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

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

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SPOKANE DISTRICT OFFICE

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

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

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Case File: WAOR 65753

Spokane District
1103 N. Fancher Road
Spokane, WA 99212

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 Archeology and Historic Preservation
Washington Department of Fish and Wildlife
Washington State Department of Natural Resources
Washington State Department of Transportation
Grant County
Kittitas County
Yakima County

October 21, 2016

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 Final Environmental Impact Statement
Lead Agency:	U. S. Department of the Interior Bureau of Land Management Spokane District, 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 Archeology and Historic Preservation Washington Department of Fish and Wildlife Washington State Department of Natural Resources Washington State Department of Transportation Grant County Kittitas County Yakima County
Project Location:	Benton, Grant, Kittitas and Yakima Counties, Washington
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Abstract:

The Final Environmental Impact Statement (FEIS) has been prepared in consultation with twelve (12) Cooperating Agencies and in compliance with the Council on Environmental Quality Regulations for Implementing National Environmental Policy Act (40 Code of Federal Regulations 1500). This FEIS is not a decision document. The FEIS addresses public comments received on both the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS) and considers the No Action Alternative and all nine of the Action Alternatives analyzed in the DEIS and SDEIS. The nine Action Alternatives considered in this FEIS range from 40.5 to 66.8 miles in length. The Action Alternatives cross federal land managed by U.S. Bureau of Land Management (BLM), Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), U.S. Bureau of Reclamation (Reclamation), state land managed by Washington State Department of Transportation (WSDOT) and Washington Department of Natural Resources. Yakima, Kittitas, Benton, and Grant counties are crossed by the Action Alternatives considered in this FEIS. In order to provide maximum flexibility to the federal, state and local decision makers and to incorporate all public review and input from the Cooperating Agencies, tribes and interested parties, all alternatives are available for consideration up to the issuance of decision documents by the BLM, JBLM YTC, Reclamation, and the other Cooperating Agencies with authorizations to grant and decisions to make regarding the proposed Project. The following issues were identified for analysis in the FEIS based on public scoping and agency concerns: potential impacts on Greater Sage-Grouse; special status wildlife species and protected birds; avian collision potential; impacts to sagebrush and native grassland communities; endangered and threatened plant species; introduction, spread, and control of noxious weeds; impacts on cultural resources, prehistoric and historic sites, and traditional cultural properties; electric and magnetic field health effects; impacts on residential areas and planned development; effects on productive or revenue generating state lands; effect on recreational areas and opportunities; 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 roads; private property aesthetic impacts; effects on BLM Visual Resource Management objectives and WSDOT-established visual quality; effect to fire management/suppression activities and risk of wildfire; and impacts on JBLM YTC training operations.

EXECUTIVE SUMMARY

This Executive Summary provides a synopsis of both the Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project (Project) Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS) included in this Final Environmental Impact Statement (FEIS) document. On January 4, 2013, the U.S. Bureau of Land Management (BLM) released the DEIS for public review and comment, identifying an Agency Preferred Alternative paralleling an existing transmission line for approximately 77% of the total length in Benton, Grant, and Yakima counties. 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 route that is located largely on JBLM YTC land. This new route is similar to a northern route, also located largely on JBLM YTC, 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 route from consideration in the DEIS. The New Northern Route (NNR) Alternative was developed and analyzed in the SDEIS and Alternative D from the DEIS remained as the Agency Preferred Alternative for comparison. The SDEIS was published in January of 2015.

This FEIS addresses public comments received on both the DEIS and SDEIS and considers the No Action Alternative and all nine of the Action Alternatives analyzed in the DEIS and SDEIS. The nine Action Alternatives considered in this FEIS range from 40.5 to 66.8 miles in length. The Action Alternatives cross federal land managed by BLM, JBLM YTC, the U.S. Bureau of Reclamation (Reclamation), and state land managed by Washington State Department of Transportation (WSDOT) and Washington State Department of Natural Resources (DNR). Yakima, Kittitas, Benton, and Grant counties are crossed by the Action Alternatives considered in this FEIS. The information presented in the DEIS and the SDEIS have been combined in the FEIS for clarity, and resource data and analyses have been updated as necessary for full disclosure of anticipated impacts for all Action Alternatives. In order to provide maximum flexibility to the decision makers and incorporate all input from the public, Cooperating Agencies, tribes, and interested parties, all Action Alternatives are available for consideration up to the issuance of a decisions (i.e., Record of Decision [ROD]) by the BLM; Record of Environmental Consideration [REC] by JBLM YTC), and any other appropriate decision documents by other federal agencies who will issue their NEPA decisions. Pursuant to 40 Code of Federal Regulations (CFR) § 1502.14(e), BLM, as the lead federal agency, has identified an Agency Preferred Alternative in this FEIS. The Agency Preferred Alternative presented in the DEIS and the SDEIS (Alternative D) has been changed to the NNR Alternative – Overhead Design Option in this FEIS. The NNR Alternative – Overhead Design Option has been selected as the Agency Preferred Alternative based on the analysis contained in the DEIS and SDEIS, in consideration of all of the Action Alternatives and their relative impacts on resources, preferences of the Cooperating Agencies and Tribal Representatives, and input received from the public via comments. The NNR Alternative – Overhead Design Option has also been identified as the Environmentally Preferred Alternative.

INTRODUCTION

Pacific Power's proposed 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. In October of 2008, Pacific Power, a regulated utility serving 730,000 customers in Oregon, Washington, and northern California, filed separate Standard Form 299 Application for Transportation and Utility Systems and Facilities on Federal Lands (SF- 299) with the BLM Spokane District Office and the JBLM YTC to request grants of right-of-way (ROW) across federal lands for the proposed Project. Updated SF-

299 applications were submitted to JBLM YTC in November 2013 and June 2016 for the NNR Alternative. In April 2011, Pacific Power filed a ROW application with Reclamation to request a grant of ROW across Reclamation lands and an updated application was submitted in June 2016. In addition, Pacific Power submitted an interconnection request to BPA to connect the proposed Project to BPA's Vantage Substation and will submit an application to Federal Highway Administration (FHWA) to cross Interstate (I) 82 and land owned by WSDOT.

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. 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 - Northwest Transmission Assessment Committee to perform a detailed screening of the transmission system's exposure to overloading. As a result of the study, system reinforcement projects or upgrades were identified to address system conditions and overloading. The proposed 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.

Pursuant to 40 CFR § 1508.16, the BLM's Oregon/Washington Spokane District is the lead federal agency, with the JBLM YTC, BPA, Reclamation, FHWA, U.S. Fish and Wildlife Service, WSDOT, Washington State Department of Archaeology and Historic Preservation, Washington State Department of Fish and Wildlife, DNR, Grant County, Kittitas County, and Yakima County serving as Cooperating Agencies. The development of the Project is dependent upon federal approvals of ROW grants for the transmission line and access roads across federal lands. The FEIS will be used by BLM, JBLM YTC, and Reclamation to make their decisions regarding Pacific Power's SF-299s. In October 2008, Pacific Power filed separate ROW applications (SF-299s) with the BLM and JBLM YTC to request grants of ROW across federal lands for the transmission line project. Updated SF-299 applications were submitted to JBLM YTC in November 2013 and June 2016 for the NNR Alternative. In April 2011, Pacific Power filed a ROW application with Reclamation to request permission to cross Reclamation lands and an updated application was submitted in June 2016. Each federal agency will issue its own appropriate decision document regarding the matter before it. 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. This includes modifying the proposed use or changing the route or location of the facilities on BLM-administered lands. The BLM's need to respond to Pacific Power's ROW application, arises from the Federal Land Policy and Management Act of 1976 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 in accordance with the National Environmental Policy Act.

ALTERNATIVES

This FEIS considers the nine Action Alternatives and the No Action Alternative that were analyzed in the DEIS and SDEIS. The Alternatives presented are as follows: No Action Alternative; Alternative A; Alternative B; Alternative C; Alternative D; Alternative E; Alternative F; Alternative G; Alternative H; and NNR Alternative. The NNR Alternative included an Overhead Design Option, an Underground Design Option and the Manastash Ridge (MR) Subroute. The NNR Alternative – Overhead Design Option has been selected as the Agency Preferred Alternative for the Project. This Alternative has also been identified as the Environmentally Preferred Alternative. A detailed description of the Action Alternatives and associated route segments are provided in Chapter 2 of this FEIS.

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. The H-frame structures 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 ROW width 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 or below the Priest Rapids Dam (depending on the Action Alternative), steel lattice structures approximately 200 feet tall would be used to safely span the approximate 2,800-foot crossing. 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.

Construction techniques considered in this FEIS are based on industry standards and methods used on other transmission line projects.

ENVIRONMENTAL IMPACTS

Potential environmental impacts of the Action Alternatives are related to: vegetation and special status plants; general wildlife and Greater Sage-Grouse (*Centrocercus urophasianus*; 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 changes 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 (National Register); sensitive Native American areas and uses; communities and landowner economic effects; public health and safety; air quality, climate and global warming; and Special Management Areas. Impacts are analyzed considering the implementation of Required Design Features (RDFs) and other mitigation measures where applicable as discussed in Chapter 2 and Chapter 4.

Vegetation

Long-term disturbance to vegetation would be similar for all the Action Alternatives ranging from Alternative G with the least amount of disturbance (139.7 acres) to Alternative A with the most amount of disturbance (210.1 acres). The Agency Preferred Alternative (NNR Alternative – Overhead Design Option) would result in 163.5 acres of long-term disturbance. The Agency Preferred Alternative would result in moderate impacts to 28.6 miles of vegetation, primarily associated with long-term disturbance to sagebrush/perennial grassland communities. The scope and intensity of vegetation impacts would fall near the middle range of all Action Alternatives considered.

The Agency Preferred Alternative would cross 8.4 miles of Washington Natural Heritage Program (WNHP) special status plant species polygons, 2.7 miles of special status plant occurrences found during Project-specific surveys, and no WNHP priority ecosystems. Of the nine Project Action Alternatives, the Agency Preferred Alternative has among the lowest impacts to special status plant species and potential special status plants suitable habitat.

Wildlife

The Agency Preferred Alternative would result in the least amount of direct disturbance to wildlife habitat (204 acres, exclusive of Sage-Grouse habitat) and Sage-Grouse habitat (192 acres). This alternative would also require the second fewest number of transmission structures (328). By comparison, the NNR Alternative - Underground Design Option would require the fewest number of new structures (251), compared with the Agency Preferred Alternative. However, the Underground Design Option would disturb more wildlife habitat (254 acres vs. 204 acres) and more Sage-Grouse habitat (243 acres vs. 192 acres), because it would require more vegetation removal. As the NNR Alternative (Overhead Design Option and Underground Design Option) closely parallels Pacific Power's existing Pomona-Wanapum 230 kV transmission line for the majority of its total length, utilizing nearby existing roads will greatly reduce the need for new access roads, decreasing the amount of direct habitat impacts associated with the Project. The much lengthier Alternatives A-H would each result in at least 316 acres of direct impacts to wildlife habitat, require at least 477 structures, and result in anywhere from 203 acres (Alternative C) to 296 acres (Alternative F) of direct impacts to Sage-Grouse habitat. For all Project Action Alternatives, disturbed areas would be restored following construction. However, because of the long recovery times for restoring sagebrush communities (30 to 120 years), any direct disturbance to sagebrush steppe would be considered a long-term impact.

The least amount of ground disturbance resulting in indirect habitat impacts (through the spread of noxious weeds and invasive species and potential increased fire frequency) would occur with the Agency Preferred Alternative. The NNR Alternative - Underground Design Option would result in greater habitat impacts (254 acres) in underground construction locations through trenching and new, permanent access road construction. 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, resulting in 260 acres of impacts to habitat. Alternatives A-H would result in much more ground disturbance (316 to 350 acres) due to their longer length.

Due to the Agency Preferred Alternative and the NNR Alternative - Underground Design Option's location adjacent to the existing Pomona-Wanapum 230 kV Transmission Line, it is unlikely that the addition of structures 200 feet from a similar existing structure would have much, if any, effect on the density of corvids or raptors. Construction of the Agency Preferred Alternative and the NNR Alternative - Underground Design Option would require the fewest structures greater than 0.25 mile from an existing transmission line (50 structures). All other Action Alternatives are longer and follow existing transmission lines for lesser proportions of their lengths, necessitating more structures greater than 0.25 mile from an 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 provided.

The Action Alternatives traverse through sensitive wildlife habitats (sagebrush-steppe, riparian areas, intermittent streams/dry gullies, wetlands, and trees) ranging from as low as 21.8 miles for Alternative G to as high as 35.1 miles for Alternative A. The Agency Preferred Alternative would cross 31.1 miles of sensitive wildlife habitat, primarily sagebrush-steppe and is on the moderate to high end of impacts to sensitive wildlife habitats compared to all the Action Alternatives.

The NNR Alternative – MR Subroute would have the least amount of its centerline within one mile of documented special status species raptor nests (9.1 miles), followed by Alternative A (10.0 miles), and then the Agency Preferred Alternative (10.5 miles). Alternative C would have the greatest length of its centerline within one mile of special status raptor nests (19.6 miles). The Agency Preferred Alternative, NNR Alternative - Underground Design Option, and NNR Alternative – MR Subroute had the shortest length of centerline within 0.5 mile of special status wildlife species occurrences (8.6 miles), and the greatest amount associated with Alternative B (19.4 miles). Additionally, the Agency Preferred Alternative and NNR Alternative - Underground Design Option would cross 5.0 miles of Priority Species Regional Areas, the least amount among the Project Action Alternatives.

A portion of each of the Action Alternatives would be located within the Sage-Grouse YTC Priority Area of Conservation (PAC). The Agency Preferred Alternative and the NNR Alternative - Underground

Design Option cross the shortest distance of the PAC (38.7 miles), followed by Alternative A (41.5 miles). The longest distance of the PAC crossing by any Action Alternative is 58.9 miles by Alternative G. The ROW corridors for all three NNR Alternative options, including the Agency Preferred Alternative, would be located entirely outside of the modeled YTC Sage-Grouse population range, where 95 percent of Sage-Grouse use is expected to occur based on a kernel density analysis conducted for the proposed Project. The NNR Alternative options do not overlap the modeled 80 percent core population range, where 80 percent of Sage-Grouse use is estimated to occur. Each of the Alternatives A-H, cross through the modeled Sage-Grouse population range for a substantial distance (22.1 miles to 25.4 miles, depending on Action Alternative). Alternatives A-H pass through the 80 percent core population range for distances ranging from 7.4 miles for Alternatives G and H to 10.2 miles for Alternatives A and B. The eight-mile wide Sage-Grouse analysis area for each of Alternatives A-H overlaps approximately half (44 to 56 percent, depending on Action Alternative) of the total estimated 95 percent core population range for the YTC Sage-Grouse population.

Impacts to Sage-Grouse for each Action Alternative were estimated by taking into account acres of disturbance to sagebrush steppe habitat, miles of Sage-Grouse core population range crossed, and distance in miles to active and inactive leks. None of the Action Alternatives corresponded to miles of overall high impact levels or of no identifiable impact levels. The Agency Preferred Alternative and the NNR Alternative - Underground Design Option had the shortest distance classified as moderate impact (23.9 miles), followed by NNR Alternative – MR Subroute (24.3 miles). Miles of moderate impacts for each of Alternatives A-H ranged from 35.1 miles for Alternative G to 45.9 miles for Alternative A. Even though Alternatives A-H passed through more degraded habitat than the three NNR Alternative options, their much longer length, much greater overlap with occupied Sage-Grouse core population range, and closer proximity to more leks, indicate a greater overall impact on Sage-Grouse for Alternatives A-H. Among Alternatives A-H, Alternative A would have the greatest impact on Sage-Grouse, and Alternative G would have the least impact, though still larger than for any of the three NNR Alternative options. While the NNR Alternative - MR Subroute would impact more miles than the Agency Preferred Alternative or NNR Alternative - Underground Design Option, most of the additional length is in a landscape that would yield a low level of impact on Sage-Grouse, resulting in modestly greater impact on Sage-Grouse than for the Agency Preferred Alternative. While the NNR Alternative - Underground Design Option would result in slightly fewer transmission structures than the Agency Preferred Alternative, 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. Thus, the NNR Alternative - Underground Design Option did not have different overall impact levels for Sage-Grouse than the Agency Preferred Alternative.

Land Use, Recreation, Transportation, and Visual

The Agency Preferred Alternative would have the majority of its impacts to military (JBLM YTC) land use (22.3 acres) with less land use impacts to BLM grazing lease areas (7.6 acres) and residential areas (2.8 acres).

Alternatives E, F, G, and H would have the greatest impacts on residential land use (22.1 acres each). Alternative H would have the greatest impacts on irrigated agriculture (9.1 acres). The NNR Alternative - MR Subroute would have the highest impacts on JBLM YTC land uses (39.7 acres). The most disturbances on DNR state trust grazing or agricultural leased land would occur for the NNR Alternative - MR Subroute (4.2 acres). Alternatives A and F would have the greatest impacts on BLM grazing leases (8.7 acres each). Overall, the greatest miles of high impacts on land use would occur for Alternative H (1.0 mile).

None of the Action Alternatives would have high residual impacts to recreation resources. Alternatives B, C, E, and G would each have 1.7 miles of moderate residual impacts. Alternative F would have the highest miles of low residual impacts on recreation resources (44.0 miles) and Alternative C would have the least number of miles with low residual impacts (19.9 miles). For the Agency Preferred Alternative and the NNR Alternative – Underground Design Option the miles of no identifiable (11.0 miles) and low (29.5 miles) impacts would be lowest compared to the Action Alternatives and no moderate or high impacts would occur.

The Agency Preferred Alternative and NNR Alternative –Underground Design Option would require the least amount of total new road construction (23.5 miles). Although the disturbance calculations for the NNR Alternative – Underground Design Option used the same access road assumptions as the Agency Preferred Alternative, grading requirements of the access road (and duct bank) would require the disturbance of more land in steep terrain for the Underground Design Option. Alternative F would require the most new and spur road construction (45.3 miles), but would not require the crossing of I-82. All Action Alternatives cross State Route 243 in one or two locations. One potential crossing location is approximately 0.3 miles north of Wanapum Village with the other potential crossing located 3.3 miles west of the Vernita Bridge.

The Agency Preferred Alternative would have the lowest total mileage of high impacts on visual resources (4.4 miles). Alternative H would have the highest total mileage of high impacts on visual resources (17.0 miles). Alternatives E, F, G, and H would cause higher impacts on residences in the Moxee Valley and Alternatives A, C, D, and H would cause higher visual impacts to recreational viewers in the Saddle Mountains, Milwaukee corridor, and residences located in the vicinity of Beverly. Alternatives B, C, E, and G would have higher impacts on residences viewing from Desert Aire and recreationists using Priest Rapids Lake. All Action Alternatives would be compliant with BLM Interim Visual Resource Management Class III designation.

Socioeconomics and Environmental Justice

Socioeconomic impacts on the Study Region (defined as Grant, Kittitas and Yakima counties) economy would be predominantly beneficial, as job opportunities increase due to any of the Action Alternatives. Impacts as a whole would not greatly vary between the Action 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 Action Alternatives. Impacts on employment would be generally very small under any Action Alternative. The impacts of 23.7 to 41.0 direct jobs would translate to, including all ripple effects, a total of 58.9 to 66.3 jobs for the Agency Preferred Alternative, NNR Alternative – Underground Design Option, and NNR Alternative - MR Subroute, respectively, and a total of 88 jobs for Alternatives A-H. However, such small differences in the initial stimuli to the regional economy caused by the Action 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 the implementation of any of the Action Alternatives. Although, some of the Census Block Groups within three miles of the Action Alternatives do contain substantial populations of minority and low-income populations, appreciable concentrations of such populations are more distant than one mile, limiting the potential impact of the Action Alternatives to no more than minimal and not significant. Differences in impacts among Action Alternatives would be extremely small with the Agency Preferred Alternative, NNR Alternative – Underground Design Option, with or without the NNR Alternative – MR Subroute, impacting the smallest proportions and number of Census Blocks containing potentially affected populations.

Cultural Resources and Native American Concerns

Total ground disturbance and, therefore, potential for disturbance of cultural sites would be least for the Agency Preferred Alternative (204 acres) and most for Alternative F (349.9 acres). The Agency Preferred Alternative corresponds to the highest total number of previously identified cultural resources including: traditional cultural properties; archaeological sites; isolated finds; architectural resources; and ineligible (or assumed ineligible), recommended, unevaluated or determined eligible National Register Sites within 75 feet of the proposed Project centerline. Comprehensive surveys along all Project Action Alternatives have not been completed and, therefore, the total number of cultural resources could change if future surveys are conducted. However, the majority of the NNR Alternative has been previously surveyed for cultural resources and portions of some route segments have been surveyed recently by the Yakama Nation Cultural Resource Program for this Project.

It has been assumed that visually sensitive cultural resources include those with burials, rock features (cairns, alignments), talus pits, rock art (pictographs and petroglyphs), and rockshelters. The numbers of visually sensitive cultural resources are similar for the Agency Preferred Alternative and other NNR Alternative options (24). Alternatives B and C have the highest number of resources that may be potentially visually sensitive (32) closely followed by Alternatives E and G (31). Alternatives F and H have the least number or resources (6) that may be potentially visually sensitive.

Wildland Fire

The Agency Preferred Alternative and NNR Alternative – Underground Design Option have the lowest number of miles with moderate impacts (5.3 miles each) and the lowest number of miles identified as no identifiable impacts (2.0 each). Alternative H has the highest number of miles with moderate impacts (21.8 miles), which is attributed to locations with higher firefighting complexity due to the presence of multiple transmission lines. Alternative A has the highest number of miles with low impacts (39.5) and Alternative G has the lowest number of miles with low impacts (26.2). Alternative G has the highest number of miles identified as no identifiable impacts (21.9). High impact levels are not anticipated for any of the Action Alternatives.

Climate and Air Quality

Implementation of any of the Action Alternatives 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 the Action Alternatives and design options because these options would have varying amounts of surface disturbance and differences in terrain. Underground construction activities would disturb more land than overhead construction activities due to total vegetation removal and trenching of the ROW for installation of the underground cable duct bank. Impacts to air quality are expected to be short-term, localized and low.

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. However, as the proposed Project would result in minimal long-term emissions of greenhouse gases, primarily associated with maintenance activities, the long-term climate impacts would not be considered adverse.

Water Resources

No long-term disturbance to water resources would occur with the construction, operation, and maintenance of any of the Action Alternatives. Differences in impact levels are very similar for all Action Alternatives with the majority of the impacts categorized as no identifiable. The NNR Alternative – MR

Subroute has the lowest number of miles of no identifiable impacts (30.0 miles), Alternative H has the highest number of miles of no identifiable impacts (54.1 miles), NNR Alternative – Overhead and Underground Options have the lowest number of miles with low impacts (8.2), and Alternatives E and G have the highest number of miles of low impacts (13.2 miles). No moderate or high impacts to water resources are anticipated for any of the Action Alternatives.

Geology and Soils

No long-term disturbance to geologic and soil resources would occur with the construction of any of the Action Alternatives. Overall impact levels are similar for all of the Action Alternatives with overhead construction, with the majority of the impacts categorized as moderate to low. However, the NNR Alternative – Underground Design Option would create more moderate impacts as compared to other NNR Alternative options (including the Agency Preferred Alternative) due to the displacement of greater volumes of soil as a result of excavated areas. Alternative F would have the highest amount of moderate impacts (19.6 miles) and Alternative B would have the highest amount of impacts characterized as high (7.9 miles). While geotechnical investigations are included in the RDFs, a more comprehensive geotechnical investigation would be required along the entire NNR Alternative – Underground Design Option as compared to the Action Alternatives with an overhead construction design.

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 and bedrock would need to be excavated for the NNR Alternative – 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 of electric transmission service disruption as a result of seismic activity or landslides would be substantially greater with the NNR Alternative – Underground Design Option than any of the other Action Alternatives due to the inability to span discovered geologic faults.

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CHAPTER 1 PURPOSE AND NEED

1.1 INTRODUCTION

In October 2008, Pacific Power (Applicant) filed separate right-of-way (ROW) applications, Standard Form 299 Application for Transportation and Utility Systems and Facilities on Federal Lands (SF-299), with the U.S. Bureau of Land Management (BLM) and U.S. Department of the Army (Army) Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) to request grants of ROW across federal lands for a transmission line project from Pacific Power's Pomona Heights Substation to the Bonneville Power Administration (BPA) Vantage Substation. 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 would require the preparation of an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA). The EIS discloses potential Project-related impacts pursuant to the requirements of NEPA 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] 1500 through 1508). The EIS 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.

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

This Chapter provides the context for the Final EIS (FEIS) by describing: the EIS process; the proposed Project; background information; lead and Cooperating Agencies; the Washington State Environmental Policy Act (SEPA); decisions to be made; and a summary of issues and concerns described and analyzed in the subsequent EIS chapters.

1.1.1 EIS Process

The Draft EIS (DEIS) for the Project, published in January 2013, analyzed eight Action Alternatives, with Alternative D being selected as the Agency Preferred Alternative. 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 the Agency Preferred Alternative. During the public comment period, the BLM received letters and e-mails containing more than 250 comments.

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 JBLM YTC met and identified a new route that is located largely on JBLM YTC land. This new route is similar to a northern route also located largely on JBLM YTC land that was 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. Around the time of publication of the DEIS, 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 Project which would minimize impacts to JBLM YTC training operations thus allowing the New Northern Route (NNR) Alternative to be reconsidered. The WECC regional criterion for Adjacent Transmission Circuits as applicable to the proposed Project was retired as part of the WECC-0071 project, approved by the WECC Board of Directors on December 1, 2011. The NNR Alternative consisted of an Overhead Design Option, Underground Design Option, and a Manastash Ridge Subroute.

The NNR Alternative was developed and analyzed in the Supplemental DEIS (SDEIS) and Alternative D from the DEIS remained as the Agency Preferred Alternative for comparison. The SDEIS was published in January of 2015.

This FEIS addresses public comments received on both the DEIS and SDEIS and considers the No Action Alternative and all nine of the Action Alternatives analyzed in the DEIS and SDEIS. The nine Action Alternatives considered in this FEIS range from 40.5 to 66.8 miles in length. The Action Alternatives cross federal land managed by BLM, JBLM YTC, Bureau of Reclamation (Reclamation), and state land managed by Washington State Department of Transportation (WSDOT) and Washington State Department of Natural Resources (DNR). Yakima, Kittitas, Benton, and Grant counties are crossed by the Action Alternatives considered in this FEIS. The information presented in the DEIS and the SDEIS have been combined in the FEIS for clarity and resource data and analyses have been updated as necessary for full disclosure of anticipated impacts for all Action Alternatives. In order to provide maximum flexibility to the decision makers and incorporate all input from the public, Cooperating Agencies, tribes, and interested parties, all Action Alternatives are available for consideration up to the issuance of a decisions (i.e., Record of Decision [ROD] by the BLM; a Record of Environmental Consideration [REC] by JBLM YTC), and any other appropriate decision documents by other federal agencies who will issue their NEPA decisions. In this FEIS, the Agency Preferred Alternative presented in the DEIS and the SDEIS (Alternative D) has been changed to NNR Alternative – Overhead Design Option. The NNR Alternative – Overhead Design Option has been selected as the Agency Preferred Alternative based on the analysis contained in the DEIS and SDEIS, in consideration of all of the Action Alternatives and their relative impacts on resources, preferences of the Cooperating Agencies and Tribal Representatives, and input received from the public via comments. Concurrence among the twelve Cooperating Agencies regarding their preferences for the FEIS Agency Preferred Alternative was not reached. The Cooperating Agency alternative preferences are included in Appendix G and a Washington Department of Fish and Wildlife (WDFW) Memorandum of Understanding Compliance Summary is documented in Appendix I. The NNR Alternative - Overhead Design Option has also been identified as the Environmentally Preferred Alternative. Chapter 2, Section 2.4.2 presents more information on the identification of the Environmentally Preferred Alternative and the selection of the Agency Preferred Alternative.

The BLM Spokane District is the lead federal agency responsible for preparation of the FEIS, project oversight, and compliance with the requirements of NEPA and other applicable laws and regulations. The FEIS will be used by BLM, JBLM YTC, and Reclamation to make their decisions regarding Pacific Power's SF-299s. In October 2008, Pacific Power filed separate ROW applications (SF-299s) with the BLM and JBLM YTC to request grants of ROW across federal lands for the transmission line project. Updated SF-299 applications were submitted to JBLM YTC in November 2013 and June 2016 for the NNR Alternative. In April 2011, Pacific Power filed a ROW application with Reclamation to request a grant of ROW across Reclamation lands and an updated application was submitted in June 2016. Each federal agency will issue its own ROD, REC, or other appropriate decision document regarding the matter before it.

Washington state and local agencies will assess applicant-requested permits and approval for the Project which will require SEPA compliance. Therefore, this FEIS may be used in a combined review process by affected counties and state agencies to satisfy SEPA requirements (see Section 1.5). A Project-specific SEPA Environmental Checklist has been developed for the proposed Project and is included in Appendix D.

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Vantage - Pomona Heights 230kV Transmission Line Project

Figure 1-1 Project Location

Legend

Project Features
Study Area

Boundaries
State
County

Transportation
Interstate

Water
Major River
Water Body

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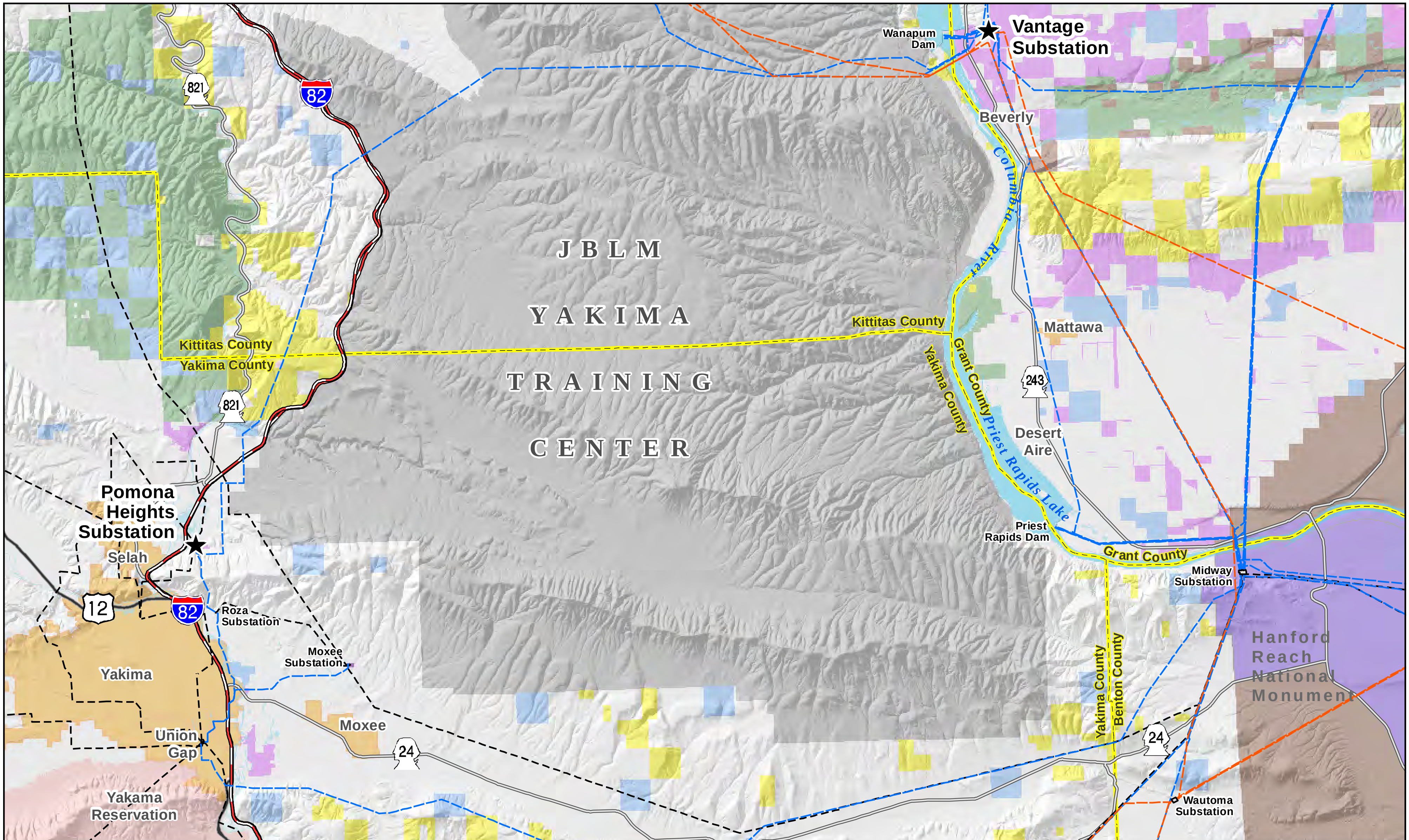

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 1-2
Project Area

Legend

Project Features
- Project Substation

Existing Utility Features
- 500 kV Transmission Line
- 230 kV Transmission Line
- 115 kV Transmission Line
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Boundaries
- County
- City Limits

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
- JBLM Yakima Training Center
- U.S. Fish and Wildlife Service
- Department of Energy

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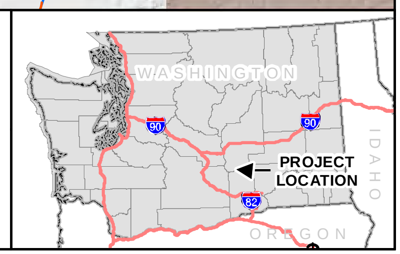

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Cooperating Agencies with expertise and/or review, approval, and permitting authority are:

1) JBLM YTC
2) BPA
3) Reclamation
4) Federal Highway Administration (FHWA)
5) U.S. Fish and Wildlife Service (USFWS)
6) WSDOT
7) Washington Department of Archeology and Historic Preservation (DAHP)
8) WDFW
9) DNR
10) Grant County
11) Kittitas County
12) Yakima County

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 (Figure 1-1 and Figure 1-2).

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 transmission line would cross the Columbia River either below Wanapum Dam or below the Priest Rapids Dam (depending on the Action Alternative) 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.

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), BLM's NEPA consultant, is assisting with the preparation of this FEIS. POWER has certified that it does not have any financial or other interest in the decisions to be made pursuant to this FEIS.

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 and 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 - 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. This 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.

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's Spokane District is the lead federal agency responsible for preparation of this FEIS and project oversight and compliance with the requirements of NEPA and other applicable laws and regulations. The BLM's Spokane/Coeur d'Alene 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 BLM AO will use this FEIS to inform her decision whether or not to approve, approve with modifications, or deny the ROW application. If the BLM decides to approve the ROW, it will also use the FEIS in generating ROW conditions including, without limitation, conditions relating to project construction, operation, maintenance, and mitigation. Section 1.8 provides more discussion on BLM's decision in consideration of its 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 FEIS (40 CFR Parts 1508.5 and 1501.6).

Although the BLM is the lead federal agency for compilation of this FEIS, each of the 12 Cooperating Agencies must make their own informed decisions on the applicant's proposal and request for ROWs and/or other permits. Therefore, this FEIS analyzes issues identified by each of the Cooperating Agencies and the public through scoping and other formal and informal meetings. As such, the Action Alternatives developed and impact assessment presented (Chapters 2 and 4, respectively) are focused on those issues and concerns that will help the BLM and Cooperating Agencies differentiate between the Action Alternatives presented and inform the decision-making process.

A summary of each Cooperating Agency's mission, general policy guidance, and interests 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 (SF-299) on the federal lands managed by the Army. In October 2008, Pacific Power filed separate ROW applications (SF-299s) with the BLM and JBLM YTC to request grants of ROW across federal lands for the transmission line project. Updated SF-299 applications were submitted to JBLM YTC in November 2013 and June 2016 for the NNR Alternative. 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 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 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. 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 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 in April, 2011 and an updated application filed in June, 2016 to include the NNR Alternative, requesting permission to cross federal lands managed by Reclamation. Reclamation will use this 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 Federal Highway Administration

FHWA is a formal Cooperating Agency responsible for approving Pacific Power's application to use Interstate (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 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.

1.4.2.5 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 Endangered Species Act (ESA; 16 U.S.C. §1531 *et seq.*); the Migratory Bird Treaty Act (MBTA; 16 U.S.C. §§703-712); Executive Order 13186; and the Bald and Golden Eagle Protection Act (BGEPA; 16 U.S.C. §668-668d), respectively.

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 BLM as the lead federal agency to fulfill Interagency Cooperation obligations in accordance with Section 7(a)(2) of the ESA.

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 I-82 and State Route (SR) 243. In order for WSDOT to make a determination on Pacific Power's application(s), the Project will need to comply with SEPA or WSDOT may need to conduct a separate SEPA analysis.

WSDOT is the SEPA co-lead agency with Yakima County, and WSDOT's South Central Region Environmental Office is serving as the nominal lead agency. WSDOT has final responsibility for the completion of all SEPA procedures and documentation. This FEIS may be utilized by state and local governments in meeting SEPA requirements. A Project-specific SEPA Environmental Checklist has been developed for the proposed Project and is included in Appendix D.

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 the WSDOT ROW and providing any additional documentation for compliance with NEPA and SEPA, the ESA, and the National Historic Preservation Act (NHPA). FHWA will use this 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 lands.

1.4.2.7 Washington State Department of Archaeology and Historic Preservation

DAHP is a formal Cooperating Agency and is responsible for reviewing cultural resource documents and issuing Archaeological Excavation and Removal Permits under Revised Code of Washington (RCW) 27.44 and RCW 27.53 and Washington Administrative Code (WAC) 25-48 on state and private lands in Washington.

1.4.2.8 Washington State Department of Fish and Wildlife

WDFW is a formal Cooperating Agency with responsibility for preserving, managing, and protecting fish, wildlife, and ecosystems within the State of Washington.

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 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.

1.4.2.10 Grant County

Grant County is a formal Cooperating Agency. Grant County has a coordinating ordinance (Chapter 21.04 Coordinating Government Regulation of Land and Natural Resource Use) which establishes as county law the basis and process for determining how federal and state agencies are to coordinate and consult with Grant County in actions affecting land and natural resource use within the county.

A section of the Grant County Unified Development Code (Chapter 25.08) which historically regulated electrical transmission lines exceeding 115 kV as a major utility development and subject to land use and environmental review and a Conditional Use Permit (CUP) was eliminated through amendment to the county code by the Board of County Commissioners in July 2011. However, the Grant County Building Code does not exempt private regulated utilities, like Pacific Power from a requirement to obtain a building permit from the county. The building permit is considered a “Project Permit” and as such SEPA review is required (D. Hooper, Personal Communication, July 2011). The building permit is an administrative permit; no Planning and Zoning or Board of County Commissioners approval is required. Grant County may choose to adopt this FEIS to satisfy SEPA requirements. A Project-specific SEPA Environmental Checklist has been developed for the proposed Project and is included in Appendix D.

1.4.2.11 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 CUP must be signed by all owners where a project is located before it can be accepted by the County. The Board of County Commissioners will make the final decision on the CUP. 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 SEPA. Due to the size and timing of the Project, a Development Agreement (DA) may also be required. The DA is subject to public notice, a public hearing before the Board of County Commissioners, and approval by the Board of County Commissioners prior to processing of the CUP and any other land use permits deemed necessary at the time of project permitting with Kittitas County. Kittitas County may choose to adopt this FEIS to satisfy SEPA requirements. A Project-specific SEPA Environmental Checklist has been developed for the proposed Project and is included in Appendix D. The Kittitas County Board of County Commissioners approved the County's updated Shoreline Master Program (SMP) on December 2, 2014. Washington State Department of Ecology (WDOE) granted final approval of the County’s updated SMP on February 22, 2016 making the County’s comprehensive SMP update effective as of March 7, 2016. Depending on the exact locations of the transmission line towers, shoreline permitting may be required.

1.4.2.12 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 SEPA. Yakima County may choose to adopt the FEIS to satisfy SEPA requirements. A Project-specific SEPA Environmental Checklist has been developed for the proposed Project and is included in Appendix D.

Yakima County is the SEPA co-lead agency with WSDOT; WSDOT's South Central Region Environmental Office is serving as the nominal lead agency for SEPA.

1.5 WASHINGTON STATE ENVIRONMENTAL POLICY ACT

In order for the affected counties and state agencies to assess applicant-requested permits and approvals for the proposed Project, it is necessary for the Project to comply with SEPA. Yakima, Kittitas, Benton, and Grant counties, DNR, and WSDOT may choose to adopt this FEIS to satisfy SEPA requirements, as is allowed by WAC 197-11-610. WSDOT is the 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, DNR, 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 FEIS may, therefore, be utilized by state and local governments in meeting SEPA requirements.

The SEPA process for the evaluation of the proposed Project utilizes an Environmental Checklist along with detailed information and analysis contained in the FEIS 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 FEIS can be found.

1.6 GROWTH MANAGEMENT ACT

On non-federal lands, the Growth Management Act (WAC 365-190-130) is the State's primary regulatory tool to protect special status species from the impacts of development. Under the Growth Management Act, local governments are required to create and implement development regulations that protect state-listed species and their habitat. Counties and cities must designate fish and wildlife habitat conservation areas and should consult with WDFW to base those designations on current information on priority habitats and species. The Priority Habitat and Species Program provides wildlife and habitat information for the purposes of land use planning and the evaluation of permits. This information is not regulatory, but is provided as recommendations that may be implemented as a part of county or local regulations (Stinson 2016).

1.7 PURPOSE AND NEED

1.7.1 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 with applicable BLM regulations and to control the use of ROWs on public lands in a manner that:

1. Protects the natural resources associated with public lands and adjacent lands, whether private or administered by a government entity;
2. Prevents unnecessary or undue degradation to public lands;
3. Promotes the use of ROWs in common considering engineering and technological compatibility, national security, and land use plans; and
4. 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.

1.7.2 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.

1.7.3 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.

1.7.4 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(s) (such as a ROW grant or license) 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.

1.8 DECISIONS TO BE MADE

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

Separate authorizations would be issued by BLM, Cooperating Agencies, and other agencies with permitting authority for construction, operation, and maintenance of the Project across lands they manage or administer. The BLM and Cooperating Agencies will use the NEPA and SEPA processes 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 FEIS, the BLM's decision regarding a land use authorization for BLM lands that are crossed by the proposed transmission line constitutes only a small portion of the overall Project. Numerous other land use authorizations, permits, approvals, and/or favorable decisions would be necessary in order to construct an end-to-end transmission line between the Vantage and Pomona Heights substations. Project components, stipulations, and permitting and approval decisions would be made on the selected alternative. Each agency decision-maker reserves the right to make its own independent decision.

The considerations and/or decisions to be evaluated through this FEIS 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 transmission line facilities.
- Whether some or all mitigation measures identified in the FEIS may be adopted or if additional measures may be required.

1.8.1 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 the proposed Project on lands managed by the BLM's Spokane District, 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). The ROW grant would also incorporate or incorporate by reference standard BLM grant conditions found at 43 CFR Part 2805.12.

1.8.2 Cooperating Agencies

1.8.2.1 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 that is made available for non-Army purposes.

1.8.2.2 Bonneville Power Administration

BPA will decide whether to allow the interconnection of the proposed Project to BPA's Vantage Substation and the FCRTS.

1.8.2.3 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.

1.8.2.4 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).

1.8.2.5 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.

1.8.2.6 Washington State Department of Archeology and Historic Preservation

DAHP will decide whether to issue Archeological Excavation and Removal Permits prior to construction pursuant to RCW 27.44 and RCW 27.53 and WAC 25-48 on state or private lands.

1.8.2.7 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 uplands and use authorization applications for crossing state-owned aquatic lands.

1.8.2.8 Grant County

As previously stated, the Grant County Building Code does not exempt private regulated utilities, like Pacific Power, from a requirement to obtain a building permit from the county. The building permit is considered a "Project Permit" and as such SEPA review is required (D. Hooper, Personal Communication, July 2011). The building permit is an administrative permit; no Planning and Zoning or Board of County Commissioners approval is required. The proposed Project is also subject to Shoreline Substantial Development Permit and Shoreline CUP pursuant to Grant County SMP. The structures for this transmission line may also be subject to local building permit requirements.

1.8.2.9 Kittitas County

Kittitas County Code (KCC) 151.11 "Development Agreements" allows for Kittitas County to enter into a development agreement on a case-by-case basis. The size and timing of this transmission line project may require a development agreement. 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.

The Kittitas County Board of County Commissioners approved the County's updated SMP on December 2, 2014. WDOE granted final approval of the County's updated SMP on February 22, 2016 making the County's comprehensive SMP update effective as of March 7, 2016. The proposed Project is subject to Shoreline Substantial Development Permit and Shoreline CUP pursuant to Kittitas County SMP.

1.8.2.10 Yakima County

Under Yakima County Code 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.

1.9 LAND USE PLAN CONFORMANCE

The BLM Spokane District RMP 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 and Area of Critical Environmental Concern, the Brewster Bald Eagle Roost and Juniper Forest ACECs [Areas of Critical Environmental Concern], the Chopaka Mountain Wilderness Study Area, 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)."

1.10 JBLM YTC FINAL PROGRAMMATIC EIS CONFORMANCE

The JBLM YTC ROD for the Final Programmatic EIS for Army Growth and Force Structure Realignment (Grow the Army) (Army 2010) is the approved plan applicable to JBLM YTC-managed lands within the proposed Project area. The Final Programmatic EIS analyzed the environmental and socioeconomic impacts at Fort Lewis and JBLM YTC related to the potential stationing of soldiers at the installation. This Final Programmatic EIS has been developed in accordance with NEPA; the regulations issued by the CEQ, 40 CFR Parts 1500–1508; and the Army's implementing procedures published in 32 CFR Part 651, Environmental Analysis of Army Actions. In addressing environmental considerations at Fort Lewis and JBLM YTC, AR 200–1, Environmental Protection and Enhancement, mandates compliance with:

- all applicable federal, state, and local environmental regulations;
- requirements of environmental permits;
- Executive Orders (EOs) that establish standards and provide guidance on environmental and natural resources management and planning; and
- Army and Fort Lewis regulations that define overall management of the land at Fort Lewis and JBLM YTC.

1.11 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 Reclamation	NEPA Compliance EIS and ROD or License	Reclamation	NEPA, 42 U.S.C. §4321 40 CFR Parts 1500-1508
Power Line Construction and Operation on JBLM YTC	NEPA Compliance EIS and REC	JBLM YTC, Army	NEPA, 42 U.S.C. §4321 40 CFR Parts 1500-1508 32 CFR Part 651
Power Line Construction and Operation on BLM	ROW Grant	BLM	FLPMA 1976 (PL94-579) 43 U.S.C. §§1761-1771 43 CFR Part 2800
Power Line Construction and Operation on Reclamation	ROW Grant or License	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 32 CFR Part 643

ACTION REQUIRING PERMIT, APPROVAL OR REVIEW	PERMIT/APPROVAL/ COMPLIANCE OR REVIEW	ACCEPTING AUTHORITY/ APPROVING AGENCY	LEGAL AUTHORITY OR POLICY GUIDANCE
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 I-82)	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 a Grant of ROW or License by Reclamation NHPA Compliance Section 106 and Section 106 Compliance for BPA and other federal agencies	BLM, JBLM YTC, and Reclamation (review by State Historic Preservation Office 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 ESA with USFWS and National Marine Fisheries Service (NMFS) and ESA Compliance for BPA	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	BGEPA 1972: 16 U.S.C. § 668
Protection of Special Status Species	Compliance	BLM, JBLM YTC, and Reclamation	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	U.S. Environmental Protection Agency	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, Reclamation)	42 U.S.C. §4321 EO 11988 Floodplains
Construction in or modifications of wetlands	Compliance	Each federal agency issuing permits for use of federal land (BLM, JBLM YTC, Reclamation)	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 Application (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

ACTION REQUIRING PERMIT, APPROVAL OR REVIEW	PERMIT/APPROVAL/ COMPLIANCE OR REVIEW	ACCEPTING AUTHORITY/ APPROVING AGENCY	LEGAL AUTHORITY OR POLICY GUIDANCE
Tower location and height relative to air traffic corridors	Form 7460-1 Notice of Proposed Construction or Alteration	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	DNR	RCW 79.36.510, WAC 197-11
Power Line Construction and Operations on State owned aquatic lands	Aquatic Use Authorization	DNR	RCW 79.105.210, 79.110, 79.36.355
SEPA Compliance with State permits and easements	EIS/SEPA Checklist	DNR, WSDOT (Lead Agency), DAHP, WDFW, WDOE	DNR – WAC 332-41 WSDOT – WAC 468-12 DAHP – WAC 25-42 WDFW – WAC 220-100 WDOE - WAC 173-802, 197-11
Potential discharge into waters of the U.S.	401 Permit, JARPA	DNR, WDOE (only agency that issues 401), WDFW	WAC 173-201A
Power Line Construction and Operations on or over State roads	Utility Crossing Permit	WSDOT	WAC 468-34 Utility Accommodation Policy M 22-86.01
Power Line Construction and Operations on WSDOT land	Easement	WSDOT	
Power Line Construction and Operations on State lands	State Historic Preservation Compliance	DAHP	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, Shoreline Substantial Development Permit, Shoreline CUP, and SEPA Compliance	Grant County Building Department	Grant County Ordinance 23.04.040CC
Power Line Construction and Operation within or on private property or use of County Road ROW	Development Agreement, Conditional Use Permit, Shoreline Substantial Development Permit, Shoreline Conditional Use Permit, County Franchise Agreement for County Road ROW	Kittitas County Board of County Commissioners	RCW 36.55, KCC 12.56, KCC 15A, KCC17.15.050, KCC 17.15.060, KCC17.31, KCC 17.60A, KCC 17A, and Kittitas County SMP
Power Line Construction and Operation within or on private property or use of County Road ROW	Shoreline Permit for Substantial Development	Benton County Shoreline Hearing Board	BCC Title 17 Permit Review Process. Chapter 17.10
Power Line Construction and Operation on private property	Building Permit	Benton County Building Department	BCC Title 3, Chapter 3.04

ACTION REQUIRING PERMIT, APPROVAL OR REVIEW	PERMIT/APPROVAL/ COMPLIANCE OR REVIEW	ACCEPTING AUTHORITY/ APPROVING AGENCY	LEGAL AUTHORITY OR POLICY GUIDANCE
Provide control of airborne dust particles during construction	Dust Control Plan	Yakima Regional Clean Air Agency and WDOE	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

1.12 SCOPING AND PUBLIC INVOLVEMENT

Public participation is essential for the environmental review process and informed decision making. Scoping occurs early in the NEPA process and generally extends through development of alternatives.

The intent of scoping is to determine the scope of issues to be addressed in the EIS and identify the significant issues related to the proposed Project by soliciting comments from interested and potentially affected parties, including landowners, citizens, tribes, government agencies and interest groups and organizations (40 CFR 1501.7). Scoping activities conducted by the BLM and JBLM YTC (Joint Lead Federal Agencies at this time), as required by 40 CFR 1501.7, are described below.

The Notice of Intent (NOI) to prepare an EIS for the proposed Project was published in the *Federal Register* on January 5, 2010. The NOI included a detailed description of the proposed Project, purpose of public scoping, the role of BLM and JBLM YTC as Joint Lead Federal Agencies and Cooperating Agencies, a list of preliminary environmental issues, notification of planned public meetings, and procedures for submitting comments on the proposed Project and issues of concern. Publication of the NOI also marked the beginning of a 60-day public comment period, January 5 through March 8, 2010.

In addition to the *Federal Register* notice, the BLM and JBLM YTC sent letters to private landowners located within 0.25 mile of either side of the assumed centerlines of the preliminary alternative routes notifying them of BLM and JBLM YTC's intent to prepare an EIS; the dates, time, and locations of the public scoping meetings; and comment period deadlines.

Scoping letters were also sent to interested agencies, individuals, groups, and organizations on the BLM and JBLM YTC's mailing lists. Additionally, scoping letters were sent to federal, state, and local agencies and elected officials notifying them of the proposed Project and the scoping period and inviting them to attend an agency scoping meeting. A total of 1,280 public and agency notification letters were sent on January 14, 2010.

Other scoping notifications included a BLM news release to local media outlets and the development of a project webpage on the BLM Spokane District website: http://www.blm.gov/or/districts/spokane/plans/vph230.php.

The BLM and JBLM YTC held two open house format public scoping meetings to explain the proposed Project and receive input on environmental concerns. Meetings were held on the following dates at the locations listed below:

- February 3, 2010 at the Selah Civic Center, Selah, Washington (approximately 70 participants).
- February 4, 2010 at the Mattawa Elementary School Cafeteria, Mattawa, Washington (approximately 25 participants).

An initial agency scoping meeting was held on February 3, 2010, in Selah. During the initial scoping period, three main alternative routes, including numerous sub-routes, were presented for public and agency review and comment:

1) A northern route crossing JBLM YTC roughly parallel with the existing Pacific Power Pomona-Wanapum transmission line;
2) A route that mostly crossed JBLM YTC land just inside its southern boundary; and
3) A route mostly on private land, approximately one-half mile south of the JBLM YTC boundary.

During the open houses the public and other agencies were given the opportunity to learn about the proposed action, regulatory processes and project details, provide comments and discuss the Project with the BLM, JBLM YTC, Project Consultants, and Pacific Power representatives.

Comments were received through a variety of methods: email, comment forms collected at the scoping meetings, comments submitted at geographic information system workstations, comments submitted by mail or fax and written and verbal comments recorded by BLM, JBLM YTC, and the Project's NEPA consultant at the scoping meetings. All comments were analyzed and assisted in defining the issues to be analyzed in the EIS. A detailed description of the scoping process and summary and analysis of the comments received from the public and agencies during the scoping period is presented in the *Vantage Pomona Heights 230 kV Transmission Line Project EIS Scoping Summary Report* (BLM 2010). A more detailed description of the public involvement efforts is presented in Chapter 5 Consultation and Coordination.

In response to public and agency input received during the scoping period, and military aviation safety issues identified after scoping, it was necessary to eliminate certain route alternatives and to make major adjustments to the remaining route alternatives. The route alternatives eliminated from consideration are discussed in Chapter 2.0, Section 2.5.1.4 Route Alternatives Considered and Eliminated.

Subsequently, Pacific Power met with elected officials, planning authorities, landowners in Yakima, Grant, and Kittitas counties, and the JBLM YTC in an effort to identify new feasible route options. Pacific Power then held open house meetings in Yakima and Mattawa on September 8 and 9, 2010, respectively, to present the newly proposed routes and obtain input from the public and agencies. After these meetings, Pacific Power further discussed its proposed new routes with the BLM and JBLM YTC and submitted amended ROW applications to both agencies in November 2013.

A second scoping letter was distributed to interested individuals, groups, organizations, and agencies on January 14, 2011. The second letter was intended to provide interested parties with an update on the project status and changes, including new route alternatives that were developed as a result of the early initial scoping and comment period. The second letter was distributed to approximately 1,100 parties and requested that comments be submitted by February 4, 2011.

A second scoping meeting was held on March 1, 2011 in Ellensburg. The agency scooping meeting brought together representatives and resource specialists from the BLM, JBLM YTC, USFWS, Reclamation, Pacific Power, the Yakama Nation, WDFW, WDNR, WSDOT, Grant County, Kittitas County, and BLM's NEPA consultant (POWER). During the meeting the attendees discussed issues associated with the new route alternatives, the EIS document outline and preparation schedule, data needs, analysis methods and protocols, and schedules for biological and other resource inventories.

On January 4, 2013, the BLM released the DEIS for public review and comment. The DEIS identified an Agency Preferred Alternative (Alternative D). Alternative D is 66.5 miles in length, would cross JBLM YTC on its southwest side, would cross the Wahluke Slope and BLM managed land in the Saddle

Mountains Management Area, and would be located primarily on private lands. This Alternative also crosses land managed by Reclamation, Grant County PUD, and DNR and is located in Yakima, Benton, and Grant Counties. Public meetings were held by BLM 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 (see Section 5.7 and Appendix F).

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 alternative. See Section 1.1.1 EIS Process for more information on the identification of the NNR Alternative.

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 informed the parties about the location of the NNR Alternative and the preparation of the SDEIS.

With the publication of the U.S. Environmental Protection Agency Notice of Availability in the *Federal Register* occurring on January 2, 2015, the SDEIS was released to the public for review and comment. A 45-day comment period followed, closing on Tuesday, February 17, 2015. Public meetings were again held by BLM in Selah and Desert Aire in January 2015 as described in Section 5.3.4 to provide the public an opportunity to give their input on the SDEIS. The BLM received letters and e-mails containing more than 90 comments during the 45-day comment period (see Section 5.7 and Appendix F).

1.13 ISSUES IDENTIFIED

This section briefly describes the issues identified for further analysis in this FEIS. The following discussion incorporates issues raised during public scoping, as well as internal BLM and Cooperating Agency scoping.

1.13.1 Issues Identified for Further Analysis During DEIS Scoping

The following issues have been identified for further analysis in this FEIS. In many cases, these issues were considered in the development of Action Alternatives (described in Chapter 2.0). In all cases, these issues have been further described and analyzed in Chapters 3, 4, and 5. The issues presented in Table 1-2 are not intended as a comprehensive list of all issues evaluated in the FEIS; these issues represent the key concerns of the public, BLM project team staff, and Cooperating Agencies.

Table 1-2 Issues Raised by the Public and Government Agencies during scoping

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?

1.14 CHANGES MADE FROM DEIS AND SDEIS

This section briefly describes route alternative changes made between the DEIS, SDEIS, and the FEIS and modification of environmental analysis from the SDEIS as presented in this FEIS.

1.14.1 Route Changes and Alternatives

As previously described in Section 2.2 of the SDEIS, Route Segment 1a presented in the DEIS was modified to accommodate a single affected landowner on the route segment’s west end (becoming NNR-1). After the publication of the SDEIS, a landowner meeting was held by Pacific Power for affected landowners located on Sage Trail Road (see Section 5.3.4) to provide a forum for landowners to communicate concerns and discuss the design, construction and maintenance of the Project. During the meeting, additional modifications to Route Segment 1a/NNR-1 were proposed by the affected landowners. As a result, the western-most portion of Route Segment 1a/NNR-1 was modified to avoid Sage Trail Road and routed to the south of the residences fronting Sage Trail Road along an approximately 0.75 mile long section located directly east of the Pomona Substation. This modification has been incorporated into the analysis of all Action Alternatives presented in this FEIS.

1.14.2 Environmental Analysis

Analysis of the Action Alternatives in the FEIS followed the detail and methodologies used in the DEIS and SDEIS for resource impact analysis. Specifically Wildlife, Special Status Species, Land Use, Visual, and Cultural Resources required analysis updates to account for changes in the Project. For Wildlife and Special Status Species (see Section 4.3), the Project area was expanded in the SDEIS to address impacts to Greater Sage-Grouse (Sage-Grouse; *Centrocercus urophasianus*) based on input from JBLM YTC and USFWS. For Sage-Grouse, the analysis area in the SDEIS was defined as an eight-mile wide corridor surrounding all of the Action Alternatives. Project modifications to Route Segment 1a/NNR-1 and information provided about the Selah Cliffs NAP required Land Use and Visual analysis updates. Updated cultural resource data was collected and incorporated into the FEIS analysis. The impact analysis for the Action Alternatives analyzed in the DEIS has been expanded to be consistent with the methodology and analysis presented in the SDEIS. All resource sections were refreshed as necessary to reflect to most current data available.

CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

The National Environmental Policy Act (NEPA) requires that a practical or feasible range of reasonable alternatives be considered and evaluated; these alternatives must meet the project's purpose and need while minimizing or avoiding environmental impacts. Reasonable alternatives are defined by the Council on Environmental Quality (CEQ) as those that are technically, economically, and environmentally practical and feasible. This range of reasonable alternatives is formulated to address issues and concerns raised by the public and by agencies during scoping. The alternatives represent other means (methods, processes, locations, times, sequences, etc.), besides the Proposed Action, of satisfying the stated purpose and need for the action. NEPA also requires that a No Action Alternative be evaluated for comparison to the other alternatives analyzed in the Environmental Impact Statement (EIS). If unreasonable alternatives or alternatives that do not meet purpose and need are suggested, a detailed analysis of these alternatives is not required. However, the rationale for eliminating them from detailed analysis must be explained.

This Chapter describes Pacific Power's proposed Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project (Project) components, describes the alternatives analyzed in detail, those alternatives that were considered but eliminated from further consideration, and identifies the Agency Preferred Alternative. All Alternatives analyzed in the Draft Environmental Impact Statement (DEIS) and Supplemental DEIS (SDEIS) were considered in this Final Environmental Impact Statement (FEIS). This Chapter presents the nine Action Alternatives and the No Action Alternative that were considered in detail in this FEIS. The Alternatives presented are as follows:

4) No Action Alternative
5) Alternative A
6) Alternative B
7) Alternative C
8) Alternative D
9) Alternative E
10) Alternative F
11) Alternative G
12) Alternative H
13) New Northern Route (NNR) Alternative with Overhead and Underground Design Options and the Manastash Ridge (MR) Subroute

The NNR Alternative with the Overhead Design Option (NNR Alternative – Overhead Design Option) has been identified by the U.S. Bureau of Land Management (BLM), the lead federal agency, as the Environmentally Preferred Alternative and was selected as the Agency Preferred Alternative in the FEIS. Information on the rationale for the selection of the NNR Alternative – Overhead Design Options as the Agency Preferred Alternative and the Environmentally Preferred Alternative is presented in Section 2.4.2.2.

The Action Alternatives are comprised of route segments for alternatives development, analysis, and to allow comparison of the Action Alternatives in the FEIS. The proposed Project's Action Alternatives consist of the interconnection of route segments to form entire end-to-end transmsission line routes. Route segments and Action Alternatives are discussed in detail in Section 2.4. The locations of the individual route segments and the FEIS Agency Preferred Alternative are shown in Figure 2-1. Figures 2-2 and 2-3 provide a schematic illustration of the nine end-to-end Action Alternatives, design options, and subroute analyzed in this FEIS. Table 2-1 presents a summary comparison of the nine Action Alternatives.

2.1 PROPOSED ACTION

2.1.1 New Overhead 230 kV Transmission Line

Pacific Power proposes to construct, operate and maintain the new Vantage to Pomona Heights 230 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. Action Alternatives analyzed in this FEIS range in length from 40.5 miles (NNR Alternative – Overhead Design Option) to 66.9 miles (Alternative H), and are routed either through or to the south and east of the Joint-Base Lewis McCord Yakima Training Center (JBLM YTC; see Figures 2-1, 2-2, and 2-3).

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. The H-frame structures 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 or below the Priest Rapids Dam (depending on the Action Alternative), 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 2.2.2.1 and Figure 2-4. Final design characteristics would be determined in the detailed design phase of the proposed Project.

Construction of the proposed 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 corridor would include existing roads in their current condition, existing roads that would be improved as part of this Project and new access roads. The proposed 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 or Burkett Lake Recreation Area.

During construction of the proposed 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.

