoir project would permanently remove vegetation for access roads and dam facilities. It would inundate approximately 1,400 acres, including substantial areas of shrub-steppe (approximately 80 percent) along with grassland (approximately 15 percent), riparian (approximately five percent), and forest (less than one percent) vegetation communities. Although the area has been grazed, the Wymer location is an area of relatively undisturbed shrub-steppe habitat, and permanent vegetation removal would further reduce shrub-steppe habitat in the Yakima basin (Reclamation and Department of Ecology 2012). The proposed Wymer Dam and Reservoir project

represents a relatively large geographical area impact and disturbance area compared to the Vantage-Pomona Heights Transmission Line Project, which is a linear facility with widely-spaced disturbance primarily associated with access roads and transmission structure placement. Added to the effects of wide-spread agricultural, urban and military land conversion, the Vantage-Pomona Heights Transmission Project will not significantly contribute to cumulative impacts to land use.

Other Projects

There are no other pending, anticipated, or foreseeable applications for projects in the CE Area of Yakima County, Grant County and Kittitas County. Also there are no pending, anticipated or foreseeable projects on Reclamation land or that are planned by the BPA beyond improvements within the Vantage Substation to accommodate the interconnection of the proposed Vantage-Pomona Heights transmission line. The only other project is the Geneva Substation (Grant County PUD) located within the community of Mattawa in Grant County. While the project is within the CE Area, it has been completed and therefore is not considered a reasonably foreseeable future project for the cumulative analysis.

Short-term and long-term impacts of the proposed Project would not alter the overall land use patterns in the CE Area and are relatively low and insubstantial when compared to the amount of available land in Yakima, Kittitas, and Grant counties.

The Project proponent (Pacific Power) would obtain transmission easements for construction, maintenance, and operation of the proposed Project on private lands and would obtain ROW grants to cross federal and state lands. Existing land use or ownership would not change along the majority of the transmission line ROW. Overall, the additional disturbance and new roads associated with the proposed Project, the proposed wind energy project, and the proposed Wymer Dam and Reservoir project could result in cumulative impacts to land uses, such as agricultural and residential land use, through land use conflicts and displacements. However, it is assumed that potential impacts to land use from the other reasonably foreseeable future projects would be reduced or avoided with proper planning, construction strategies, and mitigation similar to those identified for the proposed Project. In addition, other proposed projects would also consult with federal, state, and local agencies and private landowners to obtain easements and ROW grants. It is expected that the cumulative impacts from the proposed Project combined with the other reasonably foreseeable future actions will not vary substantially from current land use conditions and trends within the CE Area due to measures that will be implemented during construction, operation and maintenance and coordination with land management agencies and landowners.

Recreation

Geographic Scope and Timeframe of Analysis

The geographic scope and timeframe for cumulative effects on recreational resources extends to the visual influence distance of the transmission lines and associated access roads, a distance of about four miles (see visual resources cumulative effects below). The timeframe for the analysis extends from the historical past when recreational activities began occurring in the project area, into the future to include the 50-year life of the proposed Project’s requested grant of ROW for state and federal lands (ROW renewal and/or extensions are common beyond the typical 50-year ROW grant for transmission lines because of their operational longevity).

Existing Recreation and How it Has Been Affected by Past and Present Actions

Recreational activities have been occurring in the Project Area in some form or another from the time of human occupation, but most recently from the time of the establishment of developed and designated recreation areas. Past actions that have affected recreation in the Project vicinity include construction and operation of the Priest Rapids and Wanapum dams on the Columbia River, development of recreation areas and sites in the CE Area, primarily along the Columbia River, Yakima River, and Lower Crab Creek. Other past recreational development includes the hang-gliding area in the Saddle Mountains, OHV and other activities in the Saddle Mountains Management Area, and the designation of the John Wayne Pioneer Trail/Milwaukee Corridor located on the north side of the Project area following the old Chicago, Milwaukee, St. Paul, & Pacific Railroad corridor. The trail follows the railroad corridor thorough Beverly and crosses the river along the Beverly Trestle Railroad Bridge (a National Register of Historic Places site, see Section 3.11-Cultural Resources), extending into JBLM YTC just west of Wanapum Dam. Within the Yakima River basin recreational opportunities are found in both developed and rural settings. Recreationists are attracted to the basin by the quality of scenery and water along the Yakima Canyon State Scenic Byway, and by the variety of recreation opportunities. Primary recreation activities include fishing, non-motorized boating and rafting, camping, hiking, hunting, picnicking, and wildlife viewing.

More generally, agricultural activities, highway and road construction, construction and operation of the existing high voltage transmission lines and substations and limited commercial and residential development have also affected recreation in the area, particularly with respect to providing access to the area for recreation. Past and present development of transmission lines, roadway improvements, and residential development have visually affected and diminished recreational experiences and recreation opportunities to varying degrees. Present and ongoing activities in the Project area include agricultural activities, residential and subdivision development, recreational use (including off road motorized vehicle use, hunting, camping, and others) and other ongoing land uses and practices.

Effects of Reasonable Foreseeable Future Actions on Recreation without the Proposed Project
Reasonably foreseeable actions within the vicinity of the proposed Project NNR Alternative with Subroute and design options include ongoing agricultural activities, new agricultural land conversion; residential and subdivision development (depending on economic conditions); operation and maintenance of other transmission lines; construction and maintenance of communication sites; future recreational land uses, developments, and practices; Yakima River Canyon State Scenic Byway activities; off road motorized use; local road construction; operation and maintenance of the Priest Rapids and Wanapum hydroelectric projects, military training within JBLM YTC and the potential construction of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir Project.

Saddle Mountain West Wind Farm
Wind farm development has the potential to affect recreation activities in the Saddle Mountains such as hiking and motorized OHV use by temporarily or permanently displacing or disruption these activities in the Project area. Access may be restricted and areas may be closed for hunting, hiking, and OHV use. Because the proposed Project does not significantly affect these activities, the effects of reasonably foreseeable future actions on recreation without the proposed Project would be similar to the effects with the proposed Project.

Wymer Dam and Reservoir Project
Recreational uses at the proposed Wymer Dam and Reservoir site include hunting on private property (with land owner permission), among other activities. Hunting on portions of the reservoir site acquired for public use would be restricted during and following construction. The nearby Yakima River and Yakima River canyon provide water access, camping, wildlife viewing and fishing opportunities. SR 821, which parallels the Yakima River, is a designated Washington State Scenic Byway. During construction recreationists are expected to be able to move to areas of the river and canyon where disruption would be minimal, if space allows, although their experience could be compromised due to increased crowding. No public recreation areas or access are expected to be closed. Construction activities and traffic may result

in inconveniences and traffic-related slowdowns, but are not anticipated to prohibit access to recreational uses in the area.

The only recreation currently occurring at the proposed Wymer Dam and Reservoir site is hunting on private land (where land owners allow). The reservoir would displace this activity, but is not expected to be a major impact on recreation because of limited current use at the project site. No long term impacts are expected to occur in the vicinity of the pump station on the Yakima River. Reclamation does not plan to provide recreation facilities at the completed Wymer Dam and Reservoir (Reclamation and Department of Ecology 2012).

Cumulative Effects on Recreation from Reasonably Foreseeable Future Actions including the Proposed Project and Alternatives

Overall, the addition of new structures, roads, man-made features and infrastructure to the area associated with the proposed Project, the proposed wind energy project and Wymer Dam and Reservoir project could result in cumulative impacts to recreation, such as developed recreation facilities, trails and public and private hunting areas, through displacement or physical alteration of recreation areas. However, it is assumed that potential impacts to recreation from other reasonably foreseeable future projects would be reduced or avoided with proper planning, construction strategies and mitigation similar to the proposed Project. Although views from recreational areas may change, the areas themselves would not be affected. The incremental effect of the proposed Project to recreationalists when viewed in the context of the many existing high voltage transmission lines in the CE Area would be low and insubstantial. In addition, operation of the proposed Project is not expected to affect hunting or access to existing hunting areas. New access roads would be gated to prevent hunting on private lands unless authorized by the landowner. Potential impacts to recreation resources from the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir would be greater than those identified for the proposed Vantage-Pomona Heights Transmission Line Project. It is expected that the cumulative impacts from the proposed Project combined with the other reasonably foreseeable future actions will not vary substantially from current recreation conditions and trends in the CE Area.

Transportation

Geographic Scope and Timeframe of Analysis

The geographic scope and timeframe for cumulative effects on transportation resources includes the area in the vicinity of the NNR Alternative with subroute and/or design options and more broadly the three counties that would be crossed by the route alternatives (Yakima, Grant, and Kittitas counties). The temporal extent is expected to be limited to Project construction because operation of the proposed Project is not expected to have a noticeable effect on local transportation patterns. No air or navigable waterway transportation system or facilities would be involved or impacted by any of the proposed Project alternatives.

Existing Transportation and How it Has Been Affected by Past and Present Actions

Past actions that have affected transportation in the vicinity of the proposed Project include: highway, local road and railroad construction; construction and operation of the Priest Rapids and Wanapum dam hydroelectric projects; construction of the Desert Aire Airport and rural residential and commercial development throughout the CE Area. Major highways in the area include I-90 and I-82, State Highways (SH) 97 and 12, and state and local State Routes (SR) 10, 821, 410, 24, 240, 241, and 243. In addition, local roads serve the rural areas of the CE Area. The Burlington Northern Santa Fe (BNSF) Railroad runs through the area. The rail route is generally parallel to I-90 east of Easton, west of the Yakima River through the Yakima River canyon (parallel to SR 821), and parallel to I-82 toward the Tri-Cities area. Present transportation-related actions in the CE Area include ongoing road maintenance projects, transportation of agricultural crops and freight by road and railroad, and operation of the Desert Aire Airport for small aircraft.

Effects of Reasonable Foreseeable Future Actions on Transportation without the Proposed Project
Reasonably foreseeable future actions planned in the CE Area that could affect transportation include ongoing road maintenance activities and construction of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir project that would generate increased traffic volumes on local roads.

Saddle Mountain West Wind Farm
This proposed wind farm project in the CE Area would generate temporary increases in traffic volumes and reduction in traffic speeds and flows and intermittent delays during construction of the project. These delays would result from the transportation of turbines and other construction materials and workers using interstate and state highways, principally I-90 and SR 243, and local roads to access the wind farm.

Wymer Dam and Reservoir
Regional and local access to the proposed Wymer Dam and Reservoir site, as well as sites and alignments of associated facilities, would be exclusively via SR 821, a two-lane roadway in the Yakima River canyon in southern Kittitas County. The easternmost extent of the reservoir pool at high water would pass under I-82, but no access to project facilities is proposed from this location for construction or long-term operation. There are no public roads or rail facilities in the Lmuma Creek basin where the proposed Wymer Reservoir would be built. The only access present is an unpaved, private ranch road. The pumping plant would be built west of and adjacent to SR 821 and the pipeline to proposed Wymer Reservoir would cross under this road. SR 821 between Ellensburg and Yakima is designated the Yakima River Canyon Scenic Byway and is notable for views of geological features that define the region and access to the Yakima River for recreation.

Construction of the Wymer Dam and Reservoir project would have an adverse impact on transportation facilities for the duration of the three to five-year construction period. Construction would cause increased traffic on roadways with worker traffic and equipment and materials hauling.

SR 821 provides the only access to the proposed Wymer Dam and Reservoir site and disruption by construction traffic would have a temporary adverse effect on traffic using this roadway. Impacts would include intermittent delays, increased trucks and heavy equipment on a roadway that is narrow and winding, and changes in the views of the surrounding landscape. In addition, construction of the proposed discharge and intake pipelines under SR 821 would have direct, short-term adverse effects, including temporary closure of the highway. Notification and signed detours of the closure would reduce the effects on travel. Detours would likely involve diverting traffic to I-82, which would cause some out-of-direction travel for users of SR 821. Road closure would adversely affect access to the Yakima River at points along SR 821.

The proposed Wymer Reservoir would inundate the piers supporting the I-82 bridges over Lmuma Creek. The piers would be reinforced and protected to prevent adverse effects from inundation. Construction to reinforce the bridge piers would not affect travel on I-82 and would protect the stability of the structures and the highway. This construction would require coordination with WSDOT (Reclamation and Department of Ecology 2012).

Cumulative Effects on Transportation from Reasonably Foreseeable Future Actions including the Proposed Project and Alternatives
The proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir project would not coincide in time with construction of the proposed Vantage-Pomona Heights Transmission Line Project; therefore, the cumulative impacts of the proposed Project associated with increased traffic on interstate and state highways and local roads, delays and detours would be relatively low and insignificant when compared to existing levels of use.