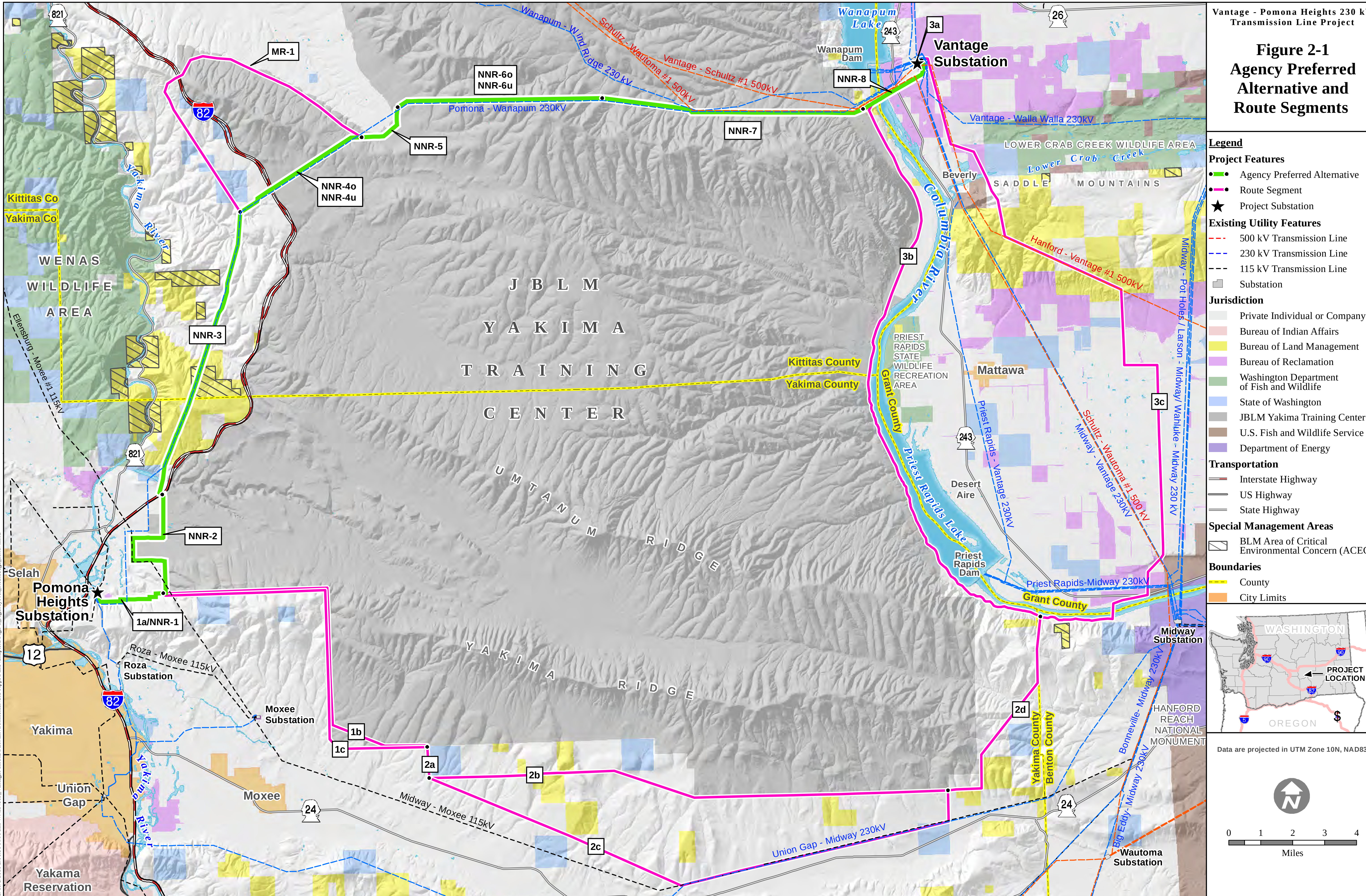

Figure 2-1
Agency Preferred Alternative and Route Segments

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Vantage - Pomona Heights 230kV Transmission Line Project

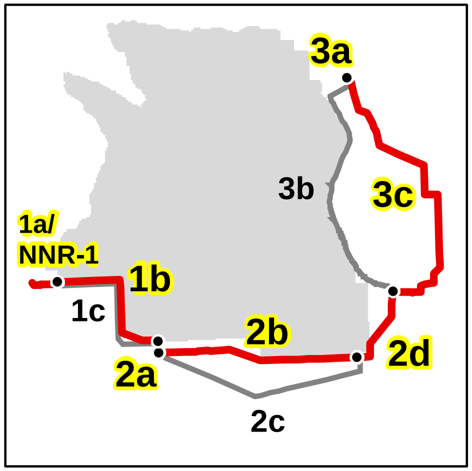
Figure 2-2

Schematic Illustration of DEIS Route Alternatives

Alternative	Link Combination
A	1a, 1b, 2a, 2b, 2d, 3a, 3c
B	1a, 1b, 2a, 2b, 2d, 3a, 3b
C	1a, 1b, 2a, 2c, 2d, 3a, 3b
D	1a, 1b, 2a, 2c, 2d, 3a, 3c

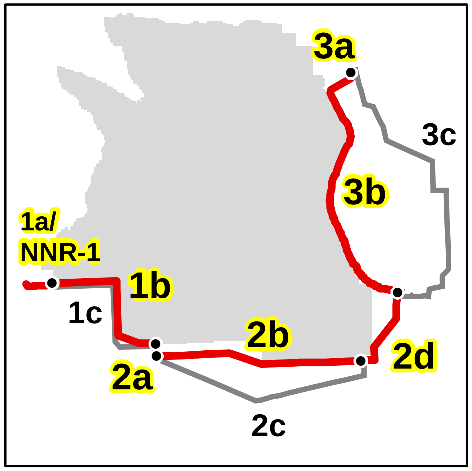
Alternative	Link Combination
E	1a, 1c, 2a, 2b, 2d, 3a, 3b
F	1a, 1c, 2a, 2b, 2d, 3a, 3c
G	1a, 1c, 2a, 2c, 2d, 3a, 3b
H	1a, 1c, 2a, 2c, 2d, 3a, 3c

Alternative A



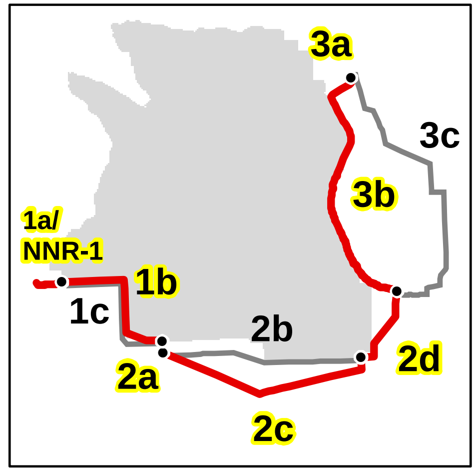
Total Length: 64.7 miles

Alternative B



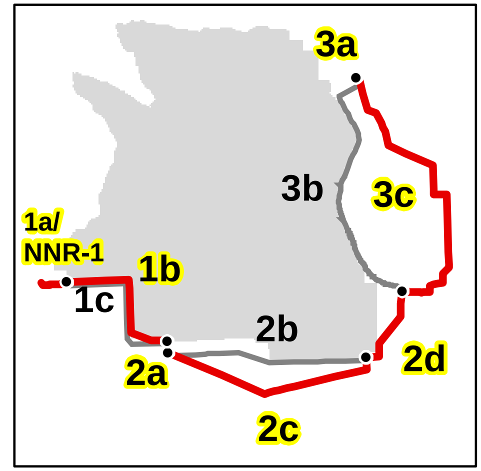
Total Length: 61.2 miles

Alternative C



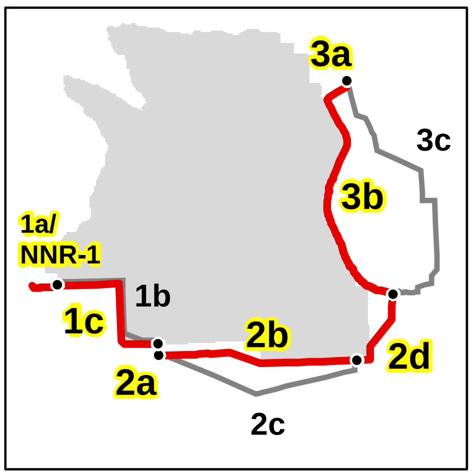
Total Length: 63.0 miles

Alternative D



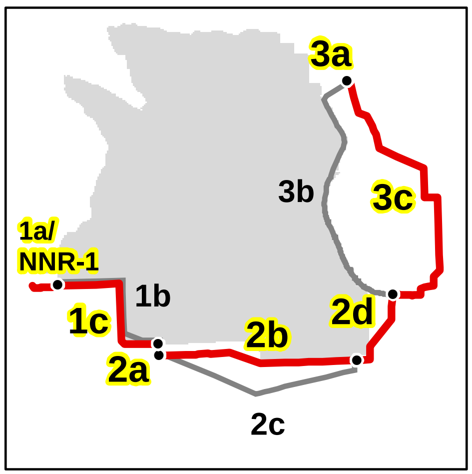
Total Length: 66.5 miles

Alternative E



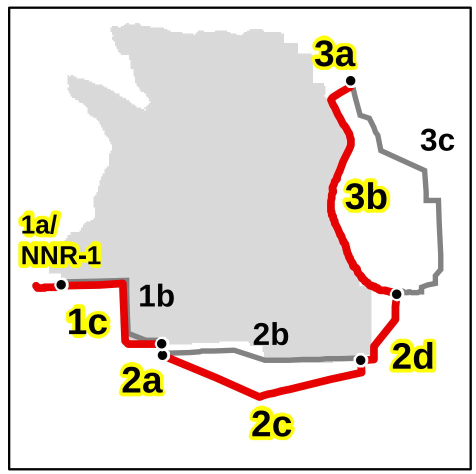
Total Length: 61.6 miles

Alternative F



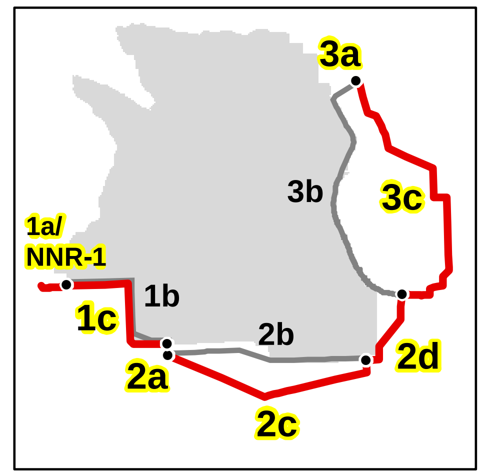
Total Length: 65.1 miles

Alternative G



Total Length: 63.4 miles

Alternative H



Total Length: 66.8 miles

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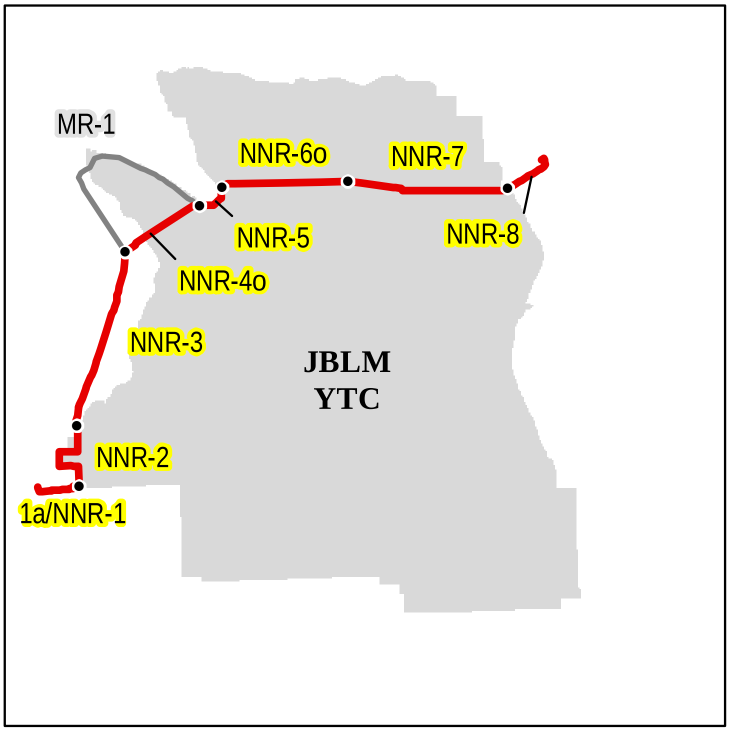
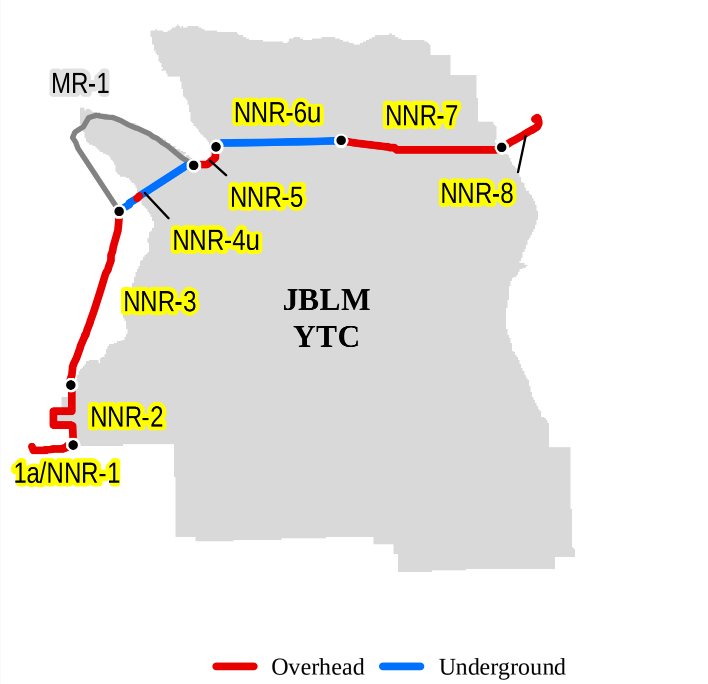
NNR Alternative (Agency Preferred)



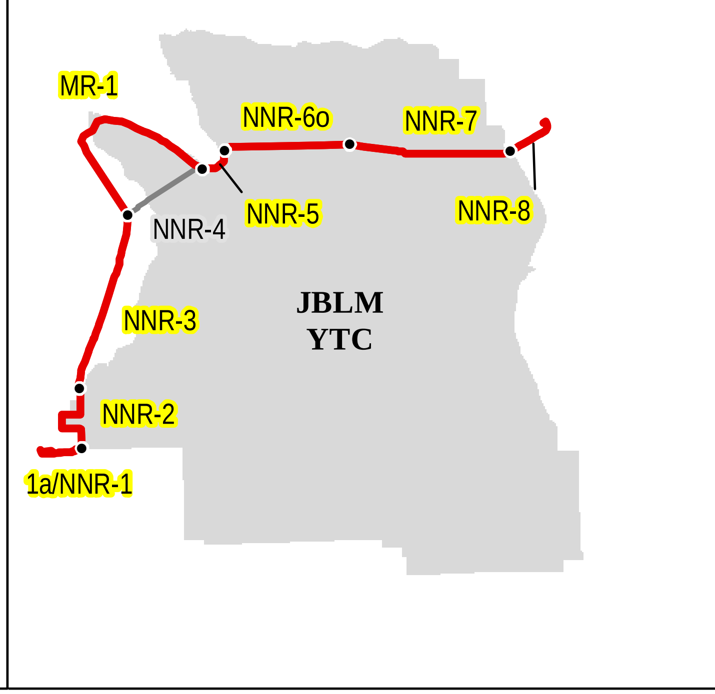
Total Length: 40.5 miles

NNR Alternative Underground Design Option



Total Length: 40.5 miles

NNR Alternative with MR Subroute



Total Length: 47.8 miles

NNR Alternative (Agency Preferred)	1a/NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8
NNR Alternative Underground Design Option	1a/NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8
NNR Alternative with Manastash Ridge (MR) Subroute	1a/NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6o, NNR-7, NNR-8

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2-3 Schematic Illustration of NNR Alternative Design Options

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Table 2-1 Action Alternative Comparison Summary

OWNERSHIP (miles crossed)	ALT. A (1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3c) 64.7 miles	ALT. B (1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3b) 61.2 miles	ALT. C (1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3b) 63.0 miles	ALT. D (1a/NNR-a, 1b, 2a, 2c, 2d, 3a, 3c) 66.5 miles	ALT. E (1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3b) 61.6 miles	ALT. F (1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3c 65.1 miles	ALT. G (1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3b) 63.4 miles	ALT. H (1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3c) 66.8 miles	NNR ALTERNATIVE – OVERHEAD DESIGN OPTION* AND UNDERGROUND DESIGN OPTION** (1a/NNR-1, NNR-2, NNR-3, NNR-4O/NNR-4U, NNR-5, NNR-6O/NNR-6U, NNR-7, NNR-8) 40.5 miles	NNR ALTERNATIVE - MR SUBROUTE (1a/NNR-1, NNR-2, NNR-3, NNR-5, NNR-6, NNR-7, MR-1, NNR-8) 47.8 miles
Federal										
Bureau of Land Management (BLM)	6.1	2.1	1.4	5.4	2.1	6.1	1.4	5.4	4.0	4.0
JBLM YTC	12.5	15.8	15.8	12.5	3.3	0.0	3.3	0.0	24.7	28.1
Bureau of Reclamation (Reclamation)	5.2	1.4	1.4	5.2	1.4	5.2	1.4	5.2	1.4	1.4
Total Federal Land	23.8	19.3	18.6	23.1	6.9	11.3	6.2	10.6	30.1	33.5
State										
Washington State Department of Transportation (WSDOT)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.8	0.7
Washington Department of Natural Resources (DNR)	0.0	0.0	1.0	1.0	1.0	1.0	2.0	2.0	0.0	1.7
Total State Land	<0.02	<0.02	1.02	1.02	1.02	1.02	2.02	2.02	0.8	2.4
Other										
Grant County Public Utility District (Grant County PUD)	0.0	1.4	1.4	0.0	1.4	0.0	1.4	0.0	0.3	0.3
Private Land	40.5	40.1	41.5	42.0	51.9	52.4	53.4	53.9	8.9	11.2
Water	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
County (miles crossed)										
Benton	3.2	0.8	0.8	3.2	0.8	3.2	0.8	3.2	0.0	0.0
Grant	22.8	2.2	2.2	22.8	2.2	22.8	2.2	22.8	2.2	2.2
Kittitas	0.0	9.5	9.5	0.0	9.5	0.0	9.5	0.0	27.6	34.9
Yakima	38.7	48.8	50.5	40.4	49.2	39.0	50.9	40.8	10.7	10.7
Parcels and Landowners										
Number of Parcels Crossed	148	124	145	169	195	219	216	240	99	111
Number of Private Landowners	57	31	33	58	77	104	81	105	36	35
Miles of Agricultural Land Potentially Affected	2.7	0.0	1.5	4.2	0.2	2.9	1.7	4.4	0.0	0.0
Miles of Paralleling Existing Transmission (w/in 200 feet)	6.7	2.2	10.8	15.3	2.2	6.7	10.8	15.3	31.1	26.9

*FEIS Agency Preferred Alternative
**Overhead and Underground Design Options would occur along the same alignment
Numbers may not sum precisely due to rounding.

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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 the EIS analysis, 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, is for overhead transmission line construction (Overhead Design Option) which is 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). In addition to the Overhead Design Option proposed by Pacific Power, this FEIS analyzes the option of undergrounding two discrete route segments of the NNR Alternative. 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 (*Centrocercus urophasianus*; 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. The impact analysis for the Underground Design Option is described and considered for each resource in the FEIS.

Upgrades would also occur to Pacific Power's Pomona Heights Substation and BPA's Vantage Substation, located at the proposed Project's termini at the north and the south ends.

2.1.2 Pomona Heights Substation Upgrades

The new 230 kV transmission line would enter Pacific Power's Pomona Heights Substation on the northwest edge of the substation. All new equipment would be installed within the existing substation fence. A new steel H-frame terminal structure 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 proposed new 230 kV transmission line. The proposed new transmission 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 PROJECT ACTIVITIES AND FEATURES COMMON TO ACTION ALTERNATIVES

2.2.1 Design Options Considered in the NNR Alternative Impact Analysis

Two design options were developed and analyzed to determine the potential impacts of the proposed Project on resources identified in Chapters 3 and 4. These options are considered in this FEIS based on the various design and construction techniques proposed. The two design options that are considered are: 1) Overhead Design Option and 2) Underground Design Option. 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. The Overhead Design Option is common to all Action Alternatives presented in this FEIS and is described in Section 2.2.2. The Underground Design Option, a project feature not common to all Action Alternatives, was analyzed for two discrete route segments of the NNR Alternative and is described in Section 2.2.5.

Disturbance assumptions, design, construction, operation, and maintenance characteristics of the NNR Alternative - Overhead Design Option are detailed in Sections 2.2.2 through 2.2.4. Disturbance assumptions, design, construction, operation, and maintenance characteristics of the NNR Alternative - Underground Design Option are detailed in Section 2.2.5.

2.2.2 Overhead Transmission Line Design Specifications

This section describes the typical characteristics of the proposed Project facilities common to all Action Alternatives.

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

2.2.2.1 Structures

The structures for the proposed 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 transmission line located in open terrain. The H-frame tangent structures would be between 65 and 90 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. The 2,800-foot Columbia River crossing would utilize approximately 200-foot tall steel lattice structures. 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 2-2 and illustrated in Figures 2-4 and 2-5.

2.2.2.2 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.

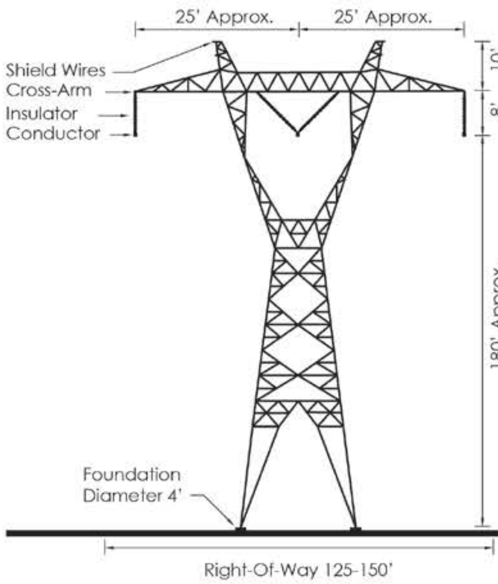
Embedment depth is expected to be between 9 and 15 feet based on the structure heights proposed for the Project. The actual depth would depend on load and soil characteristics. No foundations would be required for the wood pole structures except where necessary due to local terrain conditions, areas 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.

Table 2-2 Overhead Design Characteristics of the Proposed Vantage-Pomona Heights 230 kV Transmission Line Project

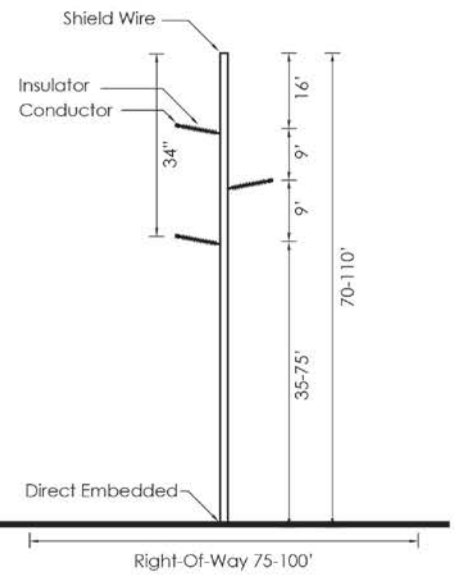
FEATURE	DESIGN CHARACTERISTICS
Line Length	40.5 to 66.8 miles
Type of Structure	H-frame wood poles-open terrain Single wood or steel poles in agricultural, developed and constrained areas
Structure Height	H-frame structures - 65 to 90 feet Single poles - 70 to 110 feet
Average Span Length	H-frame structures - 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)	
(Single Poles)	150 x 125 feet (18,750 sq. ft.)
	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 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.

* Note- Line length varies with Action Alternative.

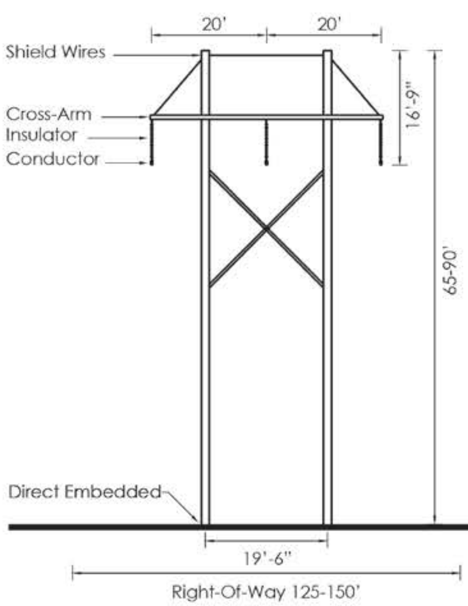
FIGURE 2-4 TYPICAL 230 KV STRUCTURE TYPES



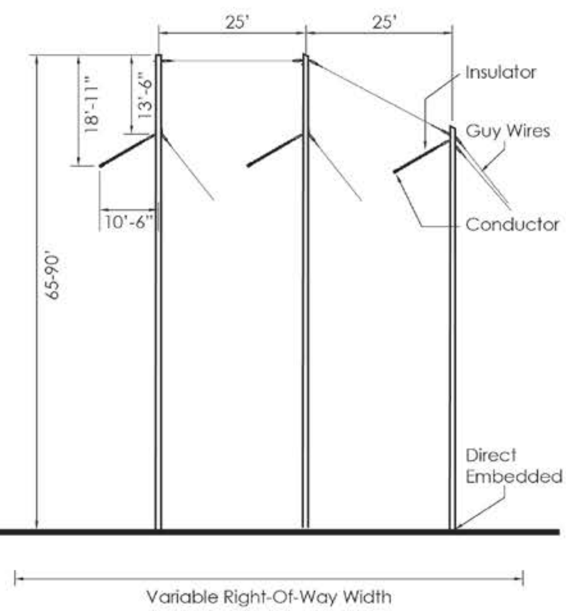
Single-Circuit 230 kV Steel Lattice Structure (Columbia River Crossing)



Single-Circuit 230 kV Single Pole Tangent Structure



Single-Circuit 230 kV H-Frame Tangent Structure



Single-Circuit 230 kV 3 Pole Angle-Guyed Structure

IMAGES NOT TO SCALE

FIGURE 2-5 PHOTOGRAPHS OF TYPICAL 230 KV STRUCTURE TYPES

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 steel 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 steel 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.

2.2.2.3 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 kilo-circular mils (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 Action Alternatives involving crossing of Interstate (I) 82, however, would be a minimum of 34 feet, according to Washington State Department of Transportation (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.

2.2.2.4 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 proposed 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.

2.2.2.5 Right-of-Way Acquisition

Acquisition of Right-of-Way Across Federal Lands
New permanent and temporary land use rights are required for the construction, operation, and maintenance of 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). Pacific Power 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 (e.g., 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.

BLM
The duration of 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 ROW renewal provision where the useful life is expected to extend beyond the initial term of the ROW Grant. Once BLM's Record of Decision (ROD) has been issued for BLM-administered lands, the applications would be finalized with Project design details. Following the issuance of the BLM ROD and ROW Grant, Pacific Power would provide a Construction Plan of Development (POD) with detailed design information specific to the BLM-administered lands.

JBLM YTC
If an application for use of real property under Army jurisdiction were to be required, review and approval by the Department of the Army (Army) would be necessary. The procedure for granting use of real property under the jurisdiction or control of the Army is governed by 10 United States Code 2668 and Army Regulations 405-80 and 420-1. The JBLM Commander has the responsibility for initiating and concurring with the proposal for granting use of such real property. After successive concurrences by the Army's Installation Command Central Region Commander; Headquarters, Installation Command, and the Deputy Assistant Secretary of the Army (DASA) and the issuance of a directive through Headquarters, US Army Corps of Engineers, the Seattle District Corps of Engineers Director of Real Estate would determine Fair Market Value for the easement and coordinate issuance of the final easement with the lead federal proponent agency. The process would involve drafting a Report of Availability (ROA) with the FEIS attached as supporting documentation. The ROA would require approval from: the Secretary of the Army's delegated official, the Assistant Secretary of the Army (Installations, Logistics and Environment), the Assistant Chief of Staff for Installation Management, the Chief of Engineers (COE) Commander, U.S. Army Corps of Engineers (USACE) Seattle District, and JBLM Installation Commanders. After approval of the underlying easement, the Joint Base Commander would coordinate with the COE-Seattle District to complete the real property action which would involve a temporary Right-of-Entry for construction purposes and a permanent grant of ROW based on as-built surveys after construction is finalized.

The duration of a permanent ROW Grant issued by the Army is primarily dependent upon a reasonable period needed to accomplish the purpose of the authorization. These ROW Grants for electric transmission facilities generally range from 30 years and up to 50 years. ROW renewal provision where the useful life is expected to extend beyond the initial term of the ROW Grant are usually renewed however, there is no guarantee. Once legally sufficient NEPA documentation has been issued, the applications would be finalized with Project design details. Following the issuance of the NEPA documentation easement approval, Pacific Power would provide a Construction POD with detailed design information specific to the JBLM YTC-administered lands.

Bureau of Reclamation
The duration of a ROW Grant issued by Reclamation is primarily dependent upon a reasonable period needed to accomplish the purpose of the authorization. These Reclamation ROW Grants generally do not exceed 10 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 (*Reclamation Manual Directives and Standards LND 08-01*).

Reclamation ROW renewal provision where the useful life is expected to extend beyond the initial term of the ROW Grant are usually renewed however, there is no guarantee. Once a Reclamation ROD or other Reclamation appropriate decision document has been issued, the applications would be finalized with Project design details. Following the issuance of the Reclamation ROD or other decision document and ROW Grant, Pacific Power would provide a Construction POD with detailed design information specific to Reclamation-administered lands.

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

In order to cross WSDOT-administered or Washington State Department of Natural Resources (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 (hachures define control of access between a highway facility and all other property; will be 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 proposed Project will need to comply with Washington’s State Environmental Policy Act 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

The ROW corridor for the proposed transmission line facilities on private land would be purchased by Pacific Power. All necessary 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 final route for the proposed transmission line has been selected, a list of all landowners with title to property lying within the transmission line ROW corridor would be obtained by Pacific Power from county records. Permission to enter the private property would be requested by Pacific Power from the landowners for Pacific Power’s personnel to conduct surveys, real property appraisals, environmental studies, and geotechnical studies. Detailed legal descriptions would be prepared using survey data of the proposed 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, Pacific Power’s realty specialists would present formal offers to acquire the necessary land rights form the landowners. Land rights would be acquired in the form of an easement contract for transmission line ROW corridor.

The Pacific Power realty specialist would explain the proposed transmission line project and contract to the landowners. If agreeable to both the landowner and Pacific Power realty specialist, the contract would be signed.

The executed contract would be recorded in the official records of the county, and the ROW corridor 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 private landowner.

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

2.2.3 Overhead Transmission Line Design Construction

Pacific Power would not initiate any construction or other surface disturbing activities on the public land portion of the ROW corridor until written approval by all federal, state, and local authorizing entites has been obtained. Authorizing entities include BLM, JBLM YTC, Reclamation, USACE, WSDOT, DNR, Washington Department of Ecology, and the authorizing counties.

The specific authorization from the BLM would consist of a written Notice to Proceed (Form 2800-15). The specific authorization from JBLM YTC would consist of a formal Determination of Availability from the DASA, temporary construction Rights of Entry, and, if necessary, short term licenses for survey or other pre-construction work. The specific authorization from Reclamation would consist of a written Notice to Proceed. WSDOT's specific authorization would consist of issuing a utility permit, an access permit and granting an easement to cross WSDOT property. For a complete list of authorizations, permits, reviews, and approvals, please see, Section 1.11 and Table 1-1.

Preconstruction conferences with each of the affected federal, state, and local 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 and/or culturally sensitive areas, an environmental specialist and/or agency and tribal personnel with appropriate qualifications (i.e., biologist, archaeologist, etc.) 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, state, and local agencies and tribes, as appropriate, 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 proposed Project. Construction equipment and work force requirements are described in Section 2.2.3.14. Construction of the proposed transmission line is discussed in the following sections according to the sequence of activities listed below.

14) Geotechnical surveys are conducted.
15) Centerline of transmission line surveyed and staked.
16) Access roads identified and constructed, where necessary.
17) ROW and structure sites cleared.
18) Work areas and set-up sites cleared, as needed.
19) Materials distributed along centerline.
20) Holes dug for transmission line structures.
21) Structures framed and erected.
22) Conductors and ground wires installed.
23) Construction sites cleaned-up and reclaimed.

2.2.3.1 Surveying the Centerline

The engineering survey would involve verifying and staking the centerline of the final 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 on private land. Depending on the final route approved by the federal, state, and local authorizing entities, the centerline may be adjusted to accommodate detailed engineering requirements and as a result of the discovery of environmentally and/or culturally sensitive areas.

2.2.3.2 Overhead Transmission Line Design Disturbance Model, Access Roads, and Ground Disturbance Assumptions

Construction of the proposed 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 corridor and structure sites for both construction and long-term maintenance of the proposed transmission line. Short-term, temporary impacts and long-term, permanent impacts created as a result of proposed 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 for overhead construction of the proposed of the Action Alternatives and route segments.

Proposed 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 Pacific Power’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 proposed transmission line ROW corridors. All construction access on federal, state, and locally managed lands is subject to the approval of the appropriate land management agency prior to the initiation of construction. Additionally, approvals from WSDOT would be needed for I-82 and State Route (SR) 243 crossings; where a break in access would occur on I-82, approval from Federal Highway Administration would also be necessary. Approval from DNR would be needed for Pacific Power’s easements and access permit applications for crossing DNR-managed uplands and use authorization applications for crossing state-owned aquatic lands.

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 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, bridges, and other such infrastructure 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; however, best management practices and required design features (RDFs) would be implemented to control erosion and other resource protection concerns, such as placing water bars in the road.

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 Pacific Power’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 and local landowner agreements.

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 (Pacific Power, state, federal, and/or local agencies, as appropriate). The stripped area would be compacted as necessary to provide an adequate surface.

In certain areas, it could be necessary to block/close roads after construction to restrict future access for general public 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 roads with earthen berms or boulders. Blocked/closed access roads would have to be reopened, when necessary for Project maintenance, repair, inspection, etc.

For the purposes of calculating estimated access road disturbance created as a result of the Action Alternatives for route segments with overhead and underground construction standards, eight levels of access (Access Levels 0 through 7) were developed). 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 all segments (see Appendix A: Map 1 – Access Map). Access levels are summarized in Table 2-3.

Table 2-3 Access Levels and Ground Disturbance (Overhead and Underground Construction Standards)

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.
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.

Access levels were assigned along the assumed Project centerlines of Action Alternatives by determining the location and condition of existing roads within the proposed Project ROW 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 for the Action

Alternatives. These areas, as well as those areas where no access 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.

The route segment centerlines for the Action Alternatives were assigned Access Levels based on proximity to existing roads. Typically, paved, gravel, and wide dirt roads within 750 feet of the assumed centerlines 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 route segment centerlines 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 proposed 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 that might be needed. 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 would 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 route segment centerlines 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.

2.2.3.3 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 wire that would be utilized by the proposed Project. For mid-span setups, work areas are located within the 125-foot ROW corridors and up to 250 feet in length. Setup sites for corners and heavy angles are the width of the ROW corridor 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 construction 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 corridors 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 corridors where construction travel would be restricted by rock outcrops, washes, ravines, canals, or sensitive habitat and cultural areas. The turn-around areas would be located at the last structure that can be accessed by the road, 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 detailed engineering design for the final selected route is available.

2.2.3.4 Pole and Foundation Installation

Wood and 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.

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 land manager.

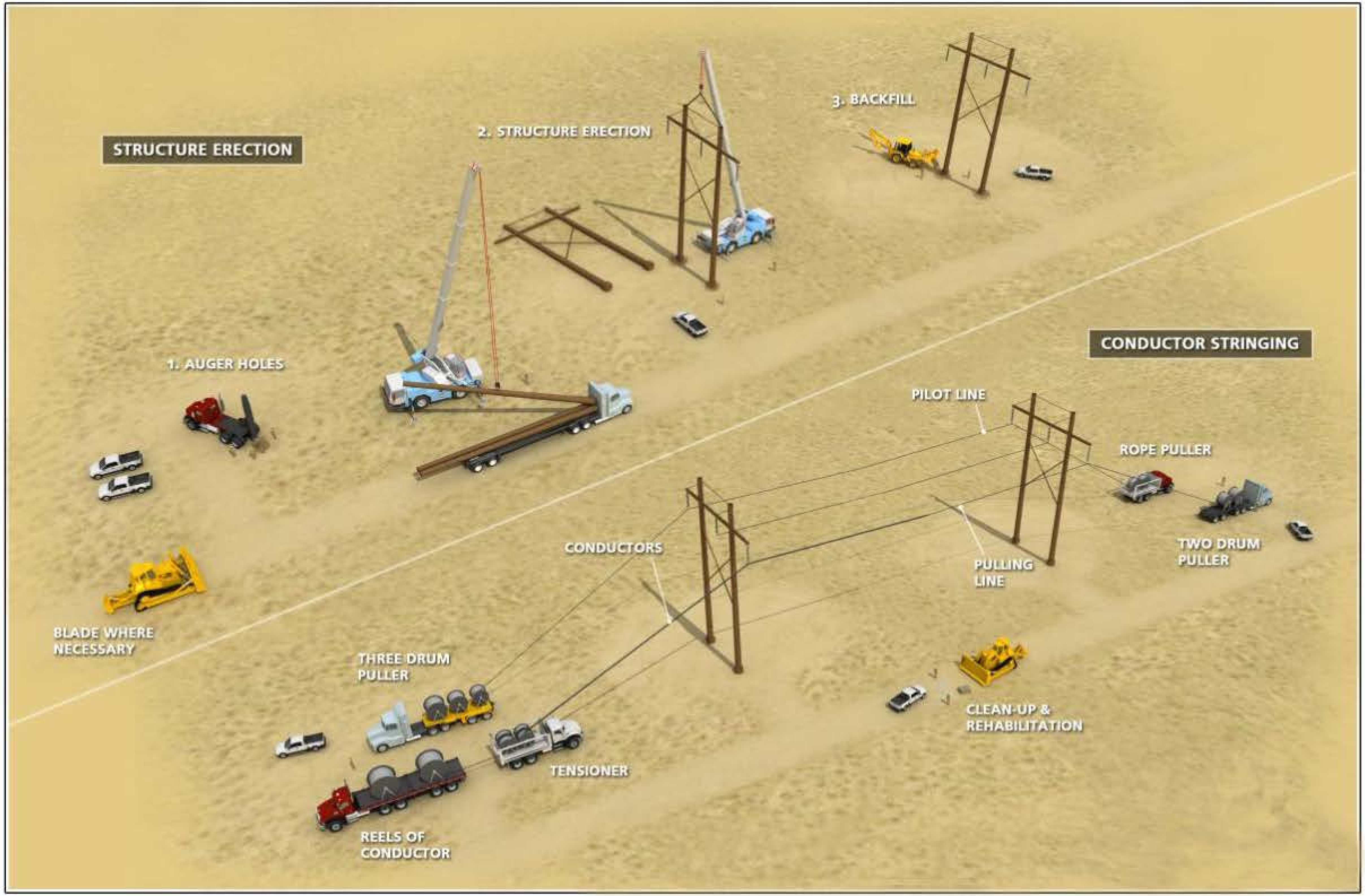
Single Steel Pole and Steel Lattice Structure Foundations

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 proposed 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.

2.2.3.5 Wood 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 2-6 illustrates typical pole assembly activities.

FIGURE 2-6 TYPICAL STRUCTURE ASSEMBLY AND WIRE INSTALLATION ACTIVITIES



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2.2.3.6 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 2-6 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 the proposed 230 kV transmission line construction would be required approximately every two miles along the ROW corridor 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 corridor. 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.

2.2.3.7 Helicopter Use

Access is required to each transmission structure site for construction and for operation and ongoing maintenance activities. Helicopters may be used to support these activities. Proposed 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 proposed Project. Except in areas of extreme terrain which limits the construction of access roads, the use of helicopter construction methods would not change the need for an access road system required for operating and maintaining the proposed 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 appropriate federal, state, and local agencies 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.

2.2.3.8 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.

2.2.3.9 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 according to resource protection plans in the POD. 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 and appropriate agency and/or tribal entities 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.

2.2.3.10 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. An Erosion and Sediment Control Plan will be included in the POD.

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 corridor 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 proposed Project's 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.

2.2.3.11 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 according to the POD. Refuse and construction debris would be removed from the sites and disposed of in an approved manner. Oil, 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 corridor 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.

2.2.3.12 Site Reclamation
The Pacific Power and its construction contractor would be responsible to 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. A Reclamation, Revegetation ,and Monitoring Plan will be included in the POD.

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 or as agreed to by the landowner. 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 land management agency. Additionally, all gates or other features affected by construction activities would be repaired to their previous condition.

2.2.3.13 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 will be included in the POD.

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 proposed transmission 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 Pacific Power's 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. Pacific Power's 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 Pacific Power's construction contractor would be responsible for any fire started, in or out of the Project area, by its employees or operations during construction. Pacific Power's construction contractor would be responsible for notifying emergency response officials and initial attempts at fire suppression. Pacific Power's 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 proposed transmission line in order to prevent fires and to ensure quick response and suppression in the event a fire occurs.

Once the proposed Project is operational, continued operation of the transmission line by Pacific Power will provide stability to the entire interconnected transmission system. Pacific Power and the appropriate land management agencies, including those with fire protection responsibilities, will work collaboratively to avoid starting fires and avoid the use of fire-suppression techniques that could take the transmission line out of service. If the appropriate land management agency determines that it must use fire-suppression techniques that could affect operation of the proposed transmission 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 proposed 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 proposed transmission line or its operation, the affected agency would notify the appropriate Pacific Power contact.

Pacific Power would be responsible for any fire that they started in the Project working area during operation and maintenance of the proposed transmission 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 and follow all seasonal fire restrictions.

2.2.3.14 Overhead Transmission Line Construction Workforce and Equipment

Table 2-4 shows the approximate number of workers and types of equipment that would be required to construct the proposed Project for the activities previously described. 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 2-4 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).

2.2.4 Overhead Transmission Line Design Operation and Maintenance

The design, construction, operation, and maintenance of the proposed 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 proposed 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 corridor 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 proposed transmission lines for a distance of 1,000 feet or more and within 100 feet of the centerline would be grounded.

Operation and ongoing 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 corridor 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 proposed transmission line has been energized, land uses that are compatible with safety regulations would be permitted in and adjacent to the ROW corridor. Existing land uses such as agriculture and grazing are generally permitted within the ROW corridor. Incompatible land uses within the ROW corridor 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 federal, state, and local regulations could be permitted adjacent to the ROW corridor. Compatible uses of the ROW corridor on public lands would have to be approved by the appropriate federal and/or state land management agency. Permission to use the ROW corridor on private lands would be determined by Pacific Power in consultation with the landowner.

2.2.4.1 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 corridor that could constitute a safety hazard and would report unauthorized use of the ROW corridor to the landowner and/or appropriate land management agency.

2.2.4.2 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 transmission 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 corridor. 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 to retard rotting and structural degradation (e.g., Dazomet). 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.

2.2.4.3 Right-of-Way Repair

ROW corridor 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 corridor would be scheduled as a result of line inspections or would occur in response to an emergency situation.

2.2.4.4 Vegetation Management

Work areas adjacent to the proposed electrical transmission structures and along the ROW corridor 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 corridor 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 corridor 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; BLM 1992) and subsequent updated RMPs, 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.

2.2.4.5 Emergency Response

The operation of the transmission system is remotely managed and monitored from control rooms at PacifiCorp's operation center in Portland, Oregon. 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 make repairs after natural hazards, fire, or man-caused damages to a transmission 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 transmission line would have priority, every effort would be made to protect crops, plants, wildlife, and resources of importance.

2.2.5 Underground Transmission Line Design

Details on the design, construction and maintenance, as well as disturbance assumptions for the two route segments of the NNR Alternative analyzed for underground transmission line construction are discussed in this section. The NNR Alternative - Underground Design Option was analyzed for two route segments in this FEIS and is not a feature common to all Action Alternatives.

2.2.5.1 Underground Construction Components and Construction Technologies and Techniques

Underground construction techniques considered in this FEIS are based on industry standards and methods used on other transmission line projects. Due to the lack of similar projects in this region, this FEIS considers industry methodology developed in highly urbanized areas. This methodology may differ substantially from the methodologies that may be used for this proposed 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 (Oregon, Washington, and California) 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.

Locations for undergrounding considered in this FEIS occur along two route segments: NNR-4u and NNR-6u (see Figure 2-3). Section 2.4.1 describes the location and Design Options considered in the analysis for each of the route segments. A permanent 30-foot ROW corridor 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 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 2-7 and 2-8.

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.

FIGURE 2-7 OPEN CUT TRENCHING (EPRI 2008)

FIGURE 2-8 UNDERGROUND CABLE CONSTRUCTION ROW WITH SINGLE CABLE OPEN TRENCH

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 2-9 shows typical underground vault installation. Topsoil would be placed above the excavated subsoil or engineered backfill material.

FIGURE 2-9 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 and underground utility construction is often perceived as more reliable, primarily because lines are buried and appear to not be as susceptible to inclement weather conditions or potential vegetation-related outages. This is generally accurate for wind and vegetation-related outages; however, underground transmission facilities are not impervious to weather-related outages. Additionally, the majority of the transmission grid in the United States is constructed using overhead construction and underground facilities are connected to the overhead system since they are integrated into the grid. Weather-related outages that affect regional and local portions of the overhead system will also affect the underground facilities attached to them. Underground transmission facilities always have some overhead components such as substation terminations and transition structures and these components are subject to weather-related failures just as overhead transmission lines are. 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 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 pounds 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.

HDD 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.

2.2.5.2 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.

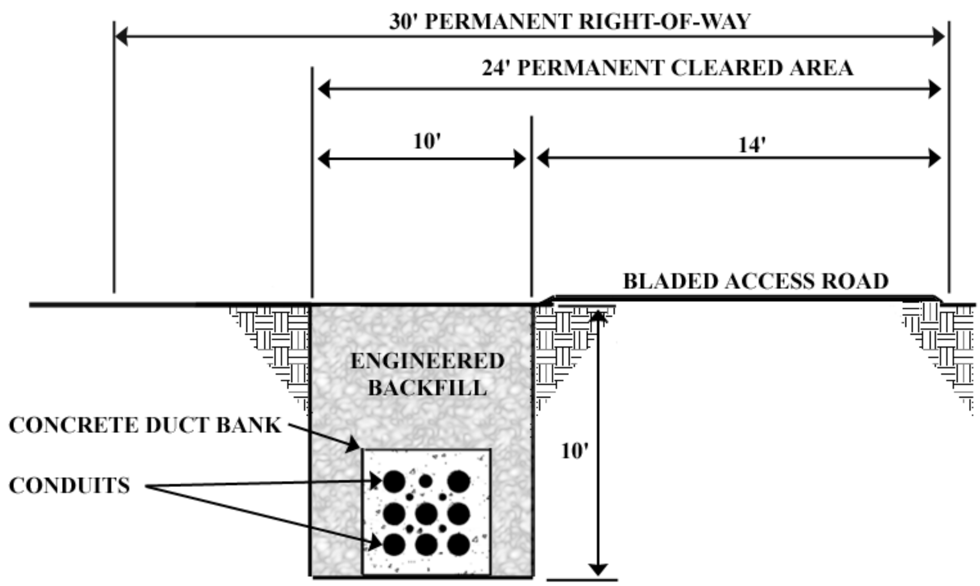
A permanent access road of approximately 14 feet in width would be required to perform operation and maintenance (see Section 2.2.3.2). A permanent cleared surface area would be required for the width of the cable structure duct bank: 5 to 10 feet wide plus the permanent 14 foot access road for a total permanent cleared area of approximately 24 feet wide (Figure 2-10). Disturbance assumptions along the proposed centerlines for access roads are considered identical for the Overhead Design Option and Underground Design Option detailed in this FEIS.

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 2-10 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 2-7 and 2-8 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 2-9 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 stormwater management facilities. Figure 2-11 is a photograph of a small transition station. Two transition stations would be required for each segment of undergrounding.

FIGURE 2-11 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.

2.2.5.3 Underground Transmission Line Temporary and Permanent Disturbance

Table 2-5 summarizes Underground Design Option disturbance assumptions based on the typical design and construction features described in the previous sections. These were applied to the Underground Design Option for route segments (NNR-4u and NNR-6u) to determine potential ground disturbance (see Section 2.6.1). Identical access road assumptions (Access Levels) were used for the Overhead Design Option and the Underground Design Option.

Table 2-5 Underground Disturbance Assumptions

PROJECT FEATURE	AREA
Access Roads:	See Section 2.2.3.2 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
Splice Vaults	Included in 10 feet wide duct bank area

2.3 REQUIRED DESIGN FEATURES COMMON TO ACTION ALTERNATIVES

The RDFs described in this section have been incorporated into the proposed Project design and would be implemented during construction and operation of the Project. RDFs were previously referred to as Project Design Features in the DEIS and SDEIS. RDFs are environmental protection measures 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 RDFs address identified Project impacts. They were developed through an iterative process during the impact analysis with Pacific Power, 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 Action Alternatives. Initial Project impacts were determined including the implementation of the applicable RDFs. Mitigation Measures identified in Chapter 4 would be applied to reduce initial impacts identified (see Section 4.1.1).

The RDFs in this section are intended to reduce impacts to specific resources, (e.g., cultural, biological, visual resources). Should an agency decide to grant a project authorization, the agency would use the POD, as it may be improved and revised from time-to-time, in crafting a ROW Grant, permit, or other written Project approval. Such approval will be consistent with applicable federal, state, and local laws, regulations, and policies.

2.3.1 General

GEN-1: All construction vehicle movement outside the ROW corridor 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 Pacific Power's 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 the 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 transmission 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 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 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 resource requirements will be prepared in consultation with the authorizing federal, state, and local agenciesprior to construction being authorized. These plans will detail additional measures required to minimize potential Project impacts on cultural and natural resources and health and human safety. Plans typically include reclamation and re-vegetation of the ROW corridor, resource protection, noxious weed control, dust control, hazardous spill prevention, fire prevention, and stormwater pollution prevention.

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

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 transmission 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.

2.3.2 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, Pacific Power's 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 and the National Marine Fisheries Service, if applicable, during consultation and coordination will be applied on a discretionary basis. If conferencing occurs on species proposed for listing under ESA, recommendations for reducing adverse effects provided by the USFWS in a conference report will be considered by the BLM and other appropriate federal agencies, and implemented by Pacific Power as necessary.

BIO-3: Special status species or other species of particular concern will be considered in accordance with management policies set forth by appropriate federal and state land management agencies and county officials (e.g., DNR, WSDOT, BPA, BLM, JBLM YTC, Reclamation, etc.). 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 and county officials. 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 and county officials as approporiate.

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 appropriate land management 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 for any part of the proposed 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 proposed 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 appropriate 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 Project facilities and will be described in detail in the POD.

BIO-7: Pacific Power will prepare a Reclamation, Revegetation, and Monitoring Plan in consultation with the appropriate 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 agencies 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 corridor 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 proposed Project. The criteria will be formulated in coordination with the BLM, cooperating agencies, and other authorizing entites 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 in the ROW corridor during pre-construction surveys or construction, these findings will be reported within 48 hours to the appropriate 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 pre-construction 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 ongoing maintenance activities 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 of the POD, the Framework for Development of a Greater Sage-Grouse Compensatory Mitigation Plan, and the Project-Specific Compensatory Mitigation Plan which will developed by Pacific Power.

- 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.
- 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 corridor 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 roads (e.g., blading, widening existing access), that are 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 corridor or designated and approved work areas, a protective buffer zone will be established and the appropriate federal and/or state agency will be contacted immediately.

BIO-16: Speed limits for travel on newly constructed access 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 proposed 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 (PacifiCorp 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 for all Action Alternatives would maximize the use of existing utility corridors and closely parallel the existing transmission lines 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 transmission structures will match the spans of adjacent transmission lines and structures.

BIO-22: Perch deterrents will be installed on new transmission structures within four miles of active Sage-Grouse leks.

BIO-23: Pacific Power staff and/or their contractors will not be allowed to have pets on the Project site during construction, operation, and/or during ongoing maintenance activities.

BIO-24: No persistent surface water sources or other potential mosquito breeding habitat will be created by the proposed Project during construction, operation, or ongoing maintenance activities.

2.3.3 Land Use and Recreation

LU-1: Existing improvements and on the ground structures (e.g., fences, roads, gates, bridges) 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, gates, and cattle guards 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 and/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, culverts, and bridges will be left in a condition equal to or better than their condition prior to the construction of the proposed transmission line as agreed upon by the appropriate land management agency, private landowners, and private landowner groups.

LU-4: Consultation with the private landowners and/ land management agencies will be conducted to identify Project transmission line structures, access roads, work areas, and other Project facility locations that create the least potential for negative impacts to their property and its current and planned land uses.

LU-5: Construction staging areas and pulling sites will be located adjacent to existing roads where practical. Coordination with private landowners and the appropriate federal, state, and local agencies will be conducted to establish construction areas (such as conductor pulling and splicing areas and construction yards).

LU-6: During construction of the proposed Project, it may be necessary to remove livestock from areas where heavy equipment operations are taking place. Arrangements will be made with private landowners, livestock owners, leases, and the appropriate federal and/or state land management agencies to keep livestock out of construction areas during construction.

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

LU-8: All required federal, state, and local land use permits and other authorizations must be obtained by Pacific Power prior to the initiation of any proposed 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 use 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 federal, state, and local agencies and private landowners prior to construction.

LU-10: Advanced notice of construction activities will be given to private landowners, land managers, and residents potentially affected by construction activities. Adequate access to existing land uses will be provided during periods of construction and landowners and land managers 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 proposed transmission line, as well as for the parallel roads where proposed transmission line construction activities would require the use of the public ROW (e.g., temporary lane closures).

LU-13: Pacific Power will 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. This notification to local agencies will include the proposed locations, nature, timing, and duration of any construction activities and advise of any access restrictions that could impact their effectiveness.

LU-14: Pacific Power will determine which aerial applicators operate in the Project area and will provide written notification to all aerial applicators stating when and where the new transmission lines and structures would be erected in order to inform the pilots to the presence of the new transmission line structures. Pacific Power will provide all aerial applicators with aerial photographs and/or topographic maps clearly showing the new transmission lines and structures in relation to agricultural lands.

LU-15: Pacific Power will provide a schedule of all planned construction activities to all landowners and all federal, state, and local agencies responsible to authorize the proposed Project and those who could be affected by its construction such as the Native American tribes who utilize the Project area.

LU-16: Pacific Power will compensate private 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. Pacific Power may also pay rents for the federal, state, and local lands that their ROW corridor and Project facilities will occupy.

LU-17: Pacific Power will plan and conduct construction activities to minimize temporary disturbance, displacement of crops, and interference with agricultural activities.

LU-18: Pacific Power will 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: Pacific Power will install marker balls on the conductor and lights on towers at the Columbia River crossing if required by the Federal Aviation Administration (FAA).

2.3.4 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, Pacific Power will submit a Traffic Management Plan to the WSDOT and applicable public works departments. The Plan will direct Pacific Power's construction contractor(s) to implement procedures that will minimize traffic impacts. Routing of construction traffic will be coordinated with WSDOT and the applicable county public works departments.

TR-3: Oversize or overweight vehicles utilized by Pacific Power and its construction contractor (s) 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: Pacific Power, in consultation with WSDOT, JBLM YTC, and the applicable counties, will develop detour plans and deploy warning signs in advance of any traffic disturbances. 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: Pacific Power personnel and its contractors will be 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: During and following construction and 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, the appropriate landowner, land management agencies and/the applicable county public works departments.

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. Removed sediment would be transported to an appropriate disposal area.

TR-11: During and following construction and as necessary to maintain safe driving conditions, any damage to the private Sage Trail Road and bridge caused by construction vehicles will be repaired to pre-construction conditions or better. Repairs will be coordinated as appropriate with the Sage Trail Road homeowners' representatives or entities responsible for Sage Trail Road and bridge maintenance.

2.3.5 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: Pacific Power will locate construction staging areas away from visually sensitive locations. Pacific Power and its contractor(s) will be responsible for determining appropriate staging locations in coordination with the private landowners, the appropriate land management agencies and other federal, state, and local authorizing entities.

VIS-4: Pacific Power will locate new access roads within previously disturbed areas wherever possible.

VIS-5: Pacific Power's contractors will maintain a clean construction site, with litter being removed daily and all related equipment and materials being removed following completion of construction activities.

VIS-6: To reduce visual contrasts caused by glare created by standard aluminum conductors (wires), Pacific Power will use non-specular conductors.

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

2.3.6 Cultural Resources

CUL-1: Pacific Power will implement stipulations and standards of the Project-Specific Programmatic Agreement (PA) prepared and executed by the BLM and JBLM YTC, Reclamation, BPA, FHWA, Washington State Historic Preservation Officer, Pacific Power and other interested parties according to the requirements of Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR Part 800). The 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 easements have been acquired or 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 final selected alternative under BLM's direction and 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's direct APE shall be a 500-foot wide corridor, 250 feet on both sides of the transmission line's centerline.
- The direct APE for any existing access roads in their current condition, existing roads that will be improved as part of the Undertaking, and newly built roads shall be a 100-foot wide corridor, 50 feet on both sides of the existing road or proposed road centerline, plus a turning radius of 60 feet where specified. The 100-foot corridor may be wider in some locations to allow cut-and-fill disturbance areas on a hillside, as required for safe construction access. The direct APE for material staging areas, pulling and tensioning sites, splicing sites, concrete batch plants, and other temporary use areas shall be the footprint of these areas, plus a buffer of no less than 50 feet from the construction footprint
- The APE for geotechnical drill sites shall be the boring location footprint, plus a buffer, no less than 50 feet, extending from the perimeter of the footprint.
- The APE for indirect effects will extend no farther than 3.0 miles from the centerline of proposed transmission line ROW for the selected route.
- Certain classes of visually sensitive cultural resources, such as TCPs, beyond the 3.0-mile indirect APE may require analyses to assess visual effect. The BLM will consult with the Tribes, DAHP, and other Signatories to determine whether a change in the visual APE is necessary for these cultural resources.

CUL-3: Pacific Power, in consultation with BLM and the Consulting Parties, will develop and implement specific mitigation measures 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 of Pacific Power's supervisory construction personnel will be instructed on the protection of cultural resources. To assist in this effort, the Pacific Power 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 proposed 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(s) 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(s).
- Pacific Power will consult with BLM and other federal land managing agencies, interested tribes, and Washington State Historic Preservation Officer, as appropriate, 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: In consultation with parties to the PA, 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 Pacific Power’s 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.

Pacific Power’s 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.

2.3.7 Wildland Fire

WF-1: Pacific Power will initiate discussions with key fire officials in the Project area including representatives of local fire districts, regional fire prevention staff, DNR, BLM, and JBLM YTC, prior to construction of the proposed transmission line project. The discussions would include the need for Pacific Power to provide transmission line safety training, including safety procedures for conducting fire suppression activities near a power line.

WF-2: The Pacific Power's construction contractor(s) 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: Pacific Power and its construction contractor(s) will 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 its contractors on fire safety, minimizing fire hazards, to safely suppress a fire until firefighters can respond.

Pacific Power and 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 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 its contractors.

2.3.8 Climate and Air Quality

AQ-1: Road construction and maintenance will include dust control measures, as required and identified in Pacific Power's approved POD.

AQ-2: All requirements of the federal, state, and local 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 by Pacific Power.

AQ-3: Pacific Power will use water trucks to control dust during construction operations when necessary.

AQ-4: Pacific Power will cover construction materials if they are a source of blowing dust.

AQ-5: Pacific Power will limit the amount of exposed soil, including dirt piles and open pits, to a minimum. Pacific Power will 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: Pacific Power will submit the Project Description and Dust Control Plan, as part of the POD, to the Yakima Regional Clean Air Agency and Washington State Department of Ecology for approval prior to construction. Pacific Power will submit a copy of the approved plan to JBLM YTC Public Works-Environmental Compliance for review prior to construction.

AQ-8: Pacific Power will prevent wind erosion by reseeding disturbed areas 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.

2.3.9 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 appropriate agencies and authorized officers) and in accordance with the Project’s Noxious Weed and Invasive Plant Management Plan and the Reclamation, Revegetation, and Monitoring 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: Pacific Power’s construction contractor will mark construction limits within agricultural fields or grasslands to minimize disturbance.

SGW-6: Pacific Power is responsible to 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: Pacific Power is responsible to 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 Project’s Spill Prevention, Control, and Countermeasure Plan.

SGW-9: Pacific Power will provide spill prevention kits at designated locations on the Project site and at the hazardous material storage areas.

SGW-10: Pacific Power will stabilize cut and fill slopes.

SGW-11: Pacific Power will 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 Project's 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 will be placed separately from sub-soils/bedrock during excavation and not comingled. Pacific Power will replace soil in reverse order.

SGW-14: Pacific Power's horizontal directional drilling process will incorporate erosion and sediment control and frac-out contingency practices that protect water and soil resources and ensure proper detection and response to frac-out events. Should horizontal directional drilling be employed as an NNR Alternative - Underground Design Option construction technique, a Frac-Out Contingency Plan will be developed and implemented by the Pacific Power.

2.3.10 Public Health and Safety

PHS-1: Pacific Power will respond to complaints of radio or television interference generated by the proposed transmission line project by investigating the complaints and implementing appropriate mitigation measures. The new 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: To eliminate induced currents and voltages onto conductive objects sharing a ROW (should they occur), mitigation will be applied, as needed, 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. Pacific Power's 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 by Pacific Power to ensure public safety during construction and as detailed in a WSDOT approved Traffic Management Plan. Pacific Power's contractor(s) 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: Pacific Power will limit construction activities to daytime hours.

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

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

PHS-10: During final design and construction, Pacific Power will 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 provide a public liaison before and during construction to respond to questions and concerns from neighboring entities and persons, including residents, about noise and other construction disturbances and or concerns.

PHS-12: Pacific Power will establish a method for receiving questions, concerns or complaints during construction (e.g., toll-free telephone number, email, address, website) and develop procedures for responding to callers.

2.4 ALTERNATIVES

2.4.1 Route Segments

To present the analysis results clearly and to compare impacts, Action Alternatives consist of a combination of discrete route segments, forming nine end-to-end Action Alternatives (see Figure 2-1). Route segments were developed based on land ownership and jurisdiction, land cover and terrain, and potential Design Options. Table 2-6 presents route segment lengths comprising all Action Alternatives.

As described in Section 1.14.1, the DEIS Route Segment 1a and SDEIS Route Segment NNR-1 followed a similar alignment; however, in response to landowner comments, modifications were made to Route Segment 1a and were reflected in Route Segment NNR-1 analyzed in the SDEIS. Based on landowner comments received on the SDEIS, Route Segment 1a/NNR-1 was further refined for the FEIS. All other Route Segments remain identical to those presented in the DEIS and SDEIS. Descriptions of each of the Route Segments are presented below.

Table 2-6 Route Segment Lengths

ROUTE SEGMENT	LENGTH (MILES)
1a/NNR-1	2.4
1b	12.5
1c	12.9
2a	1.0
2b	16.3
2c	18.1
2d	7.0
3a	0.1
3b	21.7
3c	25.2
NNR-2	5.1
NNR-3	9.3

ROUTE SEGMENT	LENGTH (MILES)
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

Route Segment 1a/NNR-1 would begin at the existing Pomona Heights Substation, proceed south for a short distance, and then turn eastward along the southern property line of residences located along Sage Trail Road for approximately 3,100 feet before turning north and intersecting Sage Trail Road and connecting with an existing distribution line. Route Segment 1a/NNR-1 would generally follow Sage Trail Road to the JBLM YTC property boundary. This route segment would cross the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line. Route Segment 1a/NNR-1 is considered for overhead construction only and is common for all Action Alternatives. The total length of the NNR-1 route segment is 2.4 miles.

Route Segment 1b would be located just within the JBLM YTC boundary and would parallel an existing perimeter firebreak road. This route segment would proceed east from Sage Trail Road for 5.1 miles before turning south for 4.3 miles. Route Segment 1b proceeds on a diagonal to the southeast for 1.7 miles before turning east for 1.4 miles. The total length of Route Segment 1b would be 12.5 miles. Segment 1b is considered for overhead construction only.

Route Segment 1c would parallel the western and southern boundary of the JBLM YTC on private land. This route segment would proceed east from Sage Trail Road just outside the JBLM YTC boundary for 5.1 miles before turning south along the JBLM YTC boundary for 4.7 miles to the vicinity of Mieras Road. Route Segment 1c would then proceed on a diagonal for approximately 0.4 mile before turning east for 2.8 miles along Mieras Road south of the JBLM YTC boundary, for a total distance of 12.9 miles. Route Segment 1c is considered for overhead construction only.

Route Segment 2a would extend south of the 1a/NNR-1-1b-2a route node on private property paralleling the boundary of a DNR state trust land parcel for a distance of one mile. Route Segment 2a is considered for overhead construction only.

Route Segment 2b would extend east from the 2a-2b-2c route intersection on private property for four miles to the intersection of a BLM-adminstered land parcel. The BLM parcel would be crossed with an aerial crossing of 970 feet. No structures would be located on the BLM parcel. The route segment would then proceed east on private property along the southern boundary of JBLM YTC for another 12.1 miles. The total length of Route Segment 2b would be 16.3 miles. Route Segment 2b is considered for overhead construction only.

Route Segment 2c would extend southeast from the 2a-2b-2c route intersection for 8.6 miles on private property to the intersection of the existing PacifiCorp, Union Gap-Midway 230 kV Transmission Line and the BPA Midway-Moxee 115 kV Transmission Line. The route segment would cross to the south side of the Midway-Moxee 115 kV Transmission Line and would proceed parallel to this existing line for 8.6 miles before crossing to the north of the existing transmission lines and continuing for a distance of one mile. The total length of Route Segment 2c would be 18.1 miles. Route Segment 2c is considered for overhead construction only.

Route Segment 2d would extend from the 2b-2c-2d route node east one mile on private land to the intersection of a BLM-administered land parcel. The route segment would then proceed one mile on the BLM parcel. After crossing the BLM parcel, the route segment would proceed in a northeasterly direction for five miles on private land crossing the Yakima Ridge, Cold Creek and Umtanum Ridge, intersecting the abandoned Chicago, Milwaukee, St. Paul, and Pacific (C, M, SP, & P) Railroad ROW at the west bank of the Columbia River. The total length of Route Segment 2d would be seven miles. Route Segment 2d is considered for overhead construction only.

Route Segment 3a is a short segment (0.1 mile) for the interconnection of the proposed transmission line into BPA's Vantage Substation extending west from the 3a-3b-3c route node. Route Segment 3a is considered for overhead construction only.

Route Segment 3b would proceed in a northwest and then northeast direction within the abandoned C, M, SP, & P Railroad ROW located on the west bank of the Columbia River and parallel with the JBLM YTC eastern boundary. This route segment would extend 19.3 miles to the Columbia River crossing site north of Auvil Fruit Company land. The Columbia River crossing would proceed east for 0.7 mile (2,965 feet) crossing Huntzinger Road, the Columbia River, with the proposed eastern transmission line structure located on Reclamation land. Route Segment 3b would then proceed north and then east for 1.7 miles crossing the Grant County Public Utilities District (PUD) Priest Rapids-Vantage 230 kV Transmission Line and the BPA Midway-Vantage 230 kV Transmission Line before intersecting with Route Segment 3a into the Vantage Substation. The total length of Route Segment 3b would be 21.7 miles. Route Segment 3b is considered for overhead construction only.

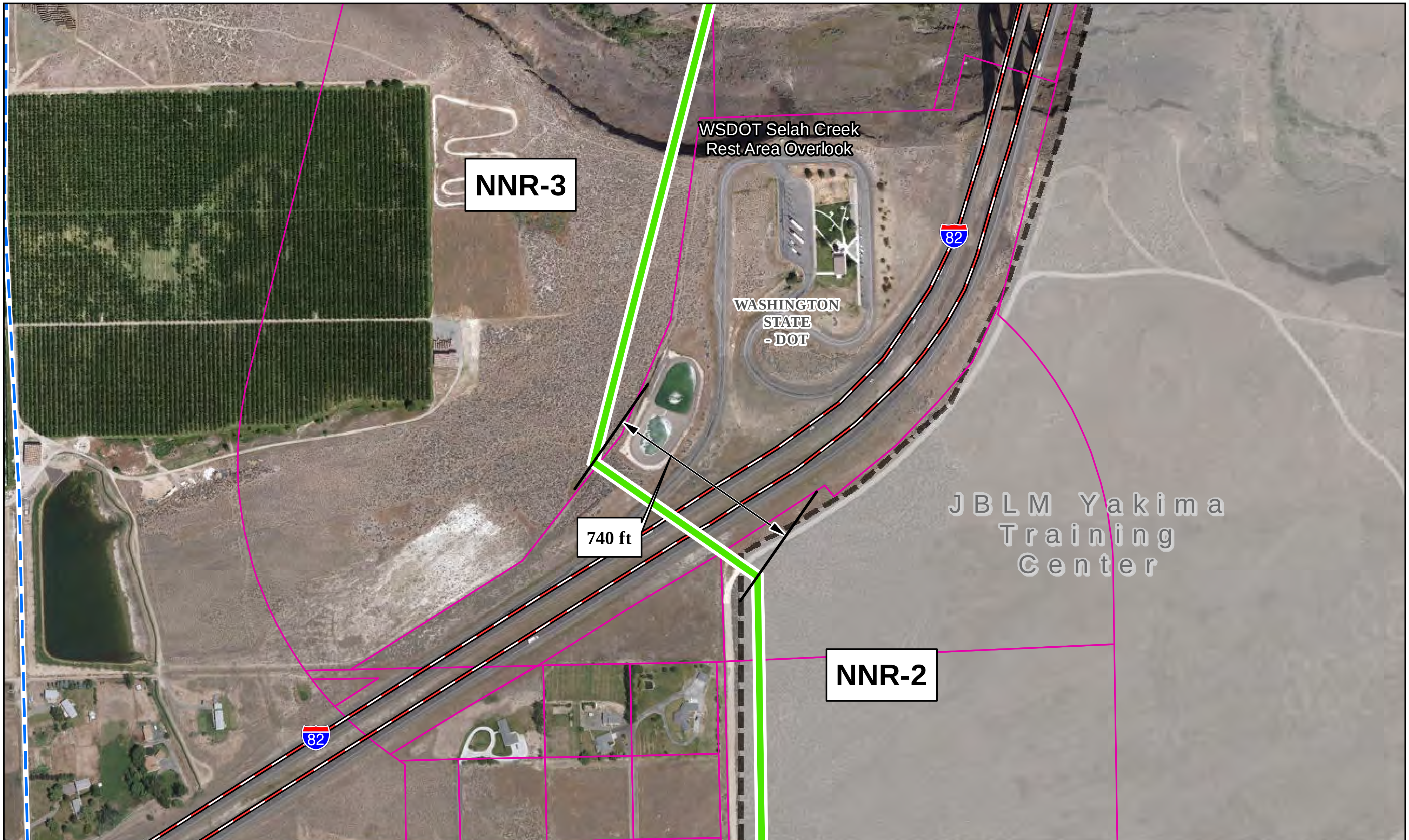
Route Segment 3c would proceed east from the 2d-3b-3c route node for 2.4 miles along the abandoned C, M, SP, & P Railroad ROW to the Columbia River crossing location east of private agricultural land. The route segment would cross from the south side to the north side of the Columbia River for a distance of 0.4 mile. Route Segment 3c would proceed to the northeast, paralleling the Columbia River on private land for 1.2 miles. From that point the route segment would turn north and northeast across Reclamation and private land for 1.4 miles crossing SR-243 and three Grant County PUD Priest Rapids-Midway 230 kV Transmission Lines, the BPA Midway-Vantage 230 kV Transmission Line, and the BPA Schultz-Wautoma No. 1 500 kV Transmission Line before intersecting with Road N. Crossing of SR-243 would require a Utility Permit from WSDOT. The proposed transmission line structures would not be placed within either the SR-243 ROW or WSDOT's Control Zone. The route segment would proceed north on Road N for 3.0 miles crossing Road 27 SW. From Road 27 SW, Route Segment 3c would continue north, parallel to a Reclamation irrigation canal through agricultural lands for 3.0 miles to the intersection of Road 24 SW. The route segment would then proceed west 0.4 mile parallel to an irrigation canal to avoid agricultural produce storage buildings and then proceed 0.6 mile west to O Road SW before turning north. It would proceed 1.2 miles north to a canal crossing. Route Segment 3c would then cross 0.8 mile of Reclamation land to the edge of the BLM land in the Saddle Mountains. The route segment would then cross to the north side of the BPA Vantage-Hanford No. 1 500 kV Transmission Line and would proceed northwest and parallel to the BPA transmission line for 5.3 miles on BLM and private land through the Saddle Mountains. After leaving BLM-administered lands, 1.1 miles of private land would be crossed before crossing Lower Crab Creek near the proposed Burkett Lake Recreation Area and onto Reclamation land. The route segment would remain on Reclamation land for 1.6 miles and then cross to the west side of the BPA Vantage-Hanford No. 1 500 kV Transmission Line. Route Segment 3c would proceed north crossing the Pacific Power/PacifiCorp Vantage-Walla Walla 230 kV Transmission Line, on private and Reclamation land for three miles to the entrance to the Vantage Substation. The total length of Route Segment 3c would be 25.2 miles. Route Segment 3c is considered for overhead construction only.

Route Segment NNR-2 would be located within the JBLM YTC boundary. From the node with 1a/NNR-1, this route segment would proceed north for one mile roughly parallel to an existing firebreak road. The route segment would then proceed west within the JBLM YTC boundary parallel to Temple Lane and passed a water storage tank parallel to the JBLM YTC perimeter road for a distance of one mile. A portion of the Route Segment NNR-2 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. Route Segment NNR-2 continues to parallel the BPA Ellensburg-Moxee No. 1 115 kV Transmission Line and passes on the edge of the JBLM YTC parade field to the intersection of Firing Center Road. The route segment would then proceed east along Firing Center Road for a distance of one mile. Along this portion of the route segment, an existing JBLM YTC distribution line would be rebuilt with the proposed Project’s single pole 230 kV transmission structures, located under the 230 kV conductors 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 I-82 crossing point. The proposed transmission line would be constructed on single poles for a portion of Route Segment NNR-2. This route segment is considered for overhead construction only. The total length of Route Segment NNR-2 is 5.1 miles.

Route Segment NNR-3 would begin south of I-82 in Selah, crossing the highway south of the Selah Canyon Rest Area (I-82 Crossing #1). This crossing would involve the placement of a transmission line structure on the eastern side of the interstate within and at the boundary of JBLM YTC. The other transmission line structure would be located on the western side of I-82 on private property west and north of the Selah Creek Rest Area. No structures would be placed within the interstate ROW or the rest area. The approximate distance of this crossing would be 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 2-12.

Route Segment NNR-3 would proceed north on H-frame structures crossing Selah Canyon and approximately 3,000 feet (0.6 mile) of WSDOT land. The route segment would then proceed onto BLM-administered land to parallel Pacific Power’s existing Pomona-Wanapum 230 kV Transmission Line. Transmission centerline separation would be approximately 300 feet in this area. The route segment would then cross BLM-administered land for a distance of 3.8 miles, including a 0.1 mile section of private land inholding 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. Route Segment NNR-3 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 Route Segment NNR-3 would not be required from DNR’s Selah Cliffs Natural Area Preserve.

Route Segment NNR-3 would cross Reclamation’s proposed Wymer Dam and Reservoir Project for approximately 0.2 mile. At this crossing, Route Segment NNR-3 is directly adjacent to Pacific Power’s existing Pomona-Wanampum 230 kV Transmission Line. Mitigation land acquisition and habitat enhancement components are intended to result in a net improvement in conditions for Sage-Grouse with the proposed Wymer Dam and Reservoir Project. Approximately 2.3 miles of Route Segment NNR-3 crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project. This Route Segment is being considered for overhead construction only. The total length of Route Segment NNR-3 is 9.3 miles.



Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 2-12
NNR Alternative I-82 Crossing #1: Selah Creek Rest Area

Legend

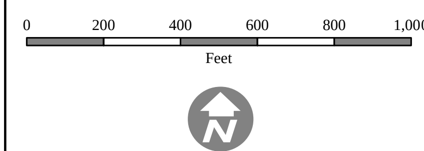
Project Features
- Agency Prefered Alternative
- Route Segment

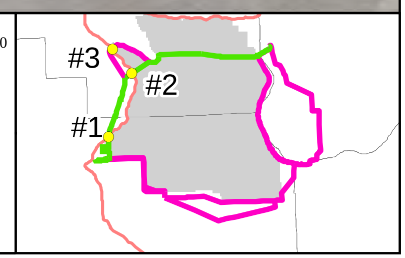
Existing Utility Features
- Pomona - Wanapum 230 kV Transmission Line

Transportation
- Interstate

Boundaries
- Parcel
- JBLM Yakima Training Center

Aerial Photography:
Esri Basemap Imagery
Service as of 11/23/2015.





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Route Segment NNR-4o/NNR-4u would be located on privately owned and JBLM YTC-managed land and parallel the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line, crossing it at two locations. Both an Overhead Design Option (Route Segment NNR-4o) and an Underground Design Option (Route Segment NNR-4u) have been analyzed for this route segment. The Overhead and Underground Design Options are located along the same route alignment. West of I-82, Route Segment NNR-4o/NNR-4u would cross the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line, and proceed west to the northern I-82 crossing. This I-82 crossing would occur adjacent to and at the same location as the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line crossing. The approximate length of this crossing would be 1,000 feet and H-frame structures would be utilized. For the Overhead Design Option (Route Segment NNR-4o), the interstate crossing would involve the placement of a new transmission structure on the western side of the interstate south of Exit 11 on private property. No structures would be placed within the interstate ROW. Conductor to ground clearance of this interstate crossing would be a minimum of 34 feet according to WSDOT. The crossing of I-82 would not involve a break in access, so approval from WSDOT at the regional level would be necessary. A permanent access break, authorizing the use of Exit 11 by WSDOT, would be required for construction access. A detailed map showing the location of Crossing #2 is provided as Figure 2-13. Route Segment NNR-4u, underground transmission construction, would be similar to that shown in Figure 2-13, with the transition stations located approximately 1,000 feet apart on the west and east sides of I-82 and on private and JBLM YTC land. 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., HDD).

Approximately 1.2 miles of Route Segment NNR-4o/NNR-4u crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project. The total length of Route Segment NNR-4o/NNR-4u would be 4.5 miles.

Route Segment NNR-5 would be a short route segment located on the southern end of Badger Pocket, inside the JBLM YTC boundary on the south side of the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line. This route segment was located to avoid impacts to agricultural land within Badger Pocket. Route Segment NNR-5 is being considered for overhead construction only. The total length of Route Segment NNR-5 is 1.8 miles.

Route Segment NNR-6o/NNR-6u would parallel the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line west of Badger Pocket for 6.4 miles and would be entirely within JBLM YTC. Line separation would be approximately 200 feet in this area. Both an Overhead Design Option (Route Segment NNR-6o) and an Underground Design Option (Route Segment NNR-6u) have been analyzed for this route segment. The Overhead and Underground Design Options are located along the same alignment. For NNR-6u, overhead to underground transition stations would be located on the east and west end where the route segment connects with Route Segments NNR-5 and NNR-7. The total length of Route Segment NNR-6o/NNR-6u is 6.4 miles.

Route Segment NNR-7 would be located in the northeastern portion of JBLM YTC. This route segment would proceed east and parallel the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line. In addition, the route segment would parallel portions of the Puget Sound Energy Wind Ridge-Wanapum 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-administered land west of the Columbia River. Route Segment NNR-7 is being considered for overhead construction only. The total length of Route Segment NNR-7 is 8.2 miles.

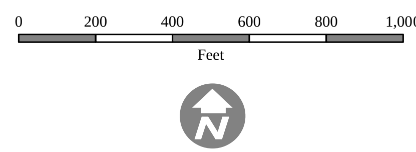
Route Segment NNR-8 would begin on BLM-administered land on the west bank of the Columbia River. The route segment would proceed east 0.4 mile on BLM-administered land. An approximately

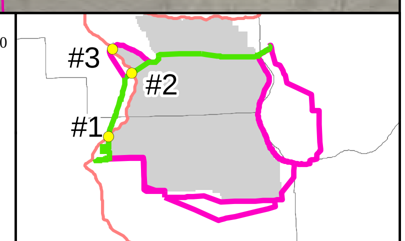
200-foot tall steel lattice structure would be located on the west bank of the Columbia River on BLM-administered land. The line would cross Huntzinger Road and the Columbia River to a steel lattice structure on the east side of the river located on Reclamation land. The Columbia River crossing would be approximately 2,800 to 3,000 feet in length depending on the final location of the steel lattice structures. Route Segment NNR-8 would proceed east, crossing SR-243 and then proceed north and east for 1.7 miles crossing the Grant County 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. Crossing of SR-243 would require a Utility Permit from WSDOT. The transmission structures would not be placed within either the highway ROW or WSDOT's Control Zone. This Route Segment is being considered for overhead construction only. The total length of Route Segment NNR-8 is 2.7 miles.

Route Segment MR-1 would begin at the northern node of Route Segment NNR-3 and cross the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line west of I-82. It would then proceed northwest, crossing privately owned land and DNR state trust land, roughly paralleling I-82 approximately 0.5 to 1.0 mile to the west. The route segment would cross I-82 just south of the designated Manastash Ridge Viewpoint (located at Milepost 8.1) into JBLM YTC. This interstate crossing would involve the placement of a new transmission line structure on private land on the west side of I-82 directly south of the west-bound Manastash Ridge Viewpoint. The other new transmission line structure would be placed on the eastern side of I-82 on 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 2-14.

After crossing I-82, this route segment would cross Manastash Ridge and proceed southeast within JBLM YTC south of Badger Pocket. Route Segment MR-1 would then cross the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line and terminates at the western node of Route Segment NNR-5. This route segment is being considered for overhead construction only.

Route Segment MR-1 would cross Reclamation's proposed Wymer Dam and Reservoir Project for approximately 0.05 mile. Mitigation land acquisition and habitat enhancement components are intended to result in a net improvement in conditions for Sage-Grouse with the proposed Wymer Dam and Reservoir Project. Approximately 3.2 miles of Route Segment MR-1 crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project. The total length of Route Segment MR-1 is 11.9 miles.





Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 2-13
NNR Alternative I-82 Crossing #2: Exit 11

Legend

Project Features

- Agency Prefered Alternative
- Route Segment

Existing Utility Features

- Pomona - Wanapum 230 kV Transmission Line

Transportation

- Interstate

Boundaries

- Parcel
- JBLM Yakima Training Center

Aerial Photography:
Esri Basemap Imagery
Service as of 11/23/2015.

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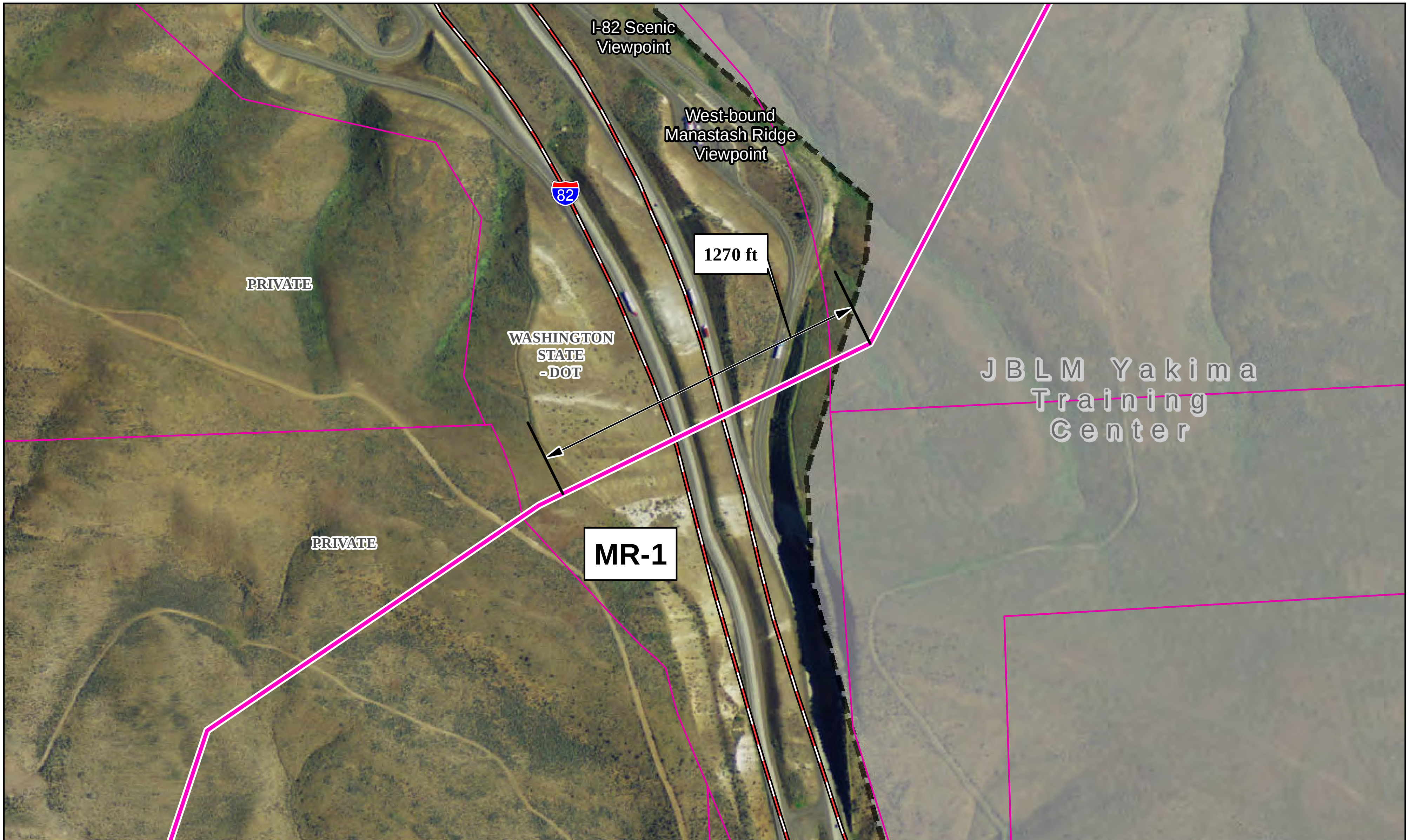


Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 2-14
Manastash Ridge Subroute
I-82 Crossing #3:
Manastash Ridge Viewpoint

Legend

Project Features

- Agency Prefered Alternative
- Route Segment

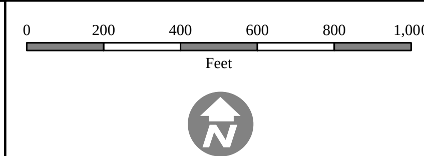
Transportation

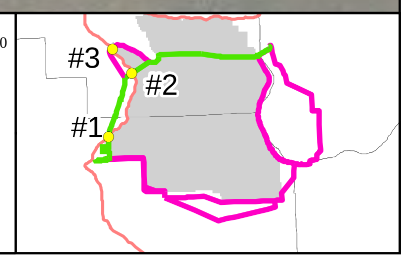
- Interstate

Boundaries

- Parcel
- JBLM Yakima Training Center

Aerial Photography: Esri Basemap Imagery Service as of 11/23/2015.





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2.4.2 Alternatives Analyzed

2.4.2.1 No Action Alternative

If no action is taken, Pacific Power's federal land ROWapplications submitted to BLM, JBLM YTC, and Reclamation for the proposed Project would not be granted and the proposed Project would not be constructed. The interconnection of the proposed Project to BPA's Vantage Substation also would not occur. 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 Pacific Power 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, Pacific Power 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 standards. This would also cause Pacific Power to be non-complaint with North American Electric Reliability Corporation (NERC) standards relating to the provision of reliable power.

2.4.2.2 NNR Alternative – Overhead Design Option (Agency Preferred Alternative)

The FEIS Agency Preferred Alternative is the alternative the Lead Agency (BLM) selected to fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors. Pursuant to 40 CFR § 1502.14(e), the FEIS must identify the Agency Preferred Alternative unless another law prohibits the expression of such a preference. The Agency Preferred Alternative may or may not be the same as the identified Environmentally Preferred Alternative.

An Agency Preferred Alternative was identified in the DEIS (January 2013) as Alternative D. 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 JBLM YTC met and identified the NNR Alternative (see Chapter 1, Section 1.1.1 for more information on the development of the NNR Alternative). The NNR Alternative was developed and analyzed in the SDEIS. The DEIS Alternative D remained as the Agency Preferred Alternative in the SDEIS published in January of 2015.

In BLM's deliberations to select the Agency Preferred Alternative for the proposed Project's FEIS, the decision-makers reviewed the DEIS and SDEIS documents, considered all of the Action Alternatives and their relative impacts on resources, preferences of the Cooperating Agencies and Tribal Representatives, and input received from the public via comments. The BLM has identified the NNR Alternative - Overhead Design Option as the Environmentally Preferred Alternative (see below) and has selected it as the Agency Preferred Alternative for the proposed Project's FEIS.

The NNR Alternative – Overhead Design Option consists of Route Segments 1a/NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, and NNR-8, and is located primarily on federal lands. The NNR Alternative – Overhead Design Option is 40.5 miles in length, would cross JBLM YTC on its north side for a majority of its length, and would cross BLM managed land in the Yakima River Canyon Management Area and west of the Columbia River (proposed Huntzinger Road Area of Critical Environmental Concern). This NNR Alternative also crosses Reclamation, WSDOT, Grant County PUD-managed lands, and private lands and is located in Yakima, Kittitas, and Grant counties (refer to Table 2-1 for ownership distance crossed for each Action Alternative). SR-243 is crossed in one location south of the Wanapum Dam, and I-82 is crossed south of the Selah Creek Rest Area and near I-82 Exit 11.

Identification of the Environmentally Preferred Alternative

The Environmentally Preferred Alternative is the alternative or alternatives that best promotes Section 101 of NEPA and ordinarily causes the least damage to the biological and physical environment and best protects, preserves, and enhances the resources that are present. The Agency Preferred Alternative may or may not be the same as the identified Environmentally Preferred Alternative(s).

Based on the best available information and science, which was analyzed and documented in both the DEIS and SDEIS, the BLM has identified the NNR Alternative - Overhead Design Option as the Environmentally Preferred Alternative for the proposed Project.

2.4.2.3 NNR Alternative – Underground Design Option

The NNR Alternative – Underground Design Option consists of Route Segments 1a/NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, and NNR-8 and is located primarily on federal land. This design option is exactly the same as the Overhead Design Option (see Section 2.4.2.2 above) with the exception of Route Segments NNR-4u and NNR-6u which are an underground transmision line construction option.

2.4.2.4 NNR Alternative – Manastash Ridge Subroute

The NNR Alternative – MR Subroute consists of Route Segments 1a/NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6o, NNR-7, and NNR-8 and is located primarily on federal land. This design option is exactly the same as the NNR Alternative - Overhead Design Option (see Section 2.4.2.2 above) with the exception of the absence of route segment NNR-4o, which is replaced by Route Segment MR-1.

2.4.2.5 Alternative A

Alternative A consists of Route Segments 1a/NNR-1, 1b, 2b, 2d, 3a, and 3c. This Alternative is 64.7 miles in length, would cross JBLM YTC on its southwest side, would cross the Wahluke Slope and BLM-administered land in the Saddle Mountains Management Area and would be located primarily on private lands. This alternative also crosses Reclamation-managed land and is located in Yakima, Benton, and Grant counties. SR-243 would be crossed in one location west of the Vernita Bridge.

2.4.2.6 Alternative B

Alternative B consists of Route Segments 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, and 3b. This alternative is 61.2 miles in length, would cross JBLM YTC on its southwest side and east side, would follow a railroad corridor and cross BLM-administered land on the west side of the Columbia River and would be located primarily on private lands. This alternative also crosses land managed by Reclamation and Grant County PUD and is located in Yakima, Kittitas, Benton, and Grant counties. SR-243 would be crossed in one location west of the Vernita Bridge.

2.4.2.7 Alternative C

Alternative C consists of Route Segments 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, and 3b. This alternative is 63.0 miles in length, would cross JBLM YTC on its southwest side and east side, would follow a railroad corridor and cross BLM-administered land on the west side of the Columbia River and would be located primarily on private lands. This alternative also crosses land managed by Reclamation, DNR, and Grant County PUD and is located in Yakima, Kittitas, Benton, and Grant counties. SR-243 would be crossed in one location west of the Vernita Bridge.

2.4.2.8 Alternative D

Alternative D was previously identified as the Agency Preferred Alternative in the DEIS and SDEIS. Alternative D consists of Route Segments 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, and 3c. This alternative is 66.5 miles in length, would cross JBLM YTC on its southwest side, would cross the Wahluke Slope and BLM-administered land in the Saddle Mountains Management Area and would be located primarily on private lands. This alternative also crosses land managed by Reclamation, Grant County PUD, and DNR and is located in Yakima, Benton, and Grant counties. SR-243 would be crossed in one location west of the Vernita Bridge.

2.4.2.9 Alternative E

Alternative E consists of Route Segments 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, and 3c. This alternative is 61.6 miles in length, would cross JBLM YTC on its east side, would follow a railroad corridor and cross BLM-administered land on the west side of the Columbia River and would be located primarily on private lands. This alternative also crosses land managed by Reclamation, DNR, and Grant County PUD and is located in Yakima, Kittitas, Benton, and Grant counties. SR-243 would be crossed in one location west of the Vernita Bridge.

2.4.2.10 Alternative F

Alternative F consists of Route Segments 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, and 3c. This alternative is 65.1miles in length, would avoid JBLM YTC, and would cross the Wahluke Slope and BLM-administered land in the Saddle Mountains Management Area and would be located primarily on private lands. This alternative also crosses land managed by Reclamation and DNR and is located in Yakima, Benton, and Grant counties. SR-243 would be crossed in one location west of the Vernita Bridge.

2.4.2.11 Alternative G

Alternative G consists of Route Segments 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, and 3b. This alternative is 63.4 miles in length, would cross JBLM YTC on its east side, would follow a railroad corridor and cross BLM-administered land on the west side of the Columbia River, and would be located primarily on private lands. This alternative also crosses land managed by Reclamation, DNR, and Grant County PUD and is located in Yakima, Kittitas, Benton, and Grant counties. SR-243 would be crossed in one location west of the Vernita Bridge.

2.4.2.12 Alternative H

Alternative H consists of Route Segments 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, and 3c. This alternative is 66.9 miles in length, would cross JBLM YTC on its southwest side, would cross the Wahluke Slope and BLM-administered land in the Saddle Mountains Management Area and would be located primarily on private lands. This alternative also crosses land managed by Reclamation and DNR and is located in Yakima, Benton, and Grant counties. SR-243 would be crossed in one location west of the Vernita Bridge.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED

The BLM, Cooperating Agencies, and Pacific Power 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 BLM, Cooperating Agencies, and Pacific Power to be remote or speculative.

2.5.1 Transmission Alternatives

2.5.1.1 Double Circuit Existing Pomona-Wanapum 230 kV Transmission Line

This alternative was considered to determine whether it would be feasible to replacePacific Power’s existing Pomona-Wanapum single-circuit 230 kV Transmission Line with a new double-circuit transmission line on a single set of structures in Pacific Power’s existing ROW corridor, thereby meeting Pacific Power’s objectives without having to increase the ROW corridor 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 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 and its customers 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's planning studies have identified the loss of their existing Pomona-Wanapum 230 kV Transmission Line as the single most critical outage risk 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/Midway-Vantage Area 230 kV study was completed in November 2007.

The study determined that loss of Pacific Power's 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 Pacific Power's 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 Pacific Power's 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 230 kV Transmission Line Project 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 and WECC reliability standards in the Yakima area and be 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 corridor 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 corridor. The outage data also suggest the average annual outage frequency for two circuits in a common ROW corridor on separate towers is even less than the average annual outage frequency for two circuits not in a common ROW corridor. 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 2013).

Placing the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line and the proposed Vantage to Pomona HeightsTransmission Line on the same set of poles would violate NERC and WECC reliability standards and would not provide the needed reliability of physically separate transmission lines.

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).

2.5.1.2 New Midway-Vantage 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. 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 Mid-Columbia 230 kV system. The study focused on the Wanapum/Vantage to Midway transmission system. 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 Transmission Line (Proposed Action)
2) A new Midway-Vantage 230 kV Transmission Line
3) Tying the Wanapum-Walla Walla, Midway-Potholes-Coulee, and Midway-Rocky Ford-Coulee 230 kV Transmission Lines together at their crossing about 12.6 miles east of Wanapum Substation along the Walla Walla Transmission Line to create a new 230 kV path

between Wanapum/Vantage and Midway (an alternative to building a new Midway-Vantage Transmission Line)

The study concluded that even with a new Midway-Vantage 230 kV Transmission Line, the existing Wanapum-Pomona 230 kV Transmission 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 Transmission Line.

The study determined that building a new Vantage-Pomona 230 kV Transmission Line provided the most benefit to the system and outperformed building a new Midway-Vantage 230 kV Transmission Line (Option 2) or tying the Wanapum-Walla Walla, Midway-Potholes-Coulee, and Midway-Rocky Ford-Coulee 230 kV transmission lines together at their crossing about 12.6 miles east of Wanapum Substation along the Walla Walla Transmission 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 Transmission Line would still be required even if a new Midway-Vantage 230 kV Transmission Line was constructed.

Based on the findings of the NTAC, Mid-Columbia Transmission Study Group, the alternative of building a new Midway-Vantage 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.

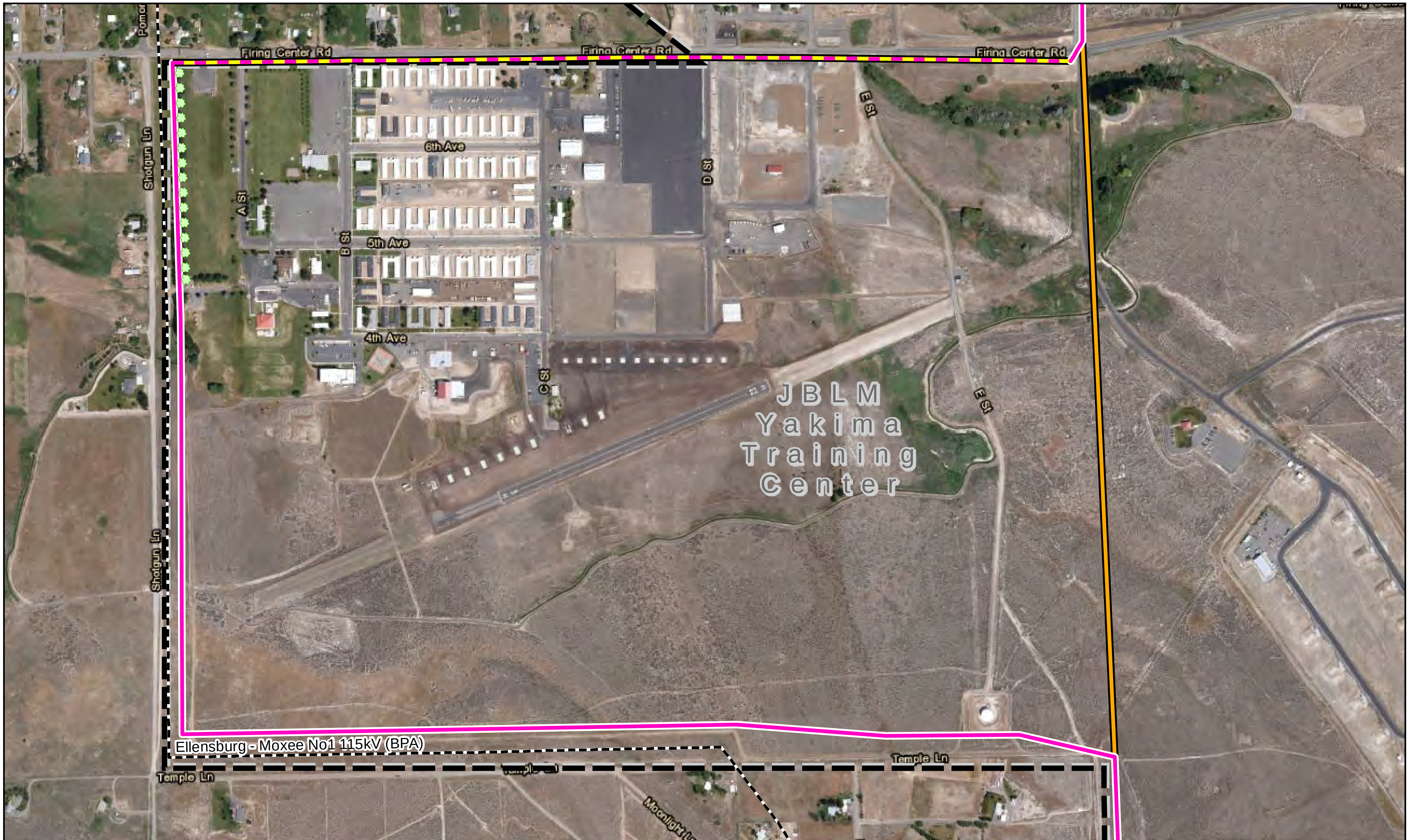
2.5.1.3 Underground Transmission Line Construction through JBLM YTC

Underground construction in limited areas (route segments) of the proposed Project were considered in response to agency comments on the DEIS regarding impacts to Sage-Grouse received by the WDFW and USFWS. During the consideration of potential route segments to underground to address Sage-Grouse concerns, the Army proposed undergrounding a section of the NNR Alternative through the Cantonment Area in the location shown below in Figure 2-15.

Undergrounding specific segments of the NNR Alternative as a Design Option is discussed above in Section 2.2.5. 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) <u>North</u>: Located northeast of the heliport, south of Firing Center Road and east of E Street 2); <u>South</u>: Located in the vicinity east/northeast of the water tower and about 1,000 feet southwest of the Ammunition Supply Point.

This Underground 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;

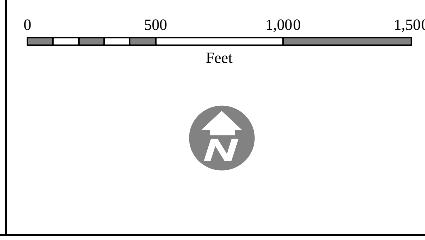


Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2-15
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
- JBLM Yakima Training Center

Aerial Photography: ESRI Imagery Service as of 11/23/2015



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- 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 (Route Segment NNR-2).

2.5.1.4 Route Alternatives Considered and Eliminated

This FEIS does not identify other route alternatives considered and eliminated not already addressed in the DEIS or SDEIS. Multiple preliminary route alternatives for Pacific Power's 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 2011 and February 2011 to receive comments on the revised route alternatives.

As previously described in Section 1.1, comments received on the DEIS resulted in the reconsideration of a route alternative similar to one previously considered and eliminated during the scoping period The NNR Alternative (FEIS Agency Preferred Alternative) is similar to a northern JBLM YTC route that was considered and eliminated from consideration because of the 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. After the publication of the DEIS, these separation requirements were revised by the electrical regulating authorities, WECC and NERC, and now would allow a much closer distance between existing lines and the proposed Project which would minimize impacts to JBLM YTC training operations and allowed the NNR Alternative to be reconsidered. Other route alternatives that remain considered and eliminated are discussed in this section.

Alternative Route Segment along Highway 243-Grant County

This alternative route segment generally followed SR-243 in Grant County, past the Desert Aire community, crossing the Saddle Mountains to a point just south of Beverly where it then paralleled the existing Midway-Vantage 230 kV Transmission Line into the Vantage Substation for a total route segment distance of 12.5 miles (see Figure 2-16). The concept with this alternative route segment was to utilize SR-243 for construction and maintenance access, with the placement of single steel or wood poles just outside of the edge of the highway ROW.

The WSDOT, Aviation Division expressed concern about the impact this alternative route segment would have on the long-term viability of the Desert Aire Airport and its ability to function as an essential public facility. WSDOT conducted an airspace assessment of the route segment and concluded that based on the estimated pole height of 75 to 85 feet and an average span length of 600 feet, the route segment would encroach on the Desert Aire Airport airspace. Potential airspace conflicts included penetrating the approach surface of Runway 28 by 35 feet and being located in the Runway Protection Zone. These potential conflicts would represent significant threats to aircraft operations and safety at the airport. WSDOT recommended that this alternative route segment be eliminated from further consideration.

This alternative route segment was eliminated from further consideration due to the significant threats to aircraft operations and safety at the Desert Aire Airport.

Alternative Route Segments East of Mattawa-Grant County

Portions of alternative route segments located just east of Mattawa were eliminated from further consideration due to potential impacts to existing agricultural uses and operations. The potential impacts considered included loss of farmable land, orchards and vineyards, impacts to farming operations, including the relocation of wheel line irrigation systems and center pivot irrigation systems and safety hazards to aerial spraying operations and the use of helicopters to dry cherry orchards in the spring.

Alternative Route Segments Columbia River Crossing below Priest Rapids Dam

Portions of the southern alternative route segments that proceeded down Umtanum Ridge before crossing the Columbia River below the Priest Rapids Dam were eliminated from further consideration due to extremely rugged terrain (e.g., slopes greater than 45 percent and vertical cliff faces) and associated constructability issues.

Alternative Route Segment Following the Midway-Moxee 115 kV

Route Segment 2c follows a portion of the existing BPA Midway-Moxee 115 kV and Union Gap-Midway 230 kV Transmission Lines for about 8.6 miles from the intersection of these two lines southeast of Moxee. The potential for routing in the area extending along the section of the Midway-Moxee 115 kV Transmission Line west of its divergence from the Union Gap-Midway 230 kV Transmission Line and north/east of Moxee was also considered. This alternative route segment was eliminated from further consideration primarily due to the extensive amount of agricultural and residential development. Irrigated agriculture and circle pivot irrigation structures, as well as occupied structures, are directly adjacent to the existing ROW corridor along a significant portion of the existing Midway-Moxee Transmission Line in this area, with some irrigation and occupied structures encroaching into the ROW corridor. The density of the development, the potential need for occupied residential acquisition/demolition, conflicts with agricultural uses, and the additional length of the transmission line were reasons this route segment was eliminated from further consideration.

2.5.2 Non-Transmission Alternatives

2.5.2.1 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 Pacific Power's 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.

2.5.2.2 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.

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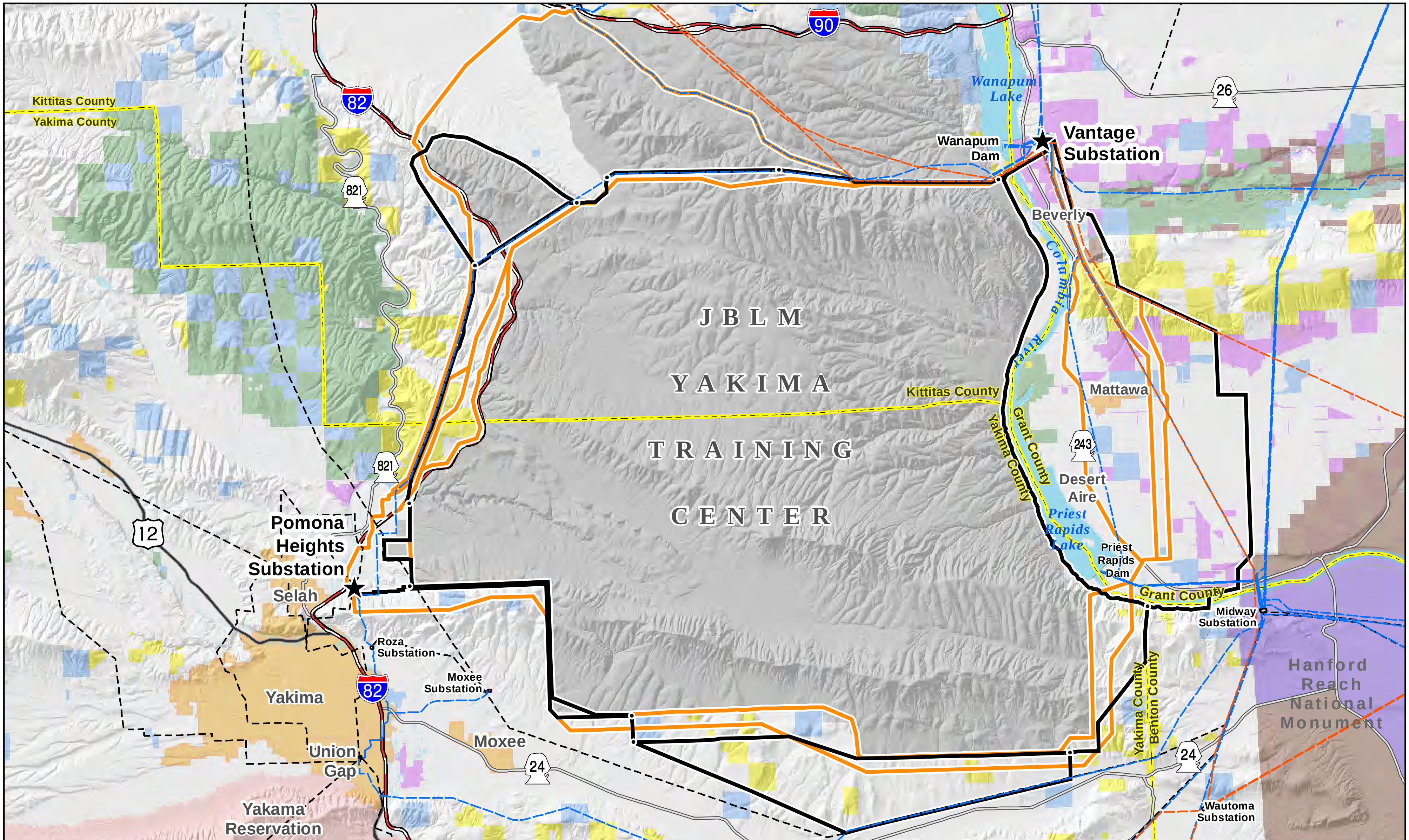
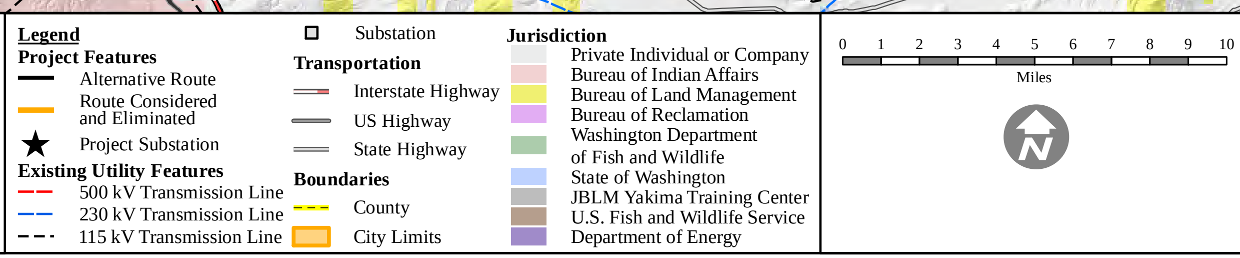
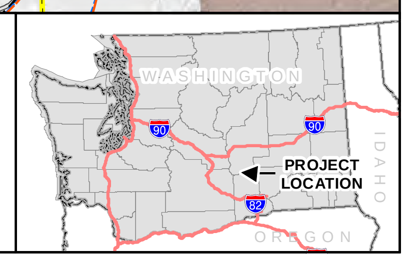


Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2-16
Route Alternatives Considered and Eliminated





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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 COMPARISON OF ALTERNATIVES AND SUMMARY OF IMPACTS

This section presents a summary comparison of all nine Action Alternatives considered in the FEIS based on impacts identified and summarized from Chapter 4 of this document with mitigation measures and RDFs implemented.

Tables 2-7 and 2-8 summarize access road short-term and long-term disturbance by route segment and Action Alternative. Tables 2-9 through 2-16 summarize short-term, long-term, and total disturbance assumptions by route segment and Action Alternative for the project components. Tables 2-15 and 2-16 summarize the total short-term and long disturbance for all activities. The overhead transmission line construction 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 2-9 and 2-10 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 for overhead transmission line construction. 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. Tables 2-12 and 2-13 summarizes the long-term disturbance calculations associated with the auguring and installation of poles and foundations as previously described and the clearing and leveling of work pads in areas over eight percent slope for the installation of structures by route segment and Action Alternative. A summary total of short-term and long-term disturbance based access roads, temporary work areas and set-up areas for route segments and Action Alternatives is shown in Tables 2-15 and 2-16.

Underground disturbance calculations were based on the assumptions detailed in Section 2.2.5 and are included in Tables 2-11 and 2-14. Access road assumptions were identical for the NNR Alternative route segments with underground design options compared to overhead design options (e.g., access levels for route segment NNR-6o is identical to NNR-6u). Short-term disturbance for the NNR Alternative - Underground Design Option shown in Table 2-11 included assumptions for cleared areas necessary for construction along the trench. Long-term disturbance for the NNR Alternative - Underground Design Option are shown in Table 2-14 and include assumptions for the transition stations and duct banks (including splice vaults) for each of the underground route segments. Disturbance assumptions shown in Table 2-14 assume transition stations for the I-82 (for Route Segment NNR-4u Underground Design Option).

Tables 2-17 summarize land use and transportation resource impacts for all Action Alternatives. Table 2-18 summarizes recreation and visual resource impacts for all Action Alternatives. Table 2-19 summarizes wildlife and vegetation resource impacts for all Action Alternatives. Table 2-20 summarizes cultural, water and geological resource impacts for all Action Alternatives.

Cost estimates were also developed for all Action Alternatives. The cost for underground segments assumes 10 to 15 times cost of overhead ($427,634 per mile for overhead; 10.9 miles – Route Segments NNR-4u & NNR-6u). The estimated construction cost for each Action Alternative is as follows:

- NNR Alternative – Overhead Design Option (FEIS Agency Preferred Alternative) - $17.3 million
- NNR Alternative – Underground Design Option - $59.2 to 82.5 million
- NNR Alternative – MR Subroute - $19.8 million
- Alternative A - $28.6 million
- Alternative B - $30.8 million
- Alternative C – $31.0 million
- Alternative D – $28.9 million
- Alternative E – $30.9 million
- Alternative F – $28.6 million
- Alternative G – $31.3 million
- Alternative H – $28.9 million

Table 2-7 Access Road Disturbance By Route Segment

ROUTE SEGMENT	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
1a/NNR-1	0	0.00	70,560	1.62	0	0.00	0	0.00	70,560	1.62
1b	0	0.00	332,220	7.63	97,574	2.24	0	0.00	429,794	9.9
1c	0	0.00	611,167	14.03	650,866	14.94	2,218	0.05	936,046	21.5
2a	2,218	0.05	40,572	0.93	73,181	1.68	0	0.00	87,881	2.0
2b	0	0.00	371,028	8.52	1,355,323	31.11	2,957	0.07	1,493,503	34.3
2c	2,957	0.07	504,974	11.59	586,925	13.47	8,131	0.19	957,365	22.0
2d	8,131	0.19	274,361	6.30	510,418	11.72	0	0.00	619,198	14.2
3a	0	0.00	5,880	0.13	0	0.00	0	0.00	5,880	0.1
3b	0	0.00	1,329,938	30.53	703,718	16.16	0	0.00	1,329,938	30.5
3c	2,957	0.07	847,190	19.45	451,651	10.37	2,957	0.07	1,086,691	24.9
NNR-2	0	0.00	152,880	3.51	0	0.00	0	0.00	152,880	3.51
NNR-3	739	0.02	670,438	15.39	20,328	0.47	739	0.02	690,766	15.86
NNR-4o	739	0.02	204,742	4.70	0	0.47	739	0.02	204,742	4.70
NNR-4u	739	0.02	204,742	4.70	0	0.00	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	232,495	5.34	0	0.00	0	0.00	232,495	5.34
NNR-6u	0	0.00	232,495	5.34	0	0.00	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	83,143	1.91	0	0.00	0	0.00	83,143	1.91
MR-1	739	0.02	382,082	8.77	998,290	22.92	739	0.02	1,380,372	31.69

Table 2-8 Access Road Disturbance By Action Alternative

ACTION ALTERNATIVE	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
Alternative A	5,914	0.14	1,941,811	44.58	1,851,696	42.51	5,914	0.14	3,793,507	87.09
Alternative B	2,957	0.07	2,424,559	55.66	1,612,195	37.01	2,957	0.07	4,036,754	92.67
Alternative C	8,131	0.19	2,558,506	58.74	942,110	21.63	8,131	0.19	3,500,616	80.36
Alternative D	11,088	0.25	2,075,758	47.65	1,181,611	27.13	11,088	0.25	3,257,369	74.78
Alternative E	5,174	0.12	2,703,506	62.06	1,839,499	42.23	5,174	0.12	4,543,006	104.29
Alternative F	8,131	0.19	2,220,758	50.98	2,079,000	47.73	8,131	0.19	4,299,758	98.71
Alternative G	10,349	0.24	2,837,453	65.14	1,169,414	26.85	10,349	0.24	4,006,867	91.99
Alternative H	13,306	0.31	2,354,705	54.06	1,408,915	32.34	13,306	0.31	3,763,620	86.40
NNR Alternative – Overhead Design Option*	1,478	0.03	1,708,258	39.22	29,568	0.68	1,478	0.03	1,734,886	39.83
NNR Alternative – Underground Design Option	1,478	0.03	1,708,258	39.22	29,568	0.68	1,478	0.03	1,734,886	39.83
NNR Alternative – MR Subroute	2,957	0.07	2,295,082	52.69	1,027,858	23.60	2,957	0.07	3,319,999	76.22

Note: NNR Alternative Overhead Design Option and Underground Design Option access road disturbance assumptions are identical.
*Agency Preferred Alternative

Table 2-9 Areas with Short-term, Temporary Disturbance - Overhead Transmission Line construction (By Route Segment)

ROUTE SEGMENT	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	
	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
1a/NNR-1	0	0.00	288,000	6.61	109,375	2.51	0	0.00	60,000	1.38	457,375	10.50
1b	1,653,750	37.96	0	0.00	62,500	1.43	0	0.00	315,000	7.23	2,031,250	46.63
1c	1,365,000	31.34	312,000	7.16	78,125	1.79	0	0.00	325,000	7.46	2,080,125	47.75
2a	131,250	3.01	0	0.00	15,625	0.36	0	0.00	25,000	0.57	171,875	3.95
2b	2,152,500	49.41	0	0.00	31,250	0.72	0	0.00	410,000	9.41	2,593,750	59.54
2c	2,165,625	49.72	204,000	4.68	46,875	1.08	0	0.00	455,000	10.45	2,871,500	65.92
2d	931,875	21.39	0	0.00	46,875	1.08	0	0.00	177,500	4.07	1,156,250	26.54
3a	26,250	0.60	0	0.00	15,625	0.36	0	0.00	5,000	0.11	46,875	1.08
3b	341,250	7.83	2,304,000	52.89	62,500	1.43	100,000	2.30	550,000	12.63	3,357,750	77.08
3c	1,811,250	41.58	1,380,000	31.68	234,375	5.38	100,000	2.30	637,500	14.63	4,163,125	95.57
NNR-2	446,250	10.24	216,000	4.96	109,375	2.51	0	0.00	130,000	2.98	901,625	20.70
NNR-3	1,220,625	28.02	0	0.00	62,500	1.43	0	0.00	232,500	5.34	1,515,625	34.79
NNR-4o	603,750	13.86	0	0.00	46,785	1.08	0	0.00	115,000	2.64	765,625	17.58
NNR-5	236,250	5.42	0	0.00	46,785	1.08	0	0.00	45,000	1.03	328,125	7.53
NNR-6o	853,123	19.59	0	0.00	31,250	0.72	0	0.00	162,500	3.73	1,046,875	24.03
NNR-7	1,089,375	25.01	0	0.00	46,875	1.08	0	0.00	207,500	4.76	1,343,750	30.85
NNR-8	275,625	6.33	0	0.00	46,875	1.08	100,000	2.30	57,500	1.32	480,000	11.02
MR-1	1,561,875	35.86	0	0.00	109,375	2.51	0	0.00	297,500	6.83	1,968,750	45.20

Table 2-10 Areas with Short-term, Temporary Disturbance - Overhead Transmission Line Construction (By Action Alternative)

ACTION ALTERNATIVE	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	
	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
Alternative A	6,706,875	153.97	1,668,000	38.29	515,625	11.84	100,000	2.30	1,630,000	37.42	10,620,500	243.81
Alternative B	5,236,875	120.22	2,592,000	59.50	343,750	7.89	100,000	2.30	1,542,500	35.41	9,815,125	225.32
Alternative C	5,250,000	120.52	2,796,000	64.19	359,375	8.25	100,000	2.30	1,587,500	36.44	10,092,875	231.70
Alternative D	6,720,000	154.27	1,872,000	42.98	531,250	12.20	100,000	2.30	1,675,000	38.45	10,898,250	250.19
Alternative E	4,948,125	113.59	2,904,000	66.67	359,375	8.25	100,000	2.30	1,552,500	35.64	9,864,000	226.45
Alternative F	6,418,125	147.34	1,980,000	45.45	531,250	12.20	100,000	2.30	1,640,000	37.65	10,669,375	244.94
Alternative G	4,961,250	113.89	3,108,000	71.35	375,000	8.61	100,000	2.30	1,597,500	36.67	10,141,750	232.82
Alternative H	6,431,250	147.64	2,184,000	50.14	546,875	12.55	100,000	2.30	1,685,000	38.68	10,947,125	251.31
NNR Alternative – Overhead Design Option**	4,725,000	108.47	504,000	11.57	500,000	11.48	100,000	2.30	1,010,000	23.19	6,839,000	157.00
NNR Alternative MR Subroute	6,273,750	144.03	504,000	11.57	609,375	13.99	100,000	2.30	1,305,000	29.96	8,792,125	201.84

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

Table 2-11 Areas with Short-term, Temporary Disturbance - Underground Transmission Line construction (By Route Segment and Action Alternative)

ROUTE SEGMENT/ACTION ALTERNATIVE	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 2-12 Areas with Long-term, Permanent Disturbance - Overhead Transmission Line Construction (By Route Segment)

ROUTE SEGMENT	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			
	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
1a/NNR-1	0	0.00	192	0.00	168	0.0	0	0.00	27,600	0.63	27,960	0.64
1b	1,323	0.030	0	0.00	96	0.0	0	0.00	59,640	1.37	61,059	1.40
1c	1,092	0.025	208	0.00	120	0.0	0	0.00	68,400	1.57	69,820	1.60
2a	105	0.002	0	0.00	24	0.0	0	0.00	1,680	0.04	1,809	0.04
2b	1,722	0.040	0	0.00	48	0.0	0	0.00	60,480	1.39	62,250	1.43
2c	1,733	0.040	136	0.00	72	0.0	0	0.00	27,720	0.64	29,661	0.68
2d	746	0.017	0	0.00	72	0.0	0	0.00	47,880	1.10	48,698	1.12
3a	21	0.000	0	0.00	24	0.0	0	0.00	0	0.00	45	0.00
3b	273	0.006	1,536	0.04	96	0.0	7,200	0.17	7,800	0.18	16,905	0.39
3c	1,449	0.033	920	0.02	360	0.0	7,200	0.17	48,720	1.12	58,649	1.35
NNR-2	357	0.01	144	0.00	168	0.00	0	0.00	21,240	0.49	21,909	0.50
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	8,280	0.19	15,773	0.36
MR-1	1,250	0.03	0	0.00	168	0.00	0	0.00	97,440	2.24	98,858	2.27

Table 2-13 Areas with Long-term, Permanent Disturbance - Overhead Transmission Line Construction (By Action Alternative)

ACTION ALTERNATIVE	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			
	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
Alternative A	5,366	0.12	1,112	0.03	792	0.02	7,200	0.17	246,000	5.65	260,470	5.98
Alternative B	4,190	0.10	1,728	0.04	528	0.01	7,200	0.17	205,080	4.71	218,726	5.02
Alternative C	4,200	0.10	1,864	0.04	552	0.01	7,200	0.17	172,320	3.96	186,136	4.27
Alternative D	5,376	0.12	1,248	0.03	816	0.02	7,200	0.17	213,240	4.90	227,880	5.23
Alternative E	3,959	0.09	1,936	0.04	552	0.01	7,200	0.17	213,840	4.91	227,487	5.22
Alternative F	5,135	0.12	1,320	0.03	816	0.02	7,200	0.17	254,760	5.85	269,231	6.18
Alternative G	3,969	0.09	2,072	0.05	576	0.01	7,200	0.17	181,080	4.16	194,897	4.47
Alternative H	5,145	0.12	1,456	0.03	840	0.02	7,200	0.17	222,000	5.10	236,641	5.43
NNR Alternative – Overhead Design Option*	3,780	0.09	336	0.01	768	0.02	7,200	0.17	291,480	6.69	303,564	6.97
NNR Alternative – MR Subroute	4,547	0.10	336	0.01	864	0.02	7,200	0.17	360,360	8.27	373,307	8.57

*Agency Preferred Alternative

Table 2-14 Areas with Long-term, Permanent Disturbance - Underground Transmission Line Construction

ROUTE SEGMENT/ ACTION ALTERNATIVE	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 2-15 Total Disturbance by Route Segment

ROUTE SEGMENT	TOTAL SHORT-TERM DISTURBANCE		TOTAL LONG-TERM DISTURBANCE	
	Square Feet	Acres	Square Feet	Acres
1a/NNR-1	457,375	10.50	98,520	2.26
1b	2,031,250	46.63	490,853	11.27
1c	2,082,343	47.80	1,005,866	23.09
2a	171,875	3.95	89,690	2.06
2b	2,596,707	59.61	1,555,753	35.72
2c	2,879,631	66.11	987,025	22.66
2d	1,156,250	26.54	667,895	15.33
3a	46,875	1.08	5,925	0.14
3b	3,357,750	77.08	1,346,843	30.92
3c	4,166,082	95.64	1,145,340	26.29
NNR-2	901,625	20.70	174,789	4.01
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
NNR-6u	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	98,916	2.27
MR-1	1,969,489	45.21	1,479,230	33.96

Table 2-16 Total Disturbance by Action Alternative

ALTERNATIVE	TOTAL SHORT-TERM DISTURBANCE		TOTAL LONG-TERM DISTURBANCE	
	Square Feet	Acres	Square Feet	Acres
Alternative A	10,626,414	243.95	4,053,977	93.07
Alternative B	9,818,082	225.39	4,255,480	97.69
Alternative C	10,101,006	231.89	3,686,752	84.64
Alternative D	10,909,338	250.44	3,485,249	80.01
Alternative E	9,869,174	226.57	4,770,492	109.52
Alternative F	10,677,506	245.12	4,568,989	104.89
Alternative G	10,152,099	233.06	4,201,764	96.46
Alternative H	10,960,431	251.62	4,000,261	91.83
NNR Alternative – Overhead Design Option*	6,840,478	157.04	2,041,390	46.86
NNR Alternative – Underground Design Option	8,544,458	196.15	2,539,112	58.29
NNR Alternative – MR Subroute	8,043,603	184.66	3,286,763	75.45

*Agency Preferred Alternative

Table 2-17 Action Alternative Comparisons: Land Use and Transportation Resources

RESOURCE/ISSUE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E	ALTERNATIVE F	ALTERNATIVE G	ALTERNATIVE H	NNR ALTERNATIVE – OVERHEAD DESIGN OPTION*	NNR ALTERNATIVE – UNDERGROUND DESIGN OPTION	NNR ALTERNATIVE – MR SUBROUTE
Ownership (miles crossed)											
Federal	23.8	19.3	18.6	23.1	6.9	11.3	6.2	10.6	30.1	30.1	33.5
State	<0.02	<0.02	1.02	1.02	1.02	1.02	2.02	2.02	0.8	0.8	2.4
Private	40.5	40.1	41.5	42.0	51.9	52.4	53.4	53.9	8.9	8.9	11.2
Other	0.4	1.8	1.8	0.4	1.8	0.4	1.8	0.4	0.7	0.7	0.7
Resources (acres long-term disturbance)											
Residential	2.3	2.3	2.3	2.3	21.2	21.2	21.2	21.2	2.8	2.8	2.8
Irrigated Agriculture	6.2	0	2.5	8.7	0.3	6.6	2.8	9.1	0	0	0
Dryland Agriculture	8.4	8.4	15.2	15.2	9.9	9.9	16.7	16.7	0	0	0
Military Use (JBLM YTC)	11.2	31.2	31.2	11.2	20.1	0	20.1	0	22.3	29.8	39.7
# Private Landowners	40.5	40.1	41.5	42.0	51.9	52.4	53.4	53.9	8.9	8.9	11.2
New Road Construction (access/spur)	42.9	39.5	33.6	37.0	41.9	45.3	36.1	39.5	23.5	23.5	39.4
Land Use Residual Impacts (miles)											
High	0.4	0	0.5	0.9	0.1	0.5	0.6	1.0	0	0	0
Moderate	21.1	18.9	20.8	23.6	7.8	10.6	10.3	13.0	32.4	32.4	37.7
Low	39.9	41.8	40.6	38.7	51.5	49.6	50.3	48.4	7.7	7.7	9.7
No Identifiable	3.3	1.5	1.5	3.3	2.2	4.4	2.2	4.4	0.4	0.4	0.4

*Agency Preferred Alternative

Table 2-18 Action Alternative Comparisons: Recreation and Visual Resources

RESOURCE/ISSUE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E	ALTERNATIVE F	ALTERNATIVE G	ALTERNATIVE H	NNR ALTERNATIVE – OVERHEAD DESIGN OPTION*	NNR ALTERNATIVE – MR SUBROUTE	NNR ALTERNATIVE – UNDERGROUND DESIGN OPTION
Recreation Residual Impacts (miles)											
High	0	0	0	0	0	0	0	0	0	0	0
Moderate	0	1.7	1.7	0	1.7	0	1.7	0	0	0	0
Low	32.9	24.7	19.9	28.1	35.8	44.0	31.0	39.2	29.5	29.5	36.9
No Identifiable	31.8	34.8	41.4	38.4	24.1	17.1	30.7	27.6	11.0	11.0	10.9
Visual Residual Impacts (miles)											
High	10.3	5.2	12.6	16.1	4.5	9.6	11.9	17.0	4.4	4.9	13.7
Moderate	37.9	39.3	33.1	31.7	37.0	35.4	30.8	29.4	3.5	4.1	5.6
Low	16.5	16.7	17.3	18.7	20.1	20.1	22.1	20.4	32.6	31.5	28.5

*Agency Preferred Alternative

Table 2-19 Action Alternative Comparisons: Wildlife and Vegetation Resources

RESOURCE/ISSUE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E	ALTERNATIVE F	ALTERNATIVE G	ALTERNATIVE H	NNR ALTERNATIVE – OVERHEAD DESIGN OPTION**	NNR ALTERNATIVE – UNDERGROUND DESIGN OPTION	NNR ALTERNATIVE – MR SUBROUTE
Wildlife											
Sage-Grouse Active or Inactive Leks (#)											
Within 0.6/2.0/3.0/4.0 mile*	0/2/3/4	0/2/3/5	0/1/3/5	0/1/3/4	0/2/2/5	0/2/2/4	0/1/2/5	0/1/2/4	0/0/0/2	0/0/0/2	0/0/0/2
Sage-Grouse Historic Leks (#)											
Within 0.6/2.0/3.0/4.0 mile*	0/8/9/15	0/10/13/21	0/7/12/21	0/5/8/15	0/10/13/21	0/8/9/15	0/7/12/21	0/5/8/15	2/5/7/10	2/5/7/10	1/4/7/10
Sage-Grouse Population Range (acres within ROW)											
0-80% Core Population Range	10.2	10.2	7.9	7.9	9.7	9.7	7.4	7.4	0.0	0.0	0.0
95% Population Range	25.1	25.1	22.1	22.1	25.4	25.4	22.4	22.4	0.0	0.0	0.0
Miles within the YTC Sage-Grouse PAC	41.5	56.7	58.5	43.3	57.1	41.9	58.9	43.7	38.7	38.7	46.0
Disturbance to Sage-Grouse Habitat (acres)											
Suitable	187.7	162.0	119.2	144.9	151.2	176.9	108.4	134.2	144.0	180.2	161.3
Marginal	94.7	74.0	84.0	104.8	97.9	118.6	107.9	128.7	48.1	62.5	68.5
Unsuitable	54.5	87.0	113.2	80.7	86.9	54.3	113.1	80.5	11.8	11.8	30.3
New Transmission Line Structures (#)											
Total Number of New Structures	482	477	485	490	480	485	488	493	328	251	383
New Structures Greater than 0.25 Mile from an Existing Transmission Line	391	432	376	335	435	394	379	338	50	50	135
Direct Disturbance to Wildlife Habitat (Acres)	337	323	316	330	336	350	329	343	204	254	260
Wildlife Habitat of Moderate or High Sensitivity (miles crossed)	35.1	31.8	25.0	28.3	28.6	31.9	21.8	25.1	31.1	31.1	31.5
Documented Special Status Species (miles crossed)											
Raptor Nest within 1 Mile	10.0	14.3	19.6	15.3	14.0	9.7	19.3	15.0	10.5	10.5	9.1
Point within 0.5 Mile	12.5	19.4	17.5	10.6	19.2	12.3	17.3	10.4	8.6	8.6	8.6
Priority Species Regional Areas (miles crossed)	29.6	48.4	50.2	31.4	45.2	26.4	47.0	28.2	5.0	5.0	5.5
Impact Levels (miles crossed)											
High	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Moderate	43.4	51.1	46.1	38.4	47.3	39.6	42.3	34.6	29.8	29.8	30.8
Low	21.3	10.1	16.9	28.1	14.3	25.5	21.1	32.2	10.7	10.7	17.0
No Identifiable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

RESOURCE/ISSUE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E	ALTERNATIVE F	ALTERNATIVE G	ALTERNATIVE H	NNR ALTERNATIVE – OVERHEAD DESIGN OPTION**	NNR ALTERNATIVE – UNDERGROUND DESIGN OPTION	NNR ALTERNATIVE – MR SUBROUTE
Vegetation											
Special Status Species Habitat Suitability (miles crossed)											
Suitable/Marginal Habitat	33.7/17.1	29.2/13.2	22.4/15.3	26.9/19.2	26.1/16.7	30.6/20.6	19.3/18.8	23.8/22.7	29.0/8.7	29.0/8.7	30.9/11.5
Special Status Plants and Ecosystems (miles crossed)											
WNHP Special Status Plant Polygons	9.6	12.7	12.1	9.0	12.7	9.6	12.1	9.0	8.4	8.4	8.4
Special Status Plants Found During Surveys	1.5	2.7	2.2	1.0	2.3	1.1	1.8	0.6	2.7	2.7	2.6
WNHP Priority Ecosystems	3.8	0.0	0.0	3.8	0.0	3.8	0.0	3.8	0.0	0.0	0.4
Total Vegetation Disturbance (acres)	210.1	179.6	140.1	170.6	179.2	209.7	139.7	170.2	163.5	208.7	184.9
Total Vegetation Impact Levels (miles crossed)											
High	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Moderate	34.2	31.4	24.9	27.7	28.1	30.9	21.6	24.4	28.6	28.6	30.5
Low	18.9	14.8	16.6	20.7	18.4	22.5	20.2	24.3	9.8	9.8	12.6
No Identifiable	11.9	15.3	21.8	18.4	15.4	12.0	21.9	18.5	2.5	2.5	5.1

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

Table 2-20 Action Alternative Comparisons: Cultural, Water, and Geological Resources

RESOURCE/ISSUE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E	ALTERNATIVE F	ALTERNATIVE G	ALTERNATIVE H	NNR ALTERNATIVE – OVERHEAD DESIGN OPTION*	NNR ALTERNATIVE – MR SUBROUTE	NNR ALTERNATIVE – UNDERGROUND DESIGN OPTION
Cultural Resources											
within 75'/250' of Centerline											
Districts	0/0	1/1	1/1	0/0	1/1	0/0	1/1	0/0	0/0	0/0	0/0
TCPs	1/1	2/2	2/2	1/1	2/2	1/1	2/2	1/1	9/9	9/9	9/9
Archeological Sites	26/39	56/87	56/88	26/40	44/73	14/25	44/74	14/26	47/66	47/66	47/65
Isolated Finds	12/21	9/16	9/16	12/21	3/10	6/15	3/10	6/15	28/44	28/44	20/34
Architectural Resources	2/4	1/4	1/4	2/4	1/4	2/4	¼	2/4	1/1	1/1	1/1
Total Cultural Resources	65	110	111	66	90	45	91	46	120	120	109
National Register Sites within 75'/250' of Centerline											
Listed	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Recommended for Listing	2/3	1/1	1/1	2/3	0/0	1/2	0/0	1/2	6/10	6/10	6/10
Determined Eligible	2/4	3/6	3/6	2/4	3/6	2/4	3/6	2/4	1/1	1/1	1/1
Not Eligible	4/13	6/11	6/11	4/13	6/11	4/14	6/11	4/13	1/1	1/1	1/1
Unevaluated	33/45	59/92	59/93	33/46	42/73	16/26	42/74	16/27	77/108	77/108	69/97
Water Resources											
Total Miles of Water Resource Crossed	13.8	13.2	13.2	13.8	13.4	13.4	13.4	14.0	8.5	8.5	10.6
Total Acres of Water Resource (Long-term) Disturbance	68.0	67.2	64.5	65.2	69.4	70.4	66.6	67.6	44.2	36.2	49.0
Residual Impacts (miles crossed, long-term impacts)											
High	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Moderate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low	12.4	13.0	13.0	12.4	13.2	12.6	13.2	12.6	8.2	8.2	10.3
NI	52.1	48.0	49.8	53.9	48.2	52.3	50.0	54.1	32.1	32.1	30.0
Geologic Resources											
30% Slope or greater crossed (miles)	4.0	2.8	2.6	3.8	2.3	3.5	2.1	3.3	11.3	11.3	14.3
Mapped Landslide (High Hazard) crossed (miles)	3.2	3.6	3.4	3.0	4.3	3.9	4.1	3.7	2.1	2.1	2.9
High Water erodibility (acres long-term disturbance)	35.7	53.3	55.0	37.5	55.3	37.8	57.1	39.6	8.4	10.3	11.0

*Agency Preferred Alternative

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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 proposed Vantage to Pomona Heights 230 kilovolt Transmission Line Project (Project). Environmental resource baseline information is presented comparing potential impacts from the Action 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 Project study area in sufficient detail to assess the potential impacts that could result from the proposed Project. The width of the Project study area along each alternative 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 alternative prior to construction. Land use, geology and soils, water, and cultural resources were inventoried within a two-mile wide Project study area (one mile on either side of the assumed centerlines of the alternative route segments). Biological resources were also inventoried within the two-mile wide Project study area. For Greater Sage-Grouse (*Centrocercus urophasianus*), the Project study area is defined as an eight-mile wide corridor (four-mile buffer of the centerline). Visual resources were inventoried within a six-mile wide Project study area (three miles on either side of the assumed centerlines). Data and information for social and economic conditions in the Project study area are based on county and state-wide data and cannot be tailored to a specific corridor.