Construction traffic associated with the proposed Vantage-Pomona Heights Transmission Line Project could result in temporary delays at localized spots. With the implementation of PDFs, including the use of flaggers, signage, and traffic reroutes, where necessary, potential cumulative impacts to roads would be reduced. Similar impacts from the wind farm development and the proposed Wymer Dam and Reservoir project as described above would be expected as a result of road closures, lane restrictions, traffic delays and road damage. However, because the proposed Project would not coincide in time with the reasonably foreseeable future actions, cumulative impacts are not expected to vary substantially from current transportation conditions and trends within the CE Area due to measures that will be implemented during construction, operation and maintenance.

Visual

Geographic Scope and Timeframe of Analysis
The geographic scope for the cumulative effects visual resources analysis includes four miles either side of the centerline for the NNR Alternative with subroute and design options. The timeframe of the analysis extends from the historical past when European settlers began to alter the landscape within these areas into the future to include the 50-year operational life of the proposed Project (ROW renewal and/or extensions are common beyond the typical 50-year ROW grant for transmission lines because of their operational longevity).

Existing Visual Resources and How it Has Been Affected by Past and Present Actions
Past actions that have affected visual resources in the vicinity of the proposed Project include construction, maintenance, and operation of the Columbia River dams and reservoirs (Priest Rapids and Wanapum dams), agricultural activities, highway, local road, and railroad construction and maintenance, construction, operation, and maintenance of numerous high voltage transmission lines and substations, residential and subdivision development, wildfire occurrence; past land uses, developments, and practices; and military training operations at JBLM YTC. Present and ongoing activities in the immediate vicinity of the proposed Project include agricultural land uses, primarily crop production and livestock grazing, as well as military operations and urbanization; off road motorized vehicle use, and wildfire cycles. Natural scenic quality and intact landscapes have been reduced by the introduction of man-made elements that contrast with the character of the natural landscape, primarily over the last century, while sensitive viewers (such as recreationists and people occupying residences) observing the natural and developed landscape have increased over that time.

Effects of Reasonable Foreseeable Future Actions on Visual Resources without the Proposed Project
Reasonably foreseeable actions in the vicinity of the Project area consist of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir project; ongoing agricultural activities; potential for new agricultural land conversion; residential/subdivision development and practices depending on economic situation; ongoing military training activities at the JBLM YTC; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; unknown

communication sites; Yakima River Canyon State Scenic Byway activities; off-road motorized use; local road construction; and wildfire cycles. Construction of the proposed Saddle Mountain West Wind Project would overlap spatially with the east edge of the Project area in Grant County; however, it is unlikely to coincide in time with this proposed Project. Construction of the proposed Wymer Dam and Reservoir Project would overlap spatially with the NNR alternative in Kittitas County (Segment 3); however, it is highly unlikely to coincide in time with the proposed NNR Alternative with subroute and design options.

Saddle Mountain West Wind Farm

The wind turbines associated with the proposed wind energy project would likely stand out in contrast with the surrounding landscape. The wind energy project would involve placement of industrial structures (turbines) in an area with no similar structures and represent a conspicuous change to the relatively natural and rural landscape. This would disrupt the relative continuity of visual resources in the landscape. The wind project would involve structures that would create a skyline on the landscape, altering the texture of the horizon. This would noticeably diminish the smooth landscape of the horizon and reduce the openness of the terrain. These types of developments would add to the industrialization of the natural landscape, but final impacts on sensitive viewers would depend on turbine location relative to those viewers.

Wymer Dam and Reservoir Project

The landscape in which the proposed Wymer Dam and Reservoir project would be established is primarily the Yakima River Canyon, along SR 821, north of Selah and south of Ellensburg. It is only within the Yakima River Canyon where facilities associated with this alternative would be visible to the public. While the dam and reservoir would be located in the Lmuma Creek basin (tributary to the Yakima River canyon to the east), that entire basin is privately owned with no public access, no existing residents, and very limited public viewpoints from surrounding areas (Reclamation and Department of Ecology 2012).

Visual impacts during construction of the proposed Wymer Dam and Reservoir project would be extensive during the construction period. Construction would require clearing, stump removal and grading of the reservoir area, and construction of a dam. All of these activities would change existing landscapes, possibly block existing views, and create a potentially interesting, but unattractive visual intrusion. These activities could last several years. The extent of impacts would depend on how visible the construction site would be to the public, the extent to which the scenic quality of the existing landscape has already been modified, the sensitivity of the viewing public, and the viewers' expectations based upon the visual character of the setting in which the alterations to views is taking place. Because the proposed Wymer Dam and Reservoir site is relatively isolated from public areas, there would be limited views of construction activity and equipment. Both highway travelers and river users would have views of the pumping plant, switchyard construction and modification of the Lmuma Creek channel, as well as limited views of the dam construction site. Viewers would also have views of roads and road traffic associated with dam and pump construction. After completion of the dam, highway travelers and river users would continue to have views of the pumping plant, switchyard structure and top of dam. Highway travelers on I-82 would be able to see part of the new reservoir, and its associated fluctuations. Construction associated with the pump station on the Yakima River would be visible to travelers on the highway as well as recreationists on the river. Travelers on this highway could have a heightened sensitivity to visual intrusions and there has been relatively little modification of the scenic quality of the landscape, so construction may result in visual impacts to highway drivers. It is likely that the BLM Visual Resource Inventory management objectives would not be met in the short-term (four years) at certain locations. A more detailed analysis of potential impacts on visual resources from Wymer Dam and Reservoir construction would need to be completed in accordance with the methods described in BLM visual assessment guidelines as part of future project-level environmental review (Reclamation and Department of Ecology 2012).

Cumulative Effects on Visual Resources from Reasonably Foreseeable Future Actions including the Proposed Project and Alternatives

Saddle Mountain West Wind Farm
The proposed NNR Alternative with subroute and design options would blend with the muted colors of the surrounding landscape in most locations when seen at longer distances (such as middleground and background), although the conductor wires may stand out and contrast with the landscape under some viewing conditions. The incremental effects of the proposed Project, when viewed in the context of the many existing high voltage transmission lines in the CE Area, would cause low to moderate, but not substantial cumulative impacts. The views of the wind turbines when combined with the existing dams and existing transmission lines would result in a more substantial adverse cumulative impact to visual resources than the proposed Project.

Wymer Dam and Reservoir Project
Construction of the proposed Wymer Dam and Reservoir Project would result in substantial long-term visual impacts. The reservoir would inundate a large area of land (1,400 acres) and change the landscape from shrub-steppe to open water. The reservoir would be drawn down during summer months creating a "bathtub ring" of mud around the reservoir.

The proposed Wymer Dam and Reservoir Project would introduce substantial new manmade facilities in the predominantly undeveloped Yakima River Canyon. The most prominent of the facilities would include the pumping plant (approximately 40 feet high) and the switchyard (which would include towers approximately 80 feet in height). These facilities would be on agricultural land east of SR 821 and the river. The outlet channel from the dam would modify the existing Lmuma Creek channel and crossing under SR 821 to the Yakima River. These facilities would represent a substantial visual impact in the context of the largely undeveloped, scenic Yakima River Canyon corridor.

Related to the dam and reservoir, the top of 450-foot high Wymer Dam would be visible to motorists along an approximately 0.5-mile stretch of SR 821, a State Scenic Byway. The dam would be concrete-faced and would be visible to viewers as something distinct and in contrast to the surrounding shrub-steppe vegetation and basaltic cliffs. The only other location from which portions the proposed Wymer Dam and Reservoir Project would be seen is I-82, where the narrow, easternmost arm of the reservoir pool would be crossed by the highway and would be visible to motorists. The dam would not be visible from any recreation sites or businesses (because there are not any in the area). Nonetheless, this visibility of the dam would add to the intensity of impact on the Yakima River Canyon corridor (Reclamation and Department of Ecology 2012).

The addition of the proposed wood pole NNR Alternative with subroute and design options when taken together with the scale and extent of the proposed Wymer Dam and Reservoir Project would cause low cumulative impacts to visual contrast as a whole when co-located within other existing transmission line corridors. In areas where the NNR Alternative with subroute and design options would be constructed outside of existing transmission corridors, the project would cause low to moderate, but not substantial, cumulative impacts.

Overall, the additional infrastructure and new roads associated with the proposed Project, the proposed wind energy project, and the proposed Wymer Dam and Reservoir project could result in cumulative impacts to visual resources, such as scenic quality and viewer sensitivity, through the introduction of visually dominant structures, potential glare, and landform and vegetation contrasts. However, it is assumed that potential impacts from the other reasonably foreseeable future projects would be reduced or avoided with proper planning, construction strategies, and mitigation similar to those identified for the proposed Project. It is expected that the cumulative impacts from the proposed Project combined with the other reasonably foreseeable future actions will not vary substantially from current visual resource conditions and trends within the CE Area.

Socioeconomics

Geographic Scope and Timeframe of Analysis
The geographic scope of the cumulative effects analysis for socioeconomics (which includes Environmental Justice) consists of the three counties that would be crossed by the route alternatives (Yakima, Grant, and Kittitas counties), as well as reasonably foreseeable future actions. The majority of the potential socioeconomic impacts are expected to occur within this area.

The timeframe for this analysis extends from the construction phase into the future to include the 50-year operational life of the proposed Project (ROW renewal and/or extensions are common beyond the typical 50 year ROW grant for transmission lines because of their operational longevity).

Existing Socioeconomics and How it Has Been Affected by Past and Present Actions
Past actions that have affected socioeconomic (which includes Environmental Justice) activity in the Project vicinity include construction, maintenance, and operation of the Priest Rapids and Wanapum dams and hydroelectric facilities; recreational activities; agricultural activities; highway and railroad construction; construction and operation of the network of existing high voltage transmission lines and substations; and rural residential and commercial development. Present and ongoing activities in the immediate Project vicinity include recreational activities; agricultural production and operation, livestock grazing, operation of the Columbia River dams, operation of electric transmission infrastructure, maintenance of transmission infrastructure, and operation of the JBLM YTC military training center.

Effects of Reasonable Foreseeable Future Actions on Socioeconomics without the Proposed Project
Reasonably foreseeable future actions in the vicinity of the proposed Project include ongoing recreational activities, agricultural activities and the development of the proposed Saddle Mountain West wind energy facility and associated electric transmission infrastructure and the construction of the Wymer Dam and Reservoir project.

Saddle Mountain West Wind Farm
The proposed Saddle Mountain West Wind Farm, located within Grant County, is not likely to result in any permanent changes in population and would have no effect on short or long-term population trends in Yakima or Grant counties. Construction of the project is likely to result in a small temporary influx of construction workers to the project area and would generate modest amounts on income for motels and RV parks. Regional resources would be more than sufficient to accommodate the small project-related demand for temporary lodging.

Local project-related expenditures, employment, and construction-related earning would be small relative to total amount of economic activity in the affected counties, and would, as a result, have a low positive impact on the local economy for the duration of construction. In addition, the wind energy project would also be expected to generate sales tax in the affected counties as workers purchase goods and services.

The proposed wind energy development project would not be expected to cause significant demands on public service or facilities. During construction, public services such as police, fire, and medical facilities would be needed only in cases of emergency.

Construction of the wind energy project is not expected to have high or adverse human health or environmental impacts on nearby communities (including minority or low income communities) and is, therefore, not expected to contribute to environmental justice related cumulative impacts.

Wymer Dam and Reservoir Project

Construction of the proposed Wymer Dam and Reservoir project would generally have the same types of short-term and long-term socioeconomic impacts as those described for the proposed Saddle Mountain West Wind Farm with the magnitude depending on the scale of employment and expenditures of the individual projects.

In its assessment of proposed construction expenditures at the proposed Wymer Dam and Reservoir, it was estimated the project would create an average of about 570 annual jobs over three to five years, the expected duration of construction (Reclamation and Department of Ecology 2012). Of the total, 255 average annual jobs represent onsite and offsite labor directly related to construction. The estimated direct jobs represent 2.0 percent of the three counties (Yakima, Kittitas, and Grant) total construction employment in 2009 and 0.1 percent of the total non-farm employment.

The proposed Wymer Dam and Reservoir project would likely change the long-term supply of several goods and services derived from the basin's water and related resources. Increased supplies of irrigation water to some lands when they otherwise would not receive their full entitlement would likely increase the production of irrigated crops from those lands. Changes in fish habitat and fish populations resulting from storage-related changes in streamflow may increase the output of the commercial fishing industry.

Long-term expenditures on the proposed Wymer Dam and Reservoir project would likely increase the demand for labor and generate new job opportunities and higher incomes for some workers. The impact of these expenditures on the regional economy is expected to be small. Overall, this project would be expected to have beneficial long-term effects on jobs and incomes.

The proposed Wymer Dam and Reservoir project would not be expected to cause significant demands on public service or facilities. During construction, public services such as police, fire and medical facilities would be needed only in cases of emergency.