Maps illustrating resource data within the Project area and Project study area are located in Appendix A. Resource data was documented along the alternatives. 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

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to vegetation and special status plant species along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

This section describes the general vegetation, special status plant species and noxious weeds present within the Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project (Project) area. For the purposes of this analysis, the Project study 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.

Scoping comments included concerns regarding the impacts to vegetation communities through construction and maintenance activities, specifically disturbance to sagebrush and native grassland communities. Concerns were also raised regarding impacts to special status plant species and the potential for the introduction and spread of noxious weeds and control measures to be implemented. These comments were considered during data collection and analysis of vegetation and special status plant species within the Project study area.

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), FEIS for Fort Lewis Army Growth and Force Structure Realignment, July 2010 (Army 2010).
- Hanford Reach National Monument Final Comprehensive Conservation Plan and Environmental Impact Statement, August 2008 (U.S. Fish and Wildlife Service [USFWS] 2008).
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) Cultural and Natural Resource Management Plan (RMP), January 2002.
- Spokane District RMP (Bureau of Land Management [BLM] 1985) and Record of Decision (ROD) (BLM 1987) and the 1992 RMP amendment (BLM 1992a) and ROD (BLM 1992b).
- Sage-Grouse Habitat Assessment Report (Appendix B-2).
- Project-Specific Special Status Plant Species Survey Report (Appendix B-3).
- Project-Specific 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) and Geographic Biotic Observations (GeoBOB), updated December 2015 (WNHP 2015a; GeoBOB 2015).
- Washington Gap Analysis Program (GAP) data was obtained from the U.S. Geological Survey (USGS) GAP.

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 Plants Reports. 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 study 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 study area and its immediate vicinity have been altered by roads, urban development, military activities, livestock grazing, agriculture, noxious weeds and invasive species, and fire. Shrub-steppe habitat is located primarily west of the Columbia River and agricultural development is located east of the Columbia River and south of the Saddle Mountains. Vegetation cover types present within the Project study area are described below.

Agriculture

Agricultural lands in the Project study 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 study area, refer to Section 3.4 - Land Jurisdiction and Land Use.

Annual Grassland

Annual grasses present in the Project study area are comprised of field brome (*Bromus arvensis*) and cheatgrass (*Bromus tectorum*). Bulbous bluegrass (*Poa bulbosa*), while perennial, is functionally similar to these non-native annual grasses and is also included in this cover type. Annual grasslands cover approximately 20.4 percent (36,798.6 acres) of the Project study area.

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 study area (5.2 acres; less than 0.1 percent).

Forb

For the Project study 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 1.1 percent (2,011.7 acres) of the Project study area 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 study 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 5.6 percent (10,022.1 acres) of the Project study area.

Table 3.2-1 Summary of Vegetation Cover Types (Acres) within the Project Study Area by Route Segment

VEGETATION COVER TYPE	ACRES WITHIN PROJECT AREA (ONE MILE FROM EITHER SIDE OF ROUTE SEGMENT CENTERLINES)																	
	1a/ NNR-1	1b	1c	2a	2b	2c	2d	3a	3b	3c	NNR-2	NNR-3	NNR-4	NNR-5	NNR-6	NNR-7	NNR-8	MR-1
Agriculture	540.9	495.4	1,107.5	132.7	3,355.0	10,565.8	38.0	0.0	884.6	11,180.7	1,638.8	602.4	579.1	833.1	536.6	0.0	0.0	3,867.8
Annual Grassland	3,292.2	8,254.1	8,869.0	2,097.4	4,515.2	7,092.4	197.8	39.9	597.6	6,519.3	3,558.6	6,104.2	1,317.0	19.8	13.7	0.0	184.9	5,627.7
Aspen	0.0	1.1	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
Bitterbrush/Perennial Grassland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	5.2	0.0	0.0	0.0	5.2
Developed/Disturbed/ Firebreak	23.1	100.9	99.8	4.9	20.8	17.3	9.1	2.0	108.4	74.7	85.2	6.9	10.6	11.7	6.4	28.7	10.3	721.3
Forb	0.0	461.0	420.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	212.8	474.9	1,206.6	59.5	0.0	130.0
Intermittent Stream or Dry Gully	1.1	13.7	13.7	3.5	11.2	14.4	4.5	0.0	1.9	0.3	1.7	2.9	2.5	1.3	4.5	13.7	0.9	3.9
Noxious Weeds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0
Open Water/Canal	459.9	0.0	0.0	0.0	0.0	0.2	290.3	25.5	7,367.8	953.6	0.3	0.2	0.0	0.0	0.0	409.2	647.5	0.0
Perennial Grassland	142.1	3,671.2	3,382.4	184.0	1,152.5	412.1	503.8	2.2	3,876.9	2.9	276.6	60.8	301.0	57.8	490.0	75.6	19.7	236.2
Rabbitbrush/Annual Grassland	52.8	187.0	187.0	42.8	123.7	139.9	2.0	2.1	20.0	94.0	54.6	0.0	0.0	0.0	0.0	0.5	10.2	0.0
Riparian/Wetland	12.4	61.0	60.2	41.4	0.0	0.0	0.3	0.0	414.0	172.8	0.6	57.9	0.1	0.0	20.4	4.7	0.5	0.1
Rock/Basalt Cliffs	0.0	0.0	0.0	0.0	1.2	0.3	5.4	0.0	20.5	8.3	3.7	10.1	1.0	0.0	4.7	0.2	0.2	1.0
Sagebrush/ Annual Grassland	0.0	5.4	5.4	0.0	0.0	0.4	0.0	2.0	5.9	614.1	15.8	20.4	17.3	0.0	3.2	0.0	2.0	3.6
Sagebrush/ Perennial Grassland	323.9	4,616.6	4,211.7	745.2	13,751.5	6,860.5	9,824.9	2,119.8	16,272.4	13,936.3	1,780.7	6,984.9	5,341.9	2,850.3	7,965.5	11,931.4	4,450.6	6,488.4
Tree	0.8	0.3	0.3	0.0	0.0	0.0	0.2	0.0	20.9	0.2	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total[1]	4,849.2	17867.7	18,358.9	3,251.9	22,931.1	25,103.2	10,876.4	2,193.5	29,591.0	33,557.3	7,422.2	13,852.4	7,788.5	4,254.1	10,251.4	12,523.6	5,326.8	17,085.2

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

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Rabbitbrush/Annual Grassland

Rabbitbrush (*Chrysothamnus viscidiflorus* and *Ericameria nauseosa*) typically occurs where prior disturbance has removed sagebrush. Within the Project study area, rabbitbrush occurs with an understory of annual grasses, such as cheatgrass. Rabbitbrush/annual grasslands occur on approximately 469.8 acres (0.3 percent) within the Project study area.

Riparian/Wetland

Very few wetlands and riparian areas occur within the Project study area. The majority of riparian areas within the Project study area are seasonally moist uplands. These drier riparian areas are typically vegetated with upland shrubs, including sagebrush. The largest riparian and wetland areas consist of a band of riparian vegetation occurring along Lower Crab Creek and a quaking aspen (*Populus tremuloides*) grove associated with an area that is seasonally moist (Route Segment 3c). Much of the Lower Crab Creek riparian area is bordered by pastureland and disturbed, often grazed, shrub-steppe habitats. Within the Project study area, the vegetation bordering Lower Crab Creek consists of dense thickets of peachleaf willow (*Salix amygdaloides*), narrowleaf willow (*Salix exigua*), Russian olive (*Elaeagnus angustifolia*), and black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) trees. The understory in this area is variable, including native species, such as soft-stem bulrush (*Schoenoplectus tabernaemontani*) and broad-leaf cattail (*Typha latifolia*), as well as a host of non-native species such as diffuse knapweed (*Centaurea diffusa*) and common reed (*Phragmites australis*). A small wetland is present in the JBLM YTC Cantonment Area (Route Segment NNR-2). Vegetation at this wetland included narrowleaf willow, 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 study area, refer to Section 3.14 - Water Resources.

Sagebrush/Perennial Grassland and Sagebrush/Annual Grassland

Within the Project study 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 study area, covering 48.7 percent (87,696.5 acres) of the Project study area. Sagebrush shrublands with an annual grass understory comprise 0.4 percent (665.4 acres) of the Project study area.

3.2.2.2 Noxious Weeds and Invasive Plant Species

Many exotic plant species are found within the Project study 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. The Washington State Department of Agriculture maintains a list of noxious weeds to be controlled in Washington. 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 (Washington State Noxious Weed Control Board [WSNWCB] 2015).

Within the right-of-way (ROW) for each of the Project route segments, a Project-specific survey was completed. Qualified botanists conducted a complete, floristic pedestrian survey to target noxious weed species on accessible federal and Washington State Department of Transportation (WSDOT) lands.

Federal and WSDOT 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 the Route Segment Manastash Ridge Subroute (MR-1) were not surveyed because of route adjustments that were made following completion of the surveys. The noxious weed surveys occurred June 22-29, 2011 and May 13-20, 2013; any additional noxious weeds observed during the special status plant surveys were also documented (May 16-25 and August 8-10, 2011; and July 27, 2013). State and county-listed noxious weeds documented during the 2011 and 2013 noxious weed survey are presented in Table 3.2-2.

Noxious weeds within the Project study area are scattered and patchy in distribution, with the exception of burningbush (*Bassia scoparia*) which was 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 Project-specific 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 Reports are included in their entirety in Appendix B-4.

Several invasive plant species that do not have designation as a noxious weed were also found within the Project study 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.

Table 3.2-2 Noxious Weeds Species Documented in Project Area

SPECIES NAME	LEGAL NOXIOUS STATUS[1]		LOCATION OF SPECIES (ROUTE SEGMENT)	TOTAL NUMBER OF OCCURRENCES	TOTAL ACRES DOCUMENTED WITHIN ROW[3]
	WASHINGTON	COUNTY[2]			
Russian knapweed *Acroptilon repens*	Class B	B, G, K, Y	3b, NNR-2, NNR-3	15	5.4
Burningbush[4] *Bassia scoparia* (=*Kochia scoparia*)	Class B	B, G	1b, 1c, 3b, 3c, NNR-2, NNR-4, NNR-5, NNR-7, NNR-8	-	-
Hoary cress *Cardaria draba* *(=Lepidium draba)*	Class C	G, K	1b, NNR-5	6	0.1
Spiny plumeless thistle *Carduus acanthoides*	Class B	G	NNR-5	1	<0.1
Diffuse knapweed *Centaurea diffusa*	Class B	B, G, K, Y	1b, 1c, 2b, 3b, 3c, NNR-2, NNR-3, NNR-4, NNR-5, NNR-8	66	65.7
Rush skeletonweed *Chondrilla juncea*	Class B	B, G, K, Y	3c	1	<0.1
Canada thistle *Cirsium arvense*	Class C	B, G, K	1b, 3b, 3c, NNR-2, NNR-5	14	2.7
Bull thistle *Cirsium vulgare*	Class C	B, G, K	NNR-5	2	<0.1
Field bindweed *Convolvulus arvensis*	Class C	G, K	2b, 3b, NNR-2, NNR-8	5	0.1
Horseweed *Conyza canadensis*	Class C	K	3c, NNR-2	2	6.3
Russian olive[5] *Elaeagnus angustifolia*	Class C	G	3b, 3c	-	-

SPECIES NAME	LEGAL NOXIOUS STATUS[1]		LOCATION OF SPECIES (ROUTE SEGMENT)	TOTAL NUMBER OF OCCURRENCES	TOTAL ACRES DOCUMENTED WITHIN ROW[3]
	WASHINGTON	COUNTY[2]			
Common St. Johnswort *Hypericum perforatum*	Class C	G, K	3b, NNR-5	3	<0.1
Common catsear *Hypochaeris radicata*	Class B	G, K	3c	1	0.3
Perennial pepperweed *Lepidium latifolium*	Class B	G, K, Y	1b, 1c, 3c	11	0.7
Dalmatian toadflax *Linaria dalmatica* ssp. *dalmatica*	Class B	B, G, K, Y	NNR-2	2	0.6
Purple loosestrife *Lythrum salicaria*	Class B	B, G, K, Y	3c, NNR-2	2	<0.1
Scotch thistle *Onopordum acanthium*	Class B	B, G, K, Y	1b, 1c, 3b, 3c	8	0.1
Reed canarygrass *Phalaris arundinacea*	Class C	G, K, Y	3c, NNR-2	3	1.2
Common reed (non-native genotype) *Phragmites australis*	Class B	B, G	3c	1	0.1
Sulphur cinquefoil *Potentilla recta*	Class B	G,K,Y	NNR-5	1	<0.1
Cereal rye *Secale cereale*	Class C	B, G	3c	1	<0.1
Groundsel *Senecio vulgaris*	Class C	B, G	3c	2	2.1
Puncturevine *Tribulus terrestris*	Class B	G, K, Y	3c	7	16.1

Sources: [1] WSNWCB 2015; Benton County Noxious Weed Control Board 2015; Noxious Weed Control Board of Grant County 2015; Yakima County Noxious Weed Board 2015; Kittitas County Noxious Weed Control Board 2015.
[2] County Noxious Weed Lists: B=Benton; G=Grant; K=Kittitas; Y=Yakima.
[3] 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. Acreages are approximate and include a buffer, where appropriate.
[4] Burningbush was not mapped due to its ubiquitous and often dominant nature across most accessible federal lands.
[5] Russian olive was not included on the prior Washington State Noxious Weed List used for the surveys, but is on the 2015 list and has been included here.

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 USFWS as Candidates for federal listing under the ESA and species designated as federal Species of Concern (SOC). 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 SOCs 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 designated by the BLM as 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 Benton, 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, 2012, and 2015); Boyter (2011 and 2013); and USFWS Threatened, Endangered, Candidate, and Species of Concern.

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

Qualified botanists conducted a complete, floristic pedestrian Project-specific survey for the targeted special status plants on accessible federal and WSDOT lands within the proposed 150-foot wide ROW (survey corridor). Federal and WSDOT lands comprise approximately 42 percent of the total survey corridor. The remaining 58 percent is comprised of non-federal (private, county, other state) land and was not surveyed. Of the 1,347.3 acres of federal and WSDOT lands within the 150-foot wide survey corridor, 645.6 acres (48 percent) were accessible and surveyed. 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. The remaining 701.7 acres of federal and WSDOT lands that were identified for survey were not surveyed due to inaccessibility. Table 3.2-3 presents a summary of the total amount of land present within the 150-foot survey corridor compared with the amount of land surveyed for special status plants.

For the route segments presented in the DEIS (Alternatives A-H), a series of three special status plant surveys were conducted (May, June, and August 2011) within accessible federal lands; there were no WSDOT lands. Three special status plant surveys were conducted to address the different phenology (timing of flowering and/or fruiting) of the target special status plant species. The May and June 2011 surveys took place in all habitats within accessible federal lands and the August 2011 survey took place only at wetland and riparian areas along accessible federal lands to target later blooming sensitive wetland and riparian species including Ute ladies'-tresses (*Spiranthes diluvialis*). The May and June 2011 surveys assisted in the identification of wetland and riparian habitats to be targeted for the final survey in August.

For the route segments presented in the SDEIS (NNR Alternative and NNR Alternative with MR Subroute), two special status plant Project-specific surveys were conducted (May and July 2013) within accessible federal and WSDOT lands. The May 2013 survey occurred within accessible federal and WSDOT lands and the July 2013 survey took place only at wetland and riparian areas along accessible federal lands; there were no wetland and riparian areas on WSDOT lands. Appendix B-3 (Special Status Plants Reports) lists each species' phenology and the targeted survey month. 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 2013 survey should serve as the late June survey and a follow-up survey in late July 2013 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.

Table 3.2-3 Total Amount of Federal And WSDOT Land Surveyed Compared with the Total Amount of Land Present within the 150-Foot Survey Corridor[1]

ROUTE SEGMENT	TOTAL ACRES	FEDERAL AND WSDOT LAND WITHIN 150-FT SURVEY CORRIDOR		NON-FEDERAL/WSDOT LAND WITHIN SURVEY CORRIDOR (ACRES)	TOTAL PERCENT OF SURVEY CORRIDOR COMPLETED (FEDERAL/WSDOT AND NON-FEDERAL LAND)
		TOTAL ACRES	AMOUNT SURVEYED (ACRES AND %)		
1a/NNR-1	44.1	0	0 (100%)	44.1	0%
1b	243.8	241.9	138.2 (57%)	1.9	57%
1c	251.3	1.7	1.7 (100%)	249.6	1%
2a	19.3	0	0 (100%)	19.3	0%
2b	317.5	50.6	43 (85%)	266.9	14%
2c	351.7	0.2	0.1 (50%)	351.5	<1%
2d	137.0	19.7	19.7 (100%)	117.3	14%
3a	3.3	0	0 (100%)	3.3	0%
3b	422.1	171.5	61.1 (36%)	250.6	14%
3c	489.7	181.0	179.8 (99%)	308.7	37%
NNR-2	92.7	90.5	79.7 (88.1%)	2.2	86.0%
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	120.3	0.5 (0.4%)	63.6	0.2%

[1] The total area surveyed was originally greater than shown here due to route adjustments after the survey were completed.

No federally listed plant species are known to occur within the Project study area; however, four additional plant species listed as Endangered, Threatened, or Candidate are suspected to occur within the Project study area. Critical Habitat for Umtanum desert buckwheat (*Eriogonum codium*), which was designated in December 2013, is located 1.5 miles from Route Segment 3c, but is not in the Project study area (USFWS 2013a). More information on these species is provided in Table 3.2-4. No plant species within the Project study area (Benton, Grant, Kittitas, and Yakima counties) are proposed for listing under the ESA. No other proposed or designated Critical Habitat is present within or adjacent to the Project study area (USFWS 2012, 2013b, 2013c, 2015). Of the five species listed as Endangered, Threatened, or Candidate that are suspected to occur or known to occur in the Project study area, none were located during the surveys (Appendix B-3 Special Status Plants Reports).

In addition to federally listed plant species, thirty-one Washington state-listed and BLM Sensitive plant species are known to occur within the Project study area. Table 3.2-5 presents a summary of these species and the location of the closest route segment. Five special status plant species were located during the special status plant surveys: Columbia milkvetch (*Astragalus columbianus*), Hoover's desert-parsley (*Lomatium tuberosum*), Nuttall's sandwort (*Minuartia nuttallii* var. *fragilis*), pauper milkvetch (*Astragalus misellus var. pauper*), and snowball cactus (*Pediocactus nigrispinus*). All occurrences were located during the May 2011 and 2013 surveys, but some were confirmed and expanded during the June 2011/July 2013 surveys (Appendix B-3 Special Status Plants Reports). One Wormskiold's northern wormwood (*Artemisia campestris* ssp. *borealis* var. *wormskioldii*) WNHP occurrence is documented within one mile of Route Segments 3b and 3c. Wormskiold's northern wormwood was previously considered a candidate species for listing under the ESA. However, the USFWS found that listing the species as endangered or threatened was not warranted throughout all or a significant portion of its range (81 Federal Register 64843 – 64857). Information on these species is presented in Table 3.2-5 and discussed in more detail below.

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Table 3.2-4 Federally Listed Species Suspected to Occur within the Project Study 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) outside of the Project study area. Not documented in surveys.
Ute ladies'-tresses	*Spiranthes diluvialis*	T, WE	Ute ladies'-tresses occurs in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, Wyoming, and Canada (British Columbia).	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; limited potential habitat and USFWS Information Planning and Conservation System (IPaC) does not consider species to have potential for Project study area (USFWS 2015); outside of the Project study 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 and USFWS IPaC does not consider species to have potential for Project study area (USFWS 2015); outside of the Project study area. 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 non-native 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 (*Eremothera pygmaea*), and Sandberg bluegrass. The elevation ranges from 780 to 890 feet.	June to July	Low; limited habitat potential and USFWS IPaC does not consider species to have potential for Project study area (USFWS 2015). Species is restricted to a very small area along the Columbia River and outside the Project study area. Not documented in surveys.

Sources: ISSSSP 2015; USFWS 2012; USFWS 2013b; USFWS 2013c; USFWS 2004a; USFWS 1995; Hitchcock et al. 1969; Hitchcock and Cronquist 1973; NatureServe 2011; WNHP and BLM 2005; WNHP 2010; WNHP 2014; WNHP 2015a; Camp and Gamon 2011; and Center for Plant Conservation 2010a,b.

[1] 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 and BLM Sensitive Species Known to Occur and Documented within the Project Study 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*	WS	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	3a, 3b, 3c, NNR-8	-
Awned halfchaff sedge	*Lipocarpha aristulata*	BLM-S,WT	This species is found from California north to Washington and west to Idaho, Wyoming, Utah, Arizona, Colorado, New Mexico, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, and Indiana. In Washington, awned halfchaff sedge is known from two recent occurrences along the Columbia River in Benton, Grant, and Franklin counties and five historical occurrences from Klickitat, Whitman, Benton, and Asotin counties.	G5?/S1	Two populations occupying approximately 2,718 acres are known to occur within the region.	The current primary threat is hydrologic change.	Wetlands along the Columbia River, wet soil and mud in bottomlands; sandbars and beaches; 328-1,312 feet.	June to September	2d, 3b, 3c	-
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 cryptantha	*Cryptantha rostellata* Note: The name maintained on the December 2011 list was *Cryptantha flaccida*, but that was the incorrect name and *C. rostellata* is the correct name; *C. flaccida* is not on WNHP list and is common in WA (ISSSP 2015).	BLM-S, WT	Beaked cryptantha is known from Kittitas County, Washington south through Oregon to central California. In Washington, it is currently known in Kittitas, Grant, Klickitat, Garfield, and Asotin counties in the Columbia Basin physiographic province. Historically it was also known from Yakima and Walla Walla counties.	G4/S2	Six populations occupying approximately 817 acres are known to occur within the region.	Primary threats include grazing, erosion, and invasion of habitat by exotic species.	Dry, open places; Most locations are within big sagebrush/bluebunch wheatgrass (*Artemisia tridentata/Pseudoroegneria spicata*) habitat types; however some occur within scabland sagebrush/Sandberg bluegrass (*Artemisia rigida*/*Poa secunda*) habitats; 600-2,900 feet.	April to June	3b, NNR-6, NNR-7	-
Beaked spike-rush	*Eleocharis rostellata*	BLM-STR, 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	2d, 3a, 3b, 3c, 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)
Bristle-flowered collomia	*Collomia macrocalyx*	BLM-STR, 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	3b, NNR-7, NNR-8	-
Caespitose evening-primrose	*Oenothera caespitosa* ssp. *caespitosa*	BLM-STR, 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	3b, 3c, NNR-6, NNR-7, NNR-8	3b
Columbia cress	*Rorippa columbiae*	SOC, BLM-S, WE	Columbia cress is endemic to Washington, Oregon, and California, currently found in two separated regions: along the Columbia River in Washington and Oregon, and in south-central Oregon and northern California. In Washington, it is known from two segments of the Columbia River: the arid Hanford Reach in the Columbia Basin, and the Lower Columbia Reach within the Columbia Gorge.	G3/S1S2	One population occupying approximately 13,679 acres is known to occur within the region.	Short-term inundation during the growing season may depress the vigor of the species over the long-term. In addition, current management of the Columbia River appears to affect the ability of the species to successfully produce seeds. Woody vegetation may alter the community structure of the species' habitat. Columbia cress appears to be adapted to periodic catastrophic flooding and unstable substrates typical of riparian areas, which appear to help maintain the species' habitat by limiting siltation and decreasing competition.	Moist, sandy or cobbly soil, such as river floodplains and ephemeral ponds. Associated with the Columbia River, snow -fed streams and lakes, wet meadows, irrigation ditches and roadside ditches; apparently requires wet soil throughout the growing season.	July to October	3c	-
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	2b, 2c, 2d, 3b, 3c, NNR-7, NNR-8	2b, 2d, 3b

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)
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	*Eremothera pygmaea* (synonym = *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	3b, NNR-7, NNR-8	-
Fuzzytongue penstemon	*Penstemon eriantherus var. whitedii*	BLM-S, WS	Fuzzytongue penstemon is endemic to Washington and is found in Franklin, Chelan, Kittitas, Douglas, Klickitat and Lincoln counties, Washington.	G4/S2	Eight populations occupying approximately 3,335 acres are known to occur within the region.	Primary threats include grazing and off-road vehicle use. Some existing populations occur on private land, and in one instance, are in an area heavily used for agriculture.	Dry, open places in between shrubs; in the plains, valleys, and foothills, sometimes ascending to moderate elevations in the mountains; associated with big sagebrush (*Artemisia tridentata*), antelope bitterbrush (*Purshia tridentata*), purple sage (*Salvia dorrii*), buckwheat (*Eriogonum* sp.), and rabbitbrush (*Chrysothamnus nauseosus*); 525-3,835 feet.	May to June	3c	-
Geyer's milkvetch	*Astragalus geyeri*	BLM-S, WT	Geyer's milkvetch 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	3a, 3c, NNR-8	-

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Grand redstem	*Ammannia robusta*	BLM-S, WT	Grand redstem is found from central western Canada down to California and from central United States to Mexico. In Washington, it is found in Benton, Grant and Franklin counties and was historically known from Klickitat and Whitman counties along the Columbia and Snake Rivers.	G5/S1	Two populations occupying approximately 2,299 acres are known to occur within the region.	Grand redstem is vulnerable to hydrologic changes, such as flooding by hydroelectric developments and invasion by exotic species, such as purple loosestrife (*Lythrum salicaria)*. Its habitat type was once widely distributed along the Columbia and Snake rivers, but inundation due to hydroelectric development has dramatically reduced the extent and quality of these wetlands.	Moist, heavy soil around ponds, rivers, and other wet places; deep sandy loam to gravelly soils. Along the Columbia River in riparian mudflat wetlands dominated by annual species.	May to July	3b	-
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	2d, 3a, 3b, 3c, 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	3a, 3b, 3c, NNR-8	-
Hairy bugseed	*Corispermum villosum*	WS	Hairy bugseed found in Colorado, Minnesota, Missouri, Montana, Nebraska, Nevada, North Dakota, Washington, Wisconsin, Wyoming, and most Canadian provinces. In the Project study area, it is known to occur in Grant County.	G4?/SU	Three populations occupying approximately 1,267 acres are known to occur within the region.	Threats are not documented but are presumed to be similar to sensitive species in sandy habitats, including OHV use, increased weed invasions, changes in sand deposition, and agricultural conversion.	Sand dunes, sandy and gravely shores, waste places; elevation not known.	Late summer to fall	3c	-
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	2d, 3b, 3c, NNR-2, NNR-3	NNR-3

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Hoover's tauschia	*Tauschia hooveri*	SOC, BLM-S, WS	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	1b, 1c, NNR-3	-
Kalm's lobelia	*Lobelia kalmii*	BLM-STR, WE	Kalm's lobelia occurs from Newfoundland to Pennsylvania, west to British Columbia, and Colorado to Hudson Bay and the southern Mackenzie District. In Washington, it occurs in Yakima County.	G5/S1	One population occupying approximately 92 acres is known to occur within the region.	Primary threats include habitat degradation from livestock, weedy species, and the sustainability of the habitat is dependent upon the steady flow of the natural spring. This species can apparently occur in a wide range of wetland types, including sphagnum bogs, stream and lake shores, wet meadows, and seeps and springs. The existing site in Yakima County has been degraded from past livestock use.	Marl or peat bogs, along shores and in other wet places.	Late July to August	3b	-
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 non-native 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-STR, 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	*Chylismia scapoidea* ssp. *scapoidea* (synonym = *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	3b, NNR-7, NNR-8	-
Nuttall's sandwort	*Minuartia nuttallii* ssp. *fragilis*	BLM-S, WT	Nuttall's sandwort is found in Washington, Oregon, California and Nevada. In Washington, it is known to occur in Grant County.	G5/S1	Two populations occupying approximately 884 acres are known to occur within the region.	The primary threat is off-road vehicle use.	Dry basalt scree slopes, open, gravelly benches, or limestone talus from open sagebrush hills to alpine slopes; 5,413-7,874 feet.	April to May (August)	1b, 1c, 2d, 3b, 3c	1b; also occurs in 3b 60 feet downslope from ROW edge in an area that would be potentially used for access
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

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Piper's daisy	*Erigeron piperianus*	BLM-S, WS	Piper's daisy is a regional endemic, occurring only in the Columbia Basin of Washington. It has been found recently in Adams, Benton, Douglas, Franklin, Grant, Klickitat, and Yakima counties and historically in Kittitas County.	G3/S3	Forty-two populations occupying approximately 23,158 acres are known to occur within the region.	The primary threats to Piper's daisy include habitat loss due to agricultural development, overgrazing and weedy annual plants. Piper's daisy is most common in undisturbed areas of the sagebrush steppe; however, it has also been reported growing in grazed and burned sites, so can withstand some disturbance.	Dry, open places, often among sagebrush; 400-2,250 feet.	May to June	2d, 3c,	-
Snake River cryptantha	*Cryptantha spiculifera*	BLM-S, WS	Snake River cryptantha is a regional endemic, known from central Washington and eastern Oregon to northeastern California and northern Nevada, east through the Snake River Plains of Idaho, and western Montana. In Washington, it has been in the Okanogan Highlands, Eastern Cascades and Columbia Basin physiographic provinces.	G4?/S2?	Nine populations occupying approximately 7,193 acres are known to occur within the region.	Primary threats include agricultural conversion, grazing, off-road vehicle use, and irrigation related groundwater changes.	Sandy knolls and badlands and talus at low elevations; dry, open, flat or sloping areas in stable or stony soils.	April to July	3c	-
Snowball cactus	*Pediocactus nigrispinus* (synonym = *Pediocactus simpsonii var. robustior)*	BLM-S, WS	Snowball 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 snowball 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	1b, 1c, 3b, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, MR-1	1b, NNR-3, NNR-4
Suksdorf's monkeyflower	*Erythranthe suksdorfii* (synonym = *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	-
Wanapum crazyweed	*Oxytropis campestris var. wanapum*	SOC, BLM-S, WE	Wanapum crazyweed is known only from Saddle Mountain, Grant County, Washington in the Columbia Basin physiographic province.	G5/S1	One population occupying approximately 1,919 acres is known to occur within the region.	Primary threats include past and potential future land uses include grazing, off-road vehicle use, mineral and gas exploration, and rock hounding. Very little is known about the ecology of Wanapum crazyweed. It occurs in a harsh environment where mature individuals probably face little competition from other vegetation.	Gravelly floodplains of the Columbia River; big sagebrush/bluebunch wheatgrass.	May to June	3c	-
White eatonella	*Eatonella nivea*	BLM-STR, 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	3b, NNR-7, NNR-8	-

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Wormskiold's northern wormwood	*Artemisia campestris ssp. borealis var. wormskioldii* (synonym = *Artemisia borealis* var. *wormskioldii)*	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	3b, 3c	-

Sources: ISSSSP 2015; USFWS 2010a; Hitchcock et al. 1969; Hitchcock and Cronquist 1973; WNHP and BLM 2005; Camp and Gamon 2011; WNHP 2012a,b,c; WNHP 2013; WNHP 2014; WNHP 2015a; Flora of North America 2015; and NatureServe 2015.
[1] 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.
[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 corridor was surveyed, additional special status species and populations could occur within the Project study 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; watered poplar/ornamental tree; and noxious weeds. Marginal habitat included: annual grassland, perennial grassland, rabbitbrush/annual grassland, and sagebrush annual grassland. Suitable habitat included: basalt cliff/rock, sagebrush/perennial grassland, bitterbrush/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 (ACRES)		
		Suitable Habitat	Marginal Habitat	Unsuitable Habitat
1a/NNR-1	None	12.7 acres—predominately sagebrush/perennial grassland, with some intermittent stream/dry gully	19.9	11.4
1b	Nuttall's sandwort and snowball cactus	50.3 acres - predominantly sagebrush/perennial grassland, with some aspen and intermittent stream/dry gully.	149.5	28.7
1c	Snowball cactus	58.7acres - predominantly sagebrush/perennial grassland, with some aspen and intermittent stream/dry gully.	152.9	24.0
2a	None	2.0 acres - sagebrush/perennial grassland and intermittent stream/dry gully.	16.0	0.0
2b	Columbia milkvetch	112.9 acres - predominantly sagebrush/perennial grassland, with some intermittent stream/dry gully and basalt cliff/rock.	144.5	40.2
2c	None	8.5 acres - predominantly sagebrush/perennial grassland, with some intermittent stream/dry gully and basalt cliff/rock.	242.7	78.6
2d	Awned halfchaff sedge, Columbia milkvetch	9.9 acres - predominantly sagebrush/perennial grassland, with some intermittent stream/dry gully and basalt cliff/rock.	117.7	0.8
3a	None	2.2 acres - sagebrush/perennial grassland.	0.0	0.8

ROUTE SEGMENT	SPECIAL STATUS PLANTS THAT OCCUR OR HAVE THE POTENTIAL TO OCCUR WITHIN THE ROW[1]	HABITAT SUITABILITY (ACRES)		
		Suitable Habitat	Marginal Habitat	Unsuitable Habitat
3b	Annual sandwort, awned halfchaff sedge, beaked spike-rush, bristle-flowered collomia, Columbia milkvetch, caespitose evening-primrose, gray cryptantha, Hoover's desert-parsley, Kalm's lobelia	109.9 acres - predominately sagebrush/perennial grassland with lesser amounts of basalt cliff/rock, riparian, and intermittent stream/dry gully.	157.6	128.2
3c	Awned halfchaff sedge, Columbia milkvetch, gray cryptantha, Hoover's desert-parsley, hairy bugseed	128.3 acres - predominately sagebrush/perennial grassland with lesser amounts of basalt cliff/rock, riparian, and intermittent stream/dry gully.	167.2	163.5
NNR-2	None	20.8 acres—predominately sagebrush/perennial grassland, with one small wetland	37.4	34.4
NNR-3	Pauper milkvetch, basalt daisy, Hoover's desert-parsley, snowball cactus and Hoover's tauschia	103.9 acres—predominately sagebrush/perennial grassland, followed by basalt cliff/rock, intermittent stream/dry gully and wetland/riparian	63.9	1.2
NNR-4	Snowball cactus	45.0 acres—predominately sagebrush/perennial grassland, followed by bitterbrush/perennial grassland and intermittent stream/dry gully	35.3	1.5
NNR-5	None	30.6 acres—predominately sagebrush/perennial grassland, with some intermittent stream/dry gully	0.0	2.2
NNR-6	Suksdorf's monkeyflower	95.7 acres—sagebrush/perennial grassland	21.9	0.0
NNR-7	Caespitose evening-primrose, dwarf evening-primrose, bristle-flowered collomia, gray cryptantha, beaked cryptantha, miner's' candle and Suksdorf's monkeyflower	149.9 acres—sagebrush/perennial grassland	0.0	0.1
NNR-8	Annual sandwort, dwarf evening-primrose, and gray cryptantha	26.3 acres—predominately sagebrush/perennial grassland, with some wetland/riparian and basalt cliff	13.8	10.1
MR-1	None	79.4 acres—sagebrush/perennial grassland	88.8	47.7

[1]Known and potential for occurrence is based on WNHP 2015a, BLM Geographic Biotic Observations, and survey data. Snowball cactus, Hoover's desert-parsley and pauper milkvetch were identified during the special status species surveys. As a portion of Route Segments 1a/NNR-1, 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 was 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.
Refer to Table 3.2-5 for a detailed description of habitat requirement for each special status species.

Annual Sandwort
Annual sandwort (*Minuartia pusilla* var. *pusilla*) is a Washington Sensitive 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 indicate that annual sandwort intersects Route Segments 3b and NNR-8 for approximately 0.8 mile. However, special status species locations include large buffers; therefore, it is uncertain whether this occurrence intersects the ROW.

Awned Halfchaff Sedge
Awned halfchaff sedge (*Lipocarpha aristulata*) is a BLM Sensitive and Washington Threatened species. This species is found from California north to Washington and west to Idaho, Wyoming, Utah, Arizona, Colorado, New Mexico, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, and Indiana. In Washington, awned halfchaff sedge is known from two recent occurrences along the Columbia River in Benton, Grant, and Franklin counties and five historical occurrences from Klickitat, Whitman, Benton, and Asotin counties. Two populations occupying approximately 2,718 acres are known to occur within the region. The current primary threat is hydrologic change (Camp and Gamon 2011).

WNHP data indicate that awned halfchaff sedge intersects Route Segments 2d, 3b, and 3c for approximately 0.6 miles. As the entirety of all route segments were not surveyed, it is possible that awned halfchaff sedge could occur elsewhere.

Basalt Daisy
Basalt daisy (*Erigeron basalticus*) is a federal 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 study area is adjacent to the Selah Cliffs Natural Area Preserve, which was established in 1993 to protect basalt daisy (Washington State Department of Natural Resources [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.

Beaked Cryptantha
Beaked cryptantha (*Cryptantha rostellata*) is a BLM Sensitive and a Washington Threatened species. Beaked 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 817 acres are known to occur. The primary threats to beaked cryptantha include grazing, erosion, and habitat loss through the invasion of exotic plant species (Camp and Gamon 2011).

WNHP data indicate that beaked cryptantha intersects Route Segments NNR-7 for approximately 0.7 mile. As the entirety of all route segments were not surveyed, it is possible that beaked cryptantha could occur elsewhere.

Beaked Spike-rush

Beaked spike-rush (*Eleocharis rostellata*) is a BLM Strategic and a Washington Sensitive species. 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. Within the region, six populations occupying approximately 563 acres are known to occur. The primary threats to beaked spike-rush include invasion of habitat by exotic species and increasing density of woody species (Camp and Gamon 2011).

WNHP data indicate that beaked spike-rush intersects Route Segment 3b for approximately 0.7 mile. As the entirety of all route segments were not surveyed, it is possible that beaked spike-rush could occur elsewhere.

Bristle-flowered Collomia

Bristle-flowered collomia (*Collomia macrocalyx*) is a BLM Strategic 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 indicate that bristle-flowered collomia intersects Route Segment 3b and NNR-7 for approximately 2.3 miles. As the entirety of all route segments were not surveyed, it is possible that bristle-flowered collomia could occur elsewhere.

Caespitose Evening-Primrose

Caespitose evening-primrose (*Oenothera caespitosa* ssp. *caespitosa*) is a BLM Strategic, 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 indicate that caespitose evening-primrose intersects Route Segment 3b and NNR-7 for approximately 3.0 miles. One occurrence of caespitose evening-primrose was located during the special status plant surveys along Route Segment 3b. This occurrence was located in a previously documented location and consisted of approximately 75 individuals scattered throughout 0.14 acre within the 160 foot ROW. As the entirety of all route segments were not surveyed, it is possible that caespitose evening-primrose could occur elsewhere.

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).

BLM GeoBOB and WNHP data indicate that Columbia milkvetch intersects Route Segments 2b, 2d, 3b, and 3c for approximately 10.8 miles. Special status plant surveys located three occurrences within Route Segments 2b, 2d, and 3b. All of these occurrences were within or near previously documented occurrences. The occurrence within Route Segment 2b consisted of approximately 116 individuals scattered throughout 1.9 acres. Route Segment 2d's occurrence consisted of approximately 110 individuals throughout 5.4 acres and the occurrence along Route Segment 3b contained approximately 158 individuals throughout 2.4 acres. As the entirety of all route segments were not surveyed, Columbia milkvetch could be present elsewhere.

Dwarf Evening-Primrose

Dwarf evening-primrose (*Eremothera pygmaea*) 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 indicate that dwarf evening-primrose intersects Route Segment NNR-7 and NNR-8 for approximately 0.5 mile. However, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW. As the entirety of all route segments were not surveyed, dwarf evening-primrose could be present elsewhere.

Gray Cryptantha

Gray cryptantha (*Cryptantha leucophaea*) 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 indicate that gray cryptantha intersects Route Segments 3b, 3c, NNR-7, and NNR-8 for approximately 5.4 miles. However, special status species locations include large buffers; therefore, it is uncertain whether this occurrence intersects the ROW. As the entirety of all route segments were not surveyed, gray cryptantha could be present elsewhere.

Hairy Bugseed

Hairy bugseed (*Corispermum villosum*) is a Washington Sensitive Species. This species is found in Colorado, Minnesota, Missouri, Montana, Nebraska, Nevada, North Dakota, Washington, Wisconsin, Wyoming, most Canadian provinces, and Washington including Grant County (NatureServe 2015). At the regional level, three populations occupying approximately 1,267 acres are known to occur. Threats are not documented, but are presumed to be similar to sensitive species in sandy habitats, including OHV use, increased weed invasions, changes in sand deposition, and agricultural conversion.

WHNP data indicate that hairy bugseed intersects Route Segment 3c for approximately 0.6 mile; however, special status species locations include large buffers; therefore, it is uncertain whether this occurrence intersects the ROW. As the entirety of all route segments were not surveyed, hairy bugseed could be present elsewhere.

Hoover’s Desert-Parsley

Hoover’s desert-parsley is a federal SOC, BLM Sensitive Species, and a Washington 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).

GeoBOB and WHNP data indicate that Hoover's desert-parsley intersects Route Segments 3b, 3c, and NNR-3 for approximately 7.0 miles. WNHP locations include large buffers; therefore, it is uncertain whether additional occurrences intersect the ROW. 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. Current threats to this occurrence of Hoover's desert-parsley include development and invasive and exotic species (e.g., cheatgrass). As the entirety of all route segments were not surveyed, Hoover's desert-parsley could be present elsewhere.

Hoover's Tauschia

Hoover's tauschia (*Tauschia hooveri*) 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. 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 indicate 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. As the entirety of all route segments were not surveyed, Hoover's tauschia could be present elsewhere.

Kalm's Lobelia

Kalm's lobelia (*Lobelia kalmii*) is a BLM Strategic and a Washington Endangered species. Kalm's lobelia occurs from Newfoundland to Pennsylvania, west to British Columbia, and Colorado to Hudson Bay and the southern Mackenzie District. In Washington, it occurs in Yakima County. Within the region, one population occupying approximately 92 acres is known to occur. The primary threats to Kalm's lobelia include habitat degradation from livestock and weedy species. The sustainability of the habitat is dependent upon the steady flow of the natural spring. The existing site in Yakima County has been degraded from past livestock use (Camp and Gamon 2011).

WNHP data indicate that Kalm's lobelia intersects Route Segment 3b for approximately 0.3 mile. As the entirety of all route segments were not surveyed, it is possible that Kalm's lobelia could occur elsewhere.

Miner's Candle

Miner's candle (*Cryptantha scoparia*) is a BLM Strategic 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; therefore, it is uncertain whether this occurrence intersects the ROW. As the entirety of all route segments were not surveyed, miner's candle could be present elsewhere.

Nuttall's Sandwort

Nuttall's sandwort is a BLM Sensitive and a Washington Threatened Species. This species is found in Washington; Oregon; California; Nevada; and Grant County, Washington. Two populations occupying approximately 884 acres are known to occur within the region. Threats to this species are primarily from OHV use (WNHP and BLM 2005).

One occurrence of Nuttall's sandwort was located during the special status plant surveys along Route Segment 1b and intersects Route Segment 1b for approximately 0.1 mile. Another occurrence was discovered 60 feet downslope from the ROW edge of Route Segment 3b in an area that would be potentially used for access. The occurrence within Route Segment 1b consisted of approximately 10 individuals scattered throughout 34 square feet. The occurrence of Nuttall's sandwort within Route Segment 3b consisted of one individual. Additional Nuttall's sandwort occurrences could be present within the Project study area as suitable habitat is available within all of the route segments (Table 3.2-6). Current threats to these occurrences of Nuttall's sandwort include invasion of exotic species, such as cheatgrass. As the entirety of all route segments were not surveyed, Nuttall's sandwort could be present elsewhere.

Pauper Milkvetch

Pauper milkvetch is a BLM Sensitive Species and a Washington 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 and GeoBOB data indicate that pauper milkvetch intersects Route Segment NNR-3 for approximately 2.0 miles. 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 [*Acroptilon repens*]). As the entirety of all route segments were not surveyed, pauper milkvetch could be present elsewhere.

Snowball Cactus

Snowball 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 the region, fourteen populations occupying approximately 11,895 acres are known to occur. The greatest threat to snowball cactus is from cactus collectors (WNHP and BLM 2005).

GeoBOB and WNHP data indicate that snowball cactus intersects Route Segments 1b, 1c, and NNR-3 for approximately 1.7 miles. One occurrence of snowball cactus was documented during the 2013 special status plant surveys 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. In addition, two occurrences of snowball cactus were documented during the 2011 special status plant survey within the ROW of Route Segment 1b. However, this species was not determined to be a special status plant until after the 2011 surveys were complete; therefore, its mapped location at Route Segment 1b is based on field notes and retrospective mapping. As such, information on number of individuals and acres occupied was not collected. Current threats to these occurrences of snowball cactus include development, invasive and exotic species, and competition from cheatgrass.

Suksdorf's Monkeyflower

Suksdorf's monkeyflower (*Erythranthe suksdorfii*) 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 indicate that Suksdorf's monkeyflower intersects Route Segments NNR-6 and NNR-7 for approximately 0.9 mile (Table 3.2-5). These locations include large buffers, so it is uncertain whether these occurrences intersect the ROW. As the entirety of all route segments were not surveyed, Suksdorf's monkeyflower could be present elsewhere.

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 given 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 (DNR 2011). The status of priority ecosystems with the potential to occur in the Project study area were reviewed and documented during the field survey (WNHP 2009). Eleven priority ecosystems are present within five miles of Route Segments 1c, 2b, 2c, 2d, 3a, 3b, 3c, NNR-3, NNR-4, NNR-7, NNR-8 and MR-1 (Table 3.2-7). No priority ecosystems are located within five miles of Route Segments 1a/NNR-1, 1b, 2a, NNR-2, NNR-5, and NNR-6.

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]		
				1	2	3
Antelope bitterbrush-Indian ricegrass (*Purshia tridentata-Achnatherum hymenoides*)	2d, 3a, 3b, 3c, NNR-7, NNR-8	4	2453	X		
Big sagebrush-Bluebunch wheatgrass (*Artemisia tridentata-Pseudoroegneria spicata*)	1c, 2b, 2c, 2d, 3b, 3c, NNR-3, NNR-4, MR-1	5	942			X
Big sagebrush-Idaho fescue (*Artemisia tridentata-Festuca idahoensis*)	MR-1	1	8			X
Big sagebrush- Sandberg bluegrass (*Artemisia tridentata-Poa secunda*)	2d, 3b, 3c	2	377			X
Intermountain Basins Active and Stabilized Dune	2d, 3a, 3b, 3c, NNR-7, NNR-8	9	7193	X		
Sand dropseed- Sandberg bluegrass (*Sporobolus cryptandrus-Poa secunda*)	2d, 3b, 3c	1	286		X	
Stiff sagebrush-Sandberg bluegrass (*Artemisia rigida-Poa secunda*)	MR-1	1	8			X
Spiny hopsage-Sandberg bluegrass (*Grayia spinosa-Poa secunda*)	2d, 3c	2	24	X		
Thyme buckwheat-Sandberg bluegrass (*Eriogonum thymoides-Poa secunda*)	1c	1	370			X

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]		
				1	2	3
Winter-fat -Sandberg bluegrass (*Krascheninnikovia lanata-Poa secunda*)	2d, 3b, 3c	1	59	X		
Wyoming big sagebrush-needle and thread (*Artemisia tridentata* ssp. *wyomingensis-Hesperostipa comata*)	3a, 3b, 3c, NNR-7, NNR-8	5	3255	X		

Sources: WNHP 2011; WNHP 2015a.
[1] 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 study area are described below.

3.2.3.1 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.

3.2.3.2 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.

3.2.3.3 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.

3.2.3.4 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.

3.2.3.5 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 WSNWCB, 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.

3.2.3.6 Washington Natural Heritage Program

In 1981, Chapter 79.70 of the Revised Code of Washington established the WNHP within the WDNR. The WNHP manages data on priority species and ecosystems; those that are rare or have very limited distribution (WNHP 2015b). State status of plant species is determined by the WNHP (WNHP 2014). Factors considered include abundance, occurrence patterns, vulnerability, threats, existing protection, and taxonomic distinctness. State status definitions (WNHP 2015c) include, but are not limited to:

- Endangered: Any taxon in danger of becoming extinct or extirpated from Washington within the foreseeable future if factors contributing to its decline continue. Populations of these taxa are at critically low levels or their habitats have been degraded or depleted to a significant degree.
- Threatened: Any taxon likely to become Endangered in Washington within the foreseeable future if factors contributing to its population decline or habitat degradation or loss continue.
- Sensitive: Any taxon that is vulnerable or declining and could become Endangered or Threatened in the state without active management or removal of threats.

3.2.4 Route Segment Specific Considerations

3.2.4.1 Route Segment 1a/NNR-1

Route Segment 1a/NNR-1 parallels Sage Trail Road and an existing distribution line. Vegetation within the two-mile wide Project study area for Route Segment 1a/NNR-1 is comprised primarily of disturbed shrub-steppe dominated by annual grasses such as cheatgrass (3,292.2 acres, 67.9 percent) and agricultural lands (540.9 acres, 11.2 percent; Table 3.2-1). Approximately 6.7 percent (323.9 acres) of Route Segment 1a/NNR-1 within the Project study area consists of big sagebrush with an understory of native perennial bunchgrasses. Route Segment 1a/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 1a/NNR-1 Project study area (Table 3.2-5). The entire route segment is comprised of non-federal land (44.1 acres) and was not surveyed (Table 3.2-3). Approximately 12.7 acres of suitable habitat, 19.9 acres of marginal, and 11.4 acres of unsuitable habitat is present within this route segment’s ROW. No priority ecosystems are present within five miles of the Route Segment 1a/NNR-1 ROW.

No noxious weed species are known to occur within the Route Segment 1a/NNR-1 Project study area; however, this route segment was not surveyed due to the absence of federal or WSDOT lands (Table 3.2-2). Due to the proximity to agricultural and developed lands, many of the noxious weed species in Table 3.2-2 could be present along Route Segment 1a/NNR-1.

3.2.4.2 Route Segment 1b

Vegetation within the two-mile wide Project study area for Route Segment 1b is comprised primarily of annual grasses such as cheatgrass (8,254.1 acres, 46.2 percent) and big sagebrush with an understory of native perennial bunchgrasses (4,616.6 acres, 25.8 percent). Route Segment 1b parallels an existing

JBLM YTC fire break road. Vegetation along the fire break is disturbed and dominated by non-native species including cheatgrass and Russian thistle (*Salsola kali*). Vegetation near the fire break consists of a mosaic of sagebrush with perennial bunchgrasses and annual grasses, rabbitbrush with annual grasses, and annual grasslands comprised predominately of cheatgrass (Table 3.2-1). Several small ephemeral creeks with upland vegetation are also crossed by Route Segment 1b. Kittitas Canyon Creek is crossed by Route Segment 1b and has an aspen grove and some riparian vegetation associated with it.

WNHP data indicate that Hoover's tauschia is known to occur within one mile of Route Segment 1b. Hoover's tauschia flowers in early to late March and may not have been detectable during the May 2011 Project-specific surveys. One occurrence of Nuttall's sandwort, a special status plant species, was identified along this route segment. This occurrence consisted of approximately 10 individuals scattered throughout 34 square feet within and along the ROW. Two occurrences of snowball cactus were documented during the special status plant survey along Route Segment 1b. This species was not determined to be a special status plant until after the surveys were complete; therefore, its mapped location is based on field notes and retrospective mapping. As such, information on number of individuals and acres occupied was not collected. In addition, approximately 57 percent (138.2 acres) of federal lands within this route segment were surveyed for special status plants (Table 3.2-3). The remaining un-surveyed area consisted of 103.7 acres of inaccessible federal lands and 1.9 acres of non-federal lands. Approximately 50.3 acres of suitable habitat, 149.5 acres of marginal habitat, and 28.7 acres of unsuitable habitat is present within this route segment (Table 3.2-6). No priority ecosystems are within five miles of Route Segment 1b.

Six noxious weed species were identified on federal land during the noxious weed survey and include: burningbush, hoary cress (*Cardaria draba*), diffuse knapweed, Canada thistle (*Cirsium arvense*), perennial pepperweed (*Lepidium latifolium*), and Scotch thistle (*Onopordum acanthium*). Approximately 33.7 acres of federal land within Route Segment 1b are documented as occupied by these seven noxious weed species; however, burningbush occurrences were not mapped because of its ubiquitous and dominant nature on federal and WSDOT land within the Project study area (Table 3.2-2; Appendix B-4 Noxious Weed Reports).

3.2.4.3 Route Segment 1c

Route Segment 1c parallels Route Segment 1b for the majority of the route segment. Vegetation within the two-mile wide Project study area for Route Segment 1c is comprised primarily of non-native annual grasses such as cheatgrass (8,869.0 acres, 48.3 percent), big sagebrush with an understory of native perennial bunchgrasses (4,211.7 acres, 22.9 percent) and perennial grassland (primarily crested wheatgrass; 3,382.4 acres, 18.4 percent). A small amount of riparian vegetation is present along the margins of Kittitas Canyon Creek that is crossed by Route Segment 1c.

No special status plant species were identified during Project-specific special status plant surveys along Route Segment 1c. However, WNHP data indicate that snowball cactus intersects Route Segment 1c and Hoover's tauschia and Nuttall's sandwort are known to occur within one mile of Route Segment 1c. One hundred percent (1.7 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 1c is comprised of non-federal land (249.6 acres) and was not surveyed (Table 3.2-3). Approximately 58.7 acres of suitable habitat, 152.9 acres of marginal habitat, and 24.0 acres of unsuitable habitat is present within this route segment. Two priority ecosystems, big sagebrush-bluebunch wheatgrass and thyme buckwheat-Sandberg bluegrass, are located within five miles of this route segment.

Four noxious weed species were identified on federal land during the noxious weed survey and include: burningbush, diffuse knapweed; perennial pepperweed; and Scotch thistle. Approximately 0.6 acre of federal land within Route Segment 1c are documented as occupied by these four noxious weed species;

however, burningbush occurrences were not mapped because of its ubiquitous and dominant nature on federal land within the Project study area (Table 3.2-2; Appendix B-4 Noxious Weed Reports).

3.2.4.4 Route Segment 2a

Vegetation within the two-mile wide Project study area for Route Segment 2a is comprised primarily of non-native annual grassland (2,097.4 acres, 64.5 percent) and some big sagebrush with an understory of native perennial bunchgrasses (745.2 acres, 22.9 percent; Table 3.2-1). Route Segment 2a crosses a small unnamed creek which has some riparian vegetation present.

No special status plant species are known to occur within one mile of Route Segment 2a. The entire route segment is comprised of non-federal land (19.3 acres) and was not surveyed (Table 3.2-3). Approximately 2.0 acres of suitable habitat and 16.0 acres of marginal habitat are present within this route segment (Table 3.2-6). No priority ecosystems are known to within five miles of Route Segment 2a.

No noxious weeds are known to occur along this short route segment; however, as this route segment is comprised entirely of non-federal land, this route segment was not surveyed.

3.2.4.5 Route Segment 2b

Vegetation within the two-mile wide Project study area for Route Segment 2b is comprised primarily of big sagebrush with an understory of native perennial bunchgrasses (13,751.5 acres, 60 percent), with some non-native annual grasslands (4,515.2 acres, 19.7 percent; Table 3.2-1). Route Segment 2b crosses several ephemeral drainages with primarily upland vegetation present.

Columbia milkvetch, a special status plant species, was documented along this route segment. This occurrence was near a previously documented WNHP population and consisted of approximately 116 individuals scattered throughout 1.9 acres. Approximately 85 percent (43.0 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2b is comprised of non-federal land (266.9 acres) and was not surveyed (Table 3.2-3). Approximately 112.9 acres of suitable habitat, 144.5 acres of marginal habitat, and 40.2 acres of unsuitable habitat is present within this route segment. One priority ecosystem, big sagebrush-bluebunch wheatgrass, is located approximately 4.5 miles southeast of this route segment.

Two noxious weed species were identified on federal land, primarily along JBLM YTC’s fuel break, during the Project-specific noxious weed survey: diffuse knapweed and field bindweed (*Convolvulus arvensis*). Less than 0.1 acre of federal land within Route Segment 2b was documented as occupied by these two noxious weed species (Table 3.2-2; Appendix B-4 Noxious Weed Reports).

3.2.4.6 Route Segment 2c

Vegetation within the two-mile wide Project study area for Route Segment 2c is comprised primarily of agricultural lands (10,565.8 acres, 42.1 percent; Table 3.2-1), non-native annual grassland (7,092.4 acres, 28.3 percent), and sagebrush with perennial bunchgrasses (6,860.5 acres, 27.3 percent; Table 3.2-1). The eastern portion of Route Segment 2c is private land utilized for agricultural purposes. Several un-named ephemeral drainages with some riparian vegetation are crossed by Route Segment 2c.

No special status plant species were identified along Route Segment 2c; however, WNHP data indicate that Columbia milkvetch is known to occur within one mile of Route Segment 2c. Approximately 50 percent (0.1 acre) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2c is comprised of non-federal land (351.5 acres) and was not surveyed (Table 3.2-3). Approximately 8.5 acres of suitable habitat, 242.7 acres of marginal habitat, and 78.6 acres of unsuitable habitat is present within this route segment. One priority ecosystem, big sagebrush-bluebunch wheatgrass, is located approximately four miles southeast of this route segment.

No noxious weeds are known to occur along Route Segment 2c; however, as the majority of this route segment is comprised of non-federal land, much of this route segment was not surveyed.

3.2.4.7 Route Segment 2d

Vegetation within the two-mile wide Project study area for Route Segment 2d is comprised primarily of big sagebrush with an understory of native perennial bunchgrasses (9,824.9 acres, 90.3 percent; Table 3.2-1). Some riparian vegetation is present along the ephemeral drainages that are crossed.

Columbia milkvetch, a special status plant species, was documented along this route segment. This occurrence was near a previously documented population and consisted of approximately 110 individuals throughout 5.4 acres. WNHP data indicate that awned halfchaff sedge intersects Route Segment 2d; and that , beaked spike-rush, gray cryptantha, Hoover's desert-parsley, Nuttall's sandwort, and Piper's daisy (*Erigeron piperianus*) also occur within one mile of Route Segment 2d. One-hundred percent (19.7 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2d is comprised of non-federal land (117.3 acres) and was not surveyed (Table 3.2-3). Approximately 9.9 acres of suitable habitat, 117.7 acres of marginal habitat, and 0.8 acre of unsuitable habitat is present within this route segment (Table 3.2-6). Seven priority ecosystem types are located within five miles of Route Segment 2d: antelope bitterbrush-Indian ricegrass (*Oryzopsis hymenoides*); big sagebrush-bluebunch wheatgrass; big sagebrush-Sandberg bluegrass; Intermountain Basins Active and Stabilized Dune; sand dropseed (*Sporobolus cryptandrus*)-Sandberg bluegrass; spiny hopsage (*Grayia spinosa*)-Sandberg bluegrass; and winterfat (*Krascheninnikovia lanata*)-Sandberg bluegrass.

No noxious weeds were documented on federal lands during the Project-specific noxious weed surveys; no WSDOT land is present (Table 3.2-2; Appendix B-4 Noxious Weed Reports). The majority of this route segment is comprised entirely of non-federal land and, as such, much of this route segment was not surveyed.

3.2.4.8 Route Segment 3a

Vegetation within the two-mile wide Project study area for Route Segment 3a is comprised primarily of big sagebrush with an understory of native perennial bunchgrasses (2,119.8 acres, 96.6 percent; Table 3.2-1).

WNHP data indicate that annual sandwort, beaked spike-rush, Geyer's milkvetch (*Astragalus geyeri*), gray cryptantha, and Great Basin gilia (*Gilia malior*) are known to occur within one mile of Route Segment 3a. This short-route segment is comprised entirely of non-federal land (3.3 acres) and was not surveyed (Table 3.2-3). Approximately 2.2 acres of suitable habitat and 0.8 acre of unsuitable habitat is present within this route segment (Table 3.2-6). Three priority ecosystem types are located within five miles of Route Segment 3a: antelope bitterbrush-Indian ricegrass; Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*)-needle and thread grass; and Intermountain Basins Active and Stabilized Dune.

No noxious weeds are known to occur along this short route segment; however, as this route segment is comprised entirely of non-federal land, surveys were not conducted.

3.2.4.9 Route Segment 3b

Vegetation within the two-mile wide Project study area for Route Segment 3b is comprised primarily of big sagebrush with an understory of native perennial bunchgrasses (16,272.4 acres, 55.0 percent; Table 3.2-1). Route Segment 3b parallels the western side of the Columbia River and Priest Rapids Lake for approximately 12 miles. A section of this route segment also crosses basalt cliffs. This route also parallels several orchards and a watered poplar wind row. Route Segment 3b crosses the Columbia River below Wanapum Dam. This route would cross five creeks as well as several un-named ephemeral drainages that are seasonally moist and with little or no riparian vegetation present. Some riparian vegetation is present along the portions of the Columbia River that occur within the Project study area.

Three special status plant species were documented along this route segment: caespitose evening-primrose, Columbia milkvetch, and Nuttall's sandwort. The occurrence of caespitose evening-primrose was located within a previously documented location and consisted of approximately 75 individuals scattered throughout 0.14 acre within and along the ROW. The occurrence of Columbia milkvetch contained approximately 158 individuals within 5.4 acres and was located near previously documented populations. The occurrence of Nuttall's sandwort along Route Segment 3b consisted of one individual and was located near previously documented populations. In addition to the three special status species documented, WNHP data indicate annual sandwort, awned halfchaff sedge, beaked spike-rush, bristle-flowered collomia, gray cryptantha, Hoover's desert-parsley, and Kalm's lobelia intersect Route Segment 3b.

GeoBOB and WNHP data indicate that the following species are also within one mile of Route Segment 3b: beaked cryptantha, dwarf evening-primrose, Geyer's milkvetch, grand redstem (*Ammannia robusta*), Great Basin gilia, naked-stemmed evening-primrose (*Camissonia scapoidea*), Piper's daisy, snowball cactus, white eatonella (*Eatonella nivea*), and Wormskiold's northern wormwood. Approximately 36 percent (61.1 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 3b is comprised of non-federal land (250.6 acres) and was not surveyed (Table 3.2-3). Approximately 109.9 acres of suitable habitat, 157.6 acres of marginal habitat, and 128.2 acres of unsuitable habitat are present within this route segment (Table 3.2-6). Seven priority ecosystems are located with five miles of Route Segment 3b: Antelope bitterbrush-Indian ricegrass; big sagebrush-bluebunch wheatgrass; big sagebrush-Sandberg bluegrass; intermountain Basins Active and Stabilized Dune; Sand dropseed-Sandberg bluegrass; winterfat-Sandberg bluegrass; and Wyoming big sagebrush-needle and thread grass.

Eight noxious weed species were identified on federal land during the Project-specific noxious weed survey and include: burningbush, common St. Johnswort (*Hypericum perforatum*), Canada thistle, diffuse knapweed, field bindweed, Russian knapweed, Russian olive, and Scotch thistle. Approximately 4.1 acres of federal land within Route Segment 3b are documented as occupied by these eight noxious weed species; however, burningbush occurrences were not mapped because of its ubiquitous and dominant nature on federal land within the Project study area. Russian olive was not classified as noxious until after Project-specific surveys were complete (Table 3.2-2; Appendix B-4 Noxious Weed Report).

3.2.4.10 Route Segment 3c

Vegetation within the two-mile wide Project study area for Route Segment 3c is comprised primarily of big sagebrush with an understory of native perennial bunchgrasses (13,936.3 acres, 41.5 percent) and agriculture (11,180.7acres, 33.3 percent; Table 3.2-1). The southern portion of this route crosses agricultural croplands, including orchards, vineyards, and row crops. Route Segment 3c parallels the Columbia River below Priest Rapids Dam for approximately three miles. This route segment would also cross the Columbia River approximately five miles below Priest Rapids Dam. Some riparian vegetation is present along the margin of the Columbia River. Route Segment 3c also crosses Lower Crab Creek, which has some emergent riparian vegetation associated with it. Several ephemeral drainages with little or no riparian vegetation are also crossed by this segment. Riparian habitats along this route segment were typically dominated by non-native species, including noxious weeds.

No special status plant species were identified during special status plant surveys along this route segment. However, WNHP data indicate that Route Segment 3c intersects occurrences of awned halfchaff sedge, Columbia milkvetch, gray cryptantha, hairy bugseed, and Hoover's desert-parsley. In addition, the following species are within one mile of Route Segment 3c: annual sandwort, beaked spike-rush, caespitose evening-primrose, Columbia cress (*Rorippa columbiae*), fuzzytongue penstemon (*Penstemon eriantherus*), Geyer's milkvetch, Great Basin gilia, Nuttall's sandwort, Piper's daisy, Snake River cryptantha (*Cryptantha spiculifera*), Wanapum crazyweed (*Oxytropis campestris* var. *wanapum*), and Wormskiold's northern wormwood. Approximately 99 percent (179.8 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 3c is comprised of non-federal land (308.7 acres) and was not surveyed (Table 3.2-3). Approximately 128.3 acres of suitable habitat, 167.2 acres of marginal habitat and 163.5 acres of unsuitable habitat is present within this route segment (Table 3.2-6). Eight priority ecosystems are located within five miles of Route Segment 3c: Antelope bitterbrush-Indian ricegrass; big sagebrush-bluebunch wheatgrass; big sagebrush-Sandberg bluegrass; Intermountain Basins Active and Stabilized Dune; sand dropseed-Sandberg bluegrass; spiny hopsage-Sandberg bluegrass; winterfat-Sandberg bluegrass; and Wyoming big sagebrush-needle and thread grass.

Route Segment 3c has the most noxious weeds that were documented on federal land during the Project-specific noxious weed survey. Fifteen noxious weed species were identified on federal land during the noxious weed survey and include: burningbush, diffuse knapweed, rush skeletonweed (*Chondrilla juncea*), Canada thistle, horseweed (*Conyza canadensis*), Russian olive, common catsear (*Hypochaeris radicata*), perennial pepperweed, Scotch thistle, reed canarygrass (*Phalaris arundinacea*), common reed, cereal rye (*Secale cereale*), purple loosestrife, groundsel (*Senecio vulgaris*), and puncturevine (*Tribulus terrestris*). Approximately 130.0 acres of federal land within Route Segment 3c are documented as occupied by these noxious weed species; however, burningbush occurrences were not mapped because of its ubiquitous and dominant nature on federal land within the Project study area and horseweed, common catsear, groundsel, puncturevine, and Russian olive were not determined to be noxious until after surveys were complete (Table 3.2-2; Appendix B-4 Noxious Weed Reports).

3.2.4.11 Route Segment NNR-2

Route Segment NNR-2 parallels an existing JBLM YTC fire break road, existing roads, and an existing transmission line (Bonneville Power Administration's Ellensburg-Moxee No.1 115 kV). The majority of the Route Segment NNR-2 Project study area is comprised of annual grasses (3,558.6 acres, 47.9 percent) and sagebrush/perennial grassland (1,780.7 acres, 24.0 percent; Table 3.2-1). Approximately 54.6 acres of rabbitbrush/annual grassland is present within one mile of Route Segment NNR-2, occurring along the JBLM YTC firebreak. 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 and reed canarygrass.

No special status species were identified during the special status plant surveys. WNHP data indicate that basalt daisy, Hoover's desert-parsley, and pauper milkvetch are known to occur within one mile of Route Segment NNR-2 (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. 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 study area (Table 3.2-6). The majority of the Route Segment NNR-2 ROW is comprised of federal lands and WSDOT lands, with approximately 88.1 percent (79.7 acres) of this route segment surveyed for special status plants (Table 3.2-3). Approximately 20.8 acres of suitable habitat, 37.4 acres of marginal, and 34.4 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.

Nine noxious weed species were identified and mapped on federal land during the Project-specific noxious weed survey and include: Russian knapweed, burningbush, diffuse knapweed, Canada thistle, field bindweed, horseweed, Dalmatian toadflax (*Linaria dalmatica* ssp. *dalmatica*), purple loosestrife, and reed canarygrass. Approximately 13.9 acres of federal and WSDOT land within the Route Segment

NNR-2 ROW are documented as occupied by these nine noxious weed species. Burningbush was also present, but not mapped because of its abundance and frequency of occurrence on federal land within the Route Segment NNR-2 ROW (Table 3.2-2; Appendix B-4 - Noxious Weed Reports).

3.2.4.12 Route Segment NNR-3

Route Segment NNR-3 crosses WSDOT, BLM, and private land. Approximately 0.9 mile of the Project study area 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 study area consists primarily of annual grasses (6,104.2 acres, 44.1 percent) and sagebrush with a perennial grass understory (6,984.9 acres, 50.4 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 study area appears to be intermittent.

WNHP data indicate that five special status species (basalt daisy, Hoover's desert-parsley, Hoover's tauschia, pauper milkvetch, and snowball cactus) are known to occur within the Route Segment NNR-3 Project study area (Table 3.2-5). Special status plant surveys conducted for the proposed Project documented Hoover's desert-parsley, pauper milkvetch, and snowball cactus within Route Segment NNR-3. 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 Route Segment NNR-3 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. WNHP data indicate 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. 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. The snowball cactus occurrence consisted of approximately 34 individuals scattered across 4.6 acres, of which 0.9 acre is located within the proposed ROW. Forty-three percent of federal and WSDOT 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 103.9 acres of suitable habitat, 63.9 acres of marginal, and 1.2 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 WSDOT land during the Project-specific noxious weed survey and include: Russian knapweed and diffuse knapweed. Approximately 0.1 acre of federal and WSDOT land within the Route Segment NNR-3 ROW has these two noxious weed species present (Table 3.2-2; Appendix B-4 - Noxious Weed Reports).

3.2.4.13 Route Segment NNR-4

Route Segment NNR-4 is located on JBLM YTC, WSDOT, and private land. 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 (5,341.9 acres; 68.6 percent; Table 3.2-1). Approximately 16.9 percent of vegetation within the Route Segment NNR-4 Project study area consists of annual grassland (1,317.0 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 the Route Segment NNR-4 Project study 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 45.0 acres of suitable habitat, 35.3 acres of marginal habitat, and 1.5 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 during the Project-specific noxious weed survey. Diffuse knapweed occurs on approximately 11.8 acres of federal and WSDOT land within Route Segment NNR-4's ROW. Burningbush was not mapped because of its abundance and frequency of occurrence on federal land within the Route Segment NNR-4 ROW (Table 3.2-2; Appendix B-4 - Noxious Weed Reports).

3.2.4.14 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 study area consists of the following cover types: sagebrush/perennial grassland (2,850.3 acres, 67.0 percent), agriculture (833.1 acres, 19.6 percent), and forbs (474.9 acres, 11.2 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 study area and contains no riparian vegetation.

No special status plant species are known to occur along Route Segment NNR-5, although WNHP data indicate snowball cactus occurs within one mile (Table 3.2-5). Approximately 91.5 percent (29.6 acres) of federal and WSDOT lands within this route segment's ROW were surveyed for special status plants (Table 3.2-3). Approximately 30.6 acres of suitable habitat, 0.0 acres of marginal habitat, and 2.2 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 WSDOT land during the noxious weed survey and include: hoary cress, spiny plumeless thistle (*Carduus acanthoides*), diffuse knapweed, Canada thistle, bull thistle (*Cirsium vulgare*), common St. Johnswort, and sulphur cinquefoil (*Potentilla recta*). Approximately 1.1 acres of federal and WSDOT land within Route Segment NNR-5's ROW has these seven noxious weed species present. Burningbush was also present but not mapped because of its 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).

3.2.4.15 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 study area consists primarily of sagebrush/perennial grassland cover type (7,965.5 acres, 77.7 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 1,206.6 acres (11.8 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.

WNHP data indicate that Suksdorf's monkeyflower intersects Route Segment NNR-6 and that beaked cryptantha, caespitose evening-primrose, coyote tobacco (*Nicotiana attenuata*), longsepal globemallow (*Iliamna longisepala*), and snowball cactus all are known to occur within one mile of Route Segment NNR-6 (Table 3.2-5). Route Segment NNR-6's ROW is comprised entirely of federal lands; however, 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 95.7 acres of suitable habitat, 21.9 acres of marginal habitat, and 0.0 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, the entirety of this route segment was not surveyed due to route adjustments made after noxious weed surveys occurred.

3.2.4.16 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 study area consists of the sagebrush/perennial grassland cover type (11,931.4 acres, 95.3 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.

Eleven special status species are known to occur within the Route Segment NNR-7 Project study area. WNHP data indicate Route Segment NNR-7 intersects occurrences of beaked cryptantha, bristle-flowered collomia, caespitose evening-primrose, dwarf evening-primrose, gray cryptantha, miner's candle, and Suksdorf's monkeyflower. In addition, WNHP data indicate that Columbia milkvetch, naked-stemmed evening-primrose, white eatonella, and snowball cactus 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 (Table 3.2-5). Approximately 1.6 percent (2.4 acres) of federal and WSDOT lands within this route segment's ROW were surveyed for special status plants (Table 3.2-3). Approximately 149.9 acres of suitable habitat, 0.0 acres of marginal habitat, and 0.1 acre 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 Route Segment NNR-7: Antelope bitterbrush-Indian ricegrass, Intermountain Basins Active and Stabilized Dune, and Wyoming big sagebrush-needle and thread grass (Table 3.2-7).

Two noxious weed species are known occur in Route Segment NNR-7, but are not mapped. Burningbush was present but not mapped because of its abundance and frequency of occurrence within the Route Segment NNR-7 ROW. In addition, a portion of this route segment was not surveyed due to route adjustments made after noxious weed surveys occurred (Table 3.2-2; Appendix B-4 - Noxious Weed Reports).

3.2.4.17 Route Segment NNR-8

Route Segment NNR-8 starts on BLM managed land and crosses Bureau of Reclamation (Reclamation), Grant County Public Utility District land, and WSDOT ROW. This short route segment crosses the Columbia River. Vegetation within one mile of this route segment is comprised primarily of sagebrush/perennial grassland (4,450.6 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 study area. Some riparian vegetation is present along the margins of the Columbia River.

Based on WNHP data, annual sandwort, dwarf evening-primrose, and gray cryptantha intersect Route Segment NNR-8. In addition, WNHP data indicate beaked spike-rush, bristle-flowered collomia, caespitose evening-primrose, Columbia milkvetch, Geyer’s milkvetch, Great Basin gilia, naked-stemmed evening-primrose, and white eatonella are known to occur within one mile of Route Segment NNR-8 (Table 3.2-5). None of these species were identified in the special status plant survey. Ninety-three percent of federal lands (7.1 acres of BLM-managed land and 23.2 acres of Reclamation land; no WSDOT land present) 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 26.3 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). Three priority ecosystem types are located within five miles of Route Segment NNR-8: Antelope bitterbrush-Indian ricegrass, Intermountain Basins Active and Stabilized Dune, and Wyoming big sagebrush-needle and thread grass (Table 3.2-7).

Two noxious weed species, diffuse knapweed and field bindweed, were identified and mapped in Route Segment NNR-8’s ROW. These two weed species comprise approximately 0.1 acre of the route segment’s ROW. Burningbush was also present but not mapped because of its abundance and frequency of occurrence on federal land within the Route Segment NNR-8 ROW (Table 3.2-2; Appendix B-4 - Noxious Weed Reports).

3.2.4.18 Route Segment MR-1

Route Segment MR-1 crosses private, JBLM YTC, DNR, and WSDOT land. Vegetation within one mile of this route segment is comprised of a mixture of sagebrush/perennial grassland (6,488.4 acres, 38.0 percent), annual grassland (5,627.7 acres, 32.9 percent), and agriculture (3,867.8 acres. 22.6 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.

WNHP data indicate snowball cactus occurs within one mile of Route Segment MR-1; however, no special status plant species were identified during the special status plant surveys. Approximately 0.4% (0.5 acre) of federal and WSDOT 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 79.4 acres of suitable habitat, 88.8 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 following the completion of noxious weed surveys and, as such, no noxious weed surveys were conducted for this route segment’s ROW.

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3.3 WILDLIFE AND SPECIAL STATUS WILDLIFE SPECIES

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to wildlife and special status wildlife species along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and U.S. Bureau of Land Management (BLM) has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

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 general wildlife and special status animal species and habitat, the Project study area was defined as a two-mile-wide corridor (i.e., a one-mile buffer of route segment centerlines of each Action Alternative). However, where appropriate, the Project study area was expanded to address potential impacts to species based on known ranges and potential to occur within the Project area. The Project study area was expanded to address impacts to Greater Sage-Grouse (*Centrocercus urophasianus*; Sage-Grouse) based on input from Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) and USFWS. For Sage-Grouse, the Project study area is defined as an eight-mile wide corridor surrounding each Action Alternative (i.e., a four-mile buffer of the route segment centerline. 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 Action Alternative.

Special status wildlife species that are either documented or have a reasonable likelihood to occur within the Project study area are discussed below. Locations of Priority Habitats and Species (PHS) documented near the Project study area by the Washington Department of Fish and Wildlife (WDFW; WDFW 2014) are shown on the Sensitive Wildlife Resources Map in Appendix A and descriptions of those occurrences are provided in the following sections.

3.3.1 Data Sources

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

- U.S. Department of the Army (Army), FEIS for Fort Lewis Army Growth and Force Structure Realignment, July 2010.
- Hanford Reach National Monument Final Comprehensive Conservation Plan and Environmental Impact Statement, August 2008 (USFWS 2008).

- Terrestrial Habitat Assessment Priest Rapids Project Federal Energy Regulatory Commission (FERC) 2114 Final Report, January 2003.
- Biological Assessment for Bonneville Power Administration (BPA) Schultz-Hanford Area Transmission Line, September 2002 (BPA 2002).
- 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 for the Proposed Vantage to Pomona 230 kilovolt (kV) Transmission Line Project (surveys conducted in 2010, 2011, and 2013; Appendix B-1).
- Digital element occurrence records for PHS were obtained from WDFW in June 2014.
- Wildlife protection areas and Sage-Grouse telemetry and lek data were obtained from JBLM YTC.
- BLM geographic information system data for area habitats and special status species observations.
- Sage-Grouse Habitat Assessment Reports (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 study area was compiled utilizing occurrence data from BLM, JBLM YTC, WDFW, and USFWS; the federal threatened and endangered species list for each county located within the Project study 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 Project study 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 78 focal species. These species are discussed in Sections 3.3.3.2, Federally Threatened and Endangered Species; 3.3.3.3 Greater Sage-Grouse; and 3.3.3.4, Species of Concern and State-Listed Species and are presented in Tables 3.3-3 and 3.3-7.

3.3.2 Current Conditions and Trends, Regional Overview

3.3.2.1 Species and Habitats - General

The vegetative communities associated with the Project study 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 for the Project study area are discussed below and presented in Table 3.3-1 and Table 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 study 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).

Table 3.3-1 Representative Wildlife Species and Associated Habitat Types Present within the Project Study Area

CLASS OF SPECIES	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	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	canyon wren rock wren chukar ferruginous hawk golden eagle great horned owl prairie falcon	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* sagebrush vole*	northern pocket gopher yellow-bellied marmot	big brown bat bighorn sheep bushy-tailed woodrat coyote fringed myotis little brown bat mule deer western small-footed bat yellow-bellied marmot	raccoon porcupine mink beaver montane vole
Reptiles and Amphibians	pygmy short-horned lizard sagebrush lizard*	racer	gopher snake night snake racer sagebrush lizard* striped whipsnake western rattlesnake	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 study 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

Over half of the Project study 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 Project route segments range from approximately 500 to 3,350 feet above mean sea level. A summary of the dominant landcover types is shown in Table 3.3-2. The most frequently occurring habitat types in the Project study area include sagebrush/perennial grassland (87,696.5 acres; 48.7 percent), annual grassland (36,798.6 acres; 20.4 percent), and agricultural/pasture (32,033.1 acres; 17.8 percent). The Project study area shrub-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. Sagebrush/perennial grassland occurs throughout the entire Project study area. Annual grassland occurs in large patches along the western half of each of the Action Alternatives, and also southeast of the Vantage Substation. Agricultural areas predominately occur east of the Columbia River and south of the Saddle Mountains (Route Segment 3a), along Badger Pocket (Route Segments Manastash Ridge (MR) 1 and NNR-5), near the Pomona Heights Substation (Route Segments 1a/NNR-1 and NNR-2), and south of JBLM-YTC (Route Segments 1c and 2c). Perennial grassland occurs in small patches throughout, but predominates along the southern Alternatives A-H (Route Segments 1b, 1c, 2b, and 3b).

Very few wetlands and riparian areas occur within the Project study area. The majority of riparian areas within the Project study 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 study area, refer to Section 3.14 - Water Resources and the Water Resources and Wetlands Map in Appendix A.

Shrub-Steppe

In the Project study area, shrub-steppe habitat consists primarily of sagebrush-steppe with big sagebrush (*Artemisia tridentata*) and stiff sagebrush (*Artemisia rigida*). Stiff sagebrush typically occurs on rocky shallow soils with Sandberg bluegrass (*Poa sandbergii*; JBLM YTC 2002). Sagebrush-steppe with a perennial grass understory is the most common vegetation cover type within the Project study area, covering 48.7 percent (87,696.5 acres) of the Project study area. Sagebrush shrublands with an annual grass understory comprise 0.4 percent of the Project study area (665.4 acres). Other shrub-steppe habitat types include rabbitbrush (*Chrysothamnus viscidiflorus* and *Ericameria nauseosa*)/annual grassland (469.8 acres; 0.3%) and bitterbrush (*Purshia tridentata*)/perennial grassland (5.2 acres; <0.1%)

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 (*Artemisiospiza nevadensis*), Brewer's sparrow (*Spizella breweri*), sage thrasher (*Oreoscoptes montanus),* 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 and other human land uses or to 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 (*Buteo regalis*), 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 study area are typically dominated by annual grasses such as cheatgrass (*Bromus tectorum*). Annual grasslands cover approximately 20 percent of the Project study area (36,799 acres). Most native shrub-steppe birds either do not use cheatgrass or their use occurs 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 (*Numenius americanus*) and burrowing owl (*Athene cunicularia*; Rich et al. 2005).

Table 3.3-2 Summary of Dominant Land Cover Types (Acres) Within the Project Study Area 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			TOTAL
	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	Trees	Aspen	Agriculture	Developed / Disturbed / Fire break	Noxious Weeds	
1a/NNR-1	0.0	52.8	0.0	323.9	3,292.2	0.0	142.1	0.0	1.1	459.9	12.4	0.8	0.0	540.9	23.1	0.0	4,849.2
1b	0.0	187.0	5.4	4,616.6	8,254.1	461.0	3,671.2	0.0	13.7	0.0	61.0	0.3	1.1	495.4	100.9	0.0	17,867.7
1c	0.0	187.0	5.4	4,211.7	8,869.0	420.8	3,382.4	0.0	13.7	0.0	60.2	0.3	1.1	1,107.5	99.8	0.0	18,358.9
2a	0.0	42.8	0.0	745.2	2,097.4	0.0	184.0	0.0	3.5	0.0	41.4	0.0	0.0	132.7	4.9	0.0	3,251.9
2b	0.0	123.7	0.0	13,751.5	4,515.2	0.0	1,152.5	1.2	11.2	0.0	0.0	0.0	0.0	3,355.0	20.8	0.0	22,931.1
2c	0.0	139.9	0.4	6,860.5	7,092.4	0.0	412.1	0.3	14.4	0.2	0.0	0.0	0.0	10,565.8	17.3	0.0	25,103.2
2d	0.0	2.0	0.0	9,824.9	197.8	0.0	503.8	5.4	4.5	290.3	0.3	0.2	0.0	38.0	9.1	0.0	10,876.4
3a	0.0	2.1	2.0	2,119.8	39.9	0.0	2.2	0.0	0.0	25.5	0.0	0.0	0.0	0.0	2.0	0.0	2,193.5
3b	0.0	20.0	5.9	16,272.4	597.6	0.0	3,876.9	20.5	1.9	7,367.8	414.0	20.9	0.0	884.6	108.4	0.0	29,591.0
3c	0.0	94.0	614.1	13,936.3	6,519.3	0.0	2.9	8.3	0.3	953.6	172.8	0.2	0.0	11,180.7	74.7	0.0	33,557.3
NNR-2	0.0	54.6	15.8	1,780.7	3,558.6	0.0	276.6	3.7	1.7	0.3	0.6	3.4	0.0	1,638.8	85.2	2.3	7,422.2
NNR-3	0.0	0.0	20.4	6,984.9	6,104.2	0.0	60.8	10.1	2.9	0.2	57.9	0.0	0.0	602.4	6.9	1.7	13,852.4
NNR-4	5.2	0.0	17.3	5,341.9	1,317.0	212.8	301.0	1.0	2.5	0.0	0.1	0.0	0.0	579.1	10.6	0.0	7,788.5
NNR-5	5.2	0.0	0.0	2,850.3	19.8	474.9	57.8	0.0	1.3	0.0	0.0	0.0	0.0	833.1	11.7	0.0	4,254.1
NNR-6	0.0	0.0	3.2	7,965.5	13.7	1,206.6	490.0	4.7	4.5	0.0	20.4	0.0	0.0	536.6	6.4	0.0	10,251.4
NNR-7	0.0	0.5	0.0	11,931.4	0.0	59.5	75.6	0.2	13.7	409.2	4.7	0.0	0.0	0.0	28.7	0.0	12,523.6
NNR-8	0.0	10.2	2.0	4,450.6	184.9	0.0	19.7	0.2	0.9	647.5	0.5	0.0	0.0	0.0	10.3	0.0	5,326.8
MR-1	5.2	0.0	3.6	6,488.4	5,627.7	130.0	236.2	1.0	3.9	0.0	0.1	0.0	0.0	3,867.8	721.3	0.0	17,085.2
Overall	5.2	469.8	665.4	87,696.5	36,798.6	2,011.7	10,022.1	39.8	57.6	8,498.6	743.0	24.8	1.1	32,033.1	1,148.9	2.3	180,218.2
Percent	0.0%	0.3%	0.4%	48.7%	20.4%	1.1%	5.6%	0.0%	0.0%	4.7%	0.4%	0.0%	0.0%	17.8%	0.6%	0.0%	100.0%

Notes: Each route segment's Project study area (1-mile buffer around each route segment) overlaps with the adjacent route segments and, thus, the overall acreage within the Project study area is smaller than the sum of the route segment Project study areas. This was done to allow for a discrete discussion of the affected environment and comparison of each route segment. Refer to section 3.2 Vegetation for a discussion of each land cover type and the Vegetation and Fire History Map in Appendix A.
Numbers are rounded and may not sum exactly.

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Within the Project study area, perennial grasslands are less common (5.6 percent; 10,022 acres) and are dominated by perennial bunchgrasses such as crested wheatgrass (*Agropyron cristatum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass, 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 (*Pooecetes gramineus),* lark sparrow (*Chondestes grammacus),* loggerhead shrike (*Lanius ludovicianus),* common nighthawk (*Chordeiles minor*), and northern pocket gopher (*Thomomys talpoides*). 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 39.8 acres (less than 0.1 percent) within the Project study 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 (*Canis latrans*) are likely to forage in rock talus habitats due to the occurrence of small mammals. Bighorn sheep (*Ovis canadensis*) and mule deer (*Odocoileus hemionus*) are also likely to use these habitats. Sagebrush lizard, western diamondback rattlesnake (*Crotalus viridis*), night snake (*Hypsiglena torquata),* 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 habitats are presented in Table 3.3-1.

Riparian and Wetland Communities and Trees
Riparian and wetland communities comprise a small portion of the Project study area (743 acres; 0.4 percent), but these communities are characterized by higher productivity and greater habitat and species diversity compared to adjacent uplands (Knutson and Naef 1997). Except for trees on irrigated land (e.g., planted windbreaks adjacent to orchards) and around residential areas, trees in the Project study area are limited. There is a single 1.1-acre patch of quaking aspen trees (*Populus tremuloides)* in the Project study area along the southern Action Alternatives A-H at Route Segments 1b and 1c. Several non-native trees are established in isolated patches within the Project study area (24.8 acres). These include Russian olive (*Elaeagnus angustifolia*), Siberian elm (*Ulmus pumila*), and white mulberry (*Morus alba*). Although introduced to this area, these trees do provide suitable nest sites, food, and cover for a suite of wildlife species (Grant 1997; Swearingen 2009). Riparian, wetland, and tree habitats are used by a variety of species including bald eagle (*Haliaeetus leucocephalus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), great horned owl (*Bubo virginianus*), 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 study 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). The Yakima River (Route Segment NNR-3), Burbank Creek (Route Segment NNR-3), and Foster Creek (Route Segment NNR-6) support wooded riparian vegetation, primarily dominated by black cottonwood (*Populus trichocarpa*) and willow (*Salix* sp.). The largest riparian areas occur along the Columbia River and Lower Crab Creek near the southern Action Alternatives A-H (Route Segments 3b and 3c); much of the Crab Creek riparian area is bordered by pastureland and disturbed, often grazed, shrub-steppe habitats. 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 study area, shrub-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 study area (Route Segments NNR-7 and NNR-8), one additional 230 kV transmission line (Puget Sound Energy Wanapum-Wind Ridge) and two 500 kV transmission lines (BPA Schultz-Wautoma No.1 and BPA Vantage-Schultz No.1) exist within one mile of the proposed NNR Alternative. Several of the route segments of the southern Action Alternatives A-H also parallel or are in close proximity to existing transmission lines. Route Segments 1a/NNR-1, 2c, and 3c are each within 0.25 mile of existing transmission lines for approximately half of their lengths. Transmission lines within one mile of Alternatives A-H include: the Pacific Power Pomona-Wanapum 230 kV line along Route Segment 1a/NNR-1, the Pacific Power Union Gap-Midway 230 kV line paralleling portions of Route Segments 2c and 3c, the BPA Hanford-Vantage No. 1 500 kV line paralleling a portion of Route Segment 3c, the BPA Schultz-Wautoma 500 kV line along Route Segments 3b and 3c. Agricultural areas predominately occur east of the Columbia River and south of the Saddle Mountains (Route Segment 3a), along Badger Pocket (Route Segments MR-1 and NNR-5), near the Pomona Heights Substation (Route Segments 1a/NNR-1 and NNR-2), and south of JBLM-YTC (Route Segments 1c and 2c). Other prominent infrastructure and disturbance within the Project study 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), communication towers, canals, and fire breaks. Generally speaking, infrastructure and disturbance is heaviest at the southwestern portions of the Project study area (1a/NNR-1, NNR-2, 1c, and 1b) and lightest along NNR-6, 2b, and 3b. Locations of existing infrastructure and disturbance are discussed in Section 3.3.4 (Route Segment Considerations).

Wildfires have occurred and will continue to occur within and near the eight-mile wide Project study area, the majority of which have been 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, use of dip tanks for aerial fire suppression, and maintenance of fire breaks (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, Bureau of Reclamation (Reclamation) 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.

3.3.2.2 Federally Threatened, Endangered and Candidate Species

Five species (one with two Distinct Population Segments [DPSs]) listed as endangered, threatened, or candidate occur or are likely to occur within the Project study area (USFWS 2015a; Table 3.3-3). More detail on these species is provided in the following sections.

table 3.3-3 Federally Listed Species that Occur or Potentially Occur Within the Project Study 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	Trees	Aspen	Agriculture	Developed / Disturbed / Fire break	Noxious Weeds
Bull trout *(Salvelinus confluentus)*	T, WC, CH	Present	2d, 3b, 3c, 1a/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	2d, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Gray wolf *(Canis lupus)*	E, WE	Possible	1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	-	-	-
Steelhead - Upper Columbia River *(Oncorhynchus mykiss)*	T, WC, CH	Present	2d, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Steelhead - Middle Columbia River *(Oncorhynchus mykiss)*	T, WC, CH	Present	1a/NNR-1, NNR-3	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Yellow-billed cuckoo (*Coccyzus americanus*)	T, WC	Very Unlikely	1a/NNR-1,	-	-	-	-	-	-	-	-	-	-	M	-	-	-	-	-
Columbia Basin pygmy rabbit (*Brachylagus idahoensis*)	E, WE	Very Unlikely	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	M	S	-	-	-	-	-	-	-	-	-	-	-	-
Marbled murrelet (*Brachyramphus marmoratus*)	T, WT	Very Unlikely		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canada lynx (*Lynx canadensis*)	T, WT	Very Unlikely		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sources: WDFW 2015a, BLM 2015a, National Oceanic and Atmospheric Administration (NOAA) 2005, NOAA 2013, USFWS 2010b USFWS 2015a.

[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] Occurrence: Present – species documented within the Project study 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 study 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; - = cover type does not provide suitable habitat for this species.

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Bull Trout

Bull trout (*Salvelinus confluentus*) was listed as a threatened species under the ESA in June 1998 (USFWS 1998) and is a candidate for state listing by the WDFW (2015a). 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). Bull trout require cold water to survive, so they are seldom found in waters where temperatures exceed 59 to 64 degrees Fahrenheit (˚F). Bull trout also require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors (USFWS 2011a).

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 study area. Aside from the Yakima and Columbia Rivers, bull trout are not known to occur in streams within the Project study area (AECOM Environmental 2010; JBLM YTC 2002). The results of a stream temperature monitoring study indicate that, within the Project study area, Johnson, Lmuma, and Selah Creeks were potentially suitable for bull trout use, but temperatures were generally much higher than preferred spawning temperatures. 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 study 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 from April to September and spawn from September to mid-October (WDFW 2000; Whitesel et al. 2004). At the time bull trout enter tributary streams north of the Project study area, temperatures in the Columbia River varied from 42 to 67˚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).

Chinook Salmon (Upper Columbia River Spring Run)

The Upper Columbia River Spring Run Chinook salmon (*Oncorhynchus tshawytscha*) 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 from 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 from Rock Island Dam, including the reach of the Columbia River within the Project study area. This corridor, which connects the ESU with the Pacific Ocean is used by rearing and 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 (National Oceanic and Atmospheric Administration [NOAA] 2005). In the Project study area, upriver migration starts in early May and extends through August, with spawning occurring upriver of the Project study area from late August to mid-September. 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 study 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 (*Canis lupus*) received listing as federally endangered in March 1967. The Project study area borders the DPS of gray wolves that was delisted in May 2011; however, gray wolves are listed as endangered within the Project study area (USFWS 2011b).

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 mule deer, elk (*Cervus canadensis*), and moose (*Alces alces*), but will also prey on smaller animals, scavenge carrion, and, occasionally, eat fish and vegetation (WDFW 2011a).

As of March 2015, a minimum of 68 wolves in 16 confirmed packs are present within Washington. The two closest confirmed wolf packs are located in the Cascade Mountains northwest and northeast of Ellensburg, approximately 25 to 30 miles from the Project study area (WDFW 2015b). Potential suitable habitat exists in the Project study area.

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

The Project study area overlaps with the Middle Columbia River steelhead (*Oncorhynchus mykiss*) DPS and the Upper Columbia River steelhead DPS; both are currently listed as threatened under the ESA (NOAA 2015). 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 1a/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 study area, the Columbia River and lower Crab Creek are designated critical habitat. Critical habitat is crossed by Route Segments 3b, 3c, and NNR-8, and within one mile of Route Segments 2d, 3a, and NNR-7. 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).

Yellow-Billed Cuckoo

Yellow-billed cuckoo (*Coccyzus americanus*) was listed as threatened under the ESA in November 2014 (USFWS 2014b). In western North America, yellow-billed cuckoo inhabit large continuous riparian zones with cottonwoods (*Populus* sp.) and willows. Though once abundant in portions of Washington, in areas along wooded rivers in eastern Washington and along the lower Columbia River near present-day Vancouver, they were rare in the state by about 1940. Breeding has not been documented in Washington since 1934 (WDFW 2012b). Vagrants are rarely sighted in Washington (WDFW 2012b, ebird 2015). None of the Action Alternatives cross potential yellow-billed cuckoo habitat, but potential habitat does exist within one mile of Route Segment 1a/NNR-1 along the Yakima River. Therefore, it is not anticipated that yellow-billed cuckoo will be impacted by the Project.

Columbia Basin Pygmy Rabbit

The Columbia Basin DPS of the pygmy rabbit (*Brachylagus idahoensis*) was listed as endangered under the ESA in 2001 (USFWS 2001). Recovery objectives for the species are to increase pygmy rabbit numbers and distribution and manage habitat for long-term protection of features that support pygmy rabbits. Pygmy rabbits are the smallest rabbit species in North America. They inhabit deep, loamy soils in sagebrush-steppe, where they dig their own burrows and depend heavily on sagebrush for food (WDFW 2015c). Pygmy rabbits have small home ranges and the maximum dispersal distance recorded in Washington is five miles (WDFW 2012b).

The Columbia Basin population of pygmy rabbits has historically been restricted to a small portion of central Washington. By 2001, the Columbia Basin DPS was represented by just one small known population, located at Sagebrush Flat State Wildlife Area in Grant County, approximately 40 miles north of the Project (Wisniewski and Becker 2014). Captive breeding and reintroduction efforts have been ongoing since 2001, with recurring releases into the Sagebrush Flat population. In 2015, introduction began into a second population in Grant County, approximately 30 miles north of the Project (WDFW 2015c). In 2013, surveys of historical pygmy rabbit areas outside of Sagebrush Flat were conducted and no sign of pygmy rabbit was detected. The historical range includes the portion of the Project east of the Columbia River, in Route Segments 3a, 3c, and NNR-8. Potentially suitable habitat occurs in all three Route Segments, but given the distance from known populations of pygmy rabbits, occurrence within the Project study area is unlikely. Therefore, pygmy rabbits are not anticipated to be impacted by the Project.

Marbled Murrelet

Although the species list generated by USFWS Information for Planning and Conservation (IPaC) website lists the federally threatened marbled murrelet (*Brachyramphus marmoratus*) as having potential occurrence within the Project study area; however, this species is very unlikely to occur in or near the Project study area. Marbled murrelets forage in marine waters and nest in large conifer trees, as far as 55 miles inland. The nearest marine waters are approximately 100 miles west of the Project study area and the nearest suitable nesting habitat is in the Cascade mountains, greater than 20 miles west of the Project study area (WDFW 2012c, USFWS 2015b). Given the lack of suitable habitat within the Project study area and the great distance from occupied or suitable habitat, marbled murrelets will not be impacted by the Project.

Canada Lynx

Although the species list generated by USFWS IPaC website lists the federally threatened Canada lynx (*Lynx canadensis*) as having potential occurrence within the Project study area, this species is very unlikely to occur in or near the Project study area. Lynx inhabit northern and high elevation forests characterized by deep winter snowpacks. The nearest population to the Project study area is in Okanogon County, approximately 75 miles north of the Project study area. Two sightings have occurred in Kittitas County, but both occurred in forested areas, approximately 25 miles north and northwest of the Project study area (WDFW 2012d). Given the lack of suitable habitat within the Project study area and the great distance from occupied or suitable habitat, Canada lynx will not be impacted by the Project.

3.3.2.3 Greater Sage-Grouse

Because of the heightened focus on Sage-Grouse conservation in the Project study area and throughout the species' range and the unique regulatory status of Sage-Grouse (refer to section 3.3.3 Current Management Considerations), this document discusses them in their own section separate from federally threatened and endangered species (Section 3.3.2.2) and state listed and other special status species (Section 3.3.2.4).

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 Analysis and Mitigation 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, the YTC population, is located in Kittitas and Yakima counties on the JBLM YTC land which is used for combat readiness training. During the past five years, the estimated Sage-Grouse population at JBLM YTC has averaged 203 birds and has fluctuated dramatically, with a high of 263 birds estimated in 2014 and a low of 140 birds estimated in 2016. Depending on the Action Alternative, the proposed Project approximately follows the western and northern edges, or the southern and eastern edges, of the JBLM YTC Sage-Grouse population.

Habitat Use

With the exception of portions of Route Segments 3a, 3c, and NNR-8, all of the route segments are within the Yakima Training Center (YTC) Priority Area for Conservation (PAC; Figure 3.3-1) and all route segments cross WDFW Management Units designated as Regularly Occupied Habitat (west of the Columbia River) or Occasionally Occupied Habitat (east of the Columbia River—portions of Route Segments 3a, 3c, and NNR-8). 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).

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). Route Segment 1b passes through JBLM YTC primary and secondary protection zones, and Route Segments 1c, 2b, 2c, and NNR-2 run adjacent to primary and/or secondary protection zones for all or part of their lengths. All other route segments avoid passing through or adjacent to any of JBLM YTC's protection zones. With the exception of Route Segments 3a and NNR-8, all route segments pass within four miles of various primary protection zones (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.

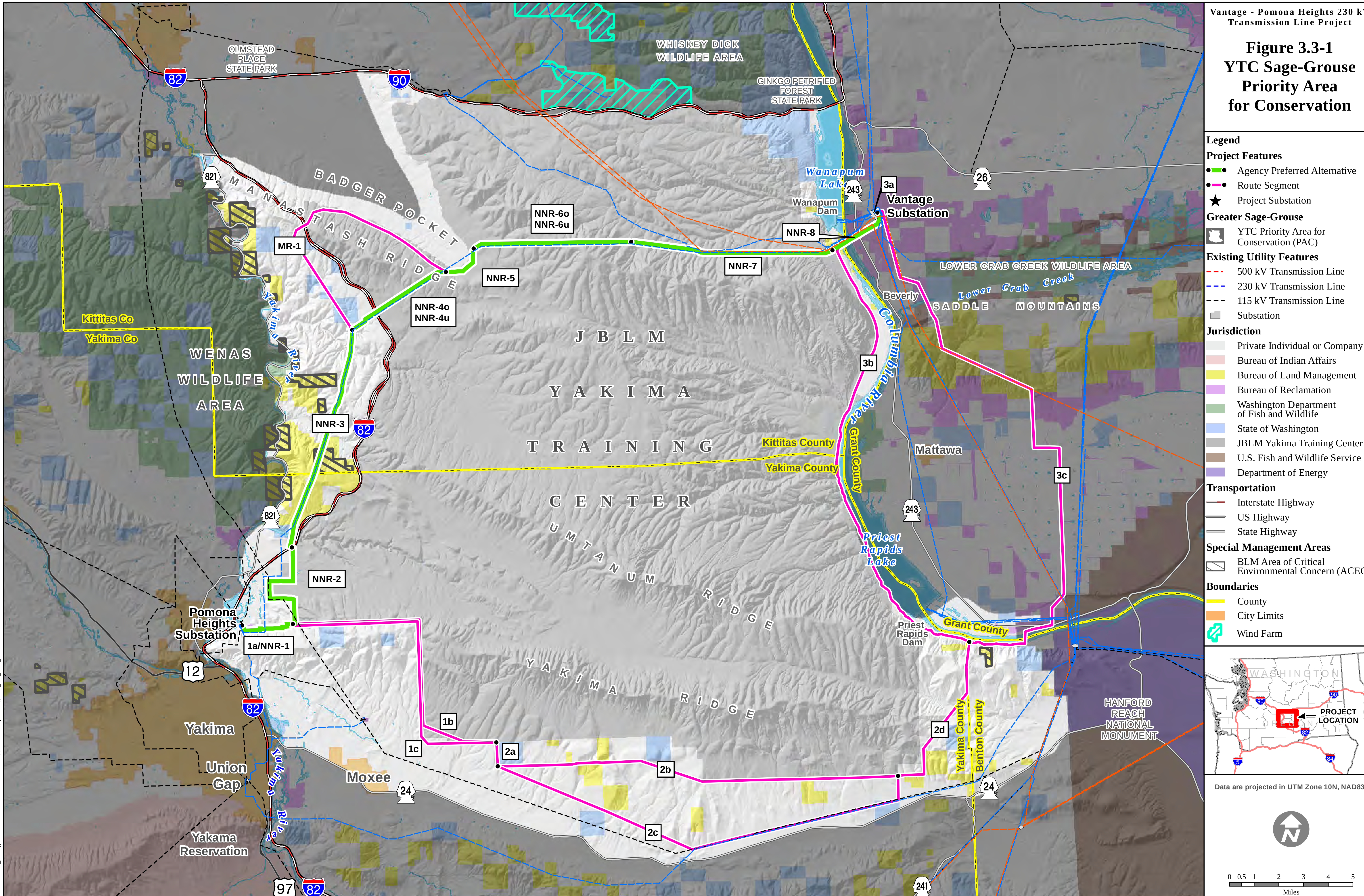

Figure 3.3-1
YTC Sage-Grouse Priority Area for Conservation

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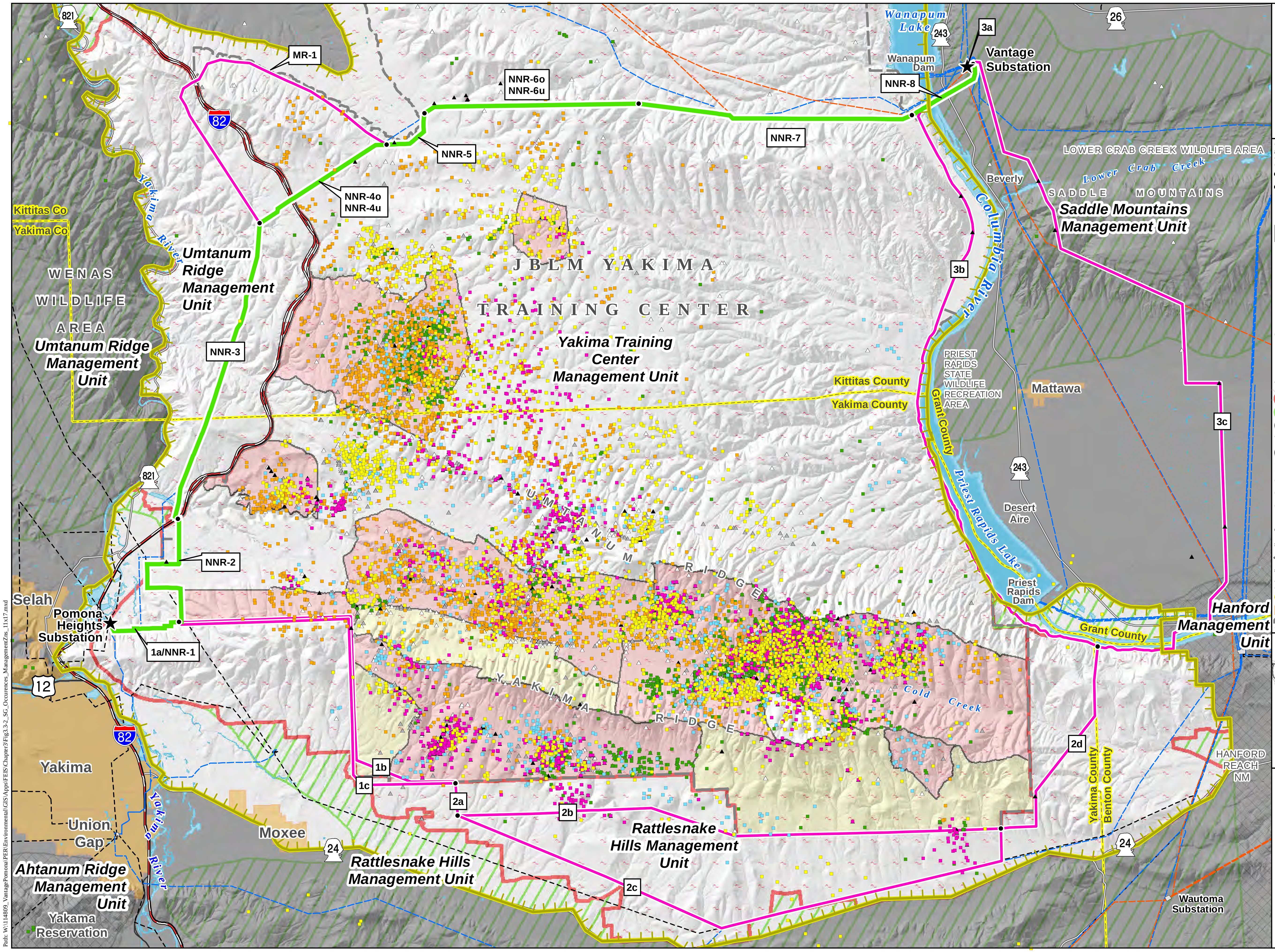
Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 3.3-2 Sage-Grouse Occurrence & Management Zones



Legend

Project Features
- Agency Preferred Alternative
- Route Segment
- Project Substation

Sage-Grouse Occurrence Data
- YTC Priority Area for Conservation (PAC)

Telemetry Data
- 2014-2015
- 2012-2013
- 1999-2001
- 1989-1993
- Translocation Study

Occurrence Data
- Incidental Sighting 2011-2014
- Incidental Sighting 2001-2010
- Incidental Sighting 1969-2000

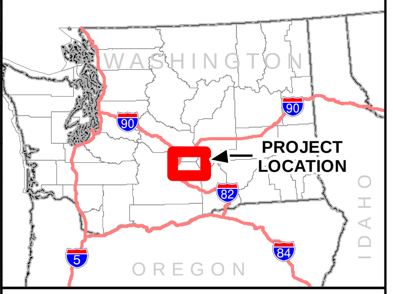
WA Sage-Grouse Management Units
- Regularly Occupied Habitat
- Occasionally Occupied Habitat
- Expansion Habitat

YTC Sage-Grouse Protection Areas 2010
- Primary
- Secondary

Existing Utility Features
- 500 kV Transmission Line
- 230 kV Transmission Line
- 115 kV Transmission Line
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Boundaries
- County
- City Limits
- JBLM Yakima Training Center



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

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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 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 Sage-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 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 Sage-Grouse will feed on a variety of other sagebrush species, depending on availability (Connelly et al. 2000).

Habitat Assessments

A Sage-Grouse habitat assessment was conducted in the proposed right-of-way (ROW) of Alternatives A-G in 2011. On public lands, field surveys were conducted using protocol based on BLM's framework for assessing sensitive species habitats (Stiver et al. 2010). On private lands not visited, surveys were conducted through aerial interpretation using adjacent survey information, 2001 JBLM YTC vegetation data, GAP data, and fire history data. A Sage-Grouse habitat assessment for the NNR Alternative including the 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 of both habitat assessments are included in Appendix B-2 (Sage-Grouse Habitat Assessments). Generally speaking, the highest concentrations of suitable habitat occurs along the south edge of JBLM YTC in Route Segment 2b and near Badger Pocket in Route Segments NNR-4, NNR-5, and the western end of NNR-6 with other concentrations of suitable habitat in NNR-7 and the north half of Route Segment 3c. The relatively disturbed, weedy southwestern portions of the Project study area (Route Segments 1a/NNR-1, 1b, 1c, 2a, 2c, and NNR-2) contain less suitable habitat. Sage-Grouse habitat crossed is discussed for each route segment in Section 4.3.4, and specific habitat delineations are described in Appendix B-2 – Sage-Grouse Habitat Assessment.

While a detailed, fine-scale habitat assessment was conducted within the NNR Alternative 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 were used. A composite of USGS GAP data, JBLM YTC vegetation data, and vegetation data collected during POWER Engineers Inc.'s (POWER) field surveys that were completed in support of the DEIS and SDEIS were used to delineate 12 categories of land cover type. Each of these was in turn assigned a Sage-Grouse habitat suitability value of suitable, marginal, or unsuitable. The values were assigned 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," "trees," and "other" (includes agriculture, developed/disturbed areas, and open water). Overall, approximately 48 percent of the eight-mile wide Sage-Grouse analysis area was classified as suitable habitat, three percent as marginal, and 49 percent as unsuitable (see Table 3.3-9). 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.

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 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 two 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 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 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 Indian Reservation in Yakima County. Sage-Grouse were translocated to the Yakama Indian 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 land covers 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 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, disturbance associated with I-90, several existing transmission lines, and two wind energy developments. 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 two wind energy developments (Robb and Schroeder 2012).

Sage-Grouse Population Range Estimates

Based on location data provided by JBLM YTC, including telemetry data and incidental observations, it is apparent that within the JBLM YTC, some areas are more heavily used by Sage-Grouse than others (Figure 3.3-2). To generate a clearer picture of relative density of use by the 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 YTC population; for the lay reader, this concept can be roughly understood in 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 YTC Sage-Grouse population.

Available location data include 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 include 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 were 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 were selected for the final analysis because the 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 any route segments within the proposed NNR Alternative ROW, nor with Route Segments 3a, 3b, or 3c (Figure 3.3-4). This does not indicate that absolutely no Sage-Grouse use ever occurs in these route segments, 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 Alternative in May and July of 2013, no Sage-Grouse were observed; however, Sage-Grouse scat was observed in six locations adjacent to the following route segments: NNR-6, one location on NNR-5 and one location on NNR-4. These results indicate that some Sage-Grouse use of the NNR Alternative ROW does occur, but that use is rare. The estimated 95 percent isopleth Sage-Grouse population range does barely overlap the eight-mile wide Sage-Grouse analysis area of the NNR Alternative and MR Subroute (18 percent of NNR-2, 16 percent of NNR-3, and less than10 percent for all other NNR Alternative Route Segments), but the core population range (80 percent isopleth) does not. At the southeastern part of the Project study area, the 95 percent population range overlaps ten percent of the Route Segment 3b analysis area and two percent of the Route Segment 3c analysis area. In the northeastern part of the Project study area, the 95 percent population range is not within four miles of Route Segments NNR-7, NNR-8, or 3a.

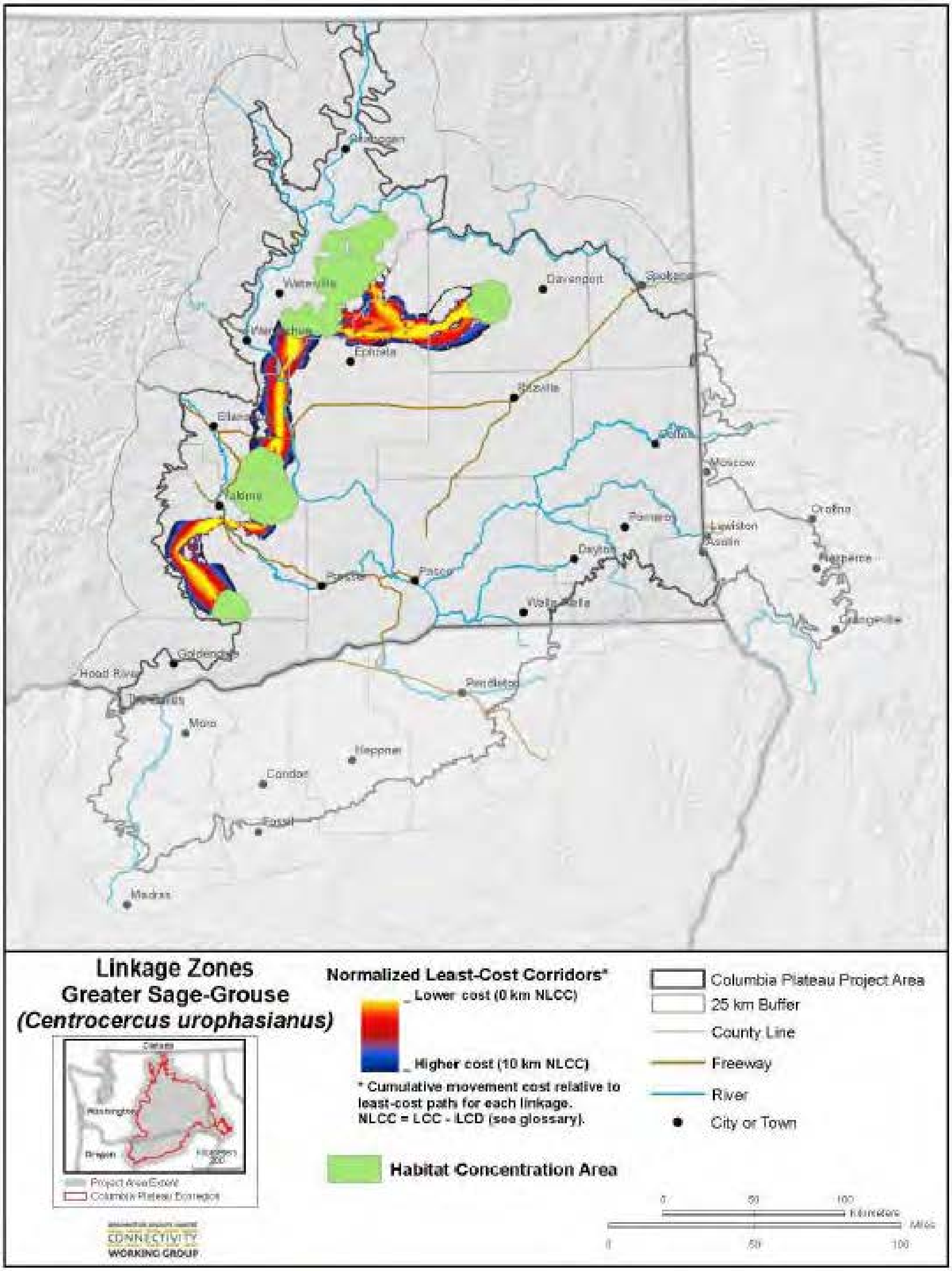

FIGURE 3.3-3 CONNECTIVITY ZONES IDENTIFIED BY WHCWG MODELING (FIGURE TAKEN FROM ROBB AND SCHROEDER 2012).

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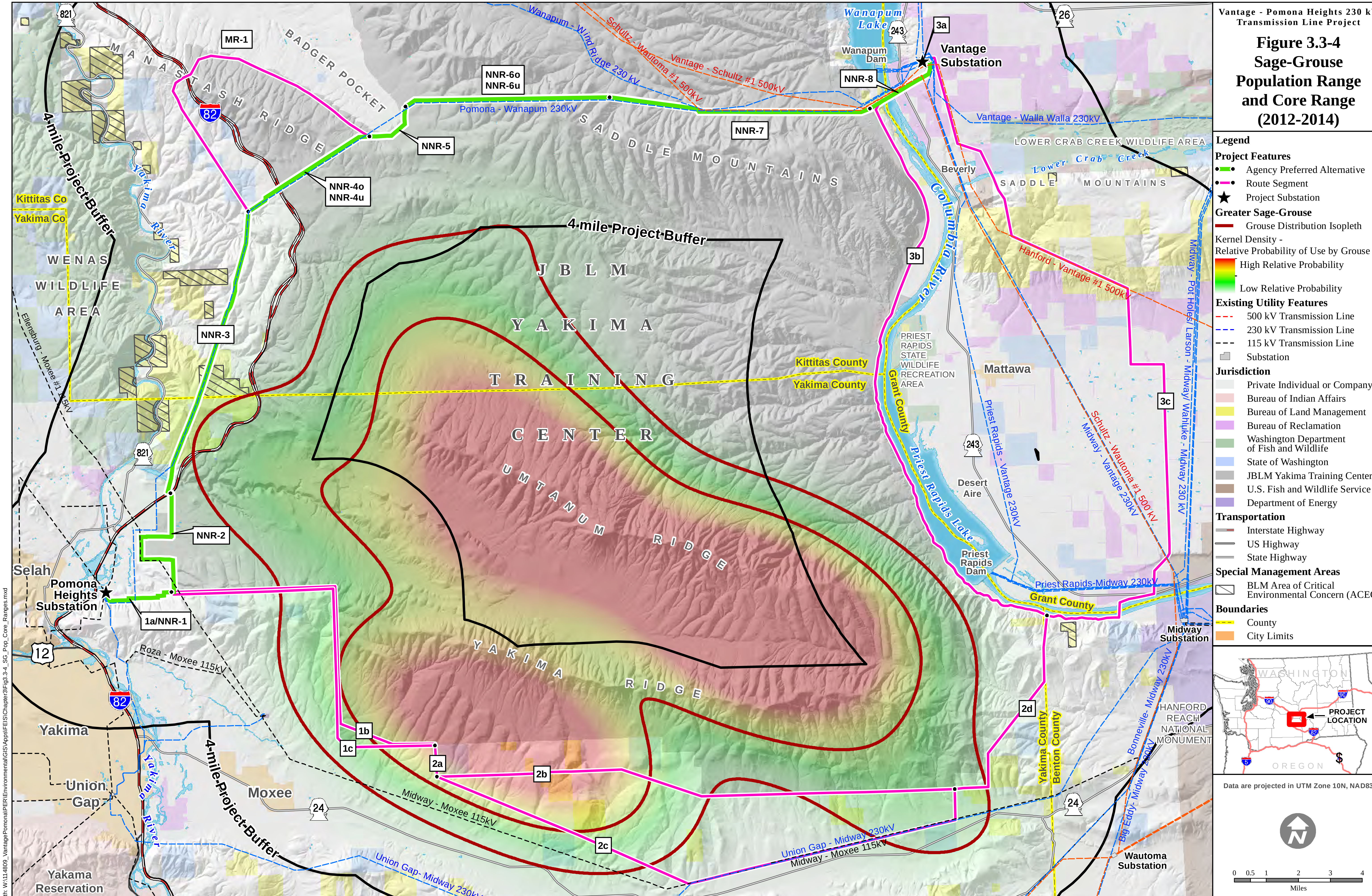

Figure 3.3-4 Sage-Grouse Population Range and Core Range (2012-2014)

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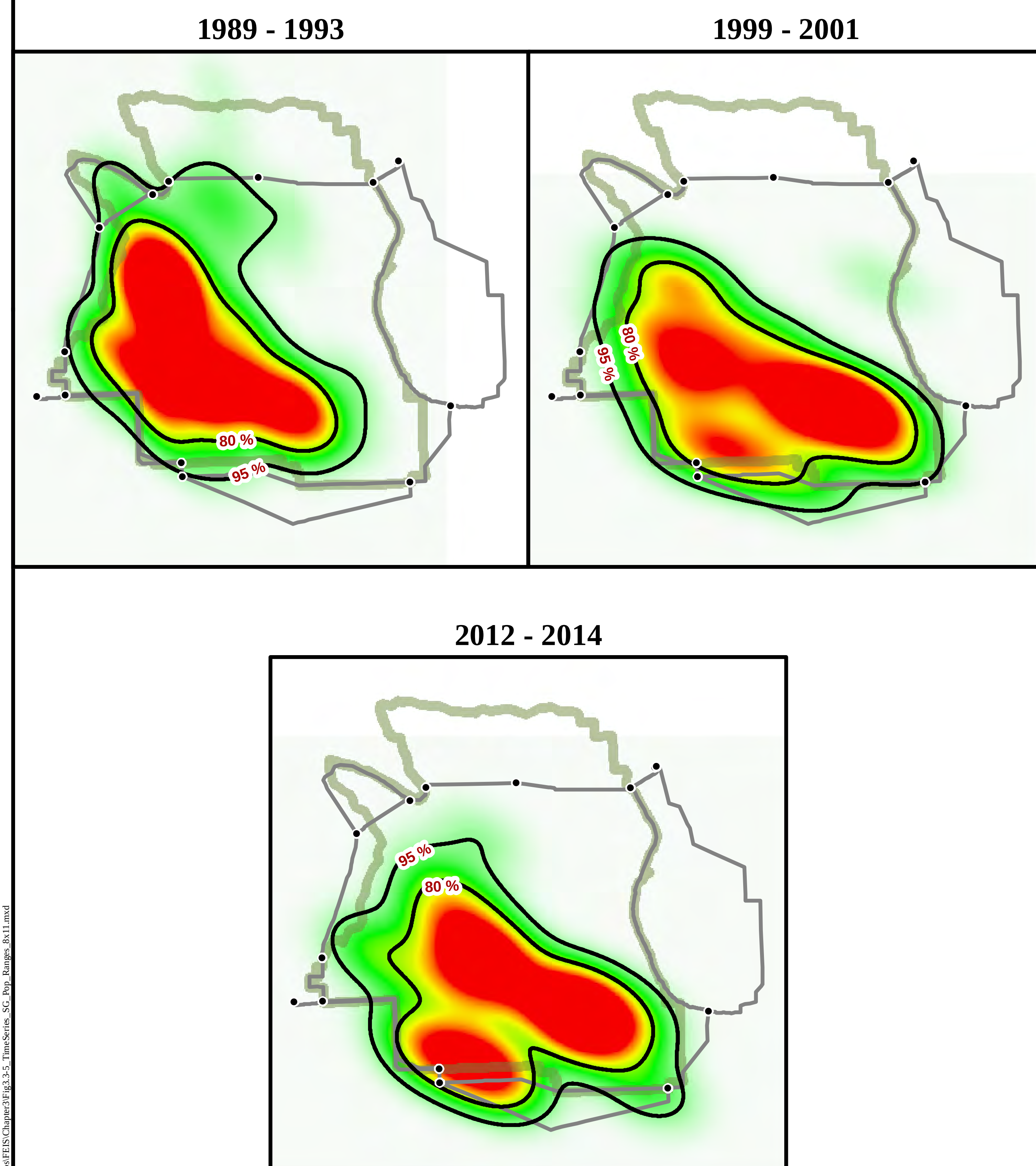

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Figure 3.3-5
Time Series of Sage-Grouse Estimated Population Ranges

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In the southern portion of the Project study area, Sage-Grouse 80 percent core and 95 percent population range substantially overlaps the other route segments associated with Alternatives A-G. Route Segment 2a is entirely within the core population range. Route Segment 2b has the next highest proportion of overlap with the core and 95 percent population ranges (41 percent in core, 84 percent in population range) followed by Route Segments 1b (18 and 73 percent) and 1c (14 and 73 percent), 2c (25 and 59 percent), and 2d (four and 14 percent). Acreages of core population range and 95 percent population range within the ROW and eight-mile wide analysis area are shown in Table 3.3-4 and described for each route segment (Section 3.3.5).

A time-series of the three study periods reveals a southeastward shift in the 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 Pomona-Wanapum 230 kV 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, JBLM YTC 2014a), 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 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.

Sage-Grouse Leks

Active, inactive, and historical leks are shown in Table 3.3-5 and discussed in Section 3.3.4 for each 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 two years or, if not checked in the past two years, was active during the last year checked; 2) inactive - has been active sometime during the previous 10 years, but was not active during the past two years or in 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 2014b; SEE 2013).

Lek complexes are defined as active leks within 1.8 miles of each other and have been used to estimate the YTC Sage-Grouse population size and trends (SEE 2013; Schroeder et al. 2000). Fifteen (15) lek complexes are known to occur within JBLM YTC, containing approximately 22 leks. Of the 15 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. 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 2015).

In 2015, eight occupied leks, from seven lek complexes were documented within the YTC Sage-Grouse population with a total count of 95 lekking males. An additional three leks were occupied in 2014, for a total of 11 currently active leks. Four of the 11 active leks are within four miles of the proposed Project study area. Two inactive leks occur within four miles of the Project study area (Table 3.3-5).

The first active lek (hereafter Lek #1) is located approximately 3.4 miles east of Route Segment NNR-3 and 3.6 miles north of Route Segment 1b. Lek #1 was considered an active lek starting in 2011. In 2015, three males were observed attending Lek #1, which was up from one male in 2014 (SEE 2015).

The second active lek (hereafter Lek #2) occurs approximately 3.5 miles south of Route Segment NNR-6. Lek #2 was discovered in 2007 and was considered an active lek beginning in 2008. Lek #2 had two males attending in 2015, up from one male in 2014 and an average of just two males attending during the past eight years (SEE 2015).

The third active lek (hereafter Lek #3) occurs approximately 2.9 miles northeast of Route Segment 1b. Lek #3 has been active every year since data collection began in 1989, with an average count of 27 males, though counts have been lower in recent years—with an average of four males during each of the past four years. Lek #3 had four males attending in 2015, and four in 2014. An inactive lek within the same complex (complex #3) is located approximately 1.6 miles southwest of the active Lek #3 and 1.3 miles northeast of Route Segment 1b. This lek was last active in 2006 (SEE 2015).

The fourth active lek (hereafter Lek #4) occurs approximately 1.5 miles north of Route Segment 2b. Lek #4 was discovered in 1998 and from 1998 through 2014 was occupied every year, with an average count of 13 males. No males were observed at the lek in 2015, but it is still considered an active lek because three males were counted in 2014 (SEE 2015).

An inactive lek occurs approximately 3.9 miles west of Route Segment 3b. This lek was last occupied in 2007.

Table 3.3-6 shows lek counts from 1989 to 2015 for each lek complex within the entire YTC Sage-Grouse population, including leks greater than four miles from the proposed Project study area.

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

In 2016, the Sage-Grouse population at JBLM YTC was estimated to hold 140 birds—the lowest estimate since surveys were initiated in 1964. During the past five years, the estimated Sage-Grouse population at JBLM YTC has averaged 203 birds and has fluctuated dramatically, from a low of 146 birds in 2012, up to a high of 263 birds in 2014 and back down to a new low of 140 birds in 2016 (SEE 2015; Personal communication email from M. Schroeder June 8, 2016, forwarded via BLM office; 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 third year in a row (SEE 2015; JBLM YTC 2002). The 28 year average population estimate for JBLM YTC is 266 Sage-Grouse. There has been an overall long-term decline in the population, though population size has fluctuated substantially. From 2007 through 2010 and again in 2012 and 2016, population estimates were below 200. This may have been a result of habitat loss from fires (2006-2009); however, between 2009 and 2015, 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).