Construction of the proposed Wymer Dam and Reservoir project is not expected to have high or adverse human health or environmental impacts on nearby communities (including minority or low income communities) and is, therefore, not expected to contribute to environmental justice related cumulative impacts (Reclamation and Department of Ecology 2012).

Cumulative Effects on Socioeconomics from Reasonably Foreseeable Future Actions including the Proposed Project and Alternatives

Construction and operation of the proposed NNR Alternative with subroute and design options, the proposed Saddle Mountain West Wind Farm Project and the proposed Wymer Dam and Reservoir Project are not expected to result in any permanent changes in population and would have no effect on short or long-term population trends in Yakima, Grant, or Kittitas counties.

Construction of this proposed NNR Alternative with subroute and design options, the proposed wind energy development project, and the proposed Wymer Dam and Reservoir Project is anticipated to result in a temporary influx of construction workers to the CE Area and would generate modest amounts of income for motels and RV parks. Construction of the proposed Project is not anticipated to occur during the same time period as construction of the proposed Saddle Mountain West Wind Farm or the proposed Wymer Dam and Reservoir Project; however, regional resources would be more than sufficient to accommodate the small project-related demand for temporary lodging.

Local project-related expenditures, employment, and construction-related earnings would be relatively small relative to total amount of economic activity in the affected counties and would, as a result, have a modest and insignificant positive impact on the local economy for the duration of construction. This level of positive impact on the local economy is unlikely to increase because construction of the proposed Saddle Mountain West Wind Farm or the proposed Wymer Dam and Reservoir project and is not anticipated coincide with construction of the proposed NNR Alternative with subroute and design options. Even if the wind energy project or the proposed Wymer Dam and Reservoir Project were to coincide with this proposed Project the impact on the local economy would still be relatively low compared to the overall regional economy. This would also be the case with any other future projects were they to coincide in time with the proposed Project. The proposed Project would also be expected to generate sales tax in the affected counties as workers purchase goods and services, and this would likely be the case with other construction projects in the affected counties. The proposed Project would also generate annual property tax revenue to the affected counties from payments made by the Project proponent related to the structures in the transmission line ROW.

The proposed Project, the proposed Saddle Mountain West Wind Farm, and proposed Wymer Dam and Reservoir project would not be expected to cause significant demands on public service or facilities. During construction, public services such as police, fire and medical facilities would be needed only in cases of emergency, which would be the case for any other construction projects that could potentially coincide in time with the proposed Project. In addition, the proposed Project is not expected to have a noticeable impact on local landfill resources or their ability to handle other current or future waste streams. Therefore, it is expected that the cumulative impacts from the proposed Project combined with the other reasonably foreseeable future actions will not vary substantially from current public service conditions and trends within the CE Area.

Construction of this proposed Project is not expected to have high or adverse human health or environmental impacts on nearby communities (including minority or low income communities) and is, therefore, not expected to contribute to environmental justice related cumulative impacts.

Cultural Resources

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis for cultural resources includes a boundary of four miles either side of the centerline of the NNR Alternative with subroute and design options. This boundary was selected to allow the assessment of cumulative impacts in all direction to account for potential visual impacts on cultural resources. The timeframe of the analysis is the prehistoric period to the European settlement period and extending into the future to include the 50-year operation life of the proposed Project (ROW renewal and/or extensions are common beyond the typical 50-year ROW grant for transmission lines because of their operational longevity).

Existing Cultural Resources and How it Has Been Affected by Past and Present Actions

Past actions that have affected cultural resources in the vicinity of the proposed Project include construction and operation of the Columbia River dams and reservoirs (Priest Rapids and Wanapum dams); agricultural activities; highway and railroad construction; construction of numerous high voltage transmission lines and substations; residential and subdivision development; and military training operations at JBLM YTC. Past actions have also caused disturbance of cultural sites, reduction of the cultural integrity of certain sites, and removal of cultural artifacts. Many archaeological resources and TCPs are present along the Columbia River; many more were inundated when the reservoirs behind the Priest Rapids and Wanapum dams were filled. Construction of the dams, transmission lines, and substations created manmade structures within the viewshed of TCPs and archaeological sites in the vicinity of the Columbia River. Agricultural activities have converted native vegetation to cropland potentially affecting subsistence farming or gathering practices within TCPs.

Effects of Reasonable Foreseeable Future Actions on Cultural Resources without the Proposed Project

Reasonably foreseeable actions in the vicinity of the Project area consist of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir project. The proposed Saddle Mountain West Wind Farm would overlap spatially with the east edge of the proposed Project area in Grant County. The proposed Wymer Dam and Reservoir project would overlap spatially with the western edge of the Project area in Kittitas County.

There is the potential for archaeological resources to be impacted during the construction of both of the wind project and the proposed Wymer Dam and Reservoir project. Prior to construction, field surveys would be required to identify the location of sites and if required, changes to the location of project facilities would be required to avoid identified sites. Placement of project facilities may impact viewsheds of TCPs. Specific studies for each project would be required to determine if TCPs may be impacted.

Some portions of the project areas have been subject to previous cultural resource investigations, while others have not been extensively surveyed although cultural resources are likely present. In cases where recorded cultural resources are present in a project area, most of these have not yet been evaluated for eligibility to the National Register of Historic Places (National Register). Sites that have not yet been evaluated are considered eligible to the National Register. Prior to project implementation, all resources within a project’s Area of Potential Effects must be evaluated for eligibility and, for any eligible sites, adverse effects would require mitigation.

Cumulative Effects on Cultural Resources from Reasonably Foreseeable Future Actions including the Proposed Project and Alternatives

During construction of the proposed NNR Alternative with subroute and design options, there is also the potential for archaeological resources to be impacted. Implementation of measures described in Section 2.5.4 - Project Design Features for Cultural Resources and in the Programmatic Agreement would lessen or avoid the potential for impacts to archaeological resources. However, if the proposed Project does impact previously undiscovered archaeological resources, it would contribute incrementally to the cumulative impacts to cultural resources in the CE Area.

It is expected that the proposed NNR Alternative with subroute and design options will not substantially contribute to cumulative impacts on identified archaeological sites given the scale and extent of the impacts created by past, present, and reasonably foreseeable projects. The proposed NNR Alternative with subroute and design options, expected to temporarily disturb up to 200 acres and permanently disturb approximately 80 acres, represents a fraction of cumulative project disturbances. Fifteen other major existing transmission lines are located within the CE Area of the proposed Project, with each project affecting a much greater area within this boundary, perhaps thousands of acres. It is assumed that the total disturbance for the proposed Saddle Mountains West Wind Farm might be as much as 675 acres or more and up to 4,000 acres of disturbance with the proposed Wymer Dam and Reservoir project. This represents a relatively large geographical area impact and disturbance area compared to the Vantage-

Pomona Heights Transmission Line Project, which is a linear facility with disturbance primarily associated with access and spur road construction. Added to the affects of wide-spread agricultural, urban and military land conversion, the proposed Project would cause low and insubstantial cumulative impacts to archeological resources.

Because the proposed NNR Alternative with subroute and design options could also potentially impact the viewsheds of TCPs, it would contribute incrementally to cumulative impact to those properties. However, the cumulative effects of multiple projects on the viewsheds of specific traditional cultural properties can be determined only through consultation between the BLM and affected Native American tribes. The cumulative effects from construction, maintenance, and operation of the proposed Project and the reasonably foreseeable future actions would include potential disturbance and illegal removal of the area's cultural resources and the potential to impact previously undiscovered archaeological resources. The incremental effect of the addition of the proposed Project to the reasonably foreseeable future actions would not be substantially different from the effects of the reasonably foreseeable futures actions alone. The proposed Saddle Mountains West Wind Farm, the proposed Wymer Dam and Reservoir project, and the proposed Vantage-Pomona Heights Transmission Line Project could also have permanent or long-term effects to cultural resources through direct construction disturbance or indirect visual effects. These cultural resources could be affected by the construction of transmission lines structures, tensioning facilities, wind energy facilities, dam and reservoir inundation, access roads, and increased human activity related to maintenance activities. Increased human activity could make archaeological sites more susceptible to illegal collecting and/or degradation. Long-term visual or indirect effects could also occur to TCPs and other culturally sensitive sites. It is assumed that potential impacts to cultural resources from future projects would be reduced or avoided with proper planning and construction strategies, similar to those identified for the proposed Project. It is expected that the cumulative impacts from the proposed Project combined with the other reasonably foreseeable future actions will not vary substantially from current cultural resource conditions and trends within the CE Area.

Air Quality

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects analysis for air quality extends beyond the Project area to include the three counties that would be crossed by the NNR Alternative with subroute and design options (Yakima, Grant, and Kittitas counties). The timeframe of the analysis is limited to Project construction because operation of the proposed Project is not expected to affect air quality.

Existing Air Quality and How it Has Been Affected by Past and Present Actions

Past actions that have affected air quality in the proposed Project area include highway, local road and railroad construction, construction of the Priest Rapids and Wanapum dams, agricultural activities, construction of the existing transmission lines and substations, residential and subdivision development, military training operations, and periodic incidence of wildfires. Present actions include agricultural activities, ongoing maintenance projects, and military training activities. Air quality in the Project area is well within most of the standards for pollutants.

Historically, the City of Yakima has experienced exceedances of the National Ambient Air Quality Standards (NAAQS) for particulate matter and carbon monoxide. Through actions taken in the required State Implementation Plan, ambient air concentrations of these pollutants were brought into line with the NAAQS. Today, portions of the City of Yakima are designated as maintenance areas for particulate matter and carbon monoxide. All other areas within the CE Area are currently in attainment for regulated pollutants.

Sources of regulated air pollutants in the CE Area include transportation sources (such as cars, buses, trucks, trains, boats, and aircraft), urban sources (including wood smoke, emissions from commercial operations, and gas-powered residential equipment), re-entrained dust (naturally occurring particulate matter that is resuspended into the atmosphere through natural processes such as wind), agricultural practices (including field burning, re-entrainment of dust from practices such as plowing, and emissions from farm equipment), and wildfires. These types of sources occur, to varying degrees, throughout the CE Area. Historical exceedances have occurred due to windblown dust from area agricultural fields followed by windblown dust from open lands, outdoor and agricultural burning, wood-burning stoves and fireplaces, wildfires, industrial sources, and motor vehicles.

Effects of Reasonable Foreseeable Future Actions on Air Quality without the Proposed Project
Reasonably foreseeable future actions in the vicinity of the proposed Project that could affect air quality include ongoing agricultural activities, potential for new agricultural land conversion, continued and expanded military training activities, and the construction of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir project.

Short-term construction-related air quality impacts would largely result from emissions from transporting and operating construction equipment. In addition, construction activities have the potential to create windblown particulate matter (dust), particularly during the clearing and grading of land, and from the transport and placement of excavation material, soils and other materials.

The amount of dust emissions from construction activities would depend on meteorological conditions (particularly wind speeds), soil types and moisture content, and the surface area of soils or sediments exposed.

The level of short-term construction emissions from the various projects would depend on the amount of material moved and the number of pieces of equipment used in the peak day and peak year of construction activity. The major sources of volatile organic compounds, carbon monoxide, and nitrogen oxide emissions are expected to be the onsite construction equipment and haul trucks. The projects would require varying levels of construction with heavy machinery and equipment. Typical construction activities would include excavation, earthwork, trenching, tunneling, and concrete work.

Construction of the reservoir at Wymer would cause air quality impacts for a longer time period and would likely generate more vehicle and particulate emissions because of the large scale land clearing that would be required. Overall, the impacts from the proposed projects are expected to be temporary, minor, and not likely to cause exceedances of NAAQS.

Cumulative Effects on Air Quality from Reasonably Foreseeable Future Actions including the Proposed Project and Alternatives
Air emission from the proposed Project would occur during Project construction, principally fugitive dust generated by the placement of transmission structures and construction or improvement of access roads, as well as the use of vehicles and heavy equipment. Quantities of emissions would be very small, temporary and localized. In addition, PDFs (as described in Section 2.5) would limit emissions during both construction and operation. Impacts on air quality would be short-term during Project construction and dispersion of pollutants would be localized to the vicinity of construction activity and would quickly disperse or settle. Impacts on air quality would not be anticipated to result in the exceedence of the NAAQS.

Because emissions from the proposed Saddle Mountain West Wind Farm, the proposed Wymer Dam and Reservoir project, and the proposed Vantage-Pomona Heights Transmission Line Project would be temporary and would cease upon completion of construction. It is highly unlikely that emissions from one project would overlap in space or time with emissions from another project to create a net cumulative air quality impact in the region. In addition, it is assumed that potential impacts from the other reasonably foreseeable future projects would be reduced or avoided with proper planning, construction strategies, and mitigation similar to those identified for the proposed Project. It is expected that the cumulative impacts from the proposed Project combined with the other reasonably foreseeable future actions will not vary substantially from current air quality conditions and trends within the CE Area.

Water Resources

Geographic Scope and Timeframe of Analysis
The geographic scope of the cumulative effects analysis for water resources includes portions of five WRIAs including Esquatzel Coulee (WRIA 36), Lower Yakima (WRIA 37), Upper Yakima (WRIA 39), Alkali/Squilchuck (WRIA 40) and Lower Crab (WRIA 41). The timeframe for the analysis extends from the historical past when European settlers began to alter water resources in the vicinity of the CE Area by actions such as farming and livestock grazing, and extends into the future to include the 50-year operational life of the proposed Project (ROW renewal and/or extensions are common beyond the typical 50-year ROW grant for transmission lines because of their operational longevity).

Existing Water Resources and How it Has Been Affected by Past and Present Actions
Past and present actions that have affected water resources in the CE Area include agricultural activities, livestock grazing, commercial and residential development, road maintenance, noxious weed and invasive species establishment, and hydroelectric dams on the Columbia River. These actions have resulted in the degradation of water resources in the CE Area.

Water resources in the CE Area have undergone significant alterations in the past. The segment of the Columbia River at Priest Rapids Lake has been listed as water quality impaired due to temperature and pesticides from unknown sources and Lower Crab Creek has been listed as water quality impaired due to pH, temperature, and pesticides from unknown sources. Two large hydroelectric dams on the Columbia River occur within the CE Area. These dams regulate flows and have altered floodplains in the area. Existing studies and related water quality data indicate that nitrate contamination of groundwater exist in the region and at least portions of the CE Area primarily due to feedlots and dairies.

Effects of Reasonable Foreseeable Future Actions on Water Resources without the Proposed Project
Reasonably foreseeable future actions in the CE Area consist of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir project.

Saddle Mountain West Wind Farm
The proposed Saddle Mountain West Wind Farm would be located in the Esquatzel Coulee and the Lower Crab Creek WRIAs. Lower Crab Creek is located to the north and the Columbia River is located to the west of the Project area. The segment of the Columbia River at Priest Rapids Lake to the west of the proposed Saddle Mountain West Wind Farm has been listed as water quality impaired due to temperature and pesticides from unknown sources. Lower Crab Creek, located north of the proposed Saddle Mountain West Wind Farm project area, has been listed as water quality impaired due to pH, temperature, and pesticides from unknown sources.

The temporary effects from construction, including road building, could include increased run-off and sediment delivery to perennial and intermittent streams and the Columbia River as a result of cleared vegetation and surface disturbance. If the construction periods occurred simultaneously, these water resources could be affected by more than one project and could be vulnerable to increased sedimentation. The permanent effects to water resources from the proposed Saddle Mountain West Wind Farm would likely include a local reduction of infiltration from the placement of turbine towers.

Wymer Dam and Reservoir
The proposed Wymer Dam and Reservoir project would be located in the Upper Yakima WRIA. With construction of the proposed Wymer Dam and Reservoir project, palustrine (freshwater) wetlands would be permanently eliminated and the Lmuma Creek channel would be modified to allow passage of higher flows from the dam, making it unlikely that riparian areas could be established. Due to fluctuation in water levels, Wymer Reservoir would not be conducive to the growth of a water-dependent shoreline plant community.

Geologic testing conducted at the proposed Wymer Dam and Reservoir project site indicates that, due to the high permeability of the surficial rock layers and sediments, large amounts of seepage to groundwater could occur. To avoid excessive infiltration of stored reservoir water, grouting or importation and lining with clay materials may be necessary. Prior to construction, more detailed hydrogeologic studies would be completed to estimate the extent of impacts on local groundwater.

The temporary effects from construction could include increased run-off and sediment delivery to downstream waters as a result of cleared vegetation and surface disturbance, but is not anticipated to have a long-term impact on downstream water quality. Construction of a pump station for the proposed Wymer Dam and Reservoir project could increase erosion into the Yakima River on a short-term basis. The permanent impacts to water resources from construction of the proposed Wymer Dam and Reservoir project would include the permanent loss of wetland and riparian vegetation and potential seepage into groundwater (Reclamation and Department of Ecology 2012).

Cumulative Effects on Water Resources from Reasonably Foreseeable Future Actions including the Proposed Project and Alternatives
Ongoing agricultural activities, livestock grazing, development, road maintenance, and the presence of hydroelectric dams and other ongoing land uses and practices are expected to continue within the CE Area in the future.

Reasonably foreseeable actions with the potential to impact water resources from disturbance, sedimentation, vegetation removal, and water quality degradation consist of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir project. The cumulative effects to water resources from the proposed Project in combination with the effects of the proposed Saddle Mountain West Wind Farm would be low. The proposed Saddle Mountain West Wind Farm is concentrated in the Esquatzel Coulee and Lower Crab Creek WRIAs. A small portion of the proposed Project would occur within the Lower Crab Creek WRIA, with the remainder distributed within the Alkali-Squichuck and Upper Yakima WRIAs. Increases in impervious surfaces from the proposed Saddle Mountain West Wind Farm could increase surface water runoff and, therefore, downstream flooding potential; however, impervious surface impacts from the wind project would likely be low. The proposed Project and the proposed Wymer Dam and Reservoir project would both occur within the Upper Yakima WRIA. Permanent impacts could occur from the long-term loss of wetland vegetation and potential seepage into groundwater. The proposed Wymer Dam and Reservoir project covers a relatively large geographical area disturbance area compared to the Vantage-Pomona Heights Transmission Line Project.

Overall, the additional disturbance and new roads associated with the proposed Project, the proposed wind energy project, and the proposed Wymer Dam and Reservoir project could result in cumulative impacts to water resources, such as wetlands, streams, 100-year floodplain, through altering or impede flows, degradation erosion and sedimentation into waterways. The proposed Project is not anticipated to permanently impact water resources. Minor impacts to water resources from the construction of the proposed Saddle Mountains West Wind Farm could occur due to a reduction in water infiltration. Construction of the proposed Wymer Dam and Reservoir project would have a higher permanent impact on water resources. However, it is assumed that potential impacts from the other reasonably foreseeable future projects would be reduced or avoided with proper planning, construction strategies, and mitigation similar to those identified for the proposed Project. The proposed Project will marginally contribute to cumulative impacts to water resources. Overall impacts of all reasonably foreseeable future actions, especially construction of the proposed Wymer Dam Project, will substantially alter resource conditions within the study area from existing conditions.

Soils and Geology

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis for soil and geologic resources includes the portion of the Columbia Plateau physiographic province that occurs within the CE Area. The timeframe for the analysis extends from the historical past when European settlers began to alter soil and geologic resources in the vicinity of the CE Area by actions such as farming and livestock grazing and extends into the future to include the 50-year operational life of the proposed Project (ROW renewal and/or extensions are common beyond the typical 50-year ROW grant for transmission lines because of their operational longevity).

Existing Soils and Geology and How it Has Been Affected by Past and Present Actions

Past and present actions that have affected soils in the CE Area and resulted in soil disturbance, compaction, and erosion include agricultural activities; highway and railroad construction; construction of existing transmission lines and substations; and residential and commercial development. Present activities that continue to affect soils include military training activities and agricultural land uses, primarily crop production and livestock grazing.

Effects of Reasonable Foreseeable Future Actions on Soils and Geology without the Proposed Project

Reasonably foreseeable actions with the potential to impact soils from disturbance, compaction, and erosion consist of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir project. The CE Area is located in the Columbia Plateaus physiographic province. The geology of the CE Area consists of interbedded volcanic and sedimentary rocks of the Columba River Basalt Group.

Saddle Mountain West Wind Farm

The effects to geology and soils caused by the proposed Saddle Mountain West Wind Farm would include short-term disturbance to soils associated with auguring of new holes and direct burial and backfill for wind turbine and transmission structure construction and the improvement of existing access roads and construction of new access and spur roads. The effects from construction of the proposed Saddle Mountain West Wind Farm would be localized and limited to the construction footprints. Additionally, soil erosion associated with construction of the proposed wind energy project would largely be mitigated by implementation of BMPs during and following construction.

Wymer Dam and Reservoir Project

The short-term effects to geology and soils from the proposed Wymer Dam and Reservoir project would occur through the clearing and excavating large areas for access roads, borrow areas, excavating along the shoreline and constructing new dams. Excavation and fill activities would increase the potential for erosion during construction although erosion is anticipated to be minimized through the use of BMPs. Erosion during construction would contribute to turbidity in downstream waters, but is not anticipated to have a long-term impact on downstream water quality. Construction of a pump station for Wymer Dam could cause increased erosion into the Yakima River. Long-term impacts from shoreline erosion may occur; however, detailed information obtained from site-specific geologic investigations would be utilized to develop facility designs that minimize the potential for impacts and to develop appropriate mitigation measures (Reclamation and Department of Ecology 2012).

Cumulative Effects on Soils and Geology from Reasonably Foreseeable Futures Actions including the Proposed Project and Alternatives
The proposed Project would result in short-term disturbance to soils associated with auguring of new holes and direct burial and backfill for transmission structure construction and the improvement of existing access roads and construction of new access and spur roads. The effects from construction of this proposed Project and proposed the Saddle Mountain West Wind Farm would be localized and limited to the construction footprints. Additionally, soil erosion associated with construction of the proposed wind energy project would largely be mitigated by implementation of BMPs during and following construction. The effects of soil erosion, soil productivity and other soil resource impacts from the reasonably foreseeable projects and the proposed Project will be low and insignificant. The construction of the proposed Wymer Dam and Reservoir project would result in greater short-term disturbance compared with this proposed Project and the proposed Saddle Mountain West Wind Farm.

Overall, the additional disturbance and new roads associated with the proposed Project, the proposed wind energy project, and the proposed Wymer Dam and Reservoir project could result in cumulative impacts to soils and geological resources, such as steep slopes, and landslide areas, through increase soil erosion, degradation or loss of soils and soil compaction. However, it is assumed that potential impacts from the other reasonably foreseeable future projects would be reduced or avoided with proper planning, construction strategies, and mitigation similar to those identified for the proposed Project. It is expected that the cumulative impacts from the proposed Project combined with the other reasonably foreseeable future actions will not vary substantially from current soils and geological conditions and trends within the CE Area.

Public Health and Safety and Noise

Geographic Scope and Timeframe of Analysis
The geographic scope of the cumulative effects analysis for public health and safety and noise and hazardous material includes the area in the vicinity of the NNR Alternative with subroute and design options and more broadly the three counties that would be crossed by the NNR Alternative with subroute and design options (Yakima, Grant, and Kittitas counties) to include a larger extent of the landscape encompassing the identified reasonably foreseeable future actions.

The timeframe for the analysis extends from the historical past when European settlers began to alter noise conditions in the area by actions such as farming and livestock grazing and extends into the future to include the 50-year operational life of the proposed Project (ROW renewal and/or extensions are common beyond the typical 50-year ROW grant for transmission lines because of their operational longevity).

Existing Public Health and Safety and Noise and How it Has Been Affected by Past and Present Actions
Implementation of past and present actions in the Project area have generally not resulted in lasting noise effects or additional hazardous material and the Project area continues to enjoy relatively low noise levels

on a continual basis and minimal local hazardous materials. Past actions that have increased noise levels and potential local hazardous materials include construction of Priest Rapids and Wanapum dams, agricultural activities, highway and railroad construction, JBLM YTC military operations, construction and operation of the numerous high voltage transmission lines and substations in the Project area. Present and ongoing activities that cause noise in the CE Area include agricultural activities, ongoing road maintenance projects, operation of the existing transmission lines, and military training activities.

Effects of Reasonable Foreseeable Future Actions on Public Health and Safety and Noise without the Proposed Project

Reasonably foreseeable future actions in the Project area and vicinity that could increase noise levels and hazardous materials include ongoing agricultural activities, ongoing road maintenance activities, JBLM YTC military operations, and operation of existing transmission lines and substations. Cumulative noise impacts in the Project area typically occur when noise receptors are exposed to noise from sources at approximately the same time, such as from vehicles and agricultural equipment operation and in the future from turbine noise from wind energy facility operation.

Construction of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir would generate short-term noise and hazardous material impacts from construction activities. Short-term construction impacts would be similar at each proposed site and, more specifically, would result from transporting and operating mechanized construction equipment.

Depending on the activity, peak noise levels from equipment would range from 69 to 110 A-weighted decibels (dBA) at 50 feet from the source. However, noise levels decrease with distance from the source at a rate of approximately 6 to 7.5 dBA per doubled distance. For example, noise levels from construction equipment would range from approximately 57 to 98 dBA at a distance of 200 feet; from 51 to 92 dBA at 400 feet; and from 45 to 86 dBA at 800 feet. The increase in noise would be temporary, localized, and limited to daytime hours.