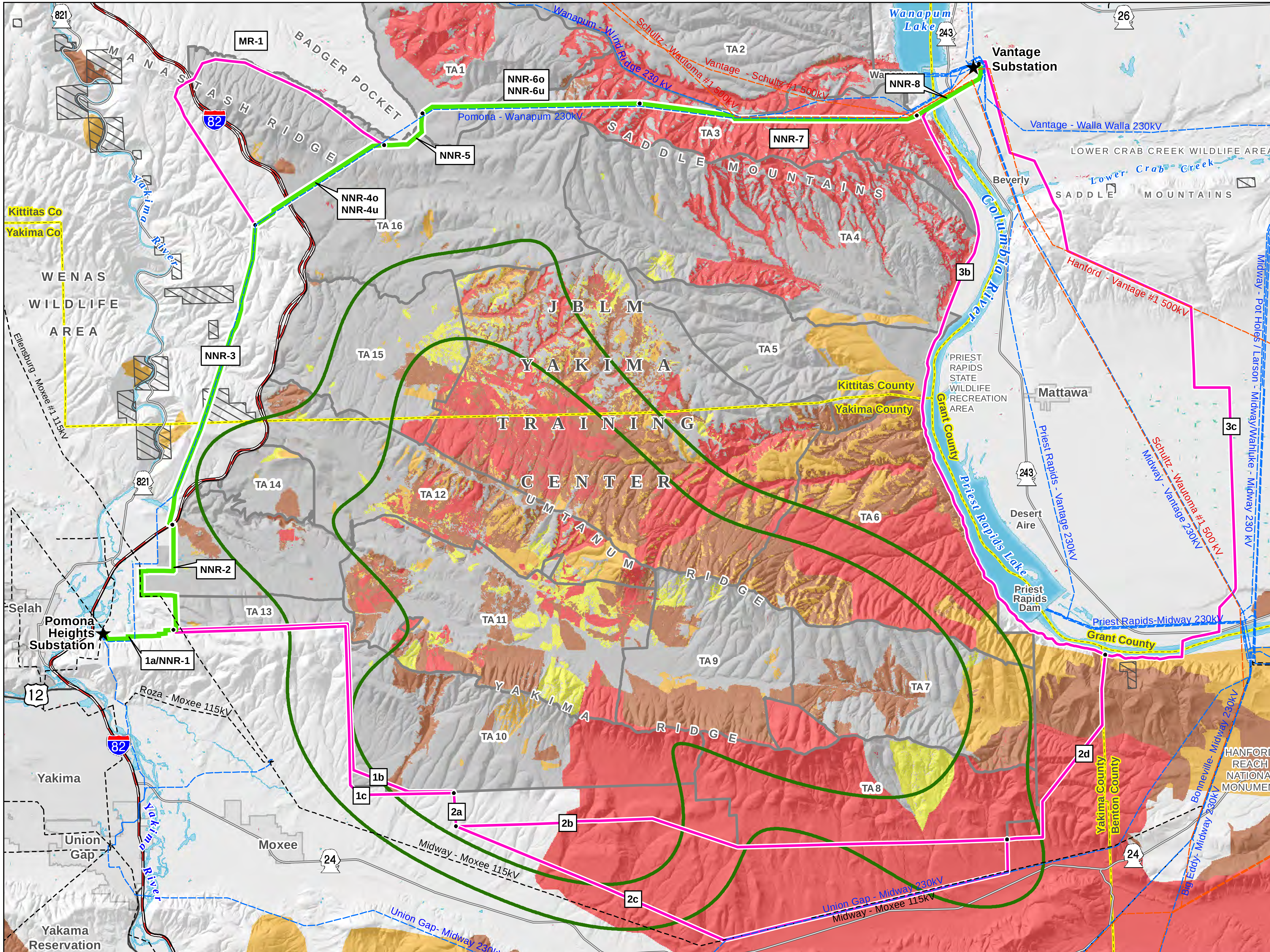

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Figure 3.3-6 Fire History and JBLM YTC Training Areas

Legend

Project Features
- Agency Preferred Alternative
- Route Segment
- Project Substation

Greater Sage-Grouse
- 2012 - 2014 Sage-Grouse Distribution

Fires
- 2010 - 2016
- 2000 - 2009
- 1990 - 1999
- 1987 - 1989

Existing Utility Features
- 500 kV Transmission Line
- 230 kV Transmission Line
- 115 kV Transmission Line
- Substation

Jurisdiction
- JBLM Yakima Training Center: Training Area
- JBLM Yakima Training Center

Transportation
- Interstate Highway
- US Highway
- State Highway

Special Management Areas
- BLM Area of Critical Environmental Concern (ACEC)

Boundaries
- County
- City Limits

WASHINGTON
OREGON
IDAHO
PROJECT LOCATION

Data are projected in UTM Zone 10N, NAD83

0 0.5 1 2 3 4
Miles

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FIGURE 3.3-7 YTC SAGE-GROUSE POPULATION TREND (1989-2015)

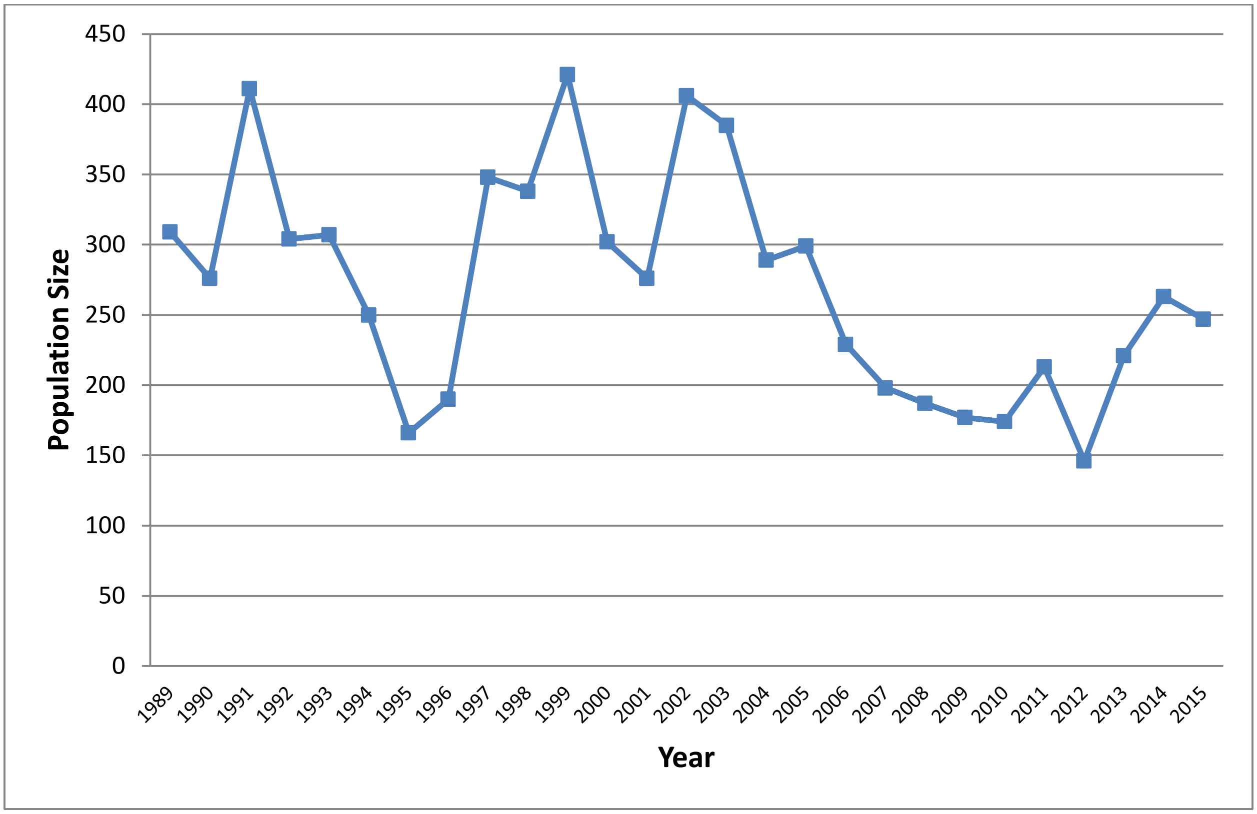

Table 3.3-4 Sage-Grouse Population Range within Four Miles of the Proposed Route Segments

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
1a/NNR-1	0	0%	3,623	8%	0	0%	0	0%
1b	167	73%	49,928	54%	41	18%	28,897	31%
1c	173	73%	49,208	52%	32	14%	28,433	30%
2a	18	100%	27,295	74%	18	100%	20,457	55%
2b	249	84%	70,636	61%	122	41%	39,515	34%
2c	194	59%	55,768	45%	82	25%	26,336	21%
2d	18	14%	17,602	26%	0	0%	2,610	4%
3a	0	0%	0	0%	0	0%	0	0%
3b	0	0%	14,616	10%	0	0%	6,263	4%
3c	0	0%	3,231	2%	0	0%	0	0%
NNR-2	0	0%	9,140	18%	0	0%	0	0%
NNR-3	0	0%	12,736	16%	0	0%	0	0%
NNR-4o/NNR-4u	0	0%	1,458	3%	0	0%	0	0%
NNR-5	0	0%	1,104	3%	0	0%	0	0%
NNR-6o/NNR-6u	0	0%	11	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%

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
MR-1	0	0%	1,052	1%	0	0%	0	0%
All	817	27%	118,715	20%	293.7	10%	56,807	10%

[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 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
1a/NNR-1	0	0	0	0	0	0	0	0
1b	0	1	2	4	0	5	6	12
1c	0	1	1	4	0	5	6	12
2a	0	0	0	1	0	0	0	1
2b	0	1	1	1	0	3	3	3
2c	0	0	1	1	0	0	2	3
2d	0	0	0	0	0	0	1	1
3a	0	0	0	0	0	0	0	1
3b	0	0	0	1	0	2	4	7
3c	0	0	0	0	0	0	0	1
NNR-2	0	0	0	1	0	0	0	2
NNR-3	0	0	0	1	0	0	3	6
NNR-4o/NNR-4u	0	0	0	0	2	3	4	6
NNR-5	0	0	0	0	1	2	5	5
NNR-6o/NNR-6u	0	0	0	1	0	2	2	4
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	2	4	5

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

Table 3.3-6 Male Sage-Grouse Counted at Lek Complexes and YTC Population Estimates from 1989-2015

YEAR	LEK COMPLEX															POPULATION ESTIMATE
	#1[1]	#2[1]	#3[1]	#4[1]	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#16	
1989	6	-	22	-	-	-	-	53	27	7	4	-	-	-	-	309
1990	7	-	17	-	-	-	-	50	25	7	0	-	-	-	-	276
1991	14	-	33	-	-	-	-	62	44	5	0	-	-	-	-	411
1992	19	-	15	-	-	-	-	55	28	0	-	-	-	-	-	304
1993	22	-	18	-	-	-	-	47	31	0	-	-	-	-	-	307
1994	13	-	15	-	-	-	3	41	24	-	-	-	-	-	-	250
1995	8	-	12	-	-	-	0	33	11	-	-	-	-	-	-	166
1996	7	-	8	-	-	17	16	19	6	-	-	-	-	-	-	190
1997	5	-	32	-	-	18	32	34	13	-	-	-	-	-	-	348
1998	0	-	25	14	5	22	18	42	4	-	-	-	-	-	-	338
1999	0	-	39	21	5	28	11	41	16	-	-	-	-	-	-	419
2000	-	-	22	21	4	23	4	32	10	-	-	-	-	-	-	302
2001	-	-	18	20	4	15	9	31	9	-	-	-	-	-	-	275
2002	-	-	28	17	2	19	20	31	15	-	-	5	19	-	-	406
2003	-	-	17	20	0	14	25	30	23	-	-	7	12	-	-	385
2004	-	-	19	18	0	8	11	28	18	-	-	2	7	-	-	289
2005	-	-	17	20	0	7	12	33	17	-	-	0	9	-	-	299
2006	-	-	7	17	0	5	13	24	16	-	-	0	6	-	-	229
2007	-	1	6	15	0	3	16	22	8	-	-	0	4	1	-	198
2008	-	2	5	9	0	1	15	26	10	-	-	1	4	1	-	187
2009	-	2	5	7	0	0	14	30	4	-	-	0	6	0	-	177
2010	-	2	11	5	0	0	16	25	4	-	-	0	4	0	-	174
2011	7	3	8	9	0	0	22	24	9	-	-	0	0	0	-	213
2012	6	0	4	5	0	0	17	10	14	-	-	0	0	0	-	146
2013	4	3	5	3	0	0	22	24	24	-	-	0	0	0	-	221
2014	1	1	4	3	-	0	39	16	20	-	-	0	0	0	14	263
2015	3	2	4	0	-	0	31	22	25	-	-	-	0	-	8	247

Sources: SEE 2013, SEE 2014, and SEE 2015.
[1]Lek located within four miles of the proposed Project.
- = lek not surveyed

Two aerial greater Sage-Grouse lek surveys were conducted for the Project study area, covering Alternatives A-G in 2010 and 2011. No additional leks were found. The Sage-Grouse Survey Report, with JBLM YTC's monitoring protocol, is presented in Appendix B-1.

3.3.2.4 State-Listed and Other Special-Status Species

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

Invertebrate Species

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

Barry's hairstreak (*Callophrys gryneus barryi*) is found in juniper woodlands and forest openings that have juniper present. This butterfly will also utilize juniper (*Juniperus* sp.; native and ornamental) in developed areas (Fleckenstein 2006). Limited suitable habitat is present within the Project study area.

The **California floater** (*Anodonta californiensis*) occurs in shallow muddy or sandy habitats in larger rivers, reservoirs, and lakes. The **western ridged mussel** (*Gonidea angulata*) 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).

Eggs of the **Columbia clubtail** (*Gomphus lynnae*) 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.

Western bumblebee (*Bombus occidentalis*) habitat includes open grassy areas, urban parks and gardens, chaparral and shrub areas, and mountain meadows. Once very common in the western United States and western Canada, this species has recently undergone a dramatic decline in abundance and distribution and is no longer present across much of the historic range. The prevailing theory on the decline and localized extirpation of western bumblebee suggests it is due to transmission of the microsporidian pathogen (*Nosema bombi*; Hatfield et al. 2015). Potential habitat for western bumblebee may occur throughout the Project study area.

Fish Species

Ten special status fish species occur or have the potential to occur in the Project study area (Table 3.3-7). All have potential to occur in the Columbia River and/or Yakima River and a few have potential to occur in smaller streams within the Project study area.

Chum salmon (*Oncorhynchus keta*) have the widest distribution of the Pacific salmon; however, most rivers have only a summer and fall run of spawning chum salmon (Pauley et al. 1988). Within the Project study area, fall chum salmon have been documented in the Columbia River, occurring only below the Priest Rapids Dam (SalmonScape 2013). The Columbia River chum salmon within the Project study area are outside the Columbia River chum salmon ESU designated as threatened under the ESA (NOAA 2012).

Coho salmon (*Oncorhynchus kisutch*) 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 study area, Coho salmon occur in the Columbia River and the Yakima River (SalmonScape 2013). The Coho salmon within the Project study area are outside the lower Columbia River Coho ESU which is designated as Threatened under the ESA (NOAA 2012).

Sockeye salmon (*Oncorhynchus nerka*) 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 study area. Sockeye salmon occur in the Columbia River within the Project study area (SalmonScape 2013); however, the sockeye salmon within the Project study area are outside the designated ESUs in Washington and are not listed under the ESA (NOAA 2012).

Table 3.3-7 State Listed And Other Special-Status Species That Occur of Potentially Occur within the Project Study 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	Trees	Aspen	Agriculture	Developed / Disturbed / Fire break	Noxious Weeds
Invertebrates																			
Barry's hairstreak (*Callophrys gryneus barryi*)	BLM-S	Possible	1a/NNR-1, 1b, 1c, NNR-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	-
California floater (*Anodonta californiensis*)	SOC	Likely	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-	-
Columbia clubtail (*Gomphus lynnae*)	SOC, BLM-S	Likely	1a/NNR-1, NNR-3	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Western Bumblebee (*Bombus occidentalis*)	BLM-S	Possible	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	S	S	S	M	S	S	-	S	-	S	S	S	M	S	-
Western ridged mussel (*Gonidea angulata*)	BLM-S	Likely	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-	-
Fish																			
Chum Salmon (*Oncorhynchus keta*)	BLM-C, WC	Present	2d, 3b, 3c	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-	-
Coho salmon (*Oncorhynchus kisutch*)	WC	Present	1a/NNR-1, 2d, 3a, 3b, 3c, NNR-3, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Leopard dace (*Rhinichthys falcatus*)	WC	Present	1a/NNR-1, , 2d, 3a, 3b, 3c, NNR-3, NNR-4, NNR-7, NNR-8, MR-1	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Mountain sucker (*Catostomus platyrhynchus*)	BLM-S, WC	Present	1a/NNR-1, , 2d, 3a, 3b, 3c, NNR-3, NNR-4, NNR-7, NNR-8, MR-1	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Pacific lamprey (*Entosphenus tridentatus* synonym-*Lampetra tridentata*)	SOC, BLM-S, WR	Present	1a/NNR-1, , 2d, 3a, 3b, 3c, NNR-3, NNR-4, NNR-7, NNR-8, MR-1	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Pygmy whitefish (*Prosopium coulteri*)	SOC, BLM-S, WS	Possible	1a/NNR-1, NNR-3, NNR-4,	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
River lamprey (*Lampetra ayresii*)	SOC, BLM-S, WC	Present	1a/NNR-1, NNR-3	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Sockeye salmon (*Oncorhynchus nerka*)	WC, WR	Present	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Tui Chub (*Siphateles bicolor*)	BLM-S	Possible	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Umatilla dace (*Rhinichthys umatilla*)	BLM-S, WC	Likely	1a/NNR-1, 2d, 3a, 3b, 3c, NNR-3, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Amphibians and Reptiles																			
Columbia spotted frog (*Rana luteiventris*)	WC	Possible	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Northern leopard frog (*Rana pipiens*)	SOC, WE	Possible	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Western toad (*Bufo boreas*)	WC	Possible	1a/NNR-1, , 2d, 3a, 3b, 3c, NNR-3, NNR-4, NNR-7, NNR-8, MR-1	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Night snake (*Hypsiglena torquata*)	BLM-S	Present	1a/NNR-1, 2d, 3a, 3b, 3c, NNR-3, NNR-7, NNR-8	S	S	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	Trees	Aspen	Agriculture	Developed / Disturbed / Fire break	Noxious Weeds
Northwestern pond turtle (*Actinemys marmorata marmorata*)	BLM-S	Possible	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Sagebrush lizard (*Sceloporus graciosus*)	SOC, BLM-S, WC	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, NNR-3	-	-	-	-	-	-	-	-	M	-	M	-	-	-	-	-
Side-blotched lizard (*Uta stansburiana*)	BLM-S	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	-	-	-	-	-	-	-
Birds																			
Black swift[5] (*Cypseloides niger*)	SOC	Possible	1a/NNR-1, 1b, 1c, NNR-2, NNR-3, NNR-4, MR-1	-	-	-	-	-	-	-	-	-	M	M	M	-	-	-	-
Black-throated sparrow[5] (*Amphispiza bilineata*)	BLM-S	Likely	2d, 3a, 3b, 3c, NNR-7, NNR-8	S	S	S	S	-	-	-	-	-	-	-	-	-	-	-	-
Bobolink[5] (*Dolichonyx oryzivorus*)	BLM-S	Possible	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 3b, 3c, NNR-2, NNR-4, NNR-5, NNR-6, MR-1	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-
Cedar waxwing[5] (*Bombycilla cedrorum*)	BLM-S	Likely	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 3b, 3c, NNR-2, NNR-3, NNR-6, NNR-7, NNR-8,	-	-	-	-	-	-	-	-	-	-	M	M	S	-	-	-
Lesser goldfinch[5] (*Carduelis psaltria*)	BLM-S	Very Unlikely		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loggerhead shrike[5] (*Lanius ludovicianus*)	SOC, WC	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	M	-	S	S	-	-	-	-	S	-	S	S	S	S	-	-
Oregon vesper sparrow[5] (*Pooecetes gramineus affinis*)	BLM-S	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	M	M	M	M	-	-	-	-	S	-	-	-	-	S	S	-
Sage sparrow[5] (*Amphispiza belli*)	WC	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	M	-	-	S	-	-	-	-	M	-	-	-	-	-	-	-
Sage thrasher[5] (*Oreoscoptes montanus*)	WC	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	M	M	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	Trees	Aspen	Agriculture	Developed / Disturbed / Fire break	Noxious Weeds
Vaux's swift[5] *(Chaetura vauxi)*	WC	Likely	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	-	-	-	-	-	-	-	-	-	M	M	M	M	-	-	-
Bald eagle[5,6] (*Haliaeetus leucocephalus*)	SOC, BLM-S, WS	Present	1a/NNR-1, 2d, 3a, 3b, 3c NNR-2, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	S	-	M	-	-
Burrowing owl[5] (*Athene cunicularia*)	SOC, BLM-S, WC	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c,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	-
Short-eared Owl[5] (*Asio flammeus*)	BLM-S	Possible	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	M	M	S	M	M	S	-	-	-	-	-	-	-	-	-
Ferruginous hawk[5] (*Buteo regalis*)	SOC, BLM-S, WT	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	S	-	S	S	-	-	-	-	-
Chukar (*Alectoris chukar*)	WR	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 3b, 3c, NNR-2, NNR-4, NNR-5, NNR-6, MR-1	-	-	-	-	-	-	-	-	M	-	M	-	-	S	-	-
American white pelican[5] (*Pelecanus erythrorhynchos*)	BLM-S, WE	Present	1a/NNR-1, 2d, 3a, 3b, 3c, NNR-3, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Black-crowned night-heron[5] (*Nycticorax nycticorax*)	WR	Likely	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-
Clark's grebe[5] (*Aechmophorus clarkii*)	BLM-S, WC	Likely	2d, 3a, 3b, 3c,NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-	-
Common loon[5] (*Gavia immer*)	BLM-S	Present	2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-	-
Eared grebe[5] (*Podiceps nigricollis*)	BLM-S	Likely	1a/NNR-1, 2d, 3a, 3b, 3c, NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	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	Trees	Aspen	Agriculture	Developed / Disturbed / Fire break	Noxious Weeds
Great blue heron[5] (*Ardea herodias*)	WR	Likely	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	-	-
Upland Sandpiper[5] (*Bartramia longicauda*)	WE,	Very Unlikely		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sandhill crane[5] (*Grus canadensis*)	BLM-S, WE	Possible	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 3b, 3c, NNR-2, NNR-4, NNR-5, NNR-6, MR-1	-	-	-	-	-	-	-	-	-	-	S	-	-	S	-	-
Tundra swan[5] (*Cygnus columbianus*)	WR	Likely	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-2, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	-	-	-	-	-	-	-	-	-	S	S	-	-	S	-	-
Western grebe[5] (*Aechmophorus occidentalis*)	WC	Likely	2d, 3a, 3b, 3c,NNR-7, NNR-8	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-	-
Mammals																			
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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, NNR-2, NNR-3, NNR-4, MR-1	S	M	M	S	M	S	S	-	S	-	S	S	S	S	M	M
Elk (*Cervus canadensis*)	WR	Present	1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c,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	S	-	-
Little Brown Myotis (*Myotis lucifugus*)	BLM-S	Likely	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	M	M	M	M	M	M	M	S	S	S	S	S	-	S	S	M
Merriam's shrew (*Sorex merriami*)	WC	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	S	M	M
Pallid bat (*Antrozous pallidus*)	BLM-S	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	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	Trees	Aspen	Agriculture	Developed / Disturbed / Fire break	Noxious Weeds
Spotted bat (*Euderma maculatum*)	BLM-S	Possible	2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, MR-1	S	M	M	S	M	M	M	-	-	-	-	-	-	M	-	-
Washington ground squirrel (*Urocitellus washingtoni*)	BLM-S, WC	Possible	2d, 3a, 3b, 3c, NNR-7, NNR-8	S	S	S	S	S	S	S	-	S	-	-	-	-	-	S	-
White-tailed jackrabbit (*Lepus townsendii*)	BLM-S, WC	Present	1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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 2015a, BLM 2015a, USFWS 2010c.
[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.
[2]Occurence: Present – species documented within the Project study 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 study 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; - = cover type does not provide suitable habitat for this species.
[5]Species protected under the MBTA.
[6]Species protected under the Bald and Golden Eagle Protection Act.

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Pygmy whitefish (*Prosopium coulteri*) 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 2013a), limited habitat for pygmy whitefish is present within the Project study area and it is unlikely that they occur (Hallock and Mongillo 1998).

The **Pacific lamprey** (*Entosphenus tridentatus*) and **river lamprey** (*Lampetra ayresi*) 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 study area (NatureServe 2013a).Near the Project study area, adult pacific lamprey passing 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 (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 **tui chub** (*Siphateles bicolor*) usually occurs in weedy shallows of lakes or in mud- or sand-bottomed reservoirs of slow-moving headwaters, creeks, and small to medium rivers (NatureServe 2013b). They occur in the Columbia River watershed which includes the eastern portion of the Project study area, but not in the Yakima River watershed.

The **leopard dace** (*Rhinichthys falcatus*) and the **mountain sucker** (*Catostomus platyrhynchus*) inhabit flowing reservoirs, 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 study area (NatureServe 2013a).

Umatilla dace inhabits the riffles and runs of large rivers (Froese and Pauly 2011). The portions of the Columbia River and Yakima River present within the Project study area are within the known range of the Umatilla dace (NatureServe 2011; Froese and Pauly 2011).

Amphibian and Reptile Species
Three amphibian and six reptile special status species occur or have the potential to occur in the Project study 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** (*Rana luteiventris*) 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 reservoirs (AmphibiaWeb 2011). Although common in other parts of Washington, only small, scattered populations occur in the Columbia Basin. The Project study 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 study area (Army 2010; Grant County Public Utility District [PUD] 2003). Suitable habitat is very limited in the Project study area.

Historical data indicate that **northern leopard frogs** (*Rana pipiens*) were present along the Columbia River and its major tributaries, including Crab Creek (WDFW 2013a). Suitable habitat for northern leopard frog exists in Lower Crab Creek, but they are unlikely to occur due to the presence of introduced fish and bull frogs (McAllister et al. 1999; Grant County PUD 2003). Limited suitable habitat is available within the Project study area and they are unlikely to occur.

Western toads (*Bufo boreas*) 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 study area is located, their distribution is limited (Hallock and McAllister 2005). Limited suitable habitat is available within the Project study 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 study area. The **night snake** occurs in a variety of habitats, from coastal dunes, mountain meadows, grasslands, to oak woodland and ponderosa pine forests. Within the Project study area, there are several records of the night snake near the Columbia River. Additional records indicate the night snake also occurs along the Yakima River, outside of the Project study area (Weaver 2008).

The **sharptail snake** (*Contia tenuis*) 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 study area in the Yakima River Canyon and Umtanum Creek. Limited suitable habitat for the sharptail snake is present within the Project study area.

The **striped whipsnake** is found in sagebrush flats, grasslands, and in basalt outcrops (Hallock and McAllister 2005). This species is rare and localized in Washington. According to WDFW, the striped whipsnake is known to occur in just one small area within Washington. This occupied habitat extends from Highway 26, located north of Vantage Substation, south to Lower Crab Creek. Historically occupied habitat in the Project study area also extends to both sides of the Columbia River and continues south to the Hanford Site (WDFW 2013b; Appendix A - Sensitive Wildlife Species).

The **northwest pond turtle** (*Actinemys marmorata marmorata*) 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 study area, potential suitable habitat is limited to along the Columbia River and Lower Crab Creek.

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 study area near the Columbia River, near the Vantage Substation, and near Lower Crab Creek.

Side-blotched lizards (*Uta stansburiana*) 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 study area (Hallock and McAllister 2005). Suitable habitat exists for side-blotched lizards and they have been documented in the Project study area north of Vantage Substation.

Bird Species

Thirty-four avian special status species are known or likely to occur in the Project study area; all but four are protected under the MBTA (Table 3.3-7). Avian species have potential habitat throughout the entire Project study 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). Migratory Birds with potential to occur in the Project study area are discussed further in Appendix B-8 - Migratory Bird Conservation Plan.

Passerines and Other Birds
The Project study area lies within the critical breeding habitat of the **black swift** (*Cypseloides niger*); 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 study area; however, the Project study area is on the eastern edge of their foraging, summer non-breeding range (Opperman et al. 2006).

The **black-throated sparrow** (*Amphispiza bilineata*) occurs in desert scrub, saltbush (*Atriplex* sp.), greasewood (*Sarcobatus* sp.), sagebrush, antelope bitterbrush (*Purshia tridentata*) 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 study area is within the black-throated sparrow's core breeding habitat zone and suitable habitat is present within the Project study area.

Bobolinks (*Dolichonyx oryzivorus*) are generally found in tall-grass prairies, hay fields, and similar open areas (BirdWeb 2008). The Project study area is not within the bobolinks breeding habitat zone. Limited suitable habitat exists in developed agricultural land within the Project study area.

Cedar waxwings (*Bombycilla cedrorum*) 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 study area.

The **gray flycatcher** (*Empidonax wrightii*) is associated with sagebrush and juniper habitats. The Project study area is within the migration corridor for the gray flycatcher (BirdWeb 2008). Suitable habitat is present within the Project study area, but the species is rare in the Project study area; a single individual was observed singing a few hundred meters north of Route Segment NNR-6 by POWER biologists during the 2013 field surveys.

Lewis's woodpecker is (*Melanerpes lewis*) associated with open forests; primary habitats in Washington include ponderosa pine (*Pinus ponderosa*) forests, Garry oak (*Quercus garryana*) stands, and forested riversides with large cottonwoods and other hardwoods (Larsen et al. 2004). Limited suitable habitat is present within the Project study area, primarily along Lower Crab Creek, the Yakima River, and Burbank Creek, and possibly along Lmuma Creek, the Columbia River, Johnson Creek, and Foster Creek.

The **lesser goldfinch** (*Carduelis psaltria*) 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 study area is outside the known range of the lesser goldfinch (BirdWeb 2008). Potential suitable habitat exists within the Project study area, but it is unlikely that lesser goldfinch is present.

In Washington, the **loggerhead shrike** breeds primarily in shrub-steppe habitats. The Project study area is within the core breeding habitat zone for loggerhead shrikes (Larsen et al. 2004). Loggerhead shrikes have been documented in the Project study area and large tracts of suitable shrub-steppe habitats occur throughout the Project study area.

Oregon vesper sparrows are commonly found in dry grasslands, shrub-steppe, and agricultural fields. They are uncommon in shrub-steppe areas that are heavily grazed or have little grass cover (BirdWeb

2008; Paige and Ritter 1999). Suitable habitat exists throughout the Project study 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 study 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 study area and are abundant in Route Segments NNR-6 and NNR-7. Suitable habitat is present throughout the Project study 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 study 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 study area by POWER biologists. Suitable habitat is present throughout the Project study area.

Vaux's swifts (*Chaetura vauxi*) forage over woodlands, lakes and rivers, where flying insects are abundant. They typically nest in old growth coniferous forests. The Project study area is within the known range of the Vaux’s swift, but is probably only used during migration (BirdWeb 2008; Larsen et al. 2004).

<u>*Raptors*</u>
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 2007). 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; FERC 2006). Approximately 10 to 15 bald eagles winter along the Priest Rapids Reservoir. Two bald eagle nests have been documented within the Project study area along the Columbia River and one 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 study area (DES 2000).

Short-eared owls (*Asio flammeus*) are widespread but uncommon in eastern Washington. They inhabit a variety of open terrain, including shrub-steppe, grasslands, agricultural areas, marshes, wet meadows, and shorelines. Potential habitat occurs throughout the Project study area and they are likely to occur in small numbers (BirdWeb 2015).

The **ferruginous hawk** is found in flat or rolling shrub-steppe and other arid shrublands (Paige and Ritter 1999). The Project study area is within the core breeding habitat zone for ferruginous hawks (Larsen et al. 2004). Four nests have been documented within the Project study area, all from 15 to 18 years ago.

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). Nesting golden eagles have been documented in the Project study area.

In Washington, **peregrine falcons** (*Falco peregrinus*) 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 study area, several peregrine falcon nests have been documented on cliffs along the west side of the Columbia River.

Gyrfalcons (*Falco rusticolus*) 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 Society 2014). The Project study area is considered to be within gyrfalcon winter range by the Seattle Audubon Society (BirdWeb 2013).

Upland Game Birds
Chukars (*Alectoris chukar*) are found in steep, rocky shrub-steppe habitats with perennial and annual grasses and forbs (Larsen et al. 2004). The Project study area is within the primary management zone for chukar and they are documented to occur within the Project study area.

Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) 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 study 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 study area, but it is unlikely that Columbian sharp-tailed grouse are present.

Ring-necked pheasants (*Phasianus colchicus*) 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 study area is within the known range of the ring-necked pheasant, and suitable habitat occurs in agricultural pockets within the Project study area. They have been documented on the JBLM YTC and near the Vantage Substation, just outside the Project study area.

Mountain quail (*Oreortyx pictus*) are known to occur in three separate populations within Washington; the nearest is about 45 miles south of the Project study area, in Klickitat County (BirdWeb 2008). They inhabit dense thickets with scattered open areas on slopes; suitable habitat does not occur within the Project study area.

Waterfowl, Shorebirds, and Other Water-birds
American white pelicans (*Pelecanus erythrorhynchos*) nest on isolated islands on lakes and rivers, and forage in shallow lakes and rivers. Non-breeding pelicans occur within the Project study area on the Columbia and Yakima Rivers (BirdWeb 2013). POWER biologists observed them within the Project study area on the Columbia River.

Great blue herons (*Ardea herodias*) 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 study area, suitable habitat exists along rivers, streams, and irrigated agricultural areas near canals (BirdWeb 2013).

Black-crowned night herons (*Nycticorax nycticorax*) breed in wetlands along the Columbia River. In the Project study area, they have been documented in several locations on Priest Rapids Lake (BirdWeb 2013). Both species nest colonially on Goose Island above Priest Rapids Dam (WDFW 2015a).

During the breeding season, **Clark's grebe** (*Aechmophorus clarkii*) and **western grebe** (*Aechmophorus occidentalis*) 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 study 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 study area. In eastern Washington, **eared grebes** (*Podiceps nigricollis*) breed in large freshwater lakes and reservoirs with open water and emergent vegetation (BirdWeb 2008) and likely occur within the Project study area on the Columbia River and in backwater areas along the Yakima River.

Migrant **common loons** (*Gavia immer*) winter along Washington's coast, the Columbia and Snake Rivers, and on lakes in northeastern Washington (Larsen et al. 2004). Within the Project study area, they have been documented in the Columbia River and Wanapum and Priest Rapid Reservoirs are regular concentration areas (WDFW 2015a).

Harlequin ducks (*Histrionicus histrionicus*) require fast-flowing mountain streams with calm loafing sites located nearby (Larsen et al. 2004). The Project study area is located outside the harlequin duck's known range and they have not been documented in the JBLM YTC (Larsen et al. 2004; DES 2000). There is not suitable habitat present within the Project study area and it is unlikely that harlequin ducks will occur.

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 study area is within the breeding range of the long-billed curlew (BirdWeb 2008; Paige and Ritter 1999). Breeding and large concentrations have been documented on the JBLM YTC and within the Project study area (WDFW 2015a).

Upland sandpipers (*Bartramia longicauda*) occur in native grasslands and are often found nesting at airports and airfields. The Project study area is outside the known distribution of upland sandpipers; however, rare migrants may occur within the Project study area (BirdWeb 2008).

Sandhill cranes (*Grus canadensis***)** 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 study 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 (*Cygnus columbianus*) 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 study 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

Fifteen mammal special status species are known or likely to occur in the Project study area (Table 3.3-7). Mammal species have potential habitat throughout the entire Project study 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. Resident bighorns are found immediately west of the Project study area within the Yakima Canyon and along bluffs within the Yakima River drainage (JBLM YTC 2002). The Project study area overlaps the Mount Baldy bighorn sheep winter range. Potential habitat exists within the Project study area; however, suitable habitat may be limited to canyons outside the Project study area.

Black-tailed jackrabbit (*Lepus californicus*) occurs in sagebrush and grasslands within the Columbia Plateau (ASM 2011; WDFW 2013a). Black-tailed jackrabbits have been observed within the Project study area and suitable habitat exists throughout the Project study area. **White-tailed jackrabbit** (*Lepus townsendii*) occurs in the grasslands of the Columbia Basin (ASM 2011). They are associated with bunchgrass grasslands, rabbitbrush, and relatively undisturbed shrub-steppe habitats (DES 2000; WDFW 2013a). White-tailed jackrabbits have been documented within the Project study area and suitable habitat exists.

In Washington, WDFW identifies deer east of U.S. Route 97 (US-97) as **Rocky Mountain mule deer** (*Odocoileus hemionus hemionus*) and deer west of US-97 as **Columbian black-tailed deer (***Odocoileus hemionus columbianus***)**. 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 study area. The Columbia Basin represents the periphery of the **northwest white-tailed deer** (*Odocoileus virginianus ochrourus*) distribution in central Washington. The habitat in the Project study 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 study area is limited, occurring primarily near Burbank, Foster, Johnson, and Lower Crab 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; within the Project study area winter range occurs west of the Yakima River and also within the southern portions of the Project study area. Elk are known to occur west of the Project study area in Wenas Wildlife Area (DES 2000). Suitable habitat is present within the Project study area and they were observed within the Project study area by POWER biologists during 2013 field surveys completed in support of the SDEIS.

Merriam's shrew (*Sorex merriami*) 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 study area (DES 2000; Azerrad 2004; WDFW 2015a). The Project study area occurs outside the known range of **Preble's shrew (***Sorex preblei***)** and this species has not been documented in the Project study area or on the JBLM YTC (DES 2000, NatureServe 2013a). Recorded habitat for Preble's shrew includes arid and semiarid shrub-grass associations dominated by sagebrush (NatureServe 2013a). Suitable habitat exists within the Project study area.

Little brown myotis (*Myotis lucifugus*) is one of the most common and widespread bats in North America. In the northeastern U.S., the species suffered a recent severe population collapse due to white-nose syndrome, but populations in Washington were unaffected. This species is a habitat generalist. In Washington, it is most abundant in the forests of the Cascade Mountains and the northeastern part of the state, but it also occurs in open forests, forest margins, shrub-steppe, clumps of trees in open habitats, sites with cliffs, and urban areas. Within these habitats, riparian areas and sites with open water are usually preferred. Roosting occurs in a variety of sites, including buildings and other structures, tree cavities and beneath bark, rock crevices, caves, and mines. Hibernacula include caves, abandoned mines, and lava tubes (Hayes and Wiles 2013). Occurrence is likely throughout the Project study area, especially near residential areas, trees, cliffs, and water.

The **pallid bat** (*Antrozous pallidus*) 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 study area is within the known range of the pallid bat and they have been observed in the JBLM YTC and within the Project study area (DES 2000, Ferguson and Azerrad 2004, WDFW 2015a). Suitable habitat is present throughout the Project study area.

Spotted bats (*Euderma maculatum*) 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. They typically roost on large cliff faces (Chambers and Herder 2005). Spotted bats are not known to occur within the Project study area, but suitable habitat exists.

Townsend's big-eared bats (*Corynorhinus townsendii*) 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 (Woodruff and Ferguson 2005; WDFW 2013a). There are no records of Townsend's bats occurring in or around the Project study area and they have not been documented on JBLM YTC (DES 2000); however, suitable habitat exists.

Townsend's ground squirrels (*Urocitellus townsendii*) 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 2013a). They have been documented on JBLM YTC and suitable habitat exists within the Project study area (DES 2000; Howard 1996).

Washington ground squirrel (*Urocitellus washingtoni*) was previously considered a Candidate species for the federal ESA. On September 21, 2016, the USFWS found that listing the species as endangered or threatened or maintaining the species as a candidate was not warranted through all or a significant portion of its range (USFWS 2016). Currently, the Washington ground squirrel is considered a BLM Sensitive Species and a candidate for state listing. Washington ground squirrels are associated with 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 squirrel distribution includes the Columbia Plateau east and south of the Columbia River.

3.3.2.5 Local Critical Areas

Local critical areas for wildlife include streams, lakes, and riparian areas; big game winter range; and priority habitats and species.

The primary surface water features found within the Project study area include the Columbia River in the eastern portion of the Project study area and the Yakima River in the western portion. In addition, Lower Crab Creek, Lmuma, Burbank, Johnson, Foster, and Selah Creeks are present within the Project study area and contain perennial flow for much of their length. Riparian and wetland communities comprise a small portion of the Project study area (743 acres; 0.4 percent), but these communities are characterized by higher productivity and greater habitat and species diversity compared to adjacent uplands (Knutson and Naef 1997). The majority of riparian areas within the Project study area are seasonally moist uplands. These drier riparian areas are typically vegetated with upland shrubs, including sagebrush. The Yakima River (Route Segment NNR-3), Burbank Creek (Route Segment NNR-3), and Foster Creek (Route Segment NNR-6) support wooded riparian vegetation, primarily dominated by black cottonwood and willow. The largest riparian areas occur along the Columbia River and Lower Crab Creek (Route

Segments 3b and 3c); much of the Crab Creek riparian area is bordered by pastureland and disturbed, often grazed, shrub-steppe habitats. For more information on water resources and riparian and wetland vegetation, refer to Sections 3.3.2.1 Species and Habitats General, 3.14 Water Resources, 3.2 Vegetation, and Appendix A - Project Maps.

As described in Sections 3.3.2.4 and 4.3.3.5, the Project study area at Route Segments NNR-3, NNR-4, and MR-1 overlaps the Mount Baldy bighorn sheep winter range along the eastern side of the Yakima River Canyon and the Wenas State Wildlife Area winter range for elk and mule deer within the Yakima River Canyon and on the foothill slopes west of the canyon (Route Segment NNR-3). The southeast portion of the Project study area is also winter range for elk (Route Segments 1c, 2a, 2b, 2c, 2d, 3a, 3b). The area extending south from the Saddle Mountains and west from the Columbia River has been identified as a mule deer regular large concentration area (Route Segments 2d, 3b, 3c, NNR-6, NNR-7). While the WDFW PHS data does not specify a season of use for this area, the shrub-steppe area is probably heavily used during winter. These areas are mapped in Appendix A Sensitive Wildlife Species and are described within Section 3.3.2.4 State-listed and Other Special-status Species and Section 3.3.5 Route Segment Considerations. Impacts to these resources are discussed in Section 4.3.3.5 State-listed and Other Special-status Species and Section 4.3.4 Impacts Specific to Route Segments.

Data from WDFW PHS documents occurrence of 26 special status species within the Project study area, including three reptiles (night snake, striped whipsnake, and sagebrush lizard), one fish (leopard dace), 14 bird species (bald eagle, burrowing owl, ferruginous hawk, golden eagle, peregrine falcon, loggerhead shrike, Sage-Grouse, chukar, ring-necked pheasant, common loon, American white pelican, black-crowned night heron, great blue heron, and long-billed curlew), and six mammal species (white-tailed jackrabbit, black-tailed jackrabbit, mule deer, elk, Merriam's shrew, and pallid bat). These occurrences are mapped in Appendix A Sensitive Wildlife Species and are described within Section 3.3.2.4 State-listed and Other Special-status Species and Section 3.3.5 Route Segment Considerations. Impacts to these resources are discussed in Section 4.3.3.5 State-listed and Other Special-status Species and Section 4.3.4 Impacts Specific to Route Segments. Locations are mapped in Appendix A Sensitive Wildlife Species. No federally listed species have been documented.

The Project study area does not pass through any special management areas, but the Columbia National Wildlife Refuge, Hanford Reach National Monument, Columbia Basin State Wildlife Area, and Wenas State Wildlife Area occur within one mile of the Project study area. Special Management areas are discussed in Section 3.6 Special Management Areas.

3.3.3 Current Management Considerations

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

3.3.3.1 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 2011c). 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.

3.3.3.2 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).

3.3.3.3 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 §668 (a); 50 Code of Federal Regulations Part 22.3; USFWS 2011c).

3.3.3.4 Washington State Species of Concern

Under Washington State Statute (Washington Administrative Code [WAC] 232-12-297), state listing determinations are made according to consistent criteria described in the statute. State status of wildlife species is determined using considerations such as abundance, occurrence patterns, vulnerability, threats, existing protection, and taxonomic distinctness. State status definitions as defined in the State statute WAC 232-12-297 include but are not limited to:

<u>State Endangered Species</u> is defined in WAC 232-12-297, Section 2.4, to include "any wildlife species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state."

<u>State Threatened Species</u> is defined in WAC 232-12-297, Section 2.5, to include "any wildlife species native to the state of Washington that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats."

<u>State Sensitive Species</u> is defined in WAC 232-12-297, Section 2.6, to include "any wildlife species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened throughout a significant portion of its range within the state without cooperative management or removal of threats."

<u>State Candidate Species</u> is defined in WDFW Policy M-6001 to include fish and wildlife species that the Department will review for possible listing as State Endangered, Threatened, or Sensitive. A species will be considered for designation as a State Candidate if sufficient evidence suggests that its status may meet the listing criteria defined for State Endangered, Threatened, or Sensitive.

Species are recommended by the WDFW to the Fish and Wildlife Commission, which makes the listing determinations. WDFW maintains a list of state species of concern, as well as the location data for species of concern occurrences (WDFW 2015a).

3.3.3.5 Washington Department of Fish and Wildlife Priority Habitats and Species

The PHS Program was initiated in 1989. WDFW manages data on wildlife PHSs; those that are rare or have very limited distribution (WDFW 2016). In addition to State Endangered, Threatened, Sensitive, and

Candidate Species, PHS also include animal aggregations (e.g., heron colonies, bat colonies) considered vulnerable, and species of recreational, commercial, or tribal importance that are vulnerable. PHS occurrence data was obtained from WDFW for the two-mile wide Project study area in June 2014.

3.3.3.6 Sage-Grouse Management

An overview of the regulatory environment specifically related to Sage-Grouse in the Project study 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, BLM 2015b). In 2001, USFWS determined that the western subspecies of Greater Sage-Grouse (*Centrocercus urophasianus phaios*) met the requirements of a DPS; (the USFWS recently reanalyzed this designation and have determined that the eastern and western subspecies are no longer considered separate taxa [USFWS 2015c]). 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 was considered a Candidate species under ESA (USFWS 2010a).

In the 2010 12-month finding, USFWS identified the two primary threats to Sage-Grouse as habitat destruction/modification and inadequacy of existing regulatory mechanisms to protect Sage-Grouse. USFWS identified that the principal regulatory mechanisms for the BLM and U.S. Forest Service would be conservation measures in their land use plans. In response, the BLM issued two Instruction Memoranda (IMs) for Sage-Grouse: WO IM 2012-043 (BLM 2011a); and WO IM 2012-044 (BLM 2011b), which initiated amendments of BLM Resource Management Plans and Land Use Plans. Because Sage-Grouse in Washington State were considered a DPS at the time, the BLM excluded Washington State from IM 2012-043 and IM 2012-044 (BLM 2011c). The Spokane District is currently completing a Land Use Plan revision which will address regulatory mechanisms for Sage-Grouse in Washington.

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 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 YTC) and two historic populations undergoing reintroduction efforts with translocated birds. The Project study area west of the Columbia River is located entirely within the YTC PAC (Figure 3.3-1 Sage-Grouse Priority Area for Conservation).

As USFWS prepared to make a final listing determination in 2015, state and federal agencies and private partners across the Sage-Grouse's range engaged in an unprecedented conservation effort to protect Sage-Grouse. Upon consideration of the conservation measures put in place by state and federal agencies and private stakeholders to protect Sage-Grouse, USFWS determined that listing under the ESA was not warranted for Sage-Grouse, rangewide. Furthermore, USFWS determined that the Columbia Basin population (including the Washington State population) did not constitute a DPS (USFWS 2015c).

Primary guidance for conservation of Sage-Grouse in the YTC population is the Washington Greater Sage-Grouse Recovery Plan (Stinson et al. 2004) and the JBLM YTC Western Sage-Grouse Management Plan (Livingston 1998). The Required Design Features (RDFs), the Project-Specific Framework for Development of a Sage-Grouse Compensatory Mitigation Plan, and Pacific Power's Sage-Grouse Compensatory Mitigation Plan are all Project-specific components in the effort to protect and recover Sage-Grouse.

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 MUs 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 Action Alternatives 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* - 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* - includes movement corridors between seasonally used areas and 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* - 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* - 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 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.

3.3.4 Route Segment Considerations

3.3.4.1 Route Segment 1a/ NNR-1

Route Segment 1a/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 (3,292 acres, 68 percent) and shrub-steppe that has been converted to agriculture (541 acres, 11 percent; Table 3.3-2). Approximately 7.4 percent (324 acres) of Route Segment 1a/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/NNR-1 crosses a concrete-lined irrigation canal operated by Roza Irrigation District and several intermittent or ephemeral drainages with no riparian habitat present. Open water is also present within the Yakima River (0.8 miles to the west of Route Segments 1a/NNR-1, NNR-2, NNR-3, and MR-1) and associated waters of the Selah Gravel Pit wetlands (0.5 miles to the northwest of Route Segment 1a/NNR-1), for a total of 460 acres of open water (9.5 percent). Riparian habitat (12 acres) 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, located to the west of Route Segment 1a/NNR-1. Bald eagles are known to nest near the Selah Gravel Pit wetlands, located along the Yakima River and west of Route Segment 1a/NNR-1. The Selah Gravel Pit wetlands and East Selah 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.

This route segment passes through a suburban residential area with heavily fragmented shrub-steppe habitat and a prevalence of disturbed ground and cheatgrass. The eight-mile wide Sage-Grouse analysis area for 1a/NNR-1 contains 6,770 acres of suitable Sage-Grouse habitat (16 percent of the analysis area), 1,374 acres of marginal habitat (three percent), and 35,125 acres of unsuitable habitat (81 percent; Table 3.3-9).

The estimated Sage-Grouse population range does not overlap the 1a/NNR-1 ROW. Approximately two percent (3,623 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment 1a/NNR-1 (Figure 3.3-4). The core population range does not overlap the analysis area (Figure 3.3-4). Route Segment 1a/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 1a/NNR-1.

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] (329,955 Acres Total)	Occasionally Occupied Habitat Present within Analysis Area (Acres)[2] (144,281 Acres Total)	Expansion Habitat Present within Analysis Area (Acres)[2] (19,031 Acres Total)
1a/NNR-1	20,162	2,379	0
1b	63,443	13,373	0
1c	62,707	14,753	0
2a	23,547	12,989	0
2b	83,356	31,859	0
2c	68,493	54,723	0
2d	38,643	16,220	3,146
3a	11,182	18,395	837
3b	76,187	39,278	3,802
3c	34,114	59,284	19,031
NNR-2	29,574	7,442	0
NNR-3	61,214	13,210	0
NNR-4o/NNR-4u*	52,525	1,440	0
NNR-5	39,635	0	0
NNR-6o/NNR-6u*	64,157	0	0
NNR-7	63,322	10,825	0
NNR-8	22,266	19,507	837
MR-1	63,699	7,751	0

[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 Suitability within the Eight-Mile Wide Analysis Area (Acres) by Route Segment[1]

ROUTE SEGMENT	SUITABLE HABITAT[2]	MARGINAL HABITAT[3]	UNSUITABLE HABITAT[4]
1a/NNR-1	6,770	1,374	35,125
1b	26,910	1,736	64,404
1c	26,960	1,716	65,642
2a	11,786	91	25,239
2b	57,485	157	58,149
2c	51,815	143	71,834
2d	35,130	104	31,499
3a	17,568	744	14,573
3b	81,970	2,888	55,339
3c	65,477	8,359	80,022
NNR-2	11,168	1,392	38,442
NNR-3	42,197	2,145	35,113
NNR-4o/NNR-4u*	35,502	912	18,774

ROUTE SEGMENT	SUITABLE HABITAT[2]	MARGINAL HABITAT[3]	UNSUITABLE HABITAT[4]
NNR-5	28,425	71	12,193
NNR-6o/NNR-6u*	52,922	187	11,968
NNR-7	63,145	320	10,681
NNR-8	28,583	1,333	15,183
MR-1	44,094	3,881	35,312
Entire Project	277,276	16,633	287,840

[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.
[2] Suitable habitat includes sagebrush/perennial grassland.
[3] Marginal habitat includes sagebrush/annual grassland, riparian, intermittent stream, and bitterbrush/perennial grassland.
[4] Unsuitable habitat includes forb, perennial grassland, rabbitbrush/annual grassland, annual grassland and noxious weeds, basalt cliffs/rock, trees, and other (includes agriculture, developed/residential areas and open water).
* o = overhead design option; u = underground design option.

3.3.4.2 Route Segment 1b

Route Segment 1b is 12.5 miles long and would be located just within the JBLM YTC boundary and would parallel an existing fire break road. Vegetation along Route Segment 1b is a mosaic of annual grassland (8,254 acres, 46 percent), sagebrush/perennial grassland (4,617 acres, 26 percent), and perennial grassland (3,671 acres, 21 percent) providing suitable habitat for grassland and shrub-steppe species (Table 3.3-2). Small ephemeral drainages support 61 acres of riparian vegetation and a 1.1-acre aspen stand.

Route Segment 1b crosses 3.2 miles of long-billed curlew Priority Species Regional Area and additional potential habitat is present. Five burrowing owl nests were documented in 2000 within one mile of Route Segment 1b. There is a small loggerhead shrike concentration area on the north slope of Yakima Ridge just east of the ROW (<0.1 mile away). Black-tailed jackrabbits have also been documented on the north slope of Yakima Ridge, within one mile of Route Segment 1b. Elk winter range is located to the east, within one mile of 1b.

The entire route segment ROW is within the Yakima Training Center 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 and secondary protection zones for Sage-Grouse.

Fire history records indicate there have been several fires within and near this route segment. Two fire breaks are present within most of the ROW corridor, consisting of bare ground, cheatgrass and Russian thistle (*Kali tragus*). Despite this disturbance, the adjacent habitat is predominantly high quality big sagebrush and stiff sagebrush with abundant native perennial bunchgrasses, low non-native species cover, and a diverse and abundant native forb layer. The eight-mile wide Sage-Grouse analysis area for Route Segment 1b contains 26,910 acres of suitable Sage-Grouse habitat (29 percent of the analysis area), 1,736 acres of marginal habitat (two percent), and 64,404 acres of unsuitable habitat (69 percent; Table 3.3-9).

Seventy-three percent of the Route Segment 1b ROW is within the estimated Sage-Grouse population range and 18 percent of the ROW is within the core population range. Approximately 26 percent (49,928 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment 1b (Figure 3.3-4). (Figure 3.3-4). Three active leks (Leks #1, #3, and #4) and one inactive lek occur within four miles of Route Segment 1b (Table 3.3-5). Lek #1 is located approximately 3.6 miles north of Route Segment 1b. As it is slightly closer to Route Segment NNR-3, Lek #1 is described in more detail for Route Segment NNR-3. Lek #3 occurs approximately 2.9 miles northeast of Route Segment 1b. Lek #3 has been active every year since data collection began in 1989, with an average count of 27 males, though counts have been lower in recent years—with an average of four males during each of the past four years. Lek #3 had four males attending in 2015, and four in 2014. An inactive lek within the same complex (complex #3) is located approximately 1.6 miles southwest of the active Lek #3, and 1.3 miles northeast of Route Segment 1b.This lek was last active in 2006 (SEE 2015). Lek #4 occurs approximately 3.9 miles east of Route Segment 1b; it is described in more detail for Route Segment 2b, to which it is more closely located. Additionally, 12 historic leks occur within four miles of Route Segment 1b.

3.3.4.3 Route Segment 1c

Route Segment 1c is 12.9 miles long and would parallel the western and southern boundary of JBLM YTC on private land. Route Segment 1c closely parallels Route Segment 1b for the majority of its length and has similar characteristics—i.e., a mosaic of annual grassland (8,869 acres, 48 percent), sagebrush/perennial grassland (4,212 acres, 23 percent) and perennial grassland (3,382 acres, 18 percent), providing suitable habitat for grassland and shrub-steppe species (Table 3.3-2). Small ephemeral drainages support 60 acres of riparian vegetation and a 1.1-acre aspen stand.

Long-billed curlew Priority Species Regional Area occurs within one mile of the Route Segment 1c ROW and additional potential habitat is present. Five burrowing owl nests were documented in 2000 within one mile of Route Segment 1c. There is a small loggerhead shrike concentration area on the north slope of Yakima Ridge just east of the ROW (0.1 mile away). Black-tailed jackrabbits have also been documented on the north slope of Yakima Ridge, within one mile of Route Segment 1c. Elk winter range is located to the east, within one mile of Route Segment 1c.

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 and secondary protection zones for Sage-Grouse.

The majority of the habitat along and immediately adjacent to this Route Segment is highly disturbed and poor quality, and borders agricultural land, roads and residences. But much of the surrounding habitat is predominantly high quality big sagebrush and stiff sagebrush with abundant native perennial bunchgrasses, low non-native species cover, and a diverse and abundant native forb layer. The eight-mile wide Sage-Grouse analysis area for Route Segment 1c contains 26,960 acres of suitable Sage-Grouse habitat (29 percent of the analysis area), 1,716 acres of marginal habitat (two percent), and 65,642 acres of unsuitable habitat (69 percent; Table 3.3-9).

Seventy-three percent of the Route Segment 1c ROW is within the estimated Sage-Grouse population range and 14 percent of the ROW is within the core population range. Approximately 25 percent (49,208 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment 1c (Figure 3.3-4).Three active leks (Leks #1, #3, and #4) and one inactive lek occur within four miles of Route Segment 1c. Because each of these leks is located closer to another route segment, they are described more fully for the route segment to which they are closest (Table 3.3-5). Lek #1 is located approximately 3.7 miles north of Route Segment 1c (described for Route Segment NNR-3), Lek #3 occurs approximately 3.0 miles northeast of 1c (described for 1b), Lek #4 occurs approximately 3.9 miles east of 1c (described for 2b), and an inactive lek is located approximately 1.4 miles northeast of 1c (described for 1b). Additionally, 12 historic leks occur within four miles of Route Segment 1c.

3.3.4.4 Route Segment 2a

Route Segment 2a is 1.0-mile long and would extend south from the 1a/NNR-1-1b route node on private property paralleling the boundary of a DNR parcel for a distance of one mile to the 2b-2c route node. Habitat along this short segment is limited due to the domination of non-native annual grasses (2,097 acres, 65 percent; Table 3.3-2). Sagebrush/perennial grass makes up most of the remainder of the area

(745 acres, 23 percent). Route Segment 2a crosses a small creek which has some riparian vegetation present (41 acres, 1.3 percent).

The Route Segment 2a ROW passes through elk winter range. A long-billed curlew Priority Species Regional Area occurs within one mile of Route Segment 2a and additional potential habitat is present.

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 and secondary protection zones for Sage-Grouse.

Habitat along and immediately adjacent to this route segment appears to be highly disturbed and of poor quality, but much of the surrounding habitat is high quality sagebrush-steppe. The eight-mile wide Sage-Grouse analysis area for Route Segment 2a contains 11,786 acres of suitable Sage-Grouse habitat (32 percent of the analysis area), 91 acres of marginal habitat (<1 percent), and 25,239 acres of unsuitable habitat (68 percent; Table 3.3-9).

One hundred percent of the Route Segment 2a ROW is within the estimated core Sage-Grouse population range. Approximately 14 percent (27,295 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment 2a (Figure 3.3-4). One active lek (Lek #4) occurs within four miles of Route Segment 2a (Table 3.3-5). Lek #4 is located approximately 3.9 miles east of Route Segment 2a; it is described in more detail for Route Segment 2b, to which it is more closely located. Additionally, one historic lek occurs within four miles of Route Segment 2a.

3.3.4.5 Route Segment 2b

Route Segment 2b extends east on private property for 16.3 miles, spanning a short section of BLM land (970 feet) along the way. The eastern half of the route segment follows the southern edge of JBLM YTC. Vegetation is predominately sagebrush/perennial grassland (13,752 acres, 60 percent). The remainder is mostly annual grassland (4,515 acres, 20 percent) and agriculture (3,355 acres, 15 percent; Table 3.3-2). The shrublands provide suitable habitat for shrub-steppe and grassland species.

The entire area within and around Route Segment 2b is designated elk winter range. Black-tailed jackrabbit has been documented within one mile of 2b.

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 and secondary protection zones for Sage-Grouse.

The central and eastern portions of Route Segment 2b are predominately comprised of high quality big sagebrush and stiff sagebrush with abundant native perennial bunchgrasses, low non-native species cover, and a diverse and abundant native forb layer. Although high quality habitat is present, the eastern portion of this route segment has experienced habitat fragmentation in the past; it parallels a disturbed fire break and is adjacent to agriculture/cropland. The western part of the route segment is comprised of areas with lower habitat quality dominated by cheatgrass and/or crested wheatgrass. Fire records indicate that several large fires have occurred within and adjacent to this route segment. The Range 12 Fire of 2016 burned approximately 175,000 acres in areas located in Yakima and Benton counties, Washington. This fire burned approximately 13.2 miles along Route Segment 2b. Post fire restoration efforts for the Range 12 fire are in development and its affects to Sage-Grouse habitat have not been assessed. The eight-mile wide Sage-Grouse analysis area for Route Segment 2b contains 57,485 acres of suitable Sage-Grouse habitat (50 percent of the analysis area), 157 acres of marginal habitat (<1 percent), and 58,149 acres of unsuitable habitat (50 percent; Table 3.3-9).

Eighty four percent of the Route Segment 2b ROW is within the estimated Sage-Grouse population range and 41 percent of the ROW is within the core population range. Approximately 36 percent (70,636 acres) of the total JBLM YTC 95 percent population range is within four miles of Route Segment 2b (Figure 3.3-4). One active lek (Lek #4) occurs within four miles of Route Segment 2b (Table 3.3-5). Lek #4 is located approximately 1.5 miles north of Route Segment 2b. From the time this lek was discovered, in 1998, through 2014 it was occupied every year, with an average count of 13 males. No males were observed at the lek in 2015, but it is still considered an active lek, because three males were counted in 2014 (SEE 2015). Additionally, three historic leks occur within four miles of Route Segment 2b.

3.3.4.6 Route Segment 2c

Route Segment 2c extends southeast across private property to the Midway-Moxee 115 kV and Union Gap-Midway 230 kV transmission lines, which it proceeds to closely parallel for 8.6 miles of the route segment's 18.1-mile total length. The eastern half of the route segment is within approximately one-half mile of State Highway 24. Vegetation along Route Segment 2c consists of a mix agriculture (10,566 acres, 42%), annual grassland (7,092 acres, 28 percent), and sagebrush/perennial grassland (6,861 acres, 27%) and provides suitable habitat for shrub-steppe and grassland species (Table 3.3-2).

The entire Route Segment 2c ROW is within designated elk winter range. Three burrowing owl nests and breeding long-billed curlews have been documented within one mile of Route Segment 2c.

Most of the route segment ROW is within the Rattlesnake Hills Sage-Grouse MU (Regularly Occupied Habitat), and the remainder is within a tier 3 MU (Occasionally 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 and secondary protection zones for Sage-Grouse.

Habitat along this Route Segment has been fragmented and disturbed by roads, developed land, agricultural/cropland and annual grass establishment. Fire records indicate that several fires have occurred within and adjacent to this route segment. The Range 12 Fire of 2016 burned approximately 15.2 miles along Route Segment 2c. As previously stated, post fire restoration efforts for the Range 12 fire are in development and impacts to Sage-Grouse habitat have not been assessed. The eight-mile wide Sage-Grouse analysis area for Route Segment 2c contains 51,815 acres of suitable Sage-Grouse habitat (42 percent of the analysis area), 143 acres of marginal habitat (<1 percent), and 71,834 acres of unsuitable habitat (58 percent; Table 3.3-9).

Fifty nine percent of the Route Segment 2c ROW is within the estimated Sage-Grouse population range, and 29 percent of the ROW is within the core population range. Approximately 29 percent (55,768 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment 2c (Figure 3.3-4). One active lek (Lek #4) occurs within four miles of Route Segment 2a (Table 3.3-5). Lek #4 is located approximately 2.9 miles north of Route Segment 2c; it is described in more detail for Route Segment 2b, to which it is more closely located. Additionally, three historic leks occur within four miles of Route Segment 2c.

3.3.4.7 Route Segment 2d

Route Segment 2d extends northeast for seven miles to the Columbia River and through a landscape that is vegetated almost exclusively by sagebrush/perennial grassland (9,825 acres, 90 percent), providing habitat for grassland and shrub-steppe species (Table 3.3-2).

Most of Route Segment 2d is within designated elk winter range, and regular concentration areas for mule deer and chukar occur within one mile near the northern end of the route segment. Three ferruginous hawk nests were documented within one mile of the route segment in 2010—the nearest was approximately 0.24 miles away. Cliffs along the Columbia River provide nesting habitat for raptors and several prairie falcon nests have been documented on the cliffs. The Columbia River and the Moran Slough wetlands, located just north of the river provide habitat for waterfowl. Loggerhead shrike and white-tailed jackrabbit have been documented within one mile of Route Segment 2d. Bull trout, Chinook salmon, steelhead (Upper Columbia River), coho salmon, chum salmon, leopard dace, mountain sucker, pacific lamprey, sockeye salmon, tui chub, and Umatilla dace are known or likely to occur in the Hanford Reach of the Columbia River near Route Segment 2d.

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 and secondary protection zones for Sage-Grouse.

The entire extent of this route segment has experienced several wildfire events and the adjacent landscape has large areas dominated by annual grasses and forbs, primarily cheatgrass and tall tumble mustard (*Sisymbrium altissimum*); however, pockets of big sagebrush and forbs are present. The Range 12 Fire of 2016 burned approximately 15.2 miles along Route Segment 2c. As previously stated, post fire restoration efforts for the Range 12 fire are in development and impacts to Sage-Grouse habitat have not been assessed. The eight-mile wide Sage-Grouse analysis area for Route Segment 2d contains 35,130 acres of suitable Sage-Grouse habitat (53 percent of the analysis area), 104 acres of marginal habitat (<1 percent), and 31,499 acres of unsuitable habitat (47 percent; Table 3.3-9).