Although not regulated, short-term construction noise can be disruptive during certain activities. Some of the construction equipment that would be used would operate at noise levels high enough to cause hearing damage at very short distances (less than 50 feet). Because the noise levels would quickly dissipate below those levels, the only people likely to be exposed to damaging noise levels would be construction workers. Those workers would wear hearing protectors to prevent hearing damage.

Construction and blasting noise is exempt from regulation if conducted between 7 a.m. and 10 p.m. (daytime hours) per WAC 173-60-050. In addition, noise created by traffic (including heavy construction vehicles) on public roads is exempt from regulation under WAC 173-60-050.

There could be cumulative noise impacts if these actions are undertaken simultaneously and in relatively close proximity to each other. However, it is expected that these actions would not result in cumulative noise impacts due to spatial and temporal separation.

Cumulative Effects on Public Health and Safety and Noise from Reasonably Foreseeable Futures Actions including the Proposed Project and Alternatives

Reasonably foreseeable future actions in the Project area and vicinity that could increase noise levels and hazardous materials include ongoing agricultural activities; ongoing road maintenance activities; JBLM YTC military operations; operation of existing transmission lines and substations; and construction of the proposed Saddle Mountain West Wind Farm and the proposed Wymer Dam and Reservoir project.

The construction of the proposed Vantage-Pomona Heights Transmission Line Project and the proposed construction of both the Saddle Mountain West Wind Farm and the Wymer Dam and Reservoir project would not result in cumulative impacts on noise levels or hazardous materials in the Project area because the proposed Project would not be constructed during the same time frame as the proposed wind farm and proposed Wymer Dam and Reservoir project.

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4.18 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The Council on Environmental Quality National Environmental Policy Act Regulations (40 Code of Federal regulations [CFR] Parts 1500-1508) require that an Environmental Impact Statement discuss “the environmental impacts of the alternatives, any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity and any irretrievable commitments or resources which would be involved in the proposal should it be implemented” (40 CFR Part 1502.16).

Short-term is defined as the total duration of the associated construction activities of the Project, whereas long-term is defined as an indefinite period beyond the construction of the Project and associated facilities. The specific effects of implementing the proposed Project vary in type, intensity, and duration according to the activities occurring at any given time. Implementation of any of the action alternatives involves tradeoffs between long-term productivity and short-term uses of the environment.

Construction of any of the action alternatives would result in a number of temporary effects that would cease upon completion of the construction phase. Short-term impacts associated with each resource are analyzed in Chapter 4 Sections 4.2 through 4.17. Examples of short-term impacts include temporary air emissions; temporary noise from construction equipment operation; temporary disruptions to existing land uses; temporary construction related road or lane closures; increased traffic from construction vehicles; and potential for soil erosion from access road construction. Environmental impacts during construction would be relatively short-term (9 to 12 months) and would be mitigated by Project Design Features, best management practices and stipulations.

The transmission line may exist for decades and longer. Many of the effects discussed in the Chapter 4 Environmental Consequences sections are considered to be short-term (occurring only during construction activities). Longer term impacts over the operational life of the Project could occur. Examples of long-term impacts would include permanent changes in land use where the transmission is constructed, and creation of deviations from the existing visual landscape character in areas where transmission lines do not currently exist.

The proposed Project could also result in both short-term and long-term benefits for the local and regional economies in Yakima, Kittitas, and Grant counties. These benefits include the creation of new jobs, and increase regional income, sales and income tax revenues, property tax revenues and right-of-way rental receipts to the federal government.

In general, the proposed Project will not result in impacts that would significantly alter the long-term productivity of the affected environment. For example, soils and vegetation within the affected environment that were disturbed during the construction of the many existing high voltage transmission lines in the Project area have largely recovered. While there is never complete recovery, long-term productivity of the affected environment has not been significantly altered by the construction of the existing transmission lines and revegetation and crop production continues to occur. A similar productivity recovery outcome following construction of the proposed Project is expected to occur.

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4.19 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

In accordance with National Environmental Policy Act Regulations (40 Code of Federal Regulations Parts 1500-1508), this section addresses irreversible and irretrievable commitment of resources that would result from the implementation of the proposed Project.

Resources committed to the proposed Project would be material and non-material. Irreversible commitment of resources for the purposes of this section has been interpreted to mean that those resources, once committed to the proposed Project, would continue to be committed throughout the 50-year life of the Project. Irretrievable commitment of resources has been interpreted to mean that those resources used, consumed, destroyed, or degraded during construction, operation, and maintenance of the proposed Project could not be retrieved or replaced for the life of the Project or beyond.

Implementation of the proposed Project would require the consumption of nonrenewable fuel (diesel, gasoline, and jet fuel) resources for construction vehicles, construction equipment, construction operation vehicles, and helicopter use. Construction of the Project would result in the consumption saleable minerals, including fill material for grade changes, sand and gravel for concrete production, gravel for road beds, and similar use resulting in an irretrievable commitment of natural resources. Construction would also require the manufacture of new materials, some of which would not be recyclable at the end of the Project's lifetime, and energy for the production of these materials, which would also result in an irretrievable commitment of natural resources. Irreversible and irretrievable commitments of resources and environmental changes for the Project are summarized in Table 4.19-1.

TABLE 4.19-1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

RESOURCE TYPE	TYPE OF COMMITMENT/CHANGE *REASON FOR COMMITMENT/CHANGE*	IRREVERSIBLE	IRRETRIEVABLE
Climate and Air Quality	Degradation of air quality *Construction activities*	No	No
Noise	None	-	-
Land Use	Exclusion of other uses *Construction, operation, and maintenance*	No	Yes
Agriculture	Exclusion of other uses *Construction and operation, and maintenance*	No	Yes
Recreation	Impacts to recreational facilities and trails *Construction, operation, and maintenance*	No	Yes
Public Services/Utilities	None	-	-
Hazardous Waste/Materials	None	-	-
Traffic and Transportation	Use of local transportation infrastructure	No	No
Visual Resources	Adverse affects to visual resources of the area *Construction, operation, and maintenance*	No	Yes
Cultural Resources	Disturbance or removal of historical, cultural and/or archaeological resources *Construction, operation, and maintenance*	Yes	Yes
Wildfire and Fuels	Impacts to fire suppression efforts *Construction, operation, and maintenance*	No	Yes
Electrical Effects	None	-	-
Social and Economic Conditions	None	-	-
Biological Resources	Disturbance to and loss of vegetation and wildlife Degradation and loss of habitat *Construction and operation, and maintenance*	Yes	Yes
Earth Resources: Soils	Soil loss and erosion *Construction activities*	Yes	Yes
Earth Resources: Mineral Resources	Raw materials *Construction activities*	No	Yes
Water Resources	Impacts to drainages, wetlands, Waters of the State, Waters of the U.S. *Construction activities*	No	No

4.20 INTENTIONAL DESTRUCTIVE ACTS

Intentional destructive acts, such as acts of sabotage, terrorism, vandalism, and theft, can occasionally occur at power utility facilities. Acts of sabotage or terrorism on electrical facilities in the Pacific Northwest are rare. When they occur, these acts are generally focused on attempts to destroy large transmission line steel towers.

Vandalism and thefts at electrical facilities are the most common intentional destructive acts. Recent increases in the price of metal and other materials have resulted in increased thefts at electrical facilities. Pacific Power has seen an increase in metal theft from its facilities over the past few years when the price of metal is high on the salvage market. There were more than seven burglaries at Pacific Power substations in 2012. The conservative estimate of damages for these crimes is $9,000, but the actual amount is likely much higher since this number does not factor in all the labor-related costs associated with repairing the damage. Stealing equipment from electrical substations can be extremely dangerous. Throughout the nation, thieves have been electrocuted while attempting to steal equipment from energized facilities; however, no deaths associated with thefts have occurred at Pacific Power facilities.

To prevent theft, vandalism, and unauthorized access to facilities, all Pacific Power electrical facilities are secured with fencing and warning signs, with sites that are classified as critical receiving additional measures. In addition, a reward program is initiated by Pacific Power to respond to heightened theft activity, when deemed necessary.

Depending on the size and voltage of the line, destroying towers or other equipment could cause electrical service to be disrupted to utility customers and end-users. The effects of these acts would be varied and would depend on the configuration of the transmission system in the area. In some circumstances, these acts would have no noticeable effect on electrical service; however, in other situations, service could be disrupted in the local area, or if the damaged equipment was part of the main transmission system, a much larger area could be impacted.

When a loss of electricity occurs, all services provided by electrical energy cease. Services lost to residential, commercial, industrial and municipal customers could include: lighting; heat; electricity for cooking; loss of ventilation; and the stopping of mechanical drives causing impacts to elevators, food preparation machines, appliances for cleaning, hygiene, and grooming, office equipment, heavy equipment, and fuel pumps. In addition, if traffic signals fail to operate, roadways could experience gridlock and mass transit dependent upon electricity, such as light rail systems, could be impacted. Sewage transportation and treatment can be disrupted.

Overhead transmission conductors and the towers that carry them are mostly on unfenced utility rights-of-way. All new equipment associated with the proposed Project would be installed within existing fencing at both the Pacific Power Pomona Heights Substation and the existing Bonneville Power Administration Vantage Substation sites.

While the likelihood for sabotage or terrorist acts on the proposed Project is difficult to predict, it is unlikely that such acts would occur. If such an act did occur, the problem area would be isolated quickly and electricity rerouted as much as possible to keep the system functioning. The Department of Energy, public and private utilities, and energy resource developers use security measures to help prevent such acts and to respond quickly if human or natural disasters occur.

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CHAPTER 5 CONSULTATION AND COORDINATION

5.1 INTRODUCTION

This chapter summarizes public and agency involvement activities undertaken by the U.S. Bureau of Land Management (BLM). These activities have been conducted for the Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project in order to satisfy the National Environmental Policy Act (NEPA) requirements for public scoping and agency consultation and coordination. Federal agencies preparing an Environmental Impact Statement (EIS) must "make diligent efforts to involve the public in preparing and implementing their [NEPA] procedures" (40 Code of Federal Regulations [CFR] Part 1506.6 (a)). Council on Environmental Quality (CEQ) regulations provide guidance on the scoping process, including inviting participation of affected federal state and local agencies, Native American Tribes, as well as any other interested parties (40 CFR Part 1517.7 (a) (1)).

Consistent with NEPA procedures, public participation and agency consultation for this Project have been accomplished through issuance of public notices, public scoping meetings, and formal and informal consultation with agencies, stakeholders, landowners and Native American tribes. The consultation and coordination process helped determine the scope of the EIS; identify the range of alternatives; and define issues of importance and potential environmental impacts to be addressed in the EIS. The Project Team will continue to solicit public and agency input on the Project by encouraging review of the EIS.

5.2 SCOPING PROCESS

Scoping is an early and open process for determining the scope of issues to be addressed in the EIS and for identifying the significant issues related to the proposed action by seeking comments from interested and potentially affected parties, including landowners, citizens, tribes, government agencies, and interest groups and organizations (40 CFR Part 1501.7). The intent of scoping is to focus the analysis on significant issues and reasonable alternatives, to eliminate extraneous discussion, and to reduce the length of the EIS. Scoping occurs early in the NEPA process and generally extends through the development of alternatives.

5.2.1 Notice of Intent

Publishing the Notice of Intent (NOI) in the *Federal Register* begins the formal scoping process and serves as the official legal notice that the BLM is commencing an EIS. To comply with NEPA 40 CFR Part 1508.22, on January 5, 2010, the BLM published an NOI to prepare an EIS for the Vantage to Pomona Heights 230 kV Transmission Line Project in the *Federal Register*, Volume 75, Number 175. The *Federal Register* is the official federal daily publication for rules, proposed rules and notices of federal agencies and organizations.

The NOI initiated the public scoping period for the EIS and described the Vantage to Pomona Heights 230 kV Transmission Line Project, alternatives and the environmental review process. It also identified preliminary issues and concerns and contacts. The NOI served as an invitation to provide comments on the proposed Project and the scope and content of the EIS. The comment period began on January 5, 2010 with a request that all comments be received by March 8, 2010.

5.2.2 Public and Agency Notification Letters

In addition to the *Federal Register* notice, the BLM sent letters notifying landowners within 0.25 mile on either side of assumed centerlines of the preliminary alternative routes of the Project, of the intent to prepare an EIS, the dates, location and time of the public scoping meetings, and ways to provide comments and when the comments were due (March 8, 2010).

Dear Interested Party letters were also sent to other interested individuals, groups, organizations and Native American tribes on a mailing list developed by the BLM. In addition, letters were sent to federal, state and local agencies and elected officials notifying them of the Project, the intent to prepare an EIS, the scoping period, and an invitation to attend an agency scoping meeting. A total of 1,280 Dear Interested Party and Agency notification letters were sent on January 14, 2010. The notification packet included the letter and a map showing the preliminary route alternatives under consideration.