Fourteen percent of the Route Segment 2d ROW is within the estimated Sage-Grouse population range, but none of the ROW is within the core population range. Approximately 9 percent (17,602 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment 2d (Figure 3.3-4). No active or inactive leks are known to occur within four miles of this proposed route segment; one historic lek occurs within four miles of the route segment (Table 3.3-5).

3.3.4.8 Route Segment 3a

Route Segment 3a is a short segment (0.1 mile) connecting Route Segments 3b or 3c with the Vantage Substation. The area is vegetated almost exclusively by sagebrush/perennial grassland (2,120 acres, 97 percent), providing habitat for grassland and shrub-steppe species (Table 3.3-2).

Within the Project study area, the night snake is known to occur near the Columbia River. Wanapum Reservoir is located approximately 0.8 mile northwest of Route Segment 3a—the Reservoir is a waterfowl concentration area and common loons occur within the Reservoir. Habitat and known locations of striped whipsnake and night snake are known to occur along Route Segment 3a. Black-tailed jackrabbit has been documented within one mile. A mule deer Priority Species Regional Area is located in a wetland adjacent to the Vantage Substation. Sagebrush lizard is known to occur within the Project study area near the Vantage Substation and sand dunes north of the substation likely provide good habitat for sagebrush lizard. Bull trout, Chinook salmon, steelhead (Upper Columbia River), Coho salmon, leopard dace, mountain sucker, pacific lamprey, sockeye salmon, tui chub, and Umatilla dace are known or likely to occur in Wanapum Reservoir of the Columbia River near Route Segment 3a.

The entire route segment ROW is within the Saddle Mountains Sage-Grouse MU (Occasionally Occupied Habitat; Table 3.3-8). The analysis area does not overlap any JBLM YTC protection zones for Sage-Grouse.

The eight-mile wide Sage-Grouse analysis area for Route Segment 3a contains 17,568 acres of suitable Sage-Grouse habitat (54 percent of the analysis area), 744 acres of marginal habitat (2 percent), and 14,573 acres of unsuitable habitat (44 percent; Table 3.3-9).

The estimated Sage-Grouse population range does not overlap the Route Segment 3a ROW, and none of the population range is within four miles of the route segment (Figure 3.3-4). No active or inactive leks are known to occur within four miles of this route segment; one historic lek occurs within four miles of this route segment (Table 3.3-5).

3.3.4.9 Route Segment 3b

Route Segment 3b roughly parallels the western side of the Columbia River and Priest Rapids Reservoir for the entirety of its 21.7-mile length, at a distance from the river ranging from approximately 30 feet to 0.7 mile. This route segment would cross five creeks as well as several un-named ephemeral drainages that are seasonally moist and with little or no riparian vegetation present. Terrestrial vegetation is dominated by sagebrush/perennial grassland (16,272 acres, 55 percent) and perennial grassland (3,877 acres, 13 percent; Table 3.3-2). Open water composes 25 percent of the landcover (7,368 acres) and riparian vegetation comprises 1.4 percent of the area (414 acres). The area provides habitat for upland shrub-steppe and grassland species, as well as fish and other aquatic and riparian species.

Numerous special status species and priority habitats occur within and along the Columbia River and nearby upland habitats. The Hanford Reach supports the larger of the only two remaining healthy naturally spawning fall Chinook salmon populations in the Columbia River System (Nugent et al. 2002). Route Segment 3b parallels the Hanford Reach for 2.7 miles and parallels the Priest Rapids Reservoir for the remainder of its length. Bull trout, steelhead (Upper Columbia River), coho salmon, chum salmon, leopard dace, mountain sucker, pacific lamprey, sockeye salmon, tui chub, and Umatilla dace also are known or likely to occur in the Columbia River near Route Segment 3b. Priest Rapids Reservoir is a waterfowl concentration area. Other aquatic species such as white pelicans, common loons, Caspian terns, and Forester's terns concentrate in Priest Rapids Reservoir as well, though breeding has not been documented. A breeding colony of black-crowned night-heron and great blue heron occurs on an island near the south end of Priest Rapids Reservoir, and large numbers of Canada geese breed on islands at the north end of the Reservoir. The Moran Slough wetlands, located just downstream of Priest Rapids Dam and north of the river also provide habitat for waterfowl and other aquatic species. Night snake and sagebrush lizard, occur in sandy grasslands along this route. Loggerhead shrike and black-tailed jackrabbit occur in the shrub-steppe habitat west of the Columbia River. Pallid bats have been detected acoustically along the route segment. Most of Route Segment 3b is within a mule deer regular concentration area, and several large pockets of steep rocky are chukar concentration areas. Designated elk winter range occurs just within one mile of the route segment, at the southern end. Basalt cliffs and bluffs along the route segment provide nesting substrates for raptors. Several nests of golden eagles, peregrine falcons, and prairie falcons have been documented on these cliffs. Two bald eagle nests have been documented along the Priest Rapid Reservoir shoreline and winter roost habitat on the east side of the Reservoir is also within one mile of Route Segment 3b. Some of the patchy riparian/wetland/upland habitat along the east shore of Priest Rapids Reservoir also hosts a population of ring-necked pheasants.

Most of the route segment ROW is within the Yakima Training Center Sage-Grouse MU (Regularly Occupied Habitat) and the remainder is within a Tier 3 MU (Occasionally 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.

Fire history records indicate that large portions of Route Segment 3b have burned since the late 1980s.

The eight-mile wide Sage-Grouse analysis area for Route Segment 3b contains 81,970 acres of suitable Sage-Grouse habitat (59 percent of the analysis area), 2,888 acres of marginal habitat (2 percent), and 55,339 acres of unsuitable habitat (39 percent; Table 3.3-9).

The estimated Sage-Grouse population range does not overlap the Route Segment 3b ROW. Approximately seven percent (14,616 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment 3b (Figure 3.3-4). One inactive lek is located approximately 3.9 miles west of Route Segment 3b. This lek was last occupied in 2007. Additionally, seven historic leks occur within four miles of the route segment.

3.3.4.10 Route Segment 3c

Route Segment 3c is 25.2 miles long. It follows the edge of the Columbia River on either side of its crossing for total of approximately 3.6 miles before proceeding north across the Wahluke Slope agricultural lands, then crossing the Saddle Mountains and Lower Crab Creek in route to its connection with the Vantage Substation via Route Segment 3a. Vegetation is predominately sagebrush/perennial grassland (6,519 acres 42 percent), agriculture (11,181 acres, 33 percent), and annual grassland (6,519 acres, 19 percent; Table 3.3-2). The area also includes 954 acres of open water (2.8 percent, mainly small backwater lakes north of Lower Crab Creek) and 173 acres of riparian vegetation (0.5 percent), most of which is located along Lower Crab Creek and dominated by Russian olive.

Several sensitive species occur along this route segment, though not as many as along the alternative Route Segment 3b. The Hanford Reach supports the larger of the only two remaining healthy naturally spawning fall Chinook salmon populations in the Columbia River System (Nugent et al. 2002). Route Segment 3c parallels the Hanford Reach for approximately 2.2 miles before crossing the river. Bull trout, steelhead (Upper Columbia River), coho salmon, chum salmon, leopard dace, mountain sucker, pacific lamprey, sockeye salmon, tui chub, and Umatilla dace also are known or likely to occur in the Columbia River near Route Segment 3c. The Nunnally Lake wetlands north of Lower Crab Creek are a waterfowl concentration area. The Moran Slough wetlands, located just downstream from Priest Rapids Dam and north of the river also provide habitat for waterfowl and other aquatic species. An area north of Vantage Substation with rock outcrops and shallow soils is considered an overwintering area for striped whipsnakes, and side-blotched lizards occur there as well. Striped whipsnakes have been documented in several other locations along Route Segment 3c. This species is rare and localized in Washington. According to WDFW, occupied habitat extends from Highway 26, located north of Vantage Substation, south to Lower Crab Creek. Night snake and sagebrush lizard occur in sandy grasslands along this route segment. Black-tailed jackrabbit has been documented east of Vantage Substation and also north of Lower Crab Creek. Mule deer regular concentration areas occur within one mile of Route Segment 3c, at the north and south ends of the route segment. The rocky slopes of the Saddle Mountains comprise a chukar concentration area. An area of basalt cliffs and bluffs along the south edge of the Columbia River and another area of cliffs and bluffs on the north side of the Saddle Mountains provide nesting substrates for raptors. Several nests of prairie falcons have been documented at both locations. Within one mile of the route segment, a peregrine falcon nest has been documented on the cliffs along the Columbia River, and a golden eagle nest has been documented on the Saddle Mountains cliffs.

Portions of the route segment ROW are within the Rattlesnake Hills Sage-Grouse MU (Regularly Occupied Habitat), the Saddle Mountains MU (Occasionally Occupied Habitat), the Hanford MU (Expansion Habitat), and a portion is not within any MU (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.

The eight-mile wide Sage-Grouse analysis area for Route Segment 3c contains 65,477 acres of suitable Sage-Grouse habitat (43 percent of the analysis area), 8,359 acres of marginal habitat (5 percent), and 80,022 acres of unsuitable habitat (52 percent; Table 3.3-9).

The estimated Sage-Grouse population range does not overlap the Route Segment 3c ROW. Approximately two percent (3,231 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment 3c (Figure 3.3-4). No active or inactive leks are known to occur within four miles of this proposed route segment; one historic lek occurs within four miles of the route segment (Table 3.3-5).

3.3.4.11 Route Segment NNR-2

Route Segment NNR-2 is 5.1 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 (3,559 acres, 48 percent), sagebrush/perennial grassland (1,781 acres, 24 percent), and agriculture (1,639, 22 percent); Table 3.3-2). Approximately 20 acres of rabbitbrush/annual grassland is present along the JBLM YTC fire break. The shrublands provide suitable habitat for shrub-steppe and grassland species. Route Segment NNR-2 crosses an irrigation canal operated by Roza Irrigation District and located 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. This wetland is highly disturbed but does contain some forested riparian habitat.

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 East Selah Wetlands, located southwest of Route Segment NNR-2 are used by waterfowl.

The entire route segment ROW is within Sage-Grouse MUs 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 Route Segment NNR-2 analysis area contains 11,168 acres of suitable Sage-Grouse habitat (22 percent of the analysis area), 1,392 acres of marginal habitat (three percent), and 38,442 acres of unsuitable habitat (75 percent; Table 3.3-9).

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-2 ROW. Approximately five percent (9,140 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment NNR-2 (Figure 3.3-4). The core population range does not overlap the analysis area (Figure 3.3-4). Route Segment 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, two historic leks occur between three and four miles east of Route Segment NNR-2.

3.3.4.12 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 YTC Sage-Grouse population. Route Segment NNR-3 crosses Washington Department of Transportation (WSDOT), BLM and private land. The DNR's Selah Cliffs Natural Area Preserve (NAP), which provides opportunities for wildflower and wildlife watching, and scenic viewing, is located just 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 (6,104 acres, 44 percent) and sagebrush with a perennial grass understory (6,985 acres, 50 percent; Table 3.3-2). Sagebrush shrublands provide suitable habitat for shrub-steppe and grassland species.

Basalt cliffs are present where Route Segment NNR-3 crosses both Selah and Lmuma creeks, and are within one mile of the route segment along the east side of the Yakima River Canyon. These basalt cliffs contain a high concentration of nesting 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 WSDOT's 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 study 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 WDFW's 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 MUs 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 are dominated by sagebrush-steppe with a perennial grass understory. Sage-Grouse habitat suitability is influenced largely by varying densities of sagebrush. The eight-mile wide NNR-3 analysis area contains 42,197 acres of suitable Sage-Grouse habitat (53 percent of the analysis area), 2,145 acres of marginal habitat (three percent), and 35,113 acres of unsuitable habitat (44 percent; Table 3.3-9).

The estimated Sage-Grouse population range does not overlap the NNR-3 ROW. Approximately seven percent (12,736 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment NNR-3 (Figure 3.3-4). The core population range does not overlap the analysis area (Figure 3.3-4). The four-mile long stretch of Route Segment 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 3.4 miles east of the southern end of Route Segment NNR-3 (Table 3.3-5). In 2015, three males were observed attending Lek #1, which was up from one male in 2014 (SEE 2015). This lek is within JBLM YTC's Sage-Grouse Primary 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.

Route Segment NNR-3 would cross Reclamation's proposed Wymer Dam and Reservoir Project for approximately 0.2 mile. At this crossing, Route Segment NNR-3 is directly adjacent to Pacific Power's existing Pomona-Wanapum 230 kV Transmission Line. For the proposed Wymer Dam and Reservoir Project, mitigation land acquisition and habitat enhancement components are intended to result in a net improvement in conditions for Sage-Grouse. Approximately 2.3 miles of Route Segment NNR-3 crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project.

3.3.4.13 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 (69 percent) of this route segment is comprised of sagebrush/perennial grassland (5,342 acres; Table 3.3-2). These sagebrush shrublands provide suitable habitat for shrub-steppe and grassland species. Approximately 17 percent of Route Segment NNR-4 consists of annual grassland (1,317 acres). Route Segment NNR-4 crosses several un-named intermittent or ephemeral drainages with little to no riparian habitat present.

Basalt cliffs 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 MUs 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 eight-mile wide Route Segment NNR-4 analysis area contains 35,502 acres of suitable Sage-Grouse habitat (64 percent of the analysis area), 912 acres of marginal habitat (two percent), and 18,774 acres of unsuitable habitat (34 percent; Table 3.3-9).

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-4 ROW. Less than one percent (1,458 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment NNR-4. 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 Route Segment NNR-4 analysis area (Table 3.3-5). Six historic leks are located within four miles to the southeast of the route segment.

Approximately 1.2 miles of Route Segment NNR-4o/NNR-4u crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project.

3.3.4.14 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 Pacific Power Pomona-Wanapum 230 kV transmission line to avoid private agricultural lands in the Badger Pocket area, but remains within 0.5 mile of the existing transmission line for the entire route segment. Vegetation along this route segment is predominately sagebrush/perennial grassland (2,850 acres, 67 percent), agriculture (833 acres, 20 percent), and forbs (475 acres, 11 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 MUs 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 eight-mile wide Route Segment NNR-5 analysis area contains 28,425 acres of suitable Sage-Grouse habitat (70 percent of the analysis area), 71 acres of marginal habitat (less than one percent), and 12,193 acres of unsuitable habitat (30 percent; Table 3.3-9).

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-5 ROW. Less than one percent (1,104 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment NNR-5. 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). Five historic leks are located within four miles of the route segment.

3.3.4.15 Route Segment NNR-6

Route Segment NNR-6 is 6.4 miles long and continues to closely parallel the existing Pacific Power Pomona-Wanapum 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 (7,966 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 (20.4 acres). Much of the eastern one-third of Route Segment NNR-6 burned in 2014 in a large wildfire; thus, much of the sagebrush-steppe habitat has likely been converted, at least temporarily, to grassland (see Vegetation and Fire History Map in Appendix A).

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 this route segment's ROW.

The entire ROW for Route Segment NNR-6 is within Sage-Grouse MUs 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 Route Segment 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. The eight-mile wide Route Segment NNR-6 analysis area contains 52,922 acres of suitable Sage-Grouse habitat (82 percent of the analysis area), 187 acres of marginal habitat (less than one percent), and 11,968 acres of unsuitable habitat (18 percent; Table 3.3-9). Because much of the eastern one-third of the Route Segment NNR-6 analysis area burned in 2014, much of the Sage-Grouse habitat in this area has likely been lost, at least temporarily. 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 YTC Sage-Grouse population (Robb and Schroeder 2012).

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-6 ROW. Less than one percent (11 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment NNR-6. The core population range does not overlap the analysis area (Figure 3.3-4). While the final location for Route Segment NNR-6 was not identified until after completion of the ground based Sage-Grouse surveys, surveys of the preliminary NNR Alternative 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). Two males were observed attending this lek in 2015, up from one in 2014. 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, four historic leks are located within four miles of this route segment.

3.3.4.16 Route Segment NNR-7

Route Segment NNR-7 is 8.2 miles long and continues to closely parallel the existing Pacific Power Pomona-Wanapum 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 percent) of the route segment consists of the sagebrush/perennial grassland cover type (11,931 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 (4.7 acres). Most of Route Segment NNR-7 burned in 2014 in a large wildfire; thus, much of the sagebrush-steppe habitat has likely been converted, at least temporarily, to grassland (see Vegetation and Fire History Map in Appendix A).

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, waterfowl, and other aquatic birds are known to utilize reservoirs 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.

Night snake and black-tailed jackrabbit occurrences have also been documented within one mile. Bull trout, Chinook salmon, steelhead (Upper Columbia River), Coho salmon, leopard dace, mountain sucker, pacific lamprey, sockeye salmon, tui chub, and Umatilla dace are known or likely to occur in the Columbia River near Route Segment NNR-7.

This entire route segment ROW is within Sage-Grouse MUs 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 had moderate cover of sagebrush, providing mainly marginal Sage-Grouse habitat. Much of the eastern five miles contained higher cover of sagebrush, which could potentially provide suitable grouse habitat, though relatively little use of the area has been documented. Based on vegetation data collected prior to the 2014 fire, the eight-mile wide NNR-7 analysis area contains 63,145 acres of suitable Sage-Grouse habitat (85 percent of the analysis area), 320 acres of marginal habitat (less than one percent), and 10,681 acres of unsuitable habitat (14 percent; Table 3.3-9). Because much of the Route Segment NNR-7 analysis area burned in 2014, much of the Sage-Grouse habitat in this area has likely been lost, at least temporarily. 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 YTC grouse population. Route Segment 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 Route Segment NNR-7 ROW or the 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.

3.3.4.17 Route Segment NNR-8

Route Segment NNR-8 starts on BLM-administered land and crosses Reclamation land and Grant County PUD land and crosses over State Route 243 and the associated WSDOT ROW. This short route segment (2.7 miles) crosses the Columbia River and is comprised primarily of sagebrush/perennial grassland (4,451 acres, 84 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, waterfowl, and other aquatic birds are known to occur in the reservoirs present along the Columbia River. Canada geese nest on islands within Priest Rapids Reservoir and American white pelicans have been documented on the islands as well, though not nesting. Wanapum Reservoir is a waterfowl concentration area. A mule deer Priority Species Regional Area is located in a wetland adjacent to the Vantage Substation. 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. Sagebrush lizard is known to occur within the Project study area near the Vantage Substation and sand dunes north of the substation likely provide good habitat for sagebrush lizard. Within the Project study area, the night snake is known to occur near the Columbia River. Bull trout, Chinook salmon, steelhead (Upper Columbia River), Coho salmon, leopard dace, mountain sucker, pacific lamprey, sockeye salmon, tui chub, and Umatilla dace are known or likely to occur in the Columbia River near Route Segment NNR-8.

This route segment ROW passes from Sage-Grouse MUs 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 this route segment’s ROW; most of the remaining area is either rocks and open water or cheatgrass and other weeds. The eight-mile wide Route Segment NNR-8 analysis area contains 28,583 acres of suitable Sage-Grouse habitat (63 percent of the analysis area), 1,333 acres of marginal habitat (three percent), and 15,183 acres of unsuitable habitat (34 percent; Table 3.3-9).

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-8 ROW or the analysis area. Four walking transects west of the Columbia River 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 Route Segment NNR-8 analysis area (Table 3.3-5). One historic lek is located approximately 2.1 miles northwest of this route segment.

3.3.4.18 Route Segment MR-1

This 11.9-mile long subroute is a proposed option to the 4.5-mile long Route Segment NNR-4. 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 the associated WSDOT ROW. This route segment is comprised of a mixture of sagebrush/perennial grassland (6,488 acres, 38 percent), agriculture (3,868 acres. 23 percent), and annual grassland (5,628 acres, 33 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 are present along Lmuma Creek within one mile of Route Segment MR-1. Golden eagle, ferruginous hawk, and prairie falcon are known to nest on 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.

This entire route segment ROW is within Sage-Grouse MUs 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.

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. The eight-mile wide Route Segment MR-1 analysis area contains 44,094 acres of suitable Sage-Grouse habitat (53 percent of the analysis area), 3,881 acres of marginal habitat (five percent), and 35,312 acres of unsuitable habitat (42 percent; Table 3.3-9).

The estimated Sage-Grouse population range does not overlap the Route Segment MR-1 ROW. Less than one percent (817 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment MR-1. The core population range does not overlap the Route Segment MR-1 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). Five historic leks are located within the analysis area of this route segment.

Route Segment MR-1 would cross Reclamation's proposed Wymer Dam and Reservoir Project for approximately 0.05 mile. For the proposed Wymer Dam and Reservoir Project, mitigation land acquisition and habitat enhancement components are intended to result in a net improvement in conditions for Sage-Grouse. Approximately 3.2 miles of Route Segment MR-1 crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project.

3.4 LAND JURISDICTION AND LAND USE

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to land jurisdiction and land use along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and U.S. Bureau of Land Management (BLM) has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

This section characterizes the uses and jurisdiction of land in the Project study 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 Action Alternative route segments. Data was compiled for land uses and jurisdiction within a two-mile wide study corridor (Project study area), one mile on either side of the assumed centerline of each Action Alternative route segment. The Project study area includes the northwest part of Yakima County west of and adjacent to the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), the northwestern corner of Benton County, the southwest corner of Grant County, and the southeast corner of Kittitas County. Appendix A - Jurisdiction, Recreation, and Special Management Areas Map of this FEIS shows land jurisdiction in the Project study area. Appendix A - Land Use Map shows existing land use.

3.4.1 Data Sources

Land use data were collected for the Project study area. 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) – FEIS 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 State Trust Lands and Other Major Public and Tribal Lands in Washington State (2010)
- Washington State Department of Ecology (WDOE) Toxic Cleanup program website database
- Benton County Comprehensive Land Use Plan (2006, amended 009)
- Kittitas County Comprehensive Plan (2013)
- Kittitas County Shoreline Master Program Plan (2014)
- Grant County Comprehensive Plan (2006, amended 2010)
- Grant County Public Utility District (PUD) No. 2 Priest Rapids/Wanapum Land Use Plan (1992)
- Priest Rapids Hydroelectric Project Recreation Management Plan Amendment (Grant County PUD 2010b)
- Grant County Shoreline Master Program (2015)
- Yakima County “Plan 2015” Comprehensive Plan (2007)

- Public Land Information System (geographic information system [GIS] database)
- Field Reconnaissance of the Project study area (May 2011, June 2013)
- Final Programmatic Environmental Impact Statement for the Yakima River Basin Integrated Water Resource Management Plan (U.S. Bureau of Reclamation [Reclamation] 2012)

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 (federal, state, and local) inventoried within the Project study area 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.

Table 3.4-1 Land Ownership and Jurisdiction in Project Study Area

LAND JURISDICTION TOTAL AREA (TWO-MILE CORRIDOR)	AREA (ACRES)	% OF PROJECT STUDY AREA (TWO-MILE CORRIDOR)
FEDERAL		
BLM	13,605	8%
Reclamation	6,732	4%
JBLM YTC	55,803	31%
USFWS	1,347	1%
STATE		
WDFW	1,121	1%
DNR	6,845	4%
WSDOT	842	<0.5%
LOCAL		
Yakima County	51,452	29%
Grant County	21,134	12%
Kittitas County	18,246	10%
Benton County	3,089	2%
Total Corridor	*180,218*	*100%*

Source: See Appendix A - Jurisdiction, Recreation, and Special Management Areas

Federal

Agencies that manage lands administered by the federal government in the Project study area include:

- Army (JBLM YTC)
- BLM
- Reclamation
- U.S. Fish and Wildlife Service (USFWS)

State

Agencies that manage lands administered by the state of Washington in the Project study area include:

- Washington Department of Fish and Wildlife (WDFW)
- Washington Department of Natural Resources (DNR)
- Washington Department of Transportation (WSDOT)

Local
Counties which administer lands in the Project study area include:

- Yakima County
- Grant County
- Kittitas County
- Benton County

Other Agencies
Other quasi-public agencies which operate additional local irrigation facilities in cooperation with Reclamation, but not directly owning or managing land in the Project study area include:

- Roza Irrigation District
- South Columbia Basin Irrigation District

Yakima County
Yakima County is the second largest county in the state by area. The county is bordered by Benton and Grant counties 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 study 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 of the proposed Project are generally located in the central part of the county between State Route (SR) 24 and the southern and eastern boundaries of JBLM YTC.

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 study area in the central part of the county is the county seat. The proposed Project is located in the Mattawa farming area, Wahluke Slope, and Crab Creek area of Grant County on its southern end.

Prominent features in the Project study area include the Saddle Mountains, Lower Crab Creek, and Wahluke Slope. The Wahluke Slope is a highly productive agricultural area of cultivated irrigated farmland south of the Saddle Mountains and north and east of the Columbia River. Saddle Mountains is a BLM-managed area with a number of allowable uses, including grazing, high voltage transmission line right-of-way (ROW) corridors, and recreation. Lower Crab Creek is a waterway that drains into the Columbia River that provides riparian habitat and is part of the WDFW-managed Columbia Basin Wildlife Area.

Benton County
Benton County is home to the U.S. Department of Energy's (DOE) Hanford Site and well as parts of the Hanford Reach National Monument. The City of Prosser, located outside of the Project study area in the west-central part of the county, is the county seat. Route Segment 3c is located in a small unpopulated area of the northwestern corner of Benton County.

Kittitas County
Kittitas County is located at the geographic center of Washington State. Route segments of the NNR Alternative, including the Manastash Ridge (MR) Subroute, and Route Segment 3b are located in southeastern Kittitas County south of Interstate (I) 90. The City of Ellensburg, located outside of the Project study area in the central part of the Kittitas County, is the county seat.

3.4.2.2 Existing and Planned Land Use

The Project study area contains portions of Yakima, Benton, Grant, and Kittitas counties in Washington. Unincorporated communities in the Project study area include Beverly, Schawana, Wanapum Village, and Desert Aire. Badger Pocket also is an area of rural agricultural and residential development located in the northwest side of the Project study area. Selah is an incorporated community located just outside the Project study area. The Grant County 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 study area (Wanapum Dam and 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 study area. These agencies manage the following specific resources within the Project study area:

Federal

- Army - JBLM YTC
- Department of the Interior
    - BLM-Yakima River Canyon Management Area (MA) and lands south of Wanapum Dam in Kittitas County; Saddle Mountains MA in Grant County; other scattered parcels across the Project study area
    - USFWS - Columbia National Wildlife Refuge and Hanford Reach National Monument
    - Reclamation - land parcels and irrigation canals in Grant County and Yakima County
        - Irrigation projects developed by Reclamation include the Columbia Basin and Yakima Projects; see Section 3.4.3.1 below.

State

- DNR - State Trust lands and Selah Cliffs Natural Area Preserve (NAP)
- WDFW - Columbia Basin Wildlife Area-Lower Crab Creek Unit and Priest Rapids Unit
- WSDOT - SR-243, SR-24, and I-82

3.4.2.3 Residential

Residences are predominantly single-family detached housing units in the Project study area. Communities with more densely populated areas include East Selah, the City of Mattawa, and the area around JBLM YTC. Wanapum Village, Schawana, Desert Aire, Beverly, and Badger Pocket are also in the Project study area.

3.4.2.4 Commercial, Public, Industrial

Mattawa has a number of retail businesses and government service facilities in the community. Industrial-type businesses and activities occurring in the Project study area are associated with light industry and agricultural processing, including food storage and processing facilities associated with large-scale agriculture.

The City of Yakima, just outside of the southwestern part of the Project study area, is the Yakima County seat and 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 study area along the Action Alternatives. 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 Project 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 study 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 Yakima River Canyon MA for a transmission line (Pomona-Wanapum 230 kilovolt [kV]; currently owned and operated by PacifiCorp) and in the Saddle Mountains for transmission lines currently owned and operated by Bonneville Power Administration (BPA; Schultz-Wautoma 500 kV; Midway-Vantage 230 kV; BPA Wahluke-Midway 230 kV; Midway-Pot Holes 230 kV). There are no other BLM designated utility corridors in the Project study area.

The BPA's Vantage Substation is located on the north end of the Project study area. Corridors and major ROWs in the Project study 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-Midway 230 kV transmission line (Grant County PUD)
- 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)
- Union Gap-Midway 230 kV transmission line (PacifiCorp)
- Hanford-Vantage 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-24
- 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, Benton, and Yakima counties in the Project study area. A network of irrigation water conveyance structures traverse the Project study area to connect to irrigation systems such as center pivots and wheel-line systems that provide water to these farms. In the Project study area, farming activities occur east of the Yakima River as it enters Selah from the Yakima Canyon, within Badger Pocket, and throughout Grant County. Apple and cherry orchards are grown in the Kittitas County and Benton County portions of the Project study area. Fruit tree orchards, vineyards and row crops are all cultivated in Grant and Yakima counties in the Project study area.

A total of 30,202 acres of cropland is located in the Project study area. Specific crops grown in the Project study area include:

- Wine Grapes
- Concord Grapes
- Apples
- Apricots
- Hops
- Nectarines/Peaches
- Cherries
- Hay (Alfalfa, Timothy, and Grass)
- Asparagus
- Field Corn
- Mint
- Pear
- Green Pea
- Onions

- Potatoes
- Wheat
- Blueberries
- Wildlife Feed

According to the Washington Wine Commission, the Project study 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 and vehicles 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 transmission line conductors or structures. Typical farm equipment that may be used in the Project study 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 trucks with inclined box may also be used in the Project study area.

Irrigated Agricultural Systems

Specific irrigation methods typically utilized in the Project study area include center pivot, hand movable sprinkler line, wheel line, drip, big gun, 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 Project study area is shown in Table 3.4-2 below. Center pivot systems may utilize articulated arms to irrigate field corners. Articulated systems, shown in Figure 3.4-1, are more easily adaptable because they can avoid or bend around transmission line structures. Appendix A-Map 9a through 9E: Existing Agriculture and Irrigation shows crop types and irrigation methods in Project study area. Figures 3.4-2 through 3.4-8 show some of the predominant irrigation systems in use in the Project study area.

Reclamation’s Columbia Basin Project provides the vast majority of irrigation to agricultural areas in the Project study area. Irrigation is also provided by groundwater or direct withdrawal from surface waters (e.g., Columbia River, Yakima River) in the Project study area and is commonly delivered through a network of feeder canals, storage ponds, open ditches, and buried pipes. Buried and surface main irrigation lines and laterals are prevalent in Grant County. Excess water is drained through a system of wastewater ditches called wasteways (see Figure 3.4-8). Reclamation maintains a system of roads to access the irrigation infrastructure. The existing irrigation infrastructure is shown in Appendix A: Map 9 Existing Agriculture and Irrigation.

Organic farming also occurs in the Project study area. The U.S. Department of Agriculture's (USDA) National Organic Standards certifies organic crops and establishes the requirements of the National Organic Program (NOP) for organic crop production including land management, seed and planting stock, crop rotation, and pest management. The USDA’s NOP Final Rule contains the general requirements for certification (7 CFR 205). The producer or handler of a production or handling operation intending to sell, label, or represent agricultural products as “100 percent organic,” “organic,” or “made with organic (specified ingredients or food group(s))” must comply with the applicable provisions of NOP. The physical presence of a transmission line would not affect organic certification, but spot spraying for weeds along a transmission line during maintenance could potentially impact organic crops due to overspray.

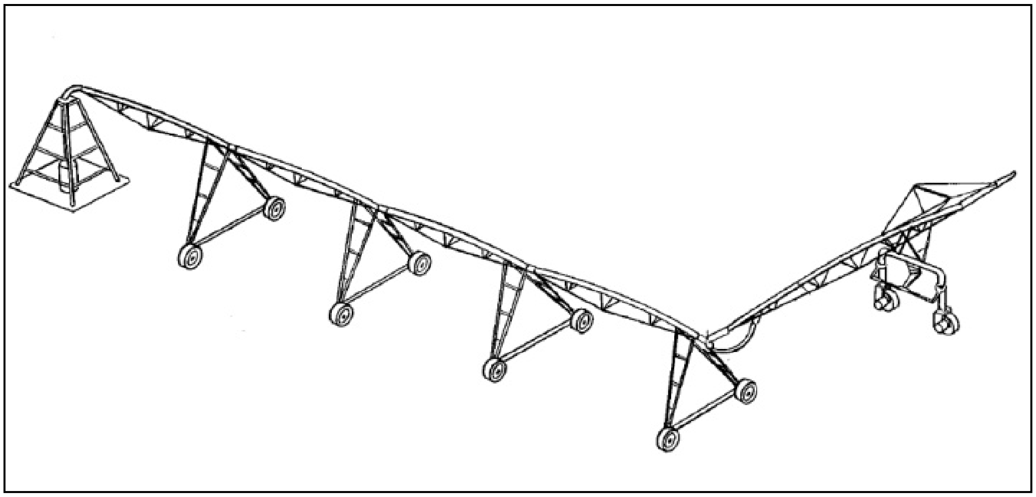

FIGURE 3.4-1 ARTICULATED PIVOT SYSTEM ILLUSTRATION

FIGURE 3.4-2 CENTER PIVOT (CIRCLE) IRRIGATION SYSTEM UTILIZED IN THE PROJECT STUDY AREA

FIGURE 3.4-3 ARTICULATED CENTER PIVOT IRRIGATION SYSTEM UTILIZED IN THE PROJECT STUDY AREA

FIGURE 3.4-4 WHEEL LINE IRRIGATION SYSTEM UTILIZED IN THE PROJECT STUDY AREA

FIGURE 3.4-5 WHEEL LINE IRRIGATION SYSTEM UTILIZED IN THE PROJECT STUDY AREA

FIGURE 3.4-6 SPRINKLER IRRIGATION SYSTEM UTILIZED IN THE PROJECT STUDY AREA

FIGURE 3.4-7 DRIP IRRIGATION SYSTEM UTILIZED IN THE PROJECT STUDY AREA

FIGURE 3.4-8 EXISTING IRRIGATION CANAL IN THE PROJECT STUDY AREA

Table 3.4-2 Crop Types and Irrigation Methods in Project Study Area

CROP TYPE	IRRIGATION METHOD	ACRES IN PROJECT STUDY AREA
ALFALFA HAY	Center Pivot	1,309
	Rill	187
	Sprinkler	44
	Wheel Line	275
	Alfalfa Hay Total	1,815
ALFALFA/GRASS HAY	Rill	48
	Sprinkler	17
	Wheel Line	274
	Alfalfa/Grass Hay Total	113
APPLE	Center Pivot	298
	Drip	324
	None	55
	Sprinkler	3,864
	Unknown	149
	Apple Total	4,688
APRICOT	Sprinkler	85
ASPARAGUS	Center Pivot	
	Wheel Line	
	Asparagus Total	125
CHERRY	Drip	48
	Sprinkler	532
	Unknown	21
	Cherry Total	601
CORN, FIELD	Center Pivot	739
CORN, SWEET	Rill	46
FALLOW	Center Pivot	101
	Drip	62
	None	366
	Rill	49
	Sprinkler	331
	Wheel Line	50
	Fallow Total	959
GRAPE, CONCORD	Sprinkler	61
GRAPE, WINE	Center Pivot	117
	Drip	241
	Sprinkler	1,389
	Unknown	347
	Wine Grape Total	2,034

CROP TYPE	IRRIGATION METHOD	ACRES IN PROJECT STUDY AREA
GRASS HAY	Center Pivot	198
	Rill	27
	Sprinkler	32.8
	Unknown	17
	Wheel Line	16
	Grass Hay Total	290
HOPS	Drip	164
MINT	Center Pivot	132
NECTARINE/PEACH	Sprinkler	2.6
OAT	Rill	51
	Wheel Line	30
	Oat Total	81
ONION	Center Pivot	76
PASTURE	Big Gun	34
	Flood	31
	None	38
	Rill	292
	Rill/Sprinkler	118
	Sprinkler	115
	Wheel Line	105
	Pasture Total	734
PEA, GREEN	Center Pivot	614
PEAR	Drip	37
	Sprinkler	23
	Pear Total	60
POTATO	Center Pivot	421
SUDANGRASS	Rill	58
TIMOTHY	Center Pivot	1,978
	None	193
	Rill	1,441
	Unknown	100
	Wheel Line	177
	Timothy Total	3,571
WHEAT	Center Pivot	820
	None	164
	Rill	186
	Unknown	101
	Wheel Line	177
	Fallow	866
	Wheat Total	2,342

CROP TYPE	IRRIGATION METHOD	ACRES IN PROJECT STUDY AREA
WILDLIFE FEED	None	300
	Total Cropland	*20,108*

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 non-agricultural 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 non-agricultural 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.

Conservation Reserve Program
The 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 is CRP land potentially within the Project study area in the Badger Pocket and Moxee Valley areas; the exact location of these lands is unknown, but they do not fall within JBLM YTC where route segments of the NNR Alternative are located. Other CRP land may be crossed in the Moxee Valley along Route Segments 2b, 2c, and 2d. Known CRP Lands in the Project study area for each PLSS section where CRP lands occur are shown in Appendix A: Agriculture and Irrigation (map pages 1-7).

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 study area. BLM has authorized six grazing leases (allotments) on public lands it manages in the Project study area. Reclamation has authorized one grazing lease in the Project study area. The DNR has authorized eight grazing leases on state trust lands. WSDOT does not have any grazing leases in the Project study area. Table 3.4-3 shows the BLM land grazing leases, Table 3.4-4 shows Reclamation grazing leases, and Table 3.4-5 shows DNR grazing leases in the Project study area.

Cattle yard and feed operations (feedlot) also occur in the Project study area. A cattle feed yard is located on Road O SW extension north of Road 24 SW.

Table 3.4-3 BLM Grazing Leases

ALLOTMENT #	AUTHORIZATION #	CATEGORY OF LEASE HOLDER	PUBLIC LANDS LOCATION (TOWNSHIP/RANGE/SECTION)	TOTAL ALLOTMENT ACREAGE/AUMS*
20803	3600803	Individual	T.14N, R.19E Sec 02, 03, 04, 09, 10, 11 T.15N, R.19E Sec 14, 22, 23, 26, 27, 33, 34, 35, 36	6,211 ac./644 AUMs (includes acreage and AUMs not in Project study area)
20804	3600804	Individual	T.15N, R.19E Sec 14	2,680 ac./277 AUMs (includes acreage and AUMs not in Project study area)
20806	3600806	Individual	T.15N, R. 23E, Secs. 11, 12, and 13 (all); Section 24 (N1/2) T.15N. R. 24E, Sections 7, 8, 13, 14, 16, and 21 (all); Secs. 6 (lots 6,7; E1/2SW1/4, SE1/4), Sec 10 (W1/2E1/2, SW1/4), Sec. 12 (N1/2, SW1/4), Sec. 18 (lots 1,2,3,4, E1/2W1/2, E1/2), Sec 20 (N1/2, N1/2S1/2), Sec. 22 (N1/2, N1/2S1/2), Sec. 24: (N1/2)	15,467.23 ac./18387 AUMs (Includes Acreage and AUMs not in Project study area)
10822	3600822	Company	T.12N., R.21E, Sec. 4 fraction of N1/2, SE1/4, E1/2SW1/4; Sec. 10 (all) TT.12N., R.22E, Sec. 18: E1/2 T.13N., R.21E, Sec. 32: N1/2NW1/4, E1/2SE1/4, Sec. 34: W1/2 T.13N., R.24E, Sec. 18: N1/2NE1/4, SE1/4NE1/4, NE1/4SE1/4; Sec. 20: E1/2SE1/4; Sec. 22: W1/2SW1/4, SE1/4SW1/4	2,394.78 ac./341 AUMs (Includes Acreage and AUMs not in Project study area)
10823	3600823	Individual	T.12N., R.23E, Sec. 2 (S1/2); Sec. 10 (NE1/4, NE1/4NW1/4); Sec. 12 (NW1/4NW1/4, NE1/4, E1/2SE1/4, NE1/4NW1/4)	840 ac./118 AUMs (Includes Acreage and AUMs not in Project study area)
10826	3600826	Individual	T.12N., R.22E, Sec. 12 (W1/2, SE1/4) T.12N., R.23E, Sec. 2 (Lots 1,2,3,4, S1/2N1/2); Sec. 14 (N1/2)	1111.86 ac./160 AUMs

*AUMs (animal unit months) = BLM unit of measure of the amount of forage needed to sustain one cow and her calf for a month; Acres=ac.

Table 3.4-4 Bureau of Reclamation Grazing Leases

GRAZING FILE #	PUBLIC LANDS LOCATION (TOWNSHIP/RANGE/SECTION)	TOTAL ALLOTMENT ACREAGE/AUMS*
0806	T.15N., R.23E, Sec. 24: N1/2SW1/4 T.15N., R.24E Sec. 19: N1/2, N1/2S1/2, Sec. 19: S1/2SE1/4, SE1/4SW1/4, Lot 4, Sec. 25: Portion north of Wahluke Canal, Sec. 26: NE1/4, S1/2, Portion north of Wahluke Canal, Sec. 27: Portion north of Wahluke Canal, Sec. 35: Portion north of Wahluke Canal T.15N., R.24E Sec. 20: S1/2S1/2, Sec. 22: S1/2S1/2, Sec. 24: S1/2	2,760.02 ac./208 AUMs (Includes Acreage and AMUs not in Project study area)

*AUMs (animal unit months) = BLM unit of measure of the amount of forage needed to sustain one cow and her calf for a month; Acres=ac.

Table 3.4-5 DNR Grazing Leases

LEASE NUMBER AND TYPE	CATEGORY OF LEASE HOLDER	PUBLIC LANDS LOCATION (TOWNSHIP/RANGE/SECTION) (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)
10-A56812 Grazing, Re-Lease Orchard/Grazing 12-B56812	Company	T.13N, R.24E Sec. 16 (3757) T.14N, R.23E Sec. 05 T.14N, R.23E Sec. 09 T.15N, R.23E Sec. 28 T.15N, R.23E Sec. 29 T.15N, R.23E Sec. 32 T.15N, R.23E Sec. 33 T.16N, R.23E Sec. 25
10-A71955 Grazing	Fish & Wildlife Department	T.16N, R.23E Sec. 36 (14777, 14778 & 5364)
10-A55580 Grazing	Individual	T.13N, R.20E Sec. 36 (10811)
10-B60748 Grazing	Company	T.13N, R.21E Sec. 36 (10824)
10-A74092 Grazing	Individual	T.12N, R.22E Sec. 30 (10850)
10-B68468 Grazing	Company	T.12N, R.23E Sec. 16 (10875)
10-B52973 Grazing	Company	T.13N, R.23E Sec. 36 (10877)

3.4.2.8 Yakima Training Center

The Project study area surrounds and traverses portions 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

There is one public airport and two private airstrips in the Project study area. Desert Aire Airport is a privately owned, public use airport with a 3,666 foot by 36 foot paved runway located in the Desert Aire community between the Columbia River and SR-243. The airport accommodates general aviation (non-commercial) flight operations.

A paved airstrip exists on private land located northwest of and adjacent to the shoreline of Nunnally Lake and the WDFW-managed Columbia Basin Wildlife Area (Lower Crab Creek Unit).Also see JBLM YTC Vagabond Army Heliport described in Section 3.4.2.8 above.

Another private airstrip is located in Grant County along Road 26 SW just west of the intersection of Road O SW. The airstrip currently has a runway approximately 2,800 feet in length, but may be extended according to the owners.

3.4.2.10 Other Land Use Considerations

<u>Other Leases on Public Lands</u>

Public land management agencies lease land for a number of reasons such as oil and gas exploration, mining, grazing, and utility ROWs. There are no oil and natural gas leases on state trust lands. WSDOT does not have any leases within the Project study area. All of the BLM lands crossed by Action Alternatives 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) and portions of the western Saddle Mountains MA for which the BLM only holds a portion of the mineral estate. Because of the lack of locatable minerals on BLM lands in the Project study 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. Table 3.4-6 lists the BLM land leases (non-grazing), Table 3.4-7 shows non-grazing leases on Reclamation land, and Table 3.4-8 shows non-grazing leases on DNR state trust land in the Project study area. In some locations, multiple leases exist for different purposes. Reclamation leases its lands in the Project study area primarily for power line easements.

Table 3.4-6 BLM Land Leases (Non-Grazing Activities)

IDENTIFIER AND LEASE TYPE	PUBLIC LANDS LOCATION (TOWNSHIP/RANGE/SECTION)
-WAW 0385: ROW for buried waterline (for livestock watering) issued to Individual -WAW 0477368692: ROW for Grant County PUD buried distribution line and use of access road WAW-05285: ROW for BPA 230 kV Midway-Vantage transmission line -WAW 05791: ROW for BPA microwave site -WAW 05880: ROW for 500 kV Hanford-Vantage transmission line -WAOR 1752317566: easement to BLM from Burlington Northern Railroad for access road -WAOR 550245: ROW to Energy Northwest for access roads to tower sites on BPA's Midway-Vantage transmission line -WAOR 57112: ROW issued to BPA for Schultz-Wautoma 500 kV transmission line	T.15N, R.23E, Sections 12 & 13

IDENTIFIER AND LEASE TYPE	PUBLIC LANDS LOCATION (TOWNSHIP/RANGE/SECTION)
-WAW 05045:ROW for BPA access road -WAOR 8634: ROW for Pacific Power 230 kV Pomona-Wanapum transmission line -WAOR 45722: ROW for Puget Sound Power 230 kV transmission line -WAOR 55771: ROW for Kittitas County PUD 34.5 kV transmission line -WAOR 59673: oil and gas lease to Delta Petroleum et al.	T.16N, R.23E, Section 20
-WAW 05880: ROW for BPA 500 kV Hanford-Vantage transmission line -WAOR 17388: ROW for United Telephone microwave reflector -WAOR 40183: ROW for Grant Co. PUD 7.62 kV aerial electric distribution line	T.15N, R.24E, Sections 18, 20, 21, 22
-WAOR 67856: Wind testing and monitoring area ROW, including authorization for placement of meteorological towers	T.15N, R.23E, Sec. 11: SE1/4, Sec. 12 (all), Sec. 13 (all), Sec. 14: E1/2, Sec. 24: N1/2 T.15N, R.24E, Sec. 6: S1/2NE1/4, SE1/4NW1/4, E1/2SW1/4, SE1/4, Lots 1-7; Sec. 7: E1/2, E1/2W1/2, Lots 1 - 4; , Sec. 8: (all), Sec. 10: W1/2E1/2, SW1/4, Sec. 12: N1/2, SW1/4, Sec. 13: (all), Sec. 14: (all), Sec. 16: (all), Sec. 18: E1/2, E1/2W1/2, Lots 1-4, Sec. 20: N1/2, N1/2S1/2, Sec. 21 (all), Sec. 22: N1/2, N1/2S1/2, Sec. 24: N1/2.

Table 3.4-7 Bureau of Reclamation Non-Grazing Leases

DESCRIPTION	PUBLIC LANDS LOCATION (SECTION)
T. 13N, R.24E	
Midway Line – Grand Coulee; Remaining parcels transferred to AEC	Section 2
Midway Line – Columbia Mattawa Drain – Reclamation Facility	Section 3
Grant County Material Site	Section 4
880 feet River Network Contract 6-7-16-L3005	Section 8 - N1/2NE1/4
Material Site License to Washington State 9-17-67-7955t14, Lots 1 through 4 to AEC	Section 10
Lots 1 and 2 to AEC	Section 11
T. 14N, R.24E	
Midway Grand Coulee Power Line	Section 2
Midway Grand Coulee Power Line Proposed N.P. Railroad 100 foot ROW, no documentation that this was ever developed further.	Section 3
Midway Grand Coulee Power Line	Section 11
Midway Grand Coulee Power Line	Section 23
T. 15N, R.23E	
Facility only	Section 22
T. 15N, R.24E	
Access Road easement W1/2NW1/4 Grant County PUD power line W1/2NW1/4	Section 27
Administered by Washington State Department of Fish and Wildlife.	Section 29
Priest Rapids Transmission Line Hanford-Vantage Transmission Line	All Sections

DESCRIPTION	PUBLIC LANDS LOCATION (SECTION)
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
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

Table 3.4-8 DNR Non-Grazing Leases

LEASE NUMBER & TYPE	LEASE HOLDERS NAME	PUBLIC LANDS LOCATION (TOWNSHIP/RANGE/SECTION) (PARCEL NUMBER)
50-024853 – Overflow	Grant County PUD 2	T.16N 23E 3 (5364)
92-081996 – Irrigation Agreement	Company	T.13N 24E 05 (112223 & 112224)
12-081077 – Orchard	Company	T.13N 24E 05 (112223 & 112224)
12-A63615 – Irrigated Agriculture	Company	T.12N 21E 16 (10822)
50-081957 – Irrigation System	Company	T. 13N 24E 05 (112223 & 112224)
92-081996 – Irrigation Agreement	Company	T. 13N 24E 05 (112223 & 112224)
59-061072 – Public Outdoor Recreation	WA State Interagency Com Outdoor Rec	T. 16N 23E 37 (5364)
50-048713 – Trail	WA State Interagency Com Outdoor Rec	T. 16N 23E 37 (14778)
50-004152 – Railroad ROW	Chicago, Milwaukee, St. Paul, & Pacific Railway	T. 16N 23E 36
50-010190 – Railroad ROW	Chicago, Milwaukee, St. Paul, & Pacific Railway	T. 16N 23E 36
43-081677 – Utilities ROW	Puget Sound Power & Light	T. 16N 23E 37
50-CR2341 – Road ROW	Grant County	T. 16N 23E 37
50-081950 – Road ROW	Grant County	T. 13N 24E 05
50-081954 – Electric Trans Line	Grant County PUD 2	T. 13N 24E 05
50-081956 – Elec Trans Line & Road	Grant County PUD 2	T. 13N 24E 05
50-081960 – Utility & Road	Grant County PUD 2	T. 13N 24E 05
50-081962 – Elec Trans Line & Cable	Grant County PUD 2	T. 13N 24E 05
50-081963 – Elec Trans & Road	Grant County PUD 2	T. 13N 24E 05
50-081964 – Elec Trans Line, Cable & Road	Grant County PUD 2	T. 13N 24E 05
50-081967 – Elec Trans Line & Cable	Grant County PUD 2	T. 13N 24E 05
50-081968 – Telecomm Cable & Road	Company	T. 13N 24E 05
50-081970 – Elec Trans & Road	Grant County PUD 2	T. 13N 24E 05
50-081981 – Water Pipe & Road	Stemilt Associates	T. 13N 24E 05
50-040234 – Road r/w	Yakima Sheep Co.	T. 13N 20E 06
50-016800 – Electric Trans Line	Bonneville Power Administration	T. 12N 21E 16
50-032867 – Electric Trans Line	Benton Rural Electric Association	T. 12N 21E 16
50-003009 – Road ROW	Yakima County	T. 12N 21E 16
50-025626 – Electric Trans Line	Pacific Power & Light Company	T. 12N 22E 30
50-047843 – Road ROW	Anderson Ranches	T. 12N 22E 30

LEASE NUMBER & TYPE	LEASE HOLDERS NAME	PUBLIC LANDS LOCATION (TOWNSHIP/RANGE/SECTION) (PARCEL NUMBER)
50-013711 – Electric Trans Line	Pacific Power & Light Company	T. 12N 22E 30
50-016776 – Electric Trans Line	Bonneville Power Administration	T. 12N 22E 30
50-024287 – Electric Trans Line	Benton Rural Electric Association	T. 12N 22E 30
50-025627 – Electric Trans Line	Pacific Power & Light Company	T. 12N 22E 30
50-045906 – Distribution Cable	Benton Rural Electric Association	T. 12N 22E 30
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

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.

There are also two sand and gravel operations located on the south side of the east-west section of SR-243 in Grant County. One operation is located where the highway begins to curve in a north-south direction. Another operation is located approximately 3,000 feet west of where the concentration of overhead parallel transmission lines cross the Columbia River into the Midway Substation.

In Yakima County, a sand and gravel operation is located north of Roza Hill Road, west of Saint Hilaire Road and east of the JBLM YTC boundary.

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 study area.

A review of the WDOE Toxics Cleanup Program site information indicated one site (Wolfkill Feed and Fertilizer, now owned by Tatoes, Inc.) is located on the west side of Mattawa but not near any of the proposed Project route segments in Grant County. The property was previously used for liquid and dry fertilizer storage distribution. Groundwater samples detected concentrations of chemicals that exceeded state cleanup levels. Restrictions have been placed on the property called a Restrictive Covenant. Groundwater extraction from the site for domestic use is prohibited.

The Hanford Superfund Sites are located in the Hanford Reach National Monument, located approximately 6.2 to 31 miles to the east and southeast of the Project study area.

Wind Energy Projects
In June 2010, Horizon Wind Energy NW (now EDP Renewables) concluded three years of wind testing in the Saddle Mountains and submitted an application to the BLM to continue testing for another three years. The second three year term was subsequently approved by the BLM. Horizon also submitted a development application to the BLM for a major wind project (up to 150 turbines) in the western half of the Saddle Mountains on both private and BLM land; however, the BLM has not yet formally accepted the application.

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 study area along Burbank Creek on private lands. Wymer Reservoir would be a 162,500 acre-feet off-channel storage facility located in the intermittent stream channel of Lmuma Creek planned to be developed on private and BLM-managed lands, which enters the Yakima River approximately 8 miles upstream of the Roza Diversion Dam.

The Yakima River Basin Water Enhancement Project Phase III Act of 2015, introduced into the Senate in June 2015, is specific legislation that would authorize the initial phase implementing the Yakima River Basin Integrated Water Resource Plan (Integrated Plan). The Wymer Dam is included in the Yakima River Basin Integrated Water Resource Plan. As part of the bill, the Department of the Interior would be authorized to make grants for the purposes of watershed enhancement that could include conservation easement or property purchases in the Project study area. As of December 2015, the bill had been passed through the Senate Energy and Natural Resources Committee, and was placed on Senate Legislative calendar under General Orders.

The Final Programmatic Environmental Impact Statement for the Integrated Plan was prepared jointly by Reclamation and WDOE. Reclamation's Integrated Plan provides water for agriculture, fish, and communities by enhancing and protecting habitat. The Targeted Watershed Protections and Enhancements program would acquire property or easements for protection of watersheds and key habitat areas. Land acquisition and habitat enhancement components included in the Integrated Plan are intended to result in a net improvement in conditions for Greater Sage-Grouse (*Centrocercus urophasianus*) and other wildlife species by protecting and enhancing existing high value habitat areas within the Yakima Basin. The Project study area contains private land parcels planned for purchase or establishment of conservation easements to fulfil the land acquisition and habitat enhancement element of the Integrated Plan.

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 study area.

3.4.3.1 Federal

Bureau of Land Management

In the Project study area, the Spokane District of the BLM manages public lands in Grant, Kittitas, Benton, and Yakima counties with the Saddle Mountains MA in Grant County constituting one of the larger contiguous areas of BLM-managed land in the Project study area. The Spokane District manages its land and resources in the Project study area using the 1985 Spokane District RMP, 1987 ROD, and the 1992 RMP Amendment and ROD. The RMP designated two utility corridors on BLM lands, one of which is partially occupied by the Saddle Mountains BPA transmission lines in the Project study area and the other is occupied by the Pomona-Wanapum 230 kV transmission line (see Appendix A - Land Use Map). No other utility corridors are designated on BLM land in the Project study area.

The BLM is in the process of updating the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD. Since the public scoping process for this planning effort was initiated in April 2010, the scope of this planning effort has changed. This planning effort only includes BLM-administered lands in eastern Washington. Originally, the BLM announced its intention to prepare a Resource Management

Plan for Eastern Washington and the San Juan Planning Areas; this RMP was intended to replace the existing Spokane RMP and expand the Planning Area to include the San Juan Islands (see April 30, 2010, Federal Register notice). On March 25, 2013, the President issued Presidential Proclamation 8947 and established the San Juan Islands National Monument. The new National Monument encompasses the BLM-administered lands in the San Juan Islands that were part of the expanded Planning Area described in the April 30, 2010 Notice of Intent to prepare an RMP. Subsequently, BLM determined that it would prepare an RMP specific to the San Juan Islands National Monument. On March 2, 2015, BLM announced its intention to prepare an RMP for the San Juan Islands National Monument and initiated the public scoping process for that effort. The Eastern Washington RMP planning effort does not include BLM-administered public lands in the San Juan Islands archipelago." Additionally, the BLM published the document *Analysis of the Management Situation for the Eastern Washington and San Juan Resource Management Plan* in March 2011 that summarizes existing conditions, trends and management guidance for 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 Action 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 contained within the Yakima Training Center Cultural and Natural Resource Management Plan (JBLM YTC 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-8, TA-10, TA-11, 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.

U.S. Fish and Wildlife Service

USFWS managed lands associated with the Columbia National Wildlife Refuge are intermingled within the WDFW-managed Columbia Wildlife MA-Lower Crab Creek Unit and Priest Rapids Unit. The purpose of the refuge is to provide habitat and breeding ground for migratory birds and other wildlife. The USFWS is developing a Comprehensive Conservation Plan that will serve as a guide for the refuge for the next 15 years.

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 study area as part of the Columbia Basin Project and Yakima Project. All basic irrigation facilities are operated by the irrigation districts. The South Columbia Irrigation District is associated with the Columbia Basin Project and the Roza Irrigation District is associated with the Yakima Project. The South Columbia Irrigation District manages facilities on the eastern side of the Columbia River in the Project study area (Grant County), while the Roza Irrigation District manages facilities on the western side of the Columbia River (Yakima County).

The Columbia Basin Project includes 330 miles of main canals, 1,990 miles of smaller canals, and 3,500 miles of drains and wasteways served by more than 240 pumping plants that carry water to some 10,000 farms. The Yakima Project provides irrigation water for a comparatively narrow strip of fertile land that extends for 175 miles on both sides of the Yakima River in south-central Washington. The irrigable lands presently being served total approximately 464,000 acres.

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 proposed 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 would include information about the height and configuration of conductors and structures.

3.4.3.2 State

Washington Department of Natural Resources

The DNR manages state trust lands and the Selah Cliffs NAP that are located in the Project study area. According to the State Trust Lands Map, the trust lands in the Project study area are managed for the benefit of the state's public schools, universities, and other state 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.

The DNR establishes NAPs to protect the best remaining examples of many ecological communities including rare plant and animal habitat. The DNR Natural Heritage Program identifies the highest quality, most ecologically important sites for protection as natural area preserves. The Selah Cliffs NAP was established to protect the largest known basalt daisy population, primarily. The colorful, lichen covered cliffs also provide nesting and roosting habitat for raptors. The NAP is accessed from the Yakima River corridor and SR-821 and includes an interpretive trail system and parking area. In 1980, the basalt daisy (*Erigeron basalticus*) was included on the Endangered Species Act species list, but it was delisted in 2007. Even though it was federally delisted, 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 and the Yakima River Canyon. DNR has not completed the public process to establish a boundary for the proposed Wanapum Natural Area Preserve and, as a result, will not be using grant money (Washington State Recreation and Conservation Office [RCO] Grant # 08-1185, 10-1474, and 12-1182). DNR may pursue future grant funding to acquire land in the vicinity.

Washington Department of Fish and Wildlife

The WDFW manages the Lower Crab Creek and Priest Rapids Units of the Columbia Basin Wildlife Area in Grant County north of the Saddle Mountains and east of the communities of Schawana and Beverly. The wetlands and riparian areas along the creek and the seep ponds and uplands on the bench north of the creek, provide a diverse habitat for many species of wildlife.

Washington Department of Transportation

The WSDOT manages land within its ROW corridors for the purposes of operating and maintaining transportation related facilities within the I-82, SR-24, 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 1993, the Selah Cliffs NAP, an interpretive trail system located at Mile Marker 3 on SR-821, was established to protect the largest known basalt daisy population (see DNR discussion above). 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 proposed 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 be assessed and mitigation for any potential impacts is required before granting an easement across WSDOT-owned property.

Washington State Recreation and Conservation Office 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. Sites that are acquired with RCO funding 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 RCO funded property acquisition to other uses would need to be approved in advance by RCO.

Within the Project study 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 #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. Proposed Project route segments do not cross this site.

- 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 DNR’s access to the site, and enhance the DNR’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. Route Segment NNR-3 crosses the parcel under consideration for acquisition.

- The Vantage Substation and portions of all Project Action Alternatives are located within an area that is being considered by the DNR as a future NAP. The proposed Wanapum NAP contains suitable habitat for the striped whipsnake (*Masticophis taeniatus*). The boundary of the proposed NAP has not yet been established and is subject to a formal public hearing process.

- Wanapum State Park 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 route segments do not cross this site.

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 four counties in the Project study 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 and Grant counties 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 study area, is the county seat. The southern part of the Army’s JBLM YTC is located in the northeast part of the county. Action Alternatives are located in the northeastern part of the county and north and east of the City of Yakima. They also surround most of the perimeter of and extend through the northern and southwestern portions 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) 19.18.260 - Linear Transmission Facilities establishes the criteria and standards for the development and expansion of transmission lines. YCC 19.14 - Allowable Land Use Table details land uses which may be permitted through Type 1, 2, 3, or 4 reviews. Review of applications for linear transmission facilities are in accordance with a Type 2 review. In addition to the required application contents specified for Type 2 applications, there are additional requirements necessary for the application detailed in YCC 19.18.260. A Type 2 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.

Zoning in Yakima County within the Project study area is typically "Agriculture," "Remote/Extremely Limited Development Potential," and "Valley Rural." See Appendix A - Zoning Map for zoning designations in the Project study 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 Project 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.

Benton County

According to the Benton County Comprehensive Land Use Plan 2006 (amended), planning for utilities should be recognized as the primary responsibility of the utility providers. The county should rely on plans prepared by the utility providers. However, the land use map, plan policies and capital facilities plan of the Comprehensive Plan offer opportunities for providers to improve the quality and cost effectiveness of service to county residents.

A review of the Benton County Code, Title 11 "Zoning" did not indicate whether transmission or power lines were a permitted or a conditional use within the county's zoning classifications. However, a Shoreline Management Substantial Development Permit would be required, subject to Benton County Shoreline Hearing Board approval. Zoning in Benton County within the Project study area is designated as GMA Agricultural District. See Appendix A: Zoning Map for zoning designations in the Project study 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 CAO. Critical areas identified by Benton County in the Project study area include "Wetlands," "Rivers and Creeks," "Critical Aquifer Recharge Areas/Interchange Areas," "Frequently Flooded Areas," "Geologically Hazardous Areas," "Fish and Wildlife Habitat Conservation Areas," and "Mineral Resource Areas." Crossing of these areas in Benton County may require a Critical Areas Permit.

Kittitas County

Kittitas County is located at the geographic center of Washington State. Action Alternative 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 study area in the central part of the Kittitas County, is the county seat.

According to the Kittitas County Comprehensive Plan (2013), 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 study 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. Due to the size and timing of this proposed Project, a Development Agreement (DA) may also be required. The DA is subject to public notice, a public hearing before the Board of County Commissioners, and approval by the Board of County Commissioners prior to processing of the CUP and any other land use permits deemed necessary at the time of project permitting with Kittitas County.

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 Kittitas County in the Project 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.

The Kittitas County Board of County Commissioners approved the County's updated Shoreline Master Program (SMP) on December 2, 2014 (Kittitas County 2014). The WDOE granted final approval of the County’s updated SMP on February 22, 2016 making the county’s comprehensive SMP update effective as of March 7, 2016. Depending on the exact locations of the transmission line towers, shoreline permitting may be required. In Kittitas County, shoreline jurisdiction includes: all shorelines of the state;

upland areas (shorelands) within 200 feet of the ordinary high water mark of those waters; associated wetlands and river deltas; and floodways and contiguous floodplain areas landward 200 feet from such floodways. Water bodies in Kittitas County that correspond to the Project study area that are considered shorelines of statewide importance and regulated under the Kittitas County SMP include the Columbia River (Route Segment 3b below the Wanapum Dam) and Route Segment NNR-8 below the Wanapum Dam (Wanapum Dam Reservoir). All proposed uses and development occurring within shoreline jurisdiction must conform to the intent and requirements of RCW Chapter 90.58, the Special Management Area, and the Kittitas County SMP whether or not a permit or other form of authorization is required. No substantial development shall be undertaken on shorelines of the state without first obtaining a permit. If any of the support structures will be located within 200 feet of the ordinary high water mark of the Columbia River or Wanapum Dam Reservoir or if there will be any ground disturbing activities within this same area, the appropriate permit (substantial development, variance, or conditional use) will be acquired through Kittitas County.

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 study area in the central part of the county is the County Seat. A portion of the proposed 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 study 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 (Pacific Power) is considered a private utility, a building permit would be required for construction of the proposed Project.

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 Grant County in the Project 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 Master Plan (SLMP) 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. The shoreline along the banks of Priest Rapids Reservoir is managed by Grant County PUD. The Grant County PUD Priest Rapids Hydroelectric Project is licensed by and requires consultation with FERC. The FERC and Grant County PUD identified stakeholders to complete a SLMP for the shorelines along the reservoirs created by the two dams. The FERC prepared an Environmental Assessment for Grant County PUD's SLMP and Grant County adopted an updated SLMP in September 2014 (WDOE 2015).

The SLMP, adopted in 2014, establishes Environmental Designations based upon the primary characteristics of the shoreline areas to guide the use and management of these areas. The SLMP classifies Grant County shoreline into eight shoreline environments as follows: Aquatic, Natural, Rural Conservancy, Public Recreation Conservancy, Recreation, High Intensity Public Facility, Shoreline Residential, and Low-Intensity Residential. The following designations occur within the Project study area and are defined as follows:

- Natural: The purpose of the "Natural" shoreline designation is to protect those shoreline areas that are relatively free of human influence or that include intact or minimally degraded shoreline ecological functions less tolerant of human use. These systems require that only very low-intensity uses be allowed in order to maintain the ecological functions and ecosystem-wide processes. Consistent with the policies of the designation, restoration of degraded shorelines within this environment is appropriate.

- Rural Conservancy: The purpose of the "Rural Conservancy" shoreline designation is to protect shoreline ecological functions, conserve existing natural resources and valuable historic and cultural areas in order to provide for sustained resource use, achieve natural floodplain processes where applicable, and provide recreational opportunities. In addition to existing agriculture uses, examples of uses that are appropriate in a Rural Conservancy shoreline designation include low-impact, passive recreation uses, water-oriented commercial development, and low-intensity residential development.

- Public Recreation Conservancy: The purpose of the “Public Recreation Conservancy” shoreline designation is to provide continued and enhanced recreational opportunities while protecting shoreline ecological functions, conserve existing natural resources and valuable historic and cultural areas in order to provide for sustained resource use, and achieve natural floodplain processes where applicable, recognizing many of the functions in these areas in Grant County are a result of the Reclamation’s Columbia Basin Project. Examples of uses that are appropriate in a Recreation Conservancy shoreline designation in addition to Columbia Basin Project and irrigation district facilities and operations include public lands with low impact recreation uses and water-oriented commercial development.