The following is a breakdown of the distribution of the public, agency and Native American tribal government notification letters:

- 117 Agencies (51 federal, 36 state, 18 county, 12 city/local)
- 11 Native American Tribes
- 22 Elected Officials
- 50 Organizations
- 19 Schools/Libraries
- 158 Individuals
- 903 Landowners

5.2.3 News Release and Paid Announcements

The BLM issued a news release to the local media and posted it on the BLM website on January 8, 2010 announcing the Project, public scoping meetings, and requesting comments. In addition to the BLM news release, paid advertisements were placed in the newspapers listed below announcing the public scoping meetings.

Selah Public Scoping Meeting

- Yakima Herald Republic – January 27, 2010 and January 31, 2010
- Selah Independent – January 27, 2010
- Ellensburg Daily Record – January 27, 2010

Mattawa Public Scoping Meeting

- Sunnyside Daily News – January 27, 2010
- The Columbia Basin Herald – January 27, 2010
- The Othello Outlook – January 28, 2010
- South County Sun – January 27, 2010
- Independent Review – February 3, 2010
- Mattawa Area News – February 3, 2010

5.2.4 Website and Comment Methods

The BLM posted information on the Project Web site at: http://www.blm.gov/or/districts/spokane/plans/vph230.php consisting of a Project description, announcement of public open houses, how to submit comments, point of contact for more information, preliminary Project map, official NOI, and Letter to Interested Parties.

The BLM and the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) invited comments through a variety of methods, including:

- Comments submitted by email
- Comment forms collected at public scoping meetings
- Comments submitted at geographic information system workstations at public scoping meetings
- Comments by mail or fax
- Written and verbal comments recorded by the BLM, JBLM YTC and contractor staff at the public scoping meetings

Comments were accepted through March 8, 2010.

5.2.5 Scoping Meetings

The BLM held two open house style public scoping meetings on consecutive evenings from 6 p.m. to 8 p.m. and one round table agency scoping meeting from 1:30 p.m. to 3:30 p.m. at the locations and dates listed in Table 5-1.

TABLE 5-1 SCOPING MEETING DATES AND LOCATIONS

MEETING DATE	MEETING LOCATION	MEETING ATTENDANCE*
February 3, 2010 Public Scoping Meeting	Selah Civic Center, Selah, WA	71
February 4, 2010 Public Scoping Meeting	Mattawa Elementary School Cafeteria, Mattawa, WA	23
February 3, 2010 Agency Scoping Meeting	Selah Civic Center, Selah, WA	-Washington Dept of Fish and Wildlife -Washington Department of Transportation -U.S. Fish and Wildlife Service -Kittitas County -Yakama Nation

*This column reflects the number of people who signed the meeting sign-in sheet form. Some members of the public declined to sign the form.

5.2.6 Second Dear Interested Party Letter and Comment Period

During 2010, there were numerous changes to the route alternatives presented for comment during the formal scoping period (January 5, 2010 through March 8, 2010). As a result of the changes to the route alternatives, the BLM prepared and distributed a second Dear Interested Party Letter on January 14, 2011. The mailing list was updated to include new interested parties and landowners potentially affected by the new route alternatives.

The purpose of the letter was to provide agencies, Native American tribes, landowners, and other organizations an update on the EIS process and schedule, as well as to present changes to the route alternatives for review and comment. Comments on the revised route alternatives were accepted through February 4, 2011. No additional public meetings were held during this second comment period. A total of 1,019 Dear Interested Party letters were sent on January 14, 2011.

The following is a breakdown of the distribution of the Second Dear Interested Party letter:

- 100 Agencies (35 federal, 38 state, 17 county, 10 city/local)
- 15 Native American Tribes
- 27 Elected Officials
- 16 Organizations
- 12 Schools/Libraries

- 150 Individuals
- 699 Landowners

5.2.7 Issues, Concerns and Comments

Issues, concerns and comments received from the January 5, 2010 to March 8, 2010 scoping period and the second comment period, January 14, 2011 to February 4, 2011 are summarized in Chapter 1, Section 1.10 - Issues Identified. A detailed summary of issues, concerns and comments, as well as copies of comment letters received is contained in the February 2011, *Vantage to Pomona Heights 230 kV Transmission Line Project EIS Scoping Report.* The full report is available for inspection and review at the BLM Wenatchee Field Office.

5.3 DRAFT ENVIRONMENTAL IMPACT STATEMENT

5.3.1 Notice of Availability

A Notice of Availability letter announcing the availability of the Draft Environmental Impact Statement (DEIS) was mailed to agencies, organizations, interested parties and landowners in December 2012 in advance of the Federal Register notice on January 14, 2013. The letter was mailed to 1,050 parties. It announced the public comment period, location where copies of the DEIS would be available for review, and ways to submit comments.

5.3.2 Federal Register Notice

A Federal Register notice published January 4, 2013, announced the availability of the DEIS.

5.3.3 DEIS Comment Period

The public comment period for the DEIS began on January 4, 2013 and ended on March 8, 2013. The BLM received 66 letters and e-mails containing more than 250 comments during the comment period.

5.3.4 DEIS Public Meetings

Two public meetings were held to receive comments on the DEIS.

- February 5, 2013 at the Selah Civic Center, Selah, Washington from 6 p.m. to 8 p.m. Thirty persons attended the meeting.
- February 6, 2013 at the Desert-Aire Multipurpose Room, Mattawa, Washington from 6 p.m. to 8 p.m. Fifty-five persons attended the meeting.

5.4 THIRD DEAR INTERESTED PARTY LETTER

As a result of comments received during the DEIS comment period, the BLM, Pacific Power and JBLM YTC met and identified a new route that was largely on JBLM YTC land. The BLM then prepared and distributed a third Dear Interested Party letter on May 31, 2013. The mailing list was updated to include new interested parties and landowners potentially affected by the New Northern Route (NNR) alternative.

The purpose of the letter was to provide agencies, Native American Tribes, landowners and other organizations information on the proposed location of the new route alternative and the reasons for its identification and consideration. The letter also informed interested parties that the BLM decided that a Supplemental Draft Environmental Impact Statement (SDEIS) would be required to identify impacts and mitigation measures associated with the NNR alternative. The letter stated that the public would have the opportunity to provide comments on the NNR alternative once the SDEIS was prepared and issued for public comment.

5.5 CONSULTATION AND COORDINATION

Agencies, Native American tribes, organizations and individuals having jurisdiction, special expertise and/or specific interest in the Project were contacted during the scoping process, during the resource inventory and surveys and prior to the publication of the DEIS to inform them of the Project, to verify the status and availability of existing environmental data, to request data and comments, and to solicit input about the Project. This section describes the consultation and coordination activities that have occurred throughout the EIS process.

5.5.1 Cooperating Agencies

The CEQ regulations implementing NEPA encourage the lead federal agency to invite other federal, state, tribal or local agencies with jurisdiction by law or special expertise with respect to environmental issues addressed in the analysis to serve as cooperating agencies in the preparation of the EIS (40 CFR Part 1508).

The BLM is the lead federal agency for NEPA compliance and preparation of the EIS. There are nine Cooperating Agencies.

A summary of each Cooperating Agency's interests and responsibilities with respect to the proposed Project is provided below.

- **U.S. Army Joint Base Lewis-McChord Yakima Training Center (JBLM YTC):** The JBLM YTC is a formal Cooperating Agency responsible for processing Pacific Power's application for a right-of-way (ROW) on federal lands managed by the U.S. Department of the Army.

- **Bonneville Power Administration (BPA):** BPA is a formal Cooperating Agency because it owns and operates the existing Vantage Substation to which Pacific Power is proposing to interconnect its proposed transmission line.

- **U.S. Bureau of Reclamation (Reclamation):** Reclamation is a formal Cooperating Agency responsible for processing Pacific Power's ROW application (SF 299) filed on April 17, 2011 requesting a grant of ROW across federal lands managed by Reclamation.

- **Yakima County:** Yakima County is a formal Cooperating Agency because of its responsibility under county code to review the proposed transmission line Project which is subject to a Type II Land Use review. For the county to make a decision regarding the issuance of a Type II Administrative Permit, it is necessary for the Project to comply with the Washington State Environmental Policy Act (SEPA). Yakima County may choose to adopt this SDEIS and Final EIS to satisfy SEPA requirements.

- **Kittitas County:** Kittitas County is a formal Cooperating Agency and is required by its code to review transmission lines over 115 kV through a Conditional Use Permitting (CUP) process. A CUP must comply with the SEPA and Kittitas County may chose to adopt this SDEIS and Final EIS to satisfy SEPA requirements.

- **Washington Department of Transportation (WSDOT):** The WSDOT is a formal Cooperating Agency because of its responsibility to process Pacific Power's utility permit or franchise application(s). In order for WSDOT to make a determination on Pacific Power's application(s), the Project will need to comply with SEPA.

WSDOT would also be responsible for coordinating Federal Highway Administration's review and concurrence of a permanent access break for a utility installation across Interstate 82 providing an easement through WSDOT property and providing any additional documentation for compliance with NEPA and SEPA, the Endangered Species Act (ESA), and the National Historic Preservation Act (NHPA).

- **Federal Highway Administration (FHWA):** The FHWA is a formal Cooperating Agency responsible for approving Pacific Power's application to use Interstate 82 land owned by WSDOT. FHWA will use this SDEIS and the Final EIS as the basis from which to make decisions related to granting a ROW to Pacific Power for construction, operation and maintenance of a new 230 kV transmission line.

- **U.S. Fish and Wildlife Service (USFWS):** The USFWS is a formal Cooperating Agency because of its special expertise and jurisdiction by law of threatened, endangered, proposed, and candidate species; migratory birds; and bald eagles and golden eagles pursuant to the implementing regulations of the ESA (16 United States Code [U.S.C.] §1531 *et seq.*); the Migratory Bird Treaty Act (MBTA; 16 U.S.C. §703-712) and Executive Order 13186; and the Bald and Golden Eagle Protection Act (16 U.S.C. §668-668d), respectively. In addition, USFWS has special expertise in management of greater sage-grouse, which the USFWS has found warrants protection under the ESA, but is precluded by the listing of higher priority species. USFWS would also be responsible for consultation or conferencing with the lead federal agency to fulfill Interagency Cooperation obligations in accordance with Section 7(a)(2) of the ESA.

- **Washington State Department of Natural Resources (DNR):** The DNR is a formal Cooperating Agency responsible for approving Pacific Power's easements and access permit applications for crossing DNR-managed uplands, and approving a use authorization for crossing State-Owned Aquatic Lands. Prior to processing permit applications, the Project will need to comply with Washington's SEPA and meet the DNR's state substantive standards. The DNR has special expertise in managing natural resources including natural areas and will provide technical assistance to preserve and protect these environmentally sensitive areas consistent with state standards.

Two coordination conference calls were held each month; one call consisted of the BLM and Cooperating Agencies; the second call consisted of the Project Steering Committee. The Steering Committee is composed of the following members: BLM, USFWS, Reclamation, JBLM YTC, WDNR, Washington Department of Fish and Wildlife (WDFW), WSDOT, Kittitas County, Grant County, Yakima County, Washington Governor's Office for Regulatory Innovation and Assistance, Pacific Power, and EIS contractor POWER Engineers, Inc (POWER).

The purpose of the calls was to discuss the status of EIS analysis and preparation, receive agency updates, review upcoming milestone tasks, coordinate information exchange, identify action items and other pertinent discussions related to the preparation of the EIS.

In addition, a Sage-Grouse Working Group was formed to guide the analysis of potential impacts to sage-grouse as well as to develop a mitigation framework. The group consisted of representatives of the BLM, USFWS, WDFW, JBLM YTC and POWER.

5.5.2 Tribal Consultation

Various federal statutes and regulations, including NEPA and the NHPA, require that agencies consult with Native American tribes. Also, Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments,* issued in 2000, directs federal agencies to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Native American tribes, and to reduce the imposition of unfunded mandates upon Native American tribes.

Regulations for Section 106 of the NHPA require that federal agencies identify potentially affected Native American tribes that might have knowledge of sites of religious and cultural significance in the area of potential effects (APE; 36 CFR Part 800.3(f)(2)). If any such properties exist, the regulations require that federal agencies invite Indian tribes to participate in the Section 106 process as consulted parties. For the Vantage to Pomona Heights 230 kV Transmission Line Project, the BLM is responsible for Section 106 consultation with Native American tribes that could potentially have interest in or who have traditional ties to the Project area. As required by the NHPA (36 CFR Parts 800.2(c)(2), 800.3(f)(2), 800.14(b)(2), and 800.14(f)), the BLM has consulted the federally recognized Confederated Tribes and Bands of the Yakama Nation and the Colville Confederated Tribes. The BLM has also consulted with the non-federally recognized Wanapum Band of Indians.

Tribal consultation to date has consisted of:

- Visit to Project vicinity by JBLM YTC and Yakama Nation Cultural Resource Program representatives on January 12, 2010.

- The public scoping letter for the Vantage to Pomona Heights Transmission Line Project was sent to the tribes and tribal organizations on January 14, 2010.

- Information meeting at Yakima Training Center on January 19, 2010 with Yakama representatives (Johnson Meninick, Dave Woody, Gideon Cauffman, Randell Squeochs), JBLM YTC (Randy Korgel), and Pacific Power (John Aniello).

- Letter from Wanapum Band of Indians to JBLM YTC on October 19, 2010 stating the Wanapum do not support any of the proposed route alternatives identified at that time.

- Second letter from Wanapum Band of Indians to JBLM YTC on October 19, 2010 stating the Wanapum do not support a route alternative along the abandoned railroad ROW (Route Segment 3b).

- Letter from Confederated Tribes and Bands of the Yakama Nation on October 27, 2010 to JBLM YTC requesting consultation and expressing that the proposed Project will have an adverse effect on cultural resources and that the Yakama Nation is not in support of proposed alternatives.

- Information meeting at Yakima Training Center on December 9, 2010 with Yakama and Wanapum Tribal representatives and BLM, JBLM YTC, Pacific Power, POWER, and Grant County Public Utility District (PUD) representatives.

- During 2010, there were numerous changes to route alternatives. As a result of the changes to the route alternatives, the BLM prepared and sent a second scoping letter to interested parties and the tribes and tribal organizations on January 14, 2011.

- Meeting with Yakama Cultural Committee and Wanapum at Yakama Agency main Offices, Toppenish, Washington on January 27, 2011, attended by Yakama Tribal Council members, and representatives of JBLM YTC, Pacific Power, POWER, BLM, and Grant County PUD.

- Meeting on March 1, 2011 in Ellensburg, Washington to discuss various aspects of NEPA and Section 106 processes, attended by cultural resource staff from BLM, JBLM YTC, POWER, and Yakama Nation.

- As part of government-to-government consultation, Native American consultation letters were sent out by the BLM on March 21, 2011 to the Yakama Nation, Wanapum Band of Indians and the Confederated Tribes of the Colville Reservation.

- Resolution from Yakama Nation Road, Irrigation and Land Committee (CA# 102 2011-5) dated March 21, 2011 rejecting the route segment along the abandoned railroad ROW (Route Segment 3b), with particular concern about proximity to Priest Rapids longhouse and sweat lodge.

- Resolutions from Yakama Nation Tribal Council Lands Committee and Culture Committee (CA# 048 2010-10 and CA# 102 2011-5) dated March 21, 2011 rejecting the route segment along the abandoned railroad right-of-way (Route Segment 3b).

- Resolution from the Yakama Nation Tribal Council Cultural Committee (CA# 019 2012-10) approved support of Route Segment 3c as long as full avoidance of archaeological sites can be achieved.

- Preferred Route Selection Workshop held in Yakima, Washington on May 17, 2012. The Workshop included 40 participants from the BLM (lead agency), JBLM YTC (cooperator), BPA (cooperator); Reclamation (cooperator), WDFW (cooperator), Yakima County (cooperator), Grant County (cooperator), Pacific Power (proponent), POWER (third-party EIS contractor), and representatives from the Confederated Tribes and Bands of the Yakama Nation and Wanapum Band of Indians. During this meeting, the Yakama Nation and the Wanapum Band of Indians expressed concern for cultural resources and requested surveys be conducted for all route segments. Refer to Chapter 2 (Section 2.8) for more information on the Preferred Route Selection Workshop.

- The Confederated Tribes and Bands of the Yakama Nation and Wanapum Band of Indians were notified on May 25, 2012 of plans to develop a Programmatic Agreement (PA) to address Section 106 review including cultural resources inventory, evaluation, and measures to address adverse effects.

- Letter from BLM to the Yakama Nation and the Wanapum Band of Indians dated June 22, 2012 inviting them to become a formal cooperating agency for the proposed Project.

- The revised draft Section 106 Programmatic Agreement was submitted to the Cultural Resource Management Program for Yakama Nation and the Wanapum Band of Indians for review and comments on February 19, 2013.

- The Yakama Nation, Colville Confederated Tribes, and the Wanapum Band of Indians were notified in a letter dated May 31, 2013 of plans to analyze the NNR alternative.

- Letter from BLM to the Yakama Nation, Colville Confederated Tribes, and the Wanapum Band of Indians dated May 31, 2013 requested review of the area of potential effect for the NNR alternative.

- The revised draft Section 106 Programmatic Agreement was submitted to the Colville Confederated Tribes' Tribal Historic Preservation Office for review and comments on August 23, 2013.

- The Yakama Nation, Colville Confederated Tribes, and the Wanapum Band of Indians were informed in the letter dated November 11, 2013 of a possible new subroute for the NNR alternative at Manastash Ridge and were offered field visits.

- The Yakama Nation, Colville Confederated Tribes, and the Wanapum Band of Indians were notified in a letter dated January 9, 2014 of plans to analyze the new Manastash Ridge subroute and underground segments of the NNR alternative.

- In response to the BLM letter of January 9, 2014, the Colville Confederated Tribes requested a contract for preparing a TCP report for the NNR alternative in the letter of January 29, 2014.

- The revised draft Section 106 Programmatic Agreement was submitted to Yakama Nation Cultural Resource Management Program, Colville Confederated Tribes History and Archaeology Department, and the Wanapum Band of Indians for review and comments on March 13, 2014.

As an outgrowth of the consultation process Pacific Power funded a study of Traditional Cultural Properties (TCPs) in the Project vicinity. The Yakama Nation Cultural Resource Program prepared a TCP report (Lally and Camuso 2011) identifying sites and issues of concern regarding Project alternatives. Separate TCP reports are being prepared for the NNR alternative by the Yakama Nation Cultural Resource Program and the Colville Confederated Tribes History and Archaeology Program. The TCP studies are being performed under the direction of the BLM.

5.5.3 Biological Resources

Under the provisions of Section 7(a) (2) of the ESA, a federal agency that carries out, permits, licenses, and funds or otherwise authorizes an activity must consult with the USFWS as appropriate, to ensure the action is not likely to jeopardize the continued existence of any species listed as threatened or endangered. BLM briefed USFWS and WDFW on the Project during agency scoping in 2008. In accordance with ESA regulations, the BLM initiated informal consultation with the USFWS in 2010 for the alternatives considered in the DEIS. On March 1, 2011, the USFWS attended an interagency meeting with resource specialists and representatives from the BLM, WDFW, JBLM YTC, Yakama Nation, Reclamation, Grant County, Kittitas County, DNR, WSDOT, Pacific Power and the EIS contractor, POWER. Due to additional developments during the public comment period for the DEIS, BLM and the cooperating agencies made the decision to prepare an SDEIS to analyze an additional alternative; the NNR alternative with design options. BLM briefed USFWS and WDFW on the NNR during an in-person meeting in Ellensburg, Washington on July 17th, 2013. On November 21st, 2013 USFWS and WDFW attended an in-person meeting hosted by BLM at the Yakima Training Center to discuss cooperating agency status and the SDEIS schedule. USFWS entered into an agreement (MOU) with BLM on April 4th 2014 formalizing their cooperating status on this project. WDFW is not a cooperating agency on this project, but remains involved as a technical advisor to BLM and a member of the sage-grouse subgroup.

To fulfill the NEPA requirements for the evaluation and determination of potential impacts to biological resources and special status species and to comply with Section 7 of the ESA, MBTA, Bald and Golden

Eagle Protection Act, SEPA, BLM and other county and state permits, a list of special status species was compiled. These species were identified from the federal threatened, endangered and candidate species list for each county located with the Project area, state of Washington listed species, the BLM sensitive species list and JBLM YTC sensitive species. The species list also included other sensitive species protected under the Bald and Golden Eagle Protection Act and/or MBTA and game species that may occur within the Project area. In addition, special status plant species were identified by compiling a list of all special status species known to the counties (Benton, Grant, Kittitas, and Yakima), data accessed from the Washington Natural Heritage Program and BLM. The list was further refined with special status species from the USFWS; federally threatened, endangered and species of concern; Washington State threatened and endangered species, Inter-agency Special Status/Sensitive Species Program species and JBLM YTC. Wildlife special status species are discussed in Section 3.3 and plant special status species are discussed in Section 3.2.

Four federally list wildlife species were identified as likely to occur within the Project area, including one threatened, one endangered and two candidate species. Five federally listed plant species were identified as likely to occur within the Project area. None of these plant species were located in the Special Status Plant surveys (Appendix B-3).

The National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) is consulted when a project's activities may affect a marine or anadromous fish or mammal species listed under the ESA. For the proposed Project, no structures or road construction work would occur within the Columbia River or its tributaries. For the Columbia River crossing, the structures would be approximately 200-foot tall lattice steel structures for the up to 2,800 foot crossing. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. These may include straw waddles, straw bale barriers and silt fencing which would be placed at construction boundaries. Specific erosion and sediment control measures and locations would be specified in a Stormwater Pollution Prevention Plan (SWPPP). No identifiable impacts to federally listed fish or their habitat are anticipated to occur through construction, operation and maintenance of the proposed Project. It is anticipated that informal consultation with NMFS will be conducted.

5.5.4 Cultural Resources

Section 106 of the NHPA of 1966 (as amended), requires federal agencies to evaluate effects of federal undertakings on historical, archaeological, and cultural resources, and to consult with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) concerning potential effects of federal actions on historic properties. Before federal funds are approved for a particular project or prior to the issuance of any permit, authorization, or license, the effect of the project on any district, site, building, structure, or object that is listed in or eligible for listing in the National Register of Historic Places (National Register) must be evaluated.

As required by the federal regulations implementing the NHPA (36 CFR Part 800), the BLM, as lead agency, has consulted with the Washington SHPO (36 CFR Part 800.3(c) (3)), and is fulfilling the requirement for JBLM YTC, BOR, BPA, and FHWA. On March 21, 2011, the BLM sent a letter to the SHPO requesting consultation for the Vantage to Pomona 230 kV Transmission Line Project, as well as concurrence of the APE as defined in 36 CFR Part 800 16(d).

The BLM, JBLM YTC, Reclamation, BPA, and the Washington SHPO are in the process of preparing a PA for the Project that would establish procedures for identifying historical, archaeological, and cultural resources; evaluating their eligibility to the National Register, assessing effects; and implementing measure to avoid or mitigate adverse effects. The ACHP was notified on March 1, 2011 of the undertaking, and notification of adverse effects and plans to develop a PA for the Project was submitted on May 17, 2012. On June 16, 2012, the ACHP declined to participate in consultation to resolve adverse effects at this time.

On May 31, 2013, BLM notified the Washington SHPO of the NNR to the Vantage to Pomona 230 kV Transmission Line Project and requested concurrence with BLM's definition of the APE for the new alternative. Consultation was initiated with the Washington SHPO again on January 9, 2014 for the definition of the APE for the new Manastash Ridge subroute and proposed underground segments of the NNR alternative.

A cultural resource study involving the collection of Class I data was conducted to identify and assess potential impacts the proposed Project may have on cultural resources and to support the evaluation of Project alternatives for the EIS. A detailed cultural resources technical report with detailed mapping of recorded sites and survey areas was prepared. In addition, a TCP study was conducted and a report was prepared by the Yakama Nation Cultural Resource Program. Separate TCP reports are being prepared for the NNR alternative by the Yakama Nation Cultural Resource Program and the Colville Confederated Tribes History and Archaeology Program. An intensive Class III inventory survey of the selected route and a sample of route segments identified in the alternatives will be conducted. The survey will be conducted to specifically identify those cultural resources that occur within the Project's APE.

5.5.5 Agencies, Organizations or Individuals Consulted

The following agencies, organizations and stakeholders were consulted as part of the EIS process:

FEDERAL AGENCIES

U.S. Fish and Wildlife Service
- Central Washington Fish and Wildlife Office
- Central Washington Field Office Ecological Services

Bureau of Reclamation
- Pacific Northwest Region-Ephrata Field Office

Joint Base Lewis-McChord Yakima Training Center

U.S. Army Corps of Engineers
- Seattle District Regulatory Branch
- Eastern Washington Field Office
- Central Washington Field Office

Columbia National Wildlife Refuge

Hanford Reach National Monument

Department of Energy

Federal Aviation Administration
- Washington Division
- Northwest Mountain Division

U.S. Environmental Protection Agency
- Region 10

Federal Highway Administration
Washington Division

Bonneville Power Administration

Advisory Council on Historic Preservation

Pacific Northwest Regional Infrastructure Team

STATE AGENCIES

Washington Department of Natural Resources
Southeast Region
Natural Heritage Program
Rights of Way Program

Washington Department of Fish and Wildlife
South-Central Regional Office

Washington Department of Ecology
Central and Eastern Regional Offices

Washington State Department of Transportation
South Central Region
Aviation Division

Washington Department of Archaeology and Historic Preservation
State Historic Preservation Office

Washington Army National Guard
Camp Murray, WA

Washington Governor's Office of Regulatory Innovation and Assistance

REGIONAL/LOCAL ENTITIES

Port of Mattawa

Yakima Regional Clean Air Agency

Grant County Public Utility District No.2

Desert Aire

Grant County Airport District No. 1

Western Electricity Coordinating Council

COUNTIES

Yakima County
- County Commission
- Public Services - Planning and Transportation
- Noxious Weed Control Board

Grant County
- County Commission
- Community Development-Planning Division
- Public Works Department
- Noxious Weed Control Board

Kittitas County
- County Commission
- Community Development Services
- Public Works Department
- Noxious Weed Control Board

Benton County
- Planning Department
- Public Works Department
- Noxious Weed Control Board

NATIVE AMERICAN TRIBES

Confederated Tribes and Bands of Yakama Nation

Wanapum Band of Indians

Confederated Tribes of the Colville Reservation

ORGANIZATIONS/STAKEHOLDERS

Pacific Northwest 4-Wheel Drive Association

Washington Association of Wine Grape Growers

Shaw Vineyards

Taylor Orchards

Ginkgo Forest Winery

Yakima Valley Audubon Society

Auvil Fruit Company

Burke Wahluke Enterprises

S Martinez Livestock, Inc.

Black Rock Ranch

Bassini Farms LLC

Coombs Ranch

Desert Aire Owners Association

Northern Fruit Company

Alton Family Trust

Drummers and Dreamers LLC

Double D Farms

Central Valley Helicopters

J. Eckenberg

J. Gallacci

Nathan Maughn

R. Eaton

5.6 PUBLIC REVIEW OF THE SDEIS

An SDEIS must be circulated in the same manner as a draft or final EIS (40 CFR Part 1502.9(e)). In compliance with NEPA (40 CFR Part 1506.6(b)(2)), a Notice of Availability (NOA) of the SDEIS must be published in the Federal Register, thus beginning the public comment period. The SDEIS is submitted to the U.S. Environmental Protection Agency (USEPA) which is required to review all EISs. The USEPA is also responsible for publishing the NOA after the SDEIS is received (40 CFR Parts 1506.9, 1506.10).

The minimum public review period for a SDEIS is 45 days from the date of publication of the NOA by the USEPA, unless a longer period is required by individual agency regulation or process.

In accordance with NEPA requirements, this SDEIS has been distributed for review and comment by agencies, interested organizations and individuals for a period of 45 days. All comments received from the review will be compiled, analyzed, summarized and responded to in the Final EIS.

This SDEIS was posted to the BLM website; electronic copies were produced on CD-ROM for distribution. This SDEIS has been distributed to agencies required to review it, and to other agencies, organizations and individuals that requested copies.

All written comments must be received 45 days after the NOA was published by the USEPA in the *Federal Register*. Comments on the SDEIS may be submitted in writing by letter or by e-mail to the BLM (as instructed in the letter to reviewers at the beginning of this document).

Following consideration of the comments received during the SDEIS comment period, a Final EIS will be prepared and circulated per NEPA requirements and will include responses to all comments. The BLM will use the Final EIS when considering approval of the proposed Project. The BLM will issue a Record of Decision to document that decision.

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CHAPTER 6 LIST OF PREPARERS AND CONTRIBUTORS

Preparers and contributors involved throughout the Project, including U.S. Bureau of Land Management (BLM) and cooperating agency staff, consultants, and Project proponent are presented in Tables 6-1, 6-2, and 6-3.

TABLE 6-1 LEAD AND COOPERATING AGENCY PREPARERS AND CONTRIBUTORS

NAME	TITLE	INVOLVEMENT
U.S. Bureau of Land Management (BLM) (Lead Agency)		
Richard Bailey	Spokane District Archaeologist	Cultural Resources, Programmatic Agreement, Section 106 Compliance
Jeffery Bernstein	Attorney - U.S. Department of the Interior, Office of the Solicitor	National Environmental Policy Act (NEPA) Compliance and Document Review
Molly Boyter	Botanist	Botanical Resources, Sensitive Species, Threatened and Endangered Species, Invasive Species and Noxious Weeds
Chris Carlton	Spokane District Planning and Environmental Coordinator	NEPA and Land Use Planning Compliance
Linda Coates-Markle	Wenatchee Field Manager & Authorizing Officer's Representative	Project Management and Government Coordination
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NAME	TITLE	INVOLVEMENT
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Bureau of Reclamation (Reclamation) (Cooperating Agency)		
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NAME	TITLE	INVOLVEMENT
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NAME	TITLE	INVOLVEMENT
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TABLE 6-2 CONTRACTOR AND SUBCONTRACTOR PREPARERS AND CONTRIBUTORS

NAME	EDUCATION	INVOLVEMENT
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TABLE 6-3 PROJECT PROPONENT PREPARERS AND CONTRIBUTORS

NAME	TITLE	INVOLVEMENT
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Juan Luna Orozco	Senior GIS Analyst	GIS Support

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CHAPTER 7 LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYM / ABBREVIATION	DEFINITION
°F	Fahrenheit
AC	alternating current
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACP	asphalt concrete pavement
AEC	Atomic Energy Commission
AMS	Analysis of Management Situation
AO	Authorizing Officer
APE	Area of Potential Effects
APLIC	Avian Power Line Interaction Committee
Army	U.S. Department of the Army
B&O	Washington State Business and Occupation
BCAA	Benton Clean Air Agency
BLM	U.S. Bureau of Land Management
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe
BPA	Bonneville Power Administration
BST	bituminous surface treatment
C, M, SP, & P	Chicago, Milwaukee, St. Paul, and Pacific Railroad
CAA	Clean Air Act
CAO	Critical Areas Ordinances
CCD	Census County Division
CDP	Census Designated Place
CE	cumulative effects
CEMP	Comprehensive Emergency Management Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulation
cfs	cubic feet per second
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
$CO_2(e)$	Carbon dioxide equivalent
COT	Conservation Objectives Team
CRP	Conservation Reserve Program
CUP	Conditional Use Permit
CWA	Clean Water Act
DAHP	Washington Department of Archaeology and Historic Preservation
dBA	A-weighted decibels
DC	direct current
DEIS	Draft Environmental Impact Statement
DES	Duke Engineering Service
DNR	Washington State Department of Natural Resources
DOE	U.S. Department of Energy
DPS	Distinct Population Segment
EDNA	environmental designation for noise abatement
EIS	Environmental Impact Statement
EJ	Environmental Justice
ELF	extremely low frequency
EMF	electric and magnetic fields

ACRONYM / ABBREVIATION	DEFINITION
EPR	Economic Planning Resources
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FAA	Federal Aviation Administration
FCC	Federal Communication Commission
FCRTS	Federal Columbia River Transmission System
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FFC	Federal functional classifications
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy and Management Act of 1976
FPPA	Farmland Protection Policy Act
FRCC	Fire Regime Condition Class
G	Gauss
GAP	Gap Analysis Program
GIL	Gas Insulated Line
GIS	Geographic Information System
GMA	Growth Management Act
GMU	Game Management Unit
GPO	Goals, Policies, and Objectives
GPS	Global Positioning System
HCA	Habitat Concentration Area
HCN	Health Council of the Netherlands
HDD	Horizontal Directional Drilling
HPFF	high pressure fluid filled
HTS	high temperature superconductors
Hz	hertz
I	Interstate
IARC	International Agency for Research on Cancer
IBA	Important Bird Area
IBC	International Building Code
ICES	International Committee on Electromagnetic Safety
ICNIRP	International Commission on Non-iodizing Radiation Protection
IEEE	Institute of Electrical and Electronics Engineers
IFPL	Industrial Fire Precaution Levels
IM	Instruction Memorandum
IOP	Inventory Observation Points
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
ISSSSP	Interagency Special Status/Sensitive Species Program
JARPA	Joint Aquatic Resources Permit Application
JBLM YTC	Joint Base Lewis-McChord Yakima Training Center
JWPT	John Wayne Pioneer Trail
KCC	Kittitas County Code
kcmil	kilo-circular mils
kHz	kilohertz
KOP	Key Observation Point
kV	kilovolt
kV/m	kilovolt per meter
Ldn	day-night sound level

ACRONYM / ABBREVIATION	DEFINITION
Leq	equivalent sound level
LGFRS	Local Government Financial Reporting System
LPP	laminated polypropylene paper
mA	milliampere
MA	Management Area
MBTA	Migratory Bird Treaty Act
MCL	Maximum Containment Level
mG	milligauss
mg/m^3	milligrams per cubic meter
MHz	megahertz
mi	mile
mm	millimeter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MP	mile post
MPH	miles per hour
MR	Manastash Ridge
MRI	Magnetic Resonance Imaging
MU	Management Unit
MW	megawatt
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAIP	National Agriculture Imagery Program
NAP	Natural Area Preserve
National Register	National Register of Historic Places
NCSS	National Cooperative Soil Survey
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NIFTT	National Interagency Fuels, Fire, and Vegetation Technology Transfer
NMFS	National Marine Fisheries Service
NNL	National Natural Landmark
NNR	New Northern Route
NO_2	Nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPL	National Priority List
NRCS	Natural Resources Conservation Service
NRPB	National Radiological Protection Board of Great Britain
NSA	Noise Sensitive Area
NTAC	Northwest Transmission Assessment Committee
NWI	National Wetland Inventory
NWPP	Northwest Power Pool
O&M	Operation and Maintenance
O_3	Ozone
OATT	Open Access Transmission Tariff
OFM	Office of Financial Management

ACRONYM / ABBREVIATION	DEFINITION
OHV	off-highway vehicle
OPGW	fiber optic ground wire
OSHA	Occupational Safety and Health Administration
P.L.	Public Law
PA	Programmatic Agreement
PAC	Priority Areas for Conservation
Pb	Lead
PCCP	Portland cement concrete pavement
PDF	Project Design Feature
PF	Project Facilities
PHS	Priority Habitat and Species
PLSS	Public Land Survey System
PM_{10}	particulate matter <10 microns
$PM_{2.5}$	particulate matter <2.5 microns
POD	Plan of Development
POWER	POWER Engineers, Inc
ppb	parts per billion
ppm	parts per million
Project	Vantage to Pomona Heights 230 kV Transmission Line Project
PSD	Prevention of Significant Deterioration
PUD	Public Utility District
PVC	polyvinyl chloride
RCO	Recreation and Conservation Office
RCW	Revised Code of Washington
Reclamation	U.S. Bureau of Reclamation
Recovery Plan	Greater Sage-grouse Recovery Plan
RM	Resource Management
RMP	Resource Management Plan
RNA	Research Natural Area
ROD	Record of Decision
ROW	Right-of-Way
S&R	Scenic and Recreational
SCFF	self-contained fluid filled
SDEIS	Supplemental Draft Environmental Impact Statement
SDP	Substantial Development Permit
SEE	Stell Environmental Enterprises
SEPA	Washington State Environmental Policy Act
SF_6	Sulfur hexafluoride
SHPO	State Historic Preservation Office
SMA	Special Management Area
SMP	Shoreline Management Plan
SO_2	Sulfur dioxide
SOC	Species of Concern
sq. ft.	square feet
SQRU	Scenic Quality Rating Unit
SR	State Route
SRMA	Special Recreation Management Area
STIP	Statewide Transportation Improvement Program
SWPPP	Stormwater Pollution Prevention Plan
TA	Training Area
TCP	traditional cultural property

ACRONYM / ABBREVIATION	DEFINITION
TIP	Transportation Improvement Program
TSP	total suspended particulates
U.S.	United States
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
V/m	volts per meter
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WAAQS	Washington Ambient Air Quality Standards
WAC	Washington Administrative Code
WDA	Workforce Development Area
WDES	Washington Department of Employment Security
WDFW	Washington Department of Fish and Wildlife
WDGER	Washington Division of Geology and Earth Resources
WDOE	Washington State Department of Ecology
WDOR	Washington Department of Revenue
WECC	Western Electricity Coordinating Council
WFO	Wenatchee Field Office
WHCWG	Washington Wildlife Habitat Connectivity Working Group
WHO	World Health Organization
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WNHP	Washington Natural Heritage Program
WO	BLM Washington, D.C. Office
WPSC	Wisconsin Public Service Commission
WRCC	Western Regional Climate Center
WRIA	Water Resource Inventory Area
WSA	Wilderness Study Area
WSDOT	Washington State Department of Transportation
WSNWCB	Washington State Noxious Weed Control Board
XLPE	Cross-Linked Polyethylene
YCC	Yakima County Code
YFC	Yakima Firing Center
YNCRP	Yakama Nation Cultural Resource Program
YRCAA	Yakima Regional Clean Air Agency
$\mu g/m^3$	micrograms per cubic meter

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