- Recreation: The purpose of the “ Recreation" environment is to provide for water-oriented recreational uses with some commercial uses and residential mixed-uses to support recreational uses while protecting existing ecological functions, conserving existing natural resources, and restoring ecological functions in areas that have been previously degraded.

- High Intensity – Public Facility: The purpose of the "High Intensity—Public Facility" environment is to provide for higher intensity public facility utility or infrastructure that needs shoreline location for operation and that are associated with high-intensity water-oriented power generation, irrigation water supply conveyance, transportation, or navigation uses. This environment may also provide for some recreational uses while protecting public safety, existing ecological functions, conserving existing natural resources, and restoring ecological functions in areas that have been previously degraded.

3.4.4 Route Segment Specific Considerations

Table 3.4-9A summarizes land use and jurisdiction along Route Segments 1a/NNR-1 through 3c. Table 3.4-9B summarizes land use and jurisdiction along Route Segments NNR-2 through NNR-8 and MR-1.

3.4.4.1 Route Segment 1a/NNR-1

The existing land use along this route segment is low-density residential. The route segment crosses 2.4 miles of residential use areas. A total of 25 residences are within 500 feet of this route segment, but 67 residences are within 1,000 feet. This route segment crosses only private land. A total of 33 parcels owned by 24 private land owners are crossed. The route segment is located entirely in Yakima County. The route segment crosses Sage Trail Road near Pacific Power’s Pomona Heights Substation south of the substation. The route segment parallels Pacific Power’s Pomona-Wanapum 230 kV transmission line behind residences located on Sage Trail Road, and joins Sage Trail Road and an existing Pacific Power electrical distribution line located generally on the south side of Sage Trail Road. The route segment would follow the existing distribution line and continue to the southwest corner of JBLM YTC.

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment 1a/NNR-1, but prime farmland is crossed for 0.1 mile and unique farmland is crossed for 1.8 miles.

This route segment is located adjacent to land zoned as “Remote Rural/Extremely Limited Development” and “Valley Rural.” This route segment would cross the Pacific Power Pomona-Wanapum 230 kV transmission line just east of Shotgun Lane.

3.4.4.2 Route Segment 1b

The existing land use along this route segment is dedicated to military operations (JBLM YTC). The route segment follows the JBLM YTC boundary for 12.5 miles along the fire break entirely on Army owned lands. The route segment is located entirely in Yakima County. The area is used for ground military training operations. There are two and four residences located within 500 feet and 1,000 feet, respectively, on adjacent private lands. The route segment crosses the BPA Ellensburg-Moxee 115 kV transmission line at milepost (MP) 0.2.

The JBLM YTC training designations crossed by this route segment include TA-13, TA-11, and TA-10. Along and adjacent to the east-west section of the route segment on JBLM YTC, the land use is Zone 2 (Conservation), with digging and bivouacking activities limited. The land use along and adjacent to the north-south section of the route segment is Zone 3 (General Use).

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment 1b.

3.4.4.3 Route Segment 1c

Route Segment 1c is similar to Route Segment 1b except Route Segment 1c is located outside of the JBLM YTC boundary. The predominant land use in the area is large lot residential, with this route segment crossing 11.4 miles of residential development. This route segment would cross 74 privately-owned parcels owned by 49 landowners and one DNR state trust land parcel. There are 17 and 28 residences located within 500 feet and 1,000 feet, respectively, of this route segment. The residential land development along this route is generally limited to roads and fences, with the majority of the parcels generally remaining in a natural or semi-natural condition and no ornamental landscaping, turf grass, or other regular management activities occurring where the route segment crosses. The route segment is located entirely in Yakima County.

The route segment crosses the BPA Ellensburg-Moxee 115 kV transmission line at MP 0.3. The route segment parallels existing gravels roads (Sage Trail, John Street) on the west end of the route segment (MP 0.0-0.9) and crosses several minor gravels roads serving residences in the area (MP 0.4, 0.8, 4.1, and 5.6). The route segment also crosses Coombs Road at MP 9.8 and Mieras Road at MP 10.2.

Agricultural land uses also occur along this route segment. Route Segment 1c crosses 0.2 mile of wheel line irrigated pasture (MP 9.8-10.0), 0.2 mile of hand-movable sprinkler irrigated apple orchards (MP 10.2-10.4) and 0.3 mile of dryland pasture (MP 9.6-9.8). The route segment also crosses and parallels Mieras Road for approximately 0.9 mile in a predominantly residential area between MP 10.2-11.3.

This route segment is located adjacent to land designated as “Remote Rural/Extremely Limited Development Potential Areas,” “Rural Self Sufficient,” and “Agricultural Resource Area” in Yakima County’s “Plan 2015.”

For the north-south section of the route segment located adjacent to JBLM YTC lands the land use is designated as Zone 3 (General Use). The land use on JBLM YTC adjacent to the east-west section of the route segment is Zone 2 (Conservation-Sage Grouse Protection Area).

3.4.4.4 Route Segment 2a

The existing land use along this one mile long route segment is undeveloped rangeland. This route segment would cross five privately-owned land parcels owned by two owners and is adjacent to a DNR state trust land parcel that is leased for grazing. The route segment is located entirely in Yakima County.

Land on the west side of the route segment is designated in Yakima County's "Plan 2015" as "Remote Rural/Extremely Limited Development Potential Areas" and land on the east side is designated as "Agricultural Resource Area" (Yakima County 2007).

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment 2a.

3.4.4.5 Route Segment 2b

The existing land use along Route Segment 2b is rangeland. This route segment would cross 23 privately-owned land parcels owned by seven landowners and also crosses two parcels of BLM lands for a distance of 0.7 mile. All BLM lands along this segment are leased for grazing and the route is located entirely in Yakima County. No linear features such as transmission and/or distribution lines are crossed or paralleled. No major roads are crossed or paralleled along this route. The route parallels JBLM YTC for eight miles along its southeastern boundary. This route segment crosses two PLSS sections (T.12N, R.23E, Sections 8 and 9) that contain CRP lands on unknown parcels.

According to Yakima County's "Plan 2015," the land is designated as "Agricultural Resource Area" (Yakima County 2007). Where the line parallels the JBLM YTC boundary, the land use on JBLM YTC is Zone 3 (General Use).

3.4.4.6 Route Segment 2c

The existing land use along Route Segment 2c is predominantly rangeland with some cultivated areas of row crops. Private land crossed totals 17.1 miles and DNR state trust lands account for one mile and the route segment is located entirely in Yakima County. This route segment would cross 44 privately-owned land parcels owned by eight landowners. Alfalfa hay, timothy, wheat, and wildland feed are crossed by this route segment. A total of 0.9 mile of irrigated cropland and 1.1 miles of dryland agriculture is crossed. The only method used for irrigation is center pivot, and a total of five pivots are crossed. Grazing leases occur on the one mile of DNR state trust land as does an irrigated agricultural leased land totaling 0.1 mile. However, the irrigated DNR lease land crossed is currently only irrigated on the south 0.5 of the section (refer to Appendix A: Agriculture and Irrigation-Page 2 of 5, Route 2c MP 4.6). One residence is located within 500 feet of this route segment and two are within 1,000 feet. There is one agricultural processing building located at MP 11.0 (refer to Appendix A: Agriculture and Irrigation-Page 3 of 5) that would be affected by this route segment just west of the Rattlesnake Substation (owned and operated by Benton Rural Electric).

Route segment 2c would parallel the BPA Midway-Moxee 115 kV and the PacifiCorp/Pacific Power Union Gap-Midway 230 kV transmission line corridor on the south side for 8.6 miles, crossing the lines twice (MP 8.5 and MP 17.2).

According to Yakima County's "Plan 2015", the land is designated as "Agricultural Resource Area" (Yakima County 2007).

3.4.4.7 Route Segment 2d

The existing land use along Route Segment 2d is primarily rangeland, and the route segment crosses the Umtanum Ridge, paralleling the Yakima-Benton county line and crossing into Benton County, terminating on the south bank of the Columbia River at the abandoned C, M, SP, & P Railroad ROW and Priest Rapids Road extension. Grazing is the primary land use along this route segment. No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment 2d. No linear features are present along this route segment. This route segment would cross six miles of privately-owned land on 13 parcels owned by three landowners and a contiguous section of BLM land totaling one mile. Most of the BLM land crossed contains grazing leases (0.8 mile, MP 1.0-1.5 and MP 1.7-2.0). The route segment also crosses Cold Creek Road at MP 4.4. Cold Creek Road is only accessible from JBLM YTC to the west and is closed to public access from the east and SR-24.

According to Yakima County's "Plan 2015," the land is designated as "Agricultural Resource Area" (Yakima County 2007). According to Benton County's Land Use Plan, the land is designated as "Agricultural" (Benton County 2006). Where the route segment parallels the JBLM YTC boundary, the land use on JBLM YTC is Zone 3 (General Use).

3.4.4.8 Route Segment 3a

The existing land use along Route Segment 3a is a utility corridor for overhead transmission lines owned by BPA, Grant County PUD, and PacifiCorp/Pacific Power on land owned by Reclamation. The route segment is located east of the Vantage Substation, and parallels four 230 kV transmission lines (Grant County PUD Priest Rapids-Vantage, BPA Midway-Vantage, PacifiCorp/Pacific Power Vantage-Walla Walla, and BPA Columbia-Vantage) for 0.1 mile into the substation.

According to the Grant County Comprehensive Plan Map, the land use designation is "Rural Remote." The primary land uses include, but are not limited to farming, mineral extraction, open space and residential (maximum density of one dwelling unit per 20 acres).

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment 3a.

3.4.4.9 Route Segment 3b

The existing land use along Route Segment 3b is a mix of military, residential, farming (orchards: Auvil Fruit Company), and the Priest Rapids Project. This route segment is located almost entirely within the abandoned C, M, SP, & P Railroad ROW, except on the north end where the route segment crosses BLM and JBLM YTC land and the Columbia River. A portion of this railroad corridor is used as the John Wayne Pioneer Trail (special management areas are described in greater detail in Section 3.6 and recreation areas are detailed in Section 3.5). BLM land is crossed for 0.4 mile of this route segment, JBLM YTC lands are crossed for 0.8 mile, Reclamation lands are crossed for 1.4 miles, and the route segment is located within the Kittitas County Huntzinger Road ROW for 1.1 miles. The BLM land contains oil and gas leases. The private lands and the railroad ROW are crossed for 18.0 miles along this route segment. This route segment would cross 55 privately-owned land parcels owned by three landowners. Route Segment 3b is located adjacent to hand-movable sprinkler irrigated apple orchards in the railroad ROW.

In Kittitas County, a large orchard is located between JBLM YTC and the Columbia River along Huntzinger Road. The orchard includes administrative offices and some housing facilities for Auvil Fruit Company workers. Other residential areas along this route segment include nine single-family detached houses near the south end of the orchard on the west side of Huntzinger Road along Auvil Road and approximately 14 single-family detached houses on the east side of the route segment next to the Priest Rapids Dam in Yakima County. A total of 21 residences are located within 500 feet and 31 are within 1,000 feet of the route segment. The route segment parallels the existing BPA-PacifiCorp/Pacific Power utility corridor across the Columbia River south of the Wanapum Dam. This route segment is located primarily in Yakima and Kittitas counties. Approximately two miles of this route segment is located in Grant County (south of Wanapum Dam on the east side of the Columbia River) and a small section (0.1 mile) is located in Benton County.

According to the Yakima County "Plan 2015," Comprehensive Plan, the land along the route segment south of Priest Rapids Dam is designated as "Agricultural Resource Area" (Yakima County 2007). The plan does not designate future land uses north of the dam as there is only a sliver of land associated with the former railroad where this route segment would be located between JBLM YTC and the Columbia River north to the Kittitas County line that provides limited development opportunity.

According to the Kittitas County Comprehensive Plan 2013, the Auvil Orchard is designated as “Commercial Agriculture.” Land within this designation is not characterized by urban growth, is primarily devoted to agriculture and has long-term significance for agriculture. Other lands along the route segment are designated as “Rural Lands.” Land uses reflect traditional rural lifestyles, landscapes, and economies.

The Grant County PUD “Shoreline Management Plan” also designates land uses on the east and northeast sides of the route segment (Grant County PUD 2010a). Approximately one mile upstream and downstream of the Priest Rapids Dam east of the route segment, the land use is designated as “Project Facilities” and are managed for the electrical power generation, transmission and associated facilities with the Priest Rapids Project, as well as for lands with the potential for such uses in the future. North of the lands designated as “Project Facilities,” the land east of the route segment is designated as “Resources Management” and are managed to preserve and enhance conservation and protection of fish, wildlife, scenic, historic, archaeological, and cultural resources. The plan classifies land around the Vantage Substation and the Wanapum Dam and Grant County PUD’s Priest Rapids-Vantage 230 kV transmission line as “Project Facilities.” The Wanapum Dam, a Grant County PUD operated hydroelectric facility, is located approximately 0.8 mile north of Route Segment 3b at the river crossing.

3.4.4.10 Route Segment 3c

The existing land uses along this route segment include rangeland, irrigated cropland (orchards, vineyards, and row crops), high voltage transmission lines, the Priest Rapids Project and special management areas (the BLM’s Saddle Mountains MA and McCoy Canyon ACEC, the WDFW Lower Crab Creek Wildlife Area-a unit of the Columbia Basin Wildlife Area, Burkett Lake Recreation Area Grant County PUD). The Columbia River is crossed west of the Hanford Reach National Monument at MP 2.3 to 2.6. Private land is crossed for 15.6 miles, BLM lands for 4.4 miles, and Reclamation lands for 5.2 miles. Dispersed agriculturally related residential areas are crossed along the Wahluke Slope and Beverly area.

The route segment crosses recreational use areas along the Milwaukee Corridor and the Nunnally Lake area. The western portion of BLM’s Saddle Mountains MA is used for recreation, principally for off-highway vehicle riding and rockhounding/petrified wood collection. Some hang-gliding and paragliding use also takes place, but the primary launch point is on private land. Special management areas are described in greater detail in Section 3.6 and recreation areas are detailed in Section 3.5. Nine communication towers are located near the summit of the Saddle Mountains east of the route segment. This route segment would cross 79 privately-owned land parcels owned by 27 landowners. A total of 15 residences are located within 1000 feet of this route segment, fourteen of which are within 500 feet. Grazing leases are also crossed for a total of 4.2 miles on BLM lands along this route segment.

This route segment parallels the BPA Hanford-Vantage No. 1 500 kV transmission line in a BLM designated Utility Corridor for four miles and on other non-BLM lands for 2.5 miles, crossing the BPA transmission line in three locations: MP 14.6, 22.2, and 25.1. The BPA Midway-Vantage 230 kV and BPA Schultz-Wautoma 500 kV transmission lines are also crossed by this route segment at MP 5.1.

Along the section of the route segment parallel to Road N SW, between State Route 243 and the foothills south of the Saddle Mountains, the adjacent land use is irrigated cropland consisting of numerous center pivot irrigation systems and a system of concrete-lined irrigation canals and ditches, including one that parallels Road N SW. There is one livestock (cattle) feeding operation located west of the route segment midway between Road 24 SW and a Reclamation irrigation canal, the Wahluke Branch Canal. The route segment crosses the Nunnally Lake drainage canal located northeast of Burkett Lake (MP 21.7). This route segment would cross SR 243 at MP 3.9, parallel Road N from MP 5.3 to 11.3, parallel Road 24 SW between MP 11.3 and 12.3, and parallel O Road between MP 12.3 and 13.4. The route segment crosses Lower Crab Creek Road at MP 21.2. This route segment is also in proximity to the aforementioned paved private airstrip located north of Nunnally Lake that is part of the Lower Crab Creek Unit of the Columbia Basin Wildlife Area.

The concentration of irrigated cropland and irrigation infrastructure (e.g., center pivots, ditches, siphons) along and adjacent to Roads N SW and O SW are concerns for the operation of a new transmission line as well as farming operations (cultivation, harvesting, pest management). Careful siting of the transmission line structures in cooperation with land owners are required to manage any conflicts with agricultural operations. This is covered in more detail in Chapter 4. A total of 2.7 miles of irrigated agricultural land is crossed by this route segment. The crop types crossed include wine grapes (1.5 miles), wheat (0.5 mile), cherries (0.3 mile), green pea (0.2 mile), potato (0.2 mils), and small areas of alfalfa hay, blueberry, field corn, and timothy totaling less than 0.1 mile. Hand-moveable sprinkler irrigation is the predominant method used along the route segment, accounting for 1.2 miles crossed. Also, center pivot irrigation is crossed along 0.9 mile with nine pivots. Smaller areas of drip and other irrigation are also used along the route segment. Appendix A: Maps 9a through 9e shows the crop types and irrigation infrastructure in the Wahluke Slope area of this route segment. Also refer to Tables 3.4-9A and 3.4-9B for a summary of land uses.

The Grant County PUD “Shoreline Management Plan” also designates land uses adjacent to Lower Crab Creek. Lands classified as “Resources Management and “Public Recreation Development,” which are managed for recreation-oriented development are located adjacent to Lower Crab Creek (Grant County PUD 2010a). The Burkett Lake Recreation Area (see Section 3.5 - Recreation) is located west and south of the route segment north of Lower Crab Creek. The plan classifies land around the Vantage Substation and the Wanapum Dam and Grant County PUD’s Priest Rapids-Vantage 230 kV transmission line as “Project Facilities.”

3.4.4.11 Route Segment NNR-2

The existing land use along Route Segment NNR-2 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 (Army) 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.

3.4.4.12 Route Segment NNR-3

The existing land use along this route segment of the Project study 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 crosses a BLM grazing lease 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 study 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 route segment. This route segment would also cross the Reclamation-proposed Wymer Dam Reservoir. This route segment also contains private land parcels planned for potential acquisition or establishment of conservation easements as part of the Integrated Plan. Land use for WSDOT parcels crossed by this route segment 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.

Route Segment NNR-3 would cross Reclamation's proposed Wymer Dam and Reservoir Project for approximately 0.2 mile. At this crossing, Route Segment NNR-3 is directly adjacent to Pacific Power's existing Pomona-Wanapum 230 kV Transmission Line. For the proposed Wymer Dam and Reservoir Project, mitigation land acquisition and habitat enhancement components are intended to result in a net improvement in conditions for Sage-Grouse. Approximately 2.3 miles of Route Segment NNR-3 crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project.

3.4.4.13 Route Segment NNR-4o/4u

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. This route segment also contains private land parcels planned for potential acquisition or establishment of conservation easements as part of the Integrated Plan. Route Segment NNR-4 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 Pacific Power's 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.

Approximately 1.2 miles of Route Segment NNR-4o/NNR-4u crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project.

3.4.4.14 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 Pacific Power's 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.

3.4.4.15 Route Segment NNR-6o/6u

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-6o/6u. Farmland of statewide importance is crossed for 0.6 mile.

3.4.4.16 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 Route Segment NNR-7. 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.

3.4.4.17 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 Route Segment NNR-8 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, while zoning in Grant County is Rural Remote. The route segment parallels the existing BPA-PacifiCorp/Pacific Power 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 study area of Route Segment NNR-8: Wanapum S. P. Boat Launch Replacement Grant #00-1519 and Wanapum NAP 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.

3.4.4.18 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. Route Segment MR-1 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. This route segment also contains private land parcels planned for potential acquisition or establishment of conservation easements as part of the Integrated Plan. 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 Pacific Power's 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.

Route Segment MR-1 would cross Reclamation's proposed Wymer Dam and Reservoir Project for approximately 0.05 mile. For the proposed Wymer Dam and Reservoir Project, mitigation land acquisition and habitat enhancement components are intended to result in a net improvement in conditions for Sage-Grouse. Approximately 3.2 miles of Route Segment MR-1 crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project.

Table 3.4-9a Land Use and Jurisdiction Summary by Route Segment

LAND USE	1A/NNR-1	1B	1C	2A	2B	2C	2D	3A	3B	3C
Irrigation Cropland Land (miles)	0	0	0.6	0	0.0	3.7	0	0	0	9.2
Residential Area Crossing (miles)	2.4	0	11.4	0	0	0	0	0	0	0
Residences (#)										
within 500 feet	25	2	17	0	0	1	0	0	21	14
within 1,000 feet	67	4	28	0	0	2	0	0	31	15
Recreation/Conservation (miles)	0	0	0	0	0	0	0	0	0	0.1
Integrated Plan Potential Acquisition/Conservation Land (miles)	0	0	0	0	0	0	0	0	0	0
Military (miles)	0	12.5	0	0	0	0	0	0	10.0	0
Transportation (miles)	0	0	0	0	0	0	0	0	<0.02	<0.02
Undeveloped/Vacant (miles)	0	0	1.5	1.0	16.4	14.4	7.0	0.1	7.2	15.5
Unincorporated Communities (#)	0	0	0	0	0	0	0	0	0.3	0
Open Water (miles)	0	0	0	0	0	0	0	0	2.2	0.4
Leases (Federal and State Land; (miles))										
Oil and Gas	0	0	0	0	0	0	0	0	0.5	0.3
Grazing	0	0	0	0	0.7	1.0	0.8	0	0	4.2
Irrigated Agriculture (State Lands)	0	0	0	0	0	0.1	0	0	0	0
Other (miles)										
Farmland of Statewide Importance	0	1.5	0	0.2	0.4	2.8	0.1	0	4.5	3.4
Unique Farmland	1.8	0.1	0.1	0.4	3.4	6.5	2.3	0	0.6	8.1
Prime Farmland if Irrigated	0.1	6.0	0	0	0.5	1.4	0.1	0	0.3	1.1
Ownership (miles)										
Federal										
BLM	0	0	0	0	0.7	0	1.0	0	0.4	4.4
JBLM YTC	0	12.5	0	0	0	0	0	0	0.8	0
Reclamation	0	0	0	0	0	0	0	0	1.4	5.2
Total Federal Land	0	*12.5*	*0*	*0*	*0.7*	*0*	*1.0*	*0*	*2.7*	*9.6*
State										
DNR	0	0	1.0	0	0	1.0	0	0	0	0
WSDOT	0	0	0	0	0	0	0	0	<0.02	<0.02

LAND USE	1A/NNR-1	1B	1C	2A	2B	2C	2D	3A	3B	3C
Total State Land	*0*	*0*	*1.0*	*0*	*0*	*1.0*	*0*	*0*	*<0.02*	*<0.02*
Kittitas Co. Road ROW	0	0	0	0	0	0	0	0	1.1	0
Private Land	2.4	0.1	11.9	1.0	15.7	17.1	6.0	0.1	17.5	15.6
County										
Benton County	0	0	0	0	0	0	0.7	0	0.1	2.5
Grant County	0	0	0	0	0	0	0	0.1	2.0	22.7
Kittitas County	0	0	0	0	0	0	0	0	9.5	0
Yakima County	2.4	12.5	12.9	1.0	16.3	18.1	6.4	0	10.1	0
Total County Land	2.4	12.5	12.9	1.0	16.3	18.1	7.1	0.1	21.7	25.2
Parcels and Landowners										
Number of Parcels Crossed	33	3	74	5	23	44	13	1	55	79
Number of Private Landowners	24	2	49	2	7	8	3	0	3	27
Miles of PacifiCorp Existing Distribution Rights	1.2	-	-	-	-	-	-	-	-	-
Miles Paralleling Existing Transmission	0.8	-	-	-	-	8.6	-	0.1	6.5	-

Table 3.4-9B Land Use and Jurisdiction Summary by Route Segment

LAND USE	NNR-2	NNR-3	NNR-4o/4u	NNR-5	NNR-6o/6u	NNR-7	NNR-8	MR-1
Irrigated Cropland (Total)	0	0	0	0	0	0	0	0
Residential Area Crossing (miles)	2.4	0.5	0	0	0	0	0	0
within 500 feet (#)	21	0	0	0	0	0	0	1
within 1,000 feet (#)	48	2	0	0	0	0	0	3
Integrated Plan Potential Acquisition/Conservation Land (miles)	0	2.4	1.2	0	0	0	0	3.3
Military (miles)	4.5	0	3.3	1.8	6.4	8.2	0	6.6
Transportation (miles)	0	0.7	0.1	0	0	0	<0.02	0.2
Undeveloped/Vacant (miles)	0	8.9	1.2	0	0	0	2.3	4.9
Open Water (miles)	0	0	0	0	0	0	0.4	0
Leases (Federal and State Land; miles)								
Oil and Gas	0	0	0	0	0	0	0	0
Grazing	0	1	0	0	0	0	0	0
Other (miles)								
Farmland of Statewide Importance	1.4	0.8	0.2	0.6	0.6	1.8	0	4.6
Unique Farmland	0	0	0	0	0	0	0	0
Prime Farmland if Irrigated	2.4	0.2	0.9	0.1	0	0	0	0
Ownership (miles)								
Federal								
BLM	0	3.6	0	0	0	0	0.4	
JBLM YTC	5.0	0	3.2	1.8	6.4	8.2	0	6.6
Reclamation	0	0	0	0	0	0	1.4	0
Total Federal Land	*5.0*	*3.6*	*3.2*	*1.8*	*6.4*	*8.2*	*1.8*	*6.6*
State								
WSDOT	0	0.7	0.1	0	0	0	<0.02	0.2
DNR	0	0	0	0	0	0	0	1.7
Total State Land	*0*	*0.7*	*0.1*	*0*	*0*	*0*	*0*	*1.9*
County								
Grant County	0	0	0	0	0	0	2.2	0

LAND USE	NNR-2	NNR-3	NNR-4o/4u	NNR-5	NNR-6o/6u	NNR-7	NNR-8	MR-1
Kittitas County	0	6.1	4.6	1.8	6.4	8.2	0.6	11.9
Yakima County	5.0	3.2	0	0	0	0	0	0
Total County Land	*5.0*	*9.3*	*4.6*	*1.8*	*6.4*	*8.2*	*2.8*	*11.9*
Private Land	0	5.0	1.2	0	0	0	0.5	3.3
Parcels and Landowners								
Number of Parcels Crossed	7	26	10	3	9	10	5	23
Number of Private Landowners	0	11	2	0	0	0	0	1
Miles of PacifiCorp Existing Distribution Rights	0	0	0	0	0	0	0	0
Miles Paralleling Existing Transmission	1.3	8.3	4.2	0	0	6.4	8.2	2.5

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3.5 RECREATION

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to recreation along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative - Overhead Design Option as the Environmentally Preferred Alternative and the U.S. Bureau of Land Management (BLM) has selected the NNR Alternative - Overhead Design Option as the Agency Preferred Alternative.

3.5.1 Data Sources

This section describes existing recreation resources in the Project study area. For recreational resources, the Project study area includes the developed and dispersed recreational activities and lands used or dedicated for recreational activities within one mile of each of the Action Alternative's 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, snowshoeing, wildlife viewing, photography, hiking, horse-back riding, and biking.

Data sources came from various readily available secondary sources and field reviews conducted on May 9 and 12, 2011 and 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 study area were verified in the field.

Scoping comments included concerns regarding potential impacts on recreation in the Milwaukee Road (railroad) Corridor, also known as the John Wayne Pioneer Trail/Iron Horse State Park; Grant County Public Utility District (PUD) Federal Energy Regulatory Commission (FERC) license measures regarding the management for recreation values; visual resources related to tourism and disruption of recreational activities along the old Chicago-Milwaukee-St. Paul and Pacific (C, M, SP, & P) Railroad Corridor; duck and geese hunting and fishing along the railroad corridor; and Beverly Sand Dune recreational opportunities. These comments and issues were considered during data collection analysis of the Project study area.

3.5.2 Current Conditions and Trends, Regional Overview

3.5.2.1 Federally Administered Recreation Areas

Columbia National Wildlife Refuge

A portion of the Columbia National Wildlife Refuge (NWR) is located in the Project study area in one contiguous parcel along Lower Crab Creek and the northern slope of the Saddle Mountains (see Appendix A – Jurisdiction, Recreation, and Special Management Area Map). The NWR is managed by the U.S. Fish and Wildlife Service (USFWS; see Section 3.6 – Special Management Areas). Recreational opportunities within the NWR are limited to areas well to the east of the Project study area (e.g., Drumheller area, Potholes Reservoir). No public access is provided to the NWR in the Project study area.

Hanford Reach National Monument

The Hanford Reach National Monument (HRNM) is located in the Project study area along the Columbia River. HRNM lands are owned and administered by either the U.S. Department of Energy (DOE) or USFWS. Lands administered by the USFWS include the previously designated Saddle Mountains NWR which existed prior to, and was incorporated into, the HRNM when it was established on June 9, 2000. See Section 3.6 for a full description of the HRNM.

The Columbia River Corridor, Wahluke, and Rattlesnake Administrative Units of the HRNM are in the Project study area as identified in the Final HRNM Comprehensive Conservation Plan and Environmental Impact Statement (USFWS 2008). The HRNM generally supports dispersed and developed recreational activities such as boating, rafting, hunting, hiking, wildlife viewing, and environmental education. Although the river (Columbia River Corridor Administrative Unit) is open and accessible to the public, the Columbia River Corridor and Rattlesnake Administrative units (adjacent to the south of the river, DOE-owned lands) are closed to public use with the exception of the area north and west of Vernita Bridge. The Wahluke Administrative Unit, located on lands owned by the USFWS is open. Access is controlled and “many/most” public uses are allowed with the exception of hunting which is not allowed.

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 the 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).

Saddle Mountains Management Area

The BLM administers the Saddle Mountains Management Area (MA), which contains all BLM-managed lands that are within the Project study area in Grant County. Additional scattered BLM-administered lands are located in Kittitas and Yakima counties. The primary activities occurring in the Saddle Mountains MA are hiking, horseback riding, hunting, mountain biking, hang gliding, paragliding, petrified wood collecting, and OHV riding on the west end of the Saddle Mountains MA. For a major portion of the Saddle Mountains MA, OHV use is restricted to designated roads and trails. Approximately 4,300 acres of public land in the western portion of the Saddle Mountains MA is designated as open to OHV use. Vehicle use is limited to designated trails (see Appendix A: Jurisdiction, Recreation and Special Management Areas Map).

Recreational use data has been collected in the Spokane District since the middle 1980s, and is stored in the Recreation Management Information System. Visitation estimates were compiled as part of the Analysis of the Management Situation (AMS) - Eastern Washington and San Juan Resource Management Plan (BLM 2011). Visits and visitor days were estimated for the Saddle Mountains MA. Planning area total recreation visits and 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 both 2008 and 2009, the latest visitation estimate dates, there were 3,000 visits and 3,500 visitor days in the Saddle Mountains MA (for all recreation sites and dispersed users). Compared to BLM’s nearby Yakima River Canyon MA, recreation site visits and visitor days are relatively low in the Saddle Mountains.

Yakima River Canyon Management Area

The BLM manages land in the Yakima River Canyon 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 Project study area (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 area is accessed by the communication facility service road leading from Selah Creek Drive that intersects with State Route (SR) 821. The area 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 AMS-Eastern Washington and San Juan Resource Management Plan (BLM 2011). Visits and visitor days were estimated for the Yakima River Canyon MA. Planning area total recreation visits and 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

Beverly Sand Dunes OHV Park

Managed by the Washington Department of Natural Resources (DNR), the 300-acre Beverly Sand Dunes OHV Park is located in the northern portion of the Project study area in Grant County between the northern slope of the Saddle Mountains and Lower Crab Creek, approximately one mile east of Mattawa. Located on state trust lands, the area was developed as a cooperative project between the DNR and the Washington Department of Fish and Wildlife (WDFW) and is maintained with off-road vehicle license funds. The site contains primitive campsites, toilets, picnic tables, and fire pits, also.

Buckshot Boat Launch

Managed by the WDFW, Buckshot Boat Launch is located on the east side of the Columbia River southwest of Mattawa. The site is accessed from Road 26 SW, and includes a gravel parking lot. No restrooms are available, but camping is allowed. Currently, there are no plans for expansion or improvements at this facility.

Columbia Basin Wildlife Area

The Columbia Basin Wildlife Area is managed by the WDFW. Two administrative units are located in the Project study area: The Lower Crab Creek Unit and the Priest Rapids Unit (see Appendix A: Jurisdiction, Recreation and Special Management Areas Map).

Lower Crab Creek Unit

The Lower Crab Creek Unit of the Columbia Basin Wildlife Area provides trout fishing, camping, hunting, wildlife viewing, and non-motorized boating activities in and around Nunnally Lake and Lenice Lake. The area is accessed by a parking lot located east of Beverly along Crab Creek Road and includes restroom (outhouse) facilities.

Columbia Basin Wildlife Area-Priest Rapids Unit
The Priest Rapids Unit of the Columbia Basin Wildlife Area provides access to the Columbia River. The unit includes Goose Island, located just north of the Priest Rapids Dam. There are no developed recreation sites within this unit.

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 study area, includes 100 miles of trail and is part of the Iron Horse State Park. The Washington State Parks and Recreation Commission (State Parks) owns an abandoned railroad (referred to by the state as the "Milwaukee Road Corridor"), the old 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 study 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 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 study 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 Milwaukee Road Corridor. The Milwaukee Road Corridor is open for use year-round.

Selah Cliffs Natural Area Preserve
The Selah Cliffs Natural Area Preserve (NAP) is managed by the Southeast Region of DNR and was established to protect the known population of basalt daisy (*Erigeron basalticus*) and prairie falcon (*Falco mexicanus*). 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 to the NAP 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 study area. A northern extension of the Yakima River Greenway is proposed along the west bank of the Yakima River in the Project study area (Yakima County 2008).

Benton County
There are no Benton County administered recreation sites in the Project study area.

Kittitas County
There are no Kittitas County administered recreation sites in the Project study area.

Grant County

Grant County does not own or administer any parks or recreation sites in the Project study area. Parks and recreation sites are owned and administered by Grant County PUD which manages parks and recreation facilities under the Shoreline Management Program (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 the FERC license requirements and project operations of the Priest Rapids Hydroelectric Project (Grant County PUD 2010b).

Burkett Lake/Crab Creek Corridor Recreation Area (Grant County PUD)

The Burkett Lake/Crab Creek Corridor Recreation Area is located on Crab Creek Road approximately 0.5 mile east of Beverly. Currently, a day use area with picnic tables and an informational kiosk is located on the northwest side of the park, and a gated access road which allows for lake access is located on the east side. Existing uses of the area also include dispersed, non-motorized activities such as hiking, hunting, fishing, scenery viewing, and wildlife and botanical watching. Developed features on site also include:

- Bonneville Power 500 kV transmission lines and lattice structures,
- Water pump structure,
- Concrete hand-launch boat ramp,
- Access bridge, and
- Non-operational irrigation pump.

Grant County PUD has plans for facility improvements at the existing day use site, as well as on the lake's south side. The future development would expand upon the existing east side access with a 2000 foot long road, and would also include picnic tables, an interpretive kiosk, accessible fishing piers, vault toilets, trash receptacles, parking, and two miles of interpretive trails. Scheduled for completion by the end of 2014, the proposed development will take place on three parcels that includes U.S. Bureau of Reclamation (Reclamation) and Grant County PUD lands and will include wildlife enhancement measures and associated propagation gardens and utility sheds.

Priest Rapids Reservoir (Grant County PUD)

Priest Rapids Reservoir is typically used for fishing, boating, and sightseeing. The reservoir is part of the Priest Rapids Hydroelectric Project, administered by the Grant County PUD No. 2 under a license agreement with FERC. Access to the lake in and around the Project study area is from the Desert Aire Boat Launch. Other nearby launches on the lake include the Huntzinger Boat Launch (Grant County PUD), located on the south side of the Wanapum Dam, and the Lower Wanapum Dam Boat Launch and Picnic Area (Grant County PUD). The Huntzinger Boat Launch is in the process of being improved pending land lease negotiations. The Lower Wanapum Dam Boat Launch is located just west of the Wanapum Heritage Center. Future plans include additional signage and the installation of a toilet in the picnic area, extension of the float, and improvements to the parking area.

All FERC licensees are required to submit a recreation report on a six year cycle. Approximately 17.1 percent of the shoreline of the Priest Rapids Reservoir Development Project is accessible to the general public by land travel without trespass. There were a total of 7,782 total annual daytime recreation day visits to the Priest Rapids Project and 1,428 total annual nighttime recreation day visits in 2008. Peak weekend day visits totaled 734 and total nighttime peak weekend visits totaled 127 (Grant County PUD 2008a).

Priest Rapids Recreational Trail (Grant County PUD)

Priest Rapids Recreational Trail is a Grant County PUD administered undeveloped trail located along the east side of Priest Rapids Reservoir adjacent to the Desert Aire community. Currently, a day use access site is located at the south end of Road U SW and the Desert Aire Dock is located south of the community. The trail generally follows the shoreline between Desert Aire Dock and the Grant County PUD Day Use Area. Future plans for the trail include a new parking lot located on the south end of U SW Road north of Desert Aire.

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 outdoor picnic area. 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.

Wanapum Reservoir (Grant County PUD)
Wanapum Reservoir is also part of the Priest Rapids Hydroelectric Project, administered by the Grant County PUD No. 2 under a license agreement with the FERC. Access to the lake near the Project study 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 2008b).

3.5.2.4 Municipal Administered Recreation Areas
There are no municipal-administered recreation areas located within one mile of the Action Alternatives.

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 study area. Hunting occurs on private lands, as well as in the public areas described above. Chukar habitat is actively managed in the Saddle Mountains area. Big game hunting occurs in the four WDFW Game Management Units (GMUs) that are located in the Project study area. Rattlesnake Hills (GMU 372) includes most of Yakima and Benton counties exclusive of JBLM YTC in the Project study area. Manastash (GMU 340) is located north and west of I-82 in the Project study area. Alkali (GMU 371) includes all of JBLM YTC and Wahluke (GMU 278) includes all of Grant County in the Project study area. Total combined 2013 General and Special Permit Harvests for elk and deer in the Project study area GMUs are shown in Table 3.5-1 below. Small game harvests are tracked by counties in Washington. Small game harvests for Benton, Grant, Kittitas, and Yakima 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.

Table 3.5-1 Combined Big Game General and Special Permit 2014 Harvest in GMU Crossed by the Project

SPECIES	NUMBER OF PERMITS BY GAME MANAGEMENT UNIT NAME AND ROUTE SEGMENT			
	Wahluke-278 (3a, 3b, 3c, NNR-8)	Manastash -340 (NNR-3,NNr-4, MR-1)	Alkali-371 (1b, 3b, NNR-2, NNR-4, NNR-5, NNR-6, NNR-7, MR-1)	Rattlesnake Hills-372 (1a, 1c, 2a, 2b, 2c, 2d, NNR-1)
Elk	0	107	12	7
Deer	58	89	0	19

Source: WDFW 2015

Table 3.5-2 Small Game Harvest by County (2014)

SPECIES	BENTON (#)	GRANT (#)	KITTITAS (#)	YAKIMA (#)
Canada Goose	3,663	15,709	506	3,772
Chukar Partridge	54	212	896	441
Cottontail Rabbit	22	497	0	1,049
Duck	33,686	79,419	4,254	30,476
Forest Grouse	0	0	2,936	2,753
Gray Partridge	248	164	499	139
Mourning Dove	3,214	14,935	340	8,169
Pheasant	4,353	7,796	535	3,306
Quail	2,622	11,319	1,455	14,344
September Canada Goose	397	1,060	54	258
Snipe	137	128	7	54
Snowshoe Hare	0	0	108	11

Source: WDFW 2015

Columbia River

Below the Priest Rapids Dam, recreation on the Columbia River is dispersed and, typically, dedicated to boating, fishing, and sightseeing activities. Rafting the free-flowing portion of the river (below Priest Rapids Dam through the HRNM) is also a popular activity. In the Project study area, the closest access to the river is at the Vernita Boat Launch and Fishing Access Site located just upstream from the Vernita Bridge and outside of the Project study area (see Section 3.8-Visual Resources).

The Hanford Reach is the only stretch of the Columbia River in the United States that is not impounded by a dam. The Hanford Reach of the Columbia River and public lands within 0.25-mile was recommended for inclusion in the National Wild and Scenic Rivers system as a "Recreational River" as a result of a study conducted by the National Park Service (NPS; NPS 1994; also see Section 3.6).

Wineries

Wineries and wine tasting generates tourism to the region, especially in Grant County. Fox Estate Winery and Ginkgo Forest Winery both are located near Mattawa in Grant County more than three miles from each Action Alternative's centerline.

Saddle Mountain Private Hang Gliding Launch Site

A privately owned hang gliding and paragliding launch site is located in the Saddle Mountains. The site is owned by the Maughan Family, and yearly permits are negotiated between the owners and the Cloudbase County Club (CBCC) which allows any United States Hang Gliding and Paragliding Association member to access the property to fly. Hang gliders launch from the area northeast of the existing communication towers, and land in the Beverly Sand Dunes OHV Park (see above; Maughan 2011; CBCC 2011).

3.5.3 Current Management Considerations

The USFWS is currently developing a "Comprehensive Conservation Plan" for the Columbia NWR to guide management of the refuge for the next 15 years and beyond. The degree of recreational use of the refuge is being considered under the plan alternatives (USFWS 2011).

The HRNM/Saddle Mountains NWR is managed for recreational use under the Final Comprehensive Conservation Plan and Environmental Impact Statement (USFWS 2008). The plans recreational focus is for the development of recreational facilities along highways and in perimeter areas of the HRNM. However, the plan states that fishing (on the Columbia River) accounts for 67 percent of the total annual visitor days. Recreational activities associated with the HRNM in the Project study area are limited to Columbia River wildlife observation, fishing, and boating activities.

BLM manages the Saddle Mountain MA and the Yakima River Canyon MA under the current Spokane District RMP and Record of Decision (ROD; BLM 1987) and the 1992 RMP (BLM 1992) Amendment and ROD. The Saddle Mountains MA and the Yakima River Canyon MA are also managed under the Recreation Management/Implementation Plan and Environmental Assessment for the Saddle Mountains MA (BLM 1997) and the Yakima River Canyon Recreation Management Plan (BLM 1988), respectively. As part of these plans, OHV usage in the open area are limited and the acquisition of property or easements to enhance trails use and access to petrified wood collecting sites is emphasized. The BLM has not identified any special recreation management areas (SRMAs) or extensive recreation management areas (ERMAs) under the current Spokane District 1987 RMP and 1992 RMP Amendment and ROD.

The Columbia Basin State Wildlife Area, which includes the Lower Crab Creek and Priest Rapids Units in the Project study area, is managed under the 2006 management plan (WDFW 2006). Recreation resources are considered under the plan as an Agency Objective. The objective is related to biological resource management "to provide sustainable fish and wildlife related recreational and commercial opportunities compatible with maintaining healthy fish and wildlife populations and habitats."

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 include:

- **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 study area; see Section 3.4 - Land Use).

Grant County PUD recreational lands are currently managed under the new Final Priest Rapids Hydroelectric Project Shoreline Master Plan (SLMP) (Grant County PUD 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). The SLMP was submitted to FERC for approval on March 2, 2010, an order modifying and approving the SLMP submitted was issued on April 18, 2013 by FERC, and Grant County adopted an updated SLMP in September 2014 (see Section 3.4 - Land Use). One of the purposes of the SLMP 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 Route Segment Specific Considerations

3.5.4.1 Route Segment 1a/NNR-1

Route Segment 1a/NNR-1 is located in a low density residential area. There are no recreation areas or significant recreational activities occurring along Route Segment 1a/NNR-1. Refer to Table 3.5-3 for a summary of recreation activities occurring in the Project study area.

3.5.4.2 Route Segment 1b

Route Segment 1b is located in a restricted area of the JBLM YTC. Private hunting opportunities exist adjacent to the route segment on private lands.

3.5.4.3 Route Segment 1c

The primary recreation activity occurring in this area is private land hunting. DNR state trust lands are crossed for one mile on the west end of the route in the Blackrock designated elk hunting area (WDFW 2011).

3.5.4.4 Route Segment 2a

Route Segment 2a crosses private lands potentially open for dispersed hunting activities. Adjacent DNR state trust lands have limited access.

3.5.4.5 Route Segment 2b

Route Segment 2b crosses private lands and BLM lands directly south of the JBLM YTC which are potentially open for dispersed hunting activities. Adjacent DNR state trust lands and BLM parcels have limited access.

3.5.4.6 Route Segment 2c

Route Segment 2c crosses private lands and parallels existing 115 kV and 230 kV transmission lines north of SR-24. This route segment crosses private lands potentially open for dispersed hunting activities. The adjacent DNR state trust land is potentially accessible from Badger Lane, but much of it has agricultural leases that limit hunting opportunities. The BLM lands have limited access.

3.5.4.7 Route Segment 2d

Route Segment 2d crosses BLM lands and private lands that have restricted access and are potentially open for dispersed hunting activities.

3.5.4.8 Route Segment 3a

Route Segment 3a is a very short route that is adjacent to the Vantage Substation. Recreational sites and activities associated with this route segment include the Wanapum Dam Overlook, Upper Wanapum Dam Boat Launch, Wanapum Heritage Center, and the Wanapum Dam Picnic Area. Existing utility infrastructure severely restricts potential hunting activities around near this route segment, although Reclamation lands and lands to the north provide opportunities for dispersed hunting activities.

3.5.4.9 Route Segment 3b

Route Segment 3b crosses the Columbia River in an area where water related recreation activities occur, and is near the Huntzinger Boat Launch and Wanapum Heritage Center and Picnic Area.

This route segment crosses in the area of the John Wayne Trail East Army Entrance parking lot on the JBLM YTC. The route segment follows the John Wayne Trail from the river crossing to the Beverly Bridge trail crossing for 1.9 miles, where the route segment continues down the C, M, SP, & P Railroad Corridor along Huntzinger Road, and crossing the trail in three locations. Hunting is prohibited on the west side of the Columbia River along the John Wayne Trail where the route segment is located. South of the Beverly Bridge, recreational activities are associated with water activities along the Columbia River and Priest Rapids Reservoir. Fishing and boating access primarily occurs from the Huntzinger Boat Launch, located north of the existing Wanapum-Wind Ridge 230 kV transmission line and the Columbia River crossing. Other river access sites are located on the east side of the river in the Project study area.

3.5.4.10 Route Segment 3c

Route Segment 3c crosses the Columbia River approximately 4.5 miles downstream of the Priest Rapids Dam just west of the HRNM and the Saddle Mountains NWR. Recreational activities are typically associated with the river in this area (e.g., rafting, fishing, boating, and sight-seeing).

This route segment crosses the Saddle Mountains MA generally following the existing Hanford-Vantage No. 1 500 kV transmission line. A portion of the line is located in an area on the western end of the Saddle Mountains MA which is designated as “open” to OHV use. The remainder of the route segment through the Saddle Mountains MA is located in an area which is designated as “limited” to designated trails for OHVs (see Appendix A Jurisdiction, Recreation and Special Areas Management map). On the north end of the Saddle Mountains, this route segment crosses adjacent to the Saddle Mountains Private

Hang Gliding Area, and between the Crab Creek Corridor and Burkett Lake Recreation Area and the Beverly Sand Dunes OHV Park.

Route Segment 3c also crosses the Milwaukee Corridor and just west of the Columbia Basin Wildlife Refuge – Lower Crab Creek Units (Nunnally Lake fishing area), and is located adjacent to the Burkett Lake and Crab Creek Corridor Recreation Area. The route segment is approximately a third of a mile east of the eastern shore of Burkett Lake. On the north end near the Vantage Substation, the route crosses private and Reclamation lands where dispersed hunting activities may occur. Owners of approximately 12,690 acres of private land are enrolled in the "Feel Free to Hunt" WDFW agreement program within the Project study area of Route Segment 3c on its north end.

3.5.4.11 Route Segment 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.

3.5.4.12 Route Segment NNR-3

Recreational activities associated with this route segment include those related to DNR's 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.

3.5.4.13 Route Segment NNR-4

Recreational activities associated with this route segment include those related with dispersed hunting activity occurring on private lands on the west end of the route segment. Most of the route segment is located on JBLM YTC-managed land, lands dedicated to military training activities, with no recreational activities allowed.

3.5.4.14 Route Segment NNR-5

Route Segment NNR-5 is located on entirely JBLM YTC-managed land, lands dedicated to military training activities, with no recreational activities allowed.

3.5.4.15 Route Segment NNR-6

Route Segment NNR-6 is located entirely on JBLM YTC-managed land, lands dedicated to military training activities, with no recreational activities allowed.

3.5.4.16 Route Segment NNR-7

Route Segment NNR-7 is located entirely on JBLM YTC-managed land, lands dedicated to military training activities. Nearby recreational activities (within one mile of the route segment) are associated with and confined within the John Wayne Pioneer Trail Corridor located north of the route segment.

3.5.4.17 Route Segment NNR-8

Route Segment NNR-8 is located on entirely JBLM YTC-managed land, lands dedicated to military 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 Route Segment NNR-8 include those associated with the Columbia River, Priest Rapids Reservoir, Wanapum Reservoir, Wanapum Heritage Center, and Wanapum Dam Overlook.

3.5.4.18 Route Segment MR-1

Recreational activities associated with this route segment include those related to dispersed hunting activity occurring on private land and DNR state trust 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.

3.6 SPECIAL MANAGEMENT AREAS

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to special management areas (SMAs) along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

3.6.1 Data Sources

Data sources for SMAs come from a number of state and federal sources. Geographic Information System shapefiles of current designations were obtained from the U.S. Bureau of Land Management (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 (ACECs), 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. Appendix A - Jurisdiction, Recreation, and SMAs shows the location of SMAs within the two-mile wide Project study area.

3.6.2 Current Conditions and Trends, Regional Overview

3.6.2.1 McCoy Canyon ACEC

McCoy Canyon ACEC consists of 100 acres of BLM land located on the north slope of Umtanum Ridge along the Columbia River. Located two miles west of the Hanford Reach National Monument (HRNM), the ACEC was designated for 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); Columbia milkvetch (*Astragalus columbianus*), Hoover's desert-parsley (*Lomatium tuberosum*), and Piper's daisy (*Erigeron piperianus*).

3.6.2.2 Sentinel Slope ACEC

Sentinel Slope ACEC is located east of the Project area on the north slopes of the Saddle Mountains Management Area (MA). According to the 2011 Analysis of the Management Situation (BLM 2011), the 200 acre Sentinel Slope ACEC was designated in the 1985 Spokane District RMP and 1987 ROD for the important biological values of a federal Candidate plant (Hoover's desert parsley).

3.6.2.3 Sentinel Butte Dunes

Sentinel Butte Dunes was identified in the Analysis of the Management Situation for the Eastern Washington and San Juan Resource Management Plan (BLM 2011) as an area that has potential for designation as an ACEC. The Sentinel Butte Dunes area is located on the west end of the Saddle Mountains and east of the Columbia River. Currently, the Spokane District RMP Revision lists proposed alternatives for the Saddle Mountains area for an Extensive Recreation Management Area (ERMA), with proposed management actions varying by alternative. The proposed alternatives for Rattlesnake Hills include it being listed as neither a SRMA nor an ERMA, but as an "other" category, with proposed management actions varying by alternative. These alternatives may change in response to public comment as the RMP process moves forward. The RMP Revision also will consider the possibility of designation of the Sentinel Butte Dunes as an ACEC (Priebe 2011).

3.6.2.4 Hanford Reach National Monument

The 195,000 acre (300 square mile) HRNM was established by Presidential Proclamation in 2000 and is located in the Project area along the Columbia River. The HRNM was established around the Hanford Site. The Monument encompasses one of the last free flowing segments of the Columbia River (see Columbia River Eligible Wild and Scenic River below).

HRNM lands are owned and administered by either the Department of Energy (DOE) or U.S. Fish and Wildlife Service (USFWS). The Columbia River Corridor, Wahluke, and Rattlesnake Administrative Units are in the Project area as established in the Final HRNM Comprehensive Conservation Plan and Environmental Impact Statement (EIS; USFWS 2008). The Columbia and Rattlesnake Units are DOE-owned lands and the Wahluke Unit is owned by the USFWS. Lands administered by the USFWS include the Saddle Mountains National Wildlife Refuge (NWR), which existed prior to and was incorporated into, the HRNM when it was established on June 9, 2000.

3.6.2.5 Columbia NWR

Portions of the western extremes of Columbia NWR are located in the Project area along Lower Crab Creek and the northern slope of the Saddle Mountains. The NWR is managed by the USFWS. The Columbia NWR was established in conjunction with the Columbia Basin Irrigation Project in 1944. The land, water, and wildlife of the NWR have been actively managed since 1955.

3.6.2.6 Yakima Hills IBA

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 (*Centrocercus urophasianus*) 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).

3.6.2.7 Columbia Basin Wildlife Area (Lower Crab Creek Unit and Priest Rapids Unit)

The Washington Department of Fish and Wildlife (WDFW) manages approximately 192,000 acres as the Columbia Basin Wildlife Area, with lands owned by U.S. Bureau of Reclamation (Reclamation), Grant County Public Utility District (PUD), the WDFW, the Washington Department of Natural Resources (DNR), and the USFWS. Lands along Crab Creek and the Priest Rapids Pool were purchased with funds provided by Grant County PUD as mitigation for habitat inundation as a result of the construction of Priest Rapids Dam.

The 24,958 acres Lower Crab Creek Unit includes the Nunnally Lake and Lenice Lake, and provides trout fishing, camping, hunting, wildlife viewing, and non-motorized boating activities. The area is managed under the Columbia Basin Wildlife Area Management Plan (WDFW 2006).

The Priest Rapids Unit covers an area of 3,202 acres on the east side of the Columbia River south of the Wanapum Dam. Ownership within the unit is primarily WDFW, with some Reclamation and BLM included.

3.6.2.8 Selah Cliffs Natural Area Preserve (NAP)

The WDNR also manages approximately 107 acres as the Selah Cliffs Natural Area Preserve (NAP), characterized by basalt cliffs that form a small canyon. In 1993, the Selah Cliffs NAP was established to protect the largest known basalt daisy (*Erigeron basalticus*) population, primarily. The colorful, lichen covered cliffs also provide nesting and roosting habitat for raptors. The NAP is accesses from the Yakima River corridor and State Route 821 and includes an interpretive trail system and parking area.

The Wanapum NAP is also located in the Project area. This NAP has been recommended by the State of Washington Natural Heritage Advisory Council and the DNR Natural Heritage Program as a future NAP. The proposed Wanapum NAP proposed boundary was established in April 2015 and contains habitat suitable for striped whipsnake (*Masticophis taeniatus*). The establishment of the NAP and determination of a final boundary is subject to formal public hearing process and associated State Environmental Policy Act analysis.

3.6.2.9 Columbia River Eligible National Wild and Scenic River

The Hanford Reach is the only stretch of the Columbia River in the United States that is not impounded by a dam. The Hanford Reach of the Columbia River and public lands within 0.25 mile was recommended for inclusion (eligible) in the National Wild and Scenic Rivers system as a “Recreational River” as a result of a study conducted by the National Park Service (NPS; NPS 1994). The study also addressed “suitability” of Hanford Reach for designation, concluding that the river segment is suitable for designation. Congress has not acted upon this recommendation; however, subsequent legislation placed the river in permanent study status. The NPS found that the Hanford Reach supported the following seven outstandingly remarkable resources (ORRs):

- Fall-run Chinook salmon along with their spawning and rearing habitat.
- The intact ecosystem of the river and the adjacent Wahluke Slope.
- Native American cultural resources.
- Archeological artifacts and sites.
- Hydrology and geology.
- Federally recognized rare animal species.
- Federally recognized rare plant species.

3.6.2.10 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 (State Threatened and BLM Sensitive) and Hoover’s desert-parsley (State Sensitive, Federal Species of Concern, and BLM Sensitive) under federal Candidate plant species values in the Spokane District RMP and 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).

3.6.2.11 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 and BLM Sensitive), Hoover’s desert-parsley (State Sensitive, Federal Species of Concern, and BLM Sensitive), the high density of nesting raptors and bighorn sheep (*Ovis canadensis*), and for protection of the travel corridor of Native Americans and fur trappers (BLM 1992; BLM 2011).

3.6.2.12 Proposed ACECs

The BLM announced its intention to prepare an RMP for Eastern Washington and the San Juan Planning Areas; this RMP was intended to replace the existing Spokane RMP and expand the Planning Area to include the San Juan Islands (see April 30, 2010, Federal Register notice). On March 25, 2013, the President issued Presidential Proclamation 8947 and established the San Juan Islands National Monument. The new National Monument encompasses the BLM-administered lands in the San Juan Islands that were part of the expanded Planning Area described in the April 30, 2010 Notice of Intent to prepare an RMP. Subsequently, the BLM determined that it would prepare an RMP specific to the San Juan Islands National Monument. On March 2, 2015, the BLM announced its intention to prepare an RMP for the San Juan Islands National Monument and initiated the public scoping process for that effort. The Eastern Washington RMP planning effort does not include BLM-administered public lands in the San Juan Islands archipelago. 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, bighorn sheep, golden eagle (*Aquilla chrysaetos*), basalt daisy, Hoover's desert-parsley, Hoover's tauschia, and pauper 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, naked-stemmed evening-primrose [*Camissonia scapoidea* ssp. *scapoidea*]; Boyter 2013).

3.6.2.13 Washington State Department of Transportation Environmental Buffer

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 western 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

3.6.3.1 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 and San Juan RMP).

3.6.3.2 Hanford Reach National Monument

The Columbia River Corridor, Wahluke, and Rattlesnake Administrative Units are in the Project area as identified in the Final HRNM Comprehensive Conservation Plan (CCP) and EIS (USFWS 2008). Although the river is open and accessible to the public, the Columbia River Corridor and Rattlesnake Administrative units (adjacent to and south of the river, DOE-owned lands) are closed to public use with the exception of the area north and west of Vernita Bridge. The Wahluke Administrative Unit, located on lands owned by the USFWS, is open. Access is controlled, with “many/most” public uses allowed; hunting is not allowed.

3.6.3.3 Columbia NWR

In September 2001, the Columbia NWR’s CCP was signed by the Regional Director, along with a Finding of No Significant Impact. Under the CCP, the NWR will serve to protect, maintain, and enhance habitat for priority species and resources of concern and will serve as an “inviolate sanctuary, or for other management purposes, for migratory birds” and as a “refuge for breeding ground for migratory birds and other wildlife” (Columbia NWR and USFWS 2011).

3.6.3.4 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.

3.6.3.5 Columbia Basin State Wildlife Area

The Columbia Basin State Wildlife Area, which includes the Lower Crab Creek and Priest Rapids Units in the Project area, is managed under the 2006 management plan (WDFW 2006). Management goals for the Columbia Basin Wildlife Area “are to preserve habitat and species diversity for both fish and wildlife resources, maintain health populations of game and non-game species, to protect and restore native plant communities, and provide diverse opportunities for the public to encounter, utilize, and appreciate wildlife and wild areas.”

The primary management concerns and public issues identified as stated in the plan for the Columbia Basin Wildlife Area include:

- Balancing recreational activities against wildlife and habitat impacts.
- Manage primarily for migrant waterfowl, upland game birds, and priority species.
- Control noxious weeds and other undesirable vegetation.
- Maintain enhanced wildlife habitats and preserve native plant communities and important habitats.
- Restore and preserve shallow water habitat and ponds.
- Litter, vandalism, and enforcement.

3.6.3.6 Columbia River Eligible National Wild and Scenic River

The eligible portion of the Columbia River has been placed into indefinite protection status under Public Laws 100-605 & 104-333, Section 404. Legislation placed the river in permanent study status. The eligible section begins one mile downstream from the outflow of the Priest Rapids Dam (free flowing river section) near the Yakima-Grant-Benton County line and includes approximately 0.25 mile on each side of the river. The USFWS, who has oversight responsibility, manages the proposed “Recreational River" in such a manner as to protect and enhance the values which caused it to be recommended for inclusion in the National Wild and Scenic Rivers System. Federal agencies engaged in projects that may affect water resources must comply with Section 5(d) of the Wild and Scenic Rivers Act and 1979 Presidential Directive on avoiding or mitigating direct and adverse impacts to rivers eligible for designation and projects must be evaluated to determine whether there will be direct and adverse effects on the values for which the river segment is under study. If the Secretary of the Interior determines that there will be direct and adverse effects that have not been adequately mitigated, the Secretary shall notify the sponsoring entity and the Committee on Interior and Insular Affairs of the U.S. House of Representatives and the Committee on Energy and Natural Resources of the U.S. Senate of the Secretary’s determination and any proposed recommendations (USFWS 2011). Under the Wild and

Scenic Rivers Act and Department of the Interior practices, USFWS will manage the river as if it was a designated Wild and Scenic River and will take no actions that would change its status. Other agencies are obligated to take all reasonable care to protect the rivers free flow and ORRs, but they are not obligated to forego projects if no reasonable alternative exists (USFWS 2008).

3.6.3.7 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 SMAs) shows the eligible segment of the Yakima River relative to the Project study area.

3.6.4 Route Segment Specific Considerations

3.6.4.1 Route Segment 1a/NNR-1

There are no SMAs associated with Route Segment 1a/NNR-1.

3.6.4.2 Route Segment 1b

Route Segment 1b is located within the JBLM YTC, which has been identified as an IBA.

3.6.4.3 Route Segment 1c

There are no SMAs associated with Route Segment 1c.

3.6.4.4 Route Segment 2a

There are no SMAs associated with Route Segment 2a.

3.6.4.5 Route Segment 2b

There are no SMAs associated with Route Segment 2b.

3.6.4.6 Route Segment 2c

There are no SMAs associated with Route Segment 2c.

3.6.4.7 Route Segment 2d

The McCoy Canyon ACEC is within one mile of Route Segment 2d.

3.6.4.8 Route Segment 3a

There are no SMAs associated with Route Segment 3a.

3.6.4.9 Route Segment 3b

The southern portion of Route Segment 3b is located within 0.25 mile of the Columbia River Eligible Wild and Scenic River along the southern bank of the river; however, no public lands are crossed in this location.

3.6.4.10 Route Segment 3c

On the south end of the route, McCoy Canyon ACEC is within one mile of Route Segment 3c, adjacent to the HRNM, crosses the Columbia River Eligible Wild and Scenic River, and is located on public lands within 0.25 mile of the river. On the north end of the route, the route segment is adjacent to the Columbia NWR and the Lower Crab Creek Unit of the Columbia Basin Wildlife Area, but does not cross either.

3.6.4.11 Route Segment NNR-2

Route Segment NNR-2 is located within the JBLM YTC, which has been identified as an IBA.

3.6.4.12 Route Segment 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. The Selah Cliffs NAP is located within the Project study area on the west side of this route segment.

3.6.4.13 Route Segment NNR-4

The portion of Route Segment NNR-3 that is located within the JBLM YTC has been identified as an IBA.

3.6.4.14 Route Segment NNR-5

Route Segment NNR-5 is located within the JBLM YTC, which has been identified as an IBA.

3.6.4.15 Route Segment NNR-6

Route Segment NNR-6 is located within the JBLM YTC, which has been identified as an IBA.

3.6.4.16 Route Segment NNR-7

Route Segment NNR-2 is located within the JBLM YTC, which has been identified as an IBA.

3.6.4.17 Route Segment 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. The planned Wanapum NAP is also crossed by this route segment.

3.6.4.18 Route Segment MR-1

The portion of Route Segment Manastash Ridge (MR) 1 that is located within the JBLM YTC has been identified as an IBA.

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3.7 TRANSPORTATION

The U.S. Bureau of Land Management (BLM) has determined that the Final Environmental Impact Statement (FEIS) must analyze impacts for all Action Alternatives that were analyzed in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS). As was done in the DEIS and SDEIS, this section describes the existing conditions (affected environment) and considers issues related to transportation resources along each Action Alternative, including those raised during scoping. This FEIS section combines the information presented in the January 2013 DEIS and the January 2015 SDEIS, and where appropriate, the information is updated to include newer information and address additional issues raised during review of the DEIS and SDEIS. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

This section primarily considers highways, local roads, and access within the Project study area. Aviation facilities are described in Section 3.4 Land Jurisdiction and Land Use. The regional roadway network in and around the Project study area is managed by Grant County, Kittitas County, Yakima County, Washington Department of Transportation (WSDOT), and the Federal Highway Administration (FHWA). There are no Benton County-managed roads within the Project study area. 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 2015-2020
- Kittitas County Long-Range Transportation Plan 2008
- Kittitas County Six-Year Transportation Improvement Program 2015-2021
- Kittitas County Road Atlas 2012
- Yakima County Six-Year Transportation Improvement Program 2016 – 2021
- 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:

- Federal Land Policy and Management Act of 1976, as amended.
- BLM Land Use Planning Handbook (H-1601-1)
- BLM National Environmental Policy Act Handbook (H-1790-1).
- 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 study area.

3.7.2 Current Conditions and Trends, Regional Overview

For the purposes of this analysis, the Project study area includes the transportation infrastructure located within a two-mile corridor; one mile either side of Action Alternative route segment center lines. To provide additional context, regional highways outside of the Project study area are also described. The analysis considered issues related to transportation in the area raised during the public scoping process. Scoping comments included concerns for a potential increase in the use of Washington State Department of Natural Resources, unauthorized access to state lands, private property access road impacts, and state highway access for Project construction, operations, and maintenance or roadway crossing.

3.7.2.1 Federal Highways and State Routes

The state highway "state routes" system forms the primary road network within the Project study 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 study area include Interstate (I) 82, Washington State Route (SR) 821, SR-24, and SR-243. Highways just outside the Project study area include I-90 to the north, U.S. Highway 12 to the west, 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 study 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 study area.

Three rest areas and designated viewpoints are located within the Project study 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). Another rest area, the west-bound Selah Creek Rest Area, is located just outside of the Project study area approximately 1.5 miles northeast of the east-bound Selah Creek Rest Area.

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 study area and is a designated Washington State Scenic Byway (see Section 3.8 – Visual Resources).

SR-243 is a north-south highway of minor regional importance. 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 stops at signalized or stop sign controlled intersections.

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.

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 (Grant County 2006).

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 (Kittitas County 2008).

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 (Yakima County 2015).

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 require precaution by both the operator and other drivers.

In Grant County, the major roads in the Project study area run along the section lines to provide a grid-like pattern and include:

- Lower Crab Creek Road, a Rural Road extending east-west along the northern boundary of the Saddle Mountains and along the Lower Crab Creek Wildlife Area. This is a major route which serves the Lower Crab Creek Wildlife Area, as well as Beverly and Smyrna. The road is accessed from SR-243 from the west.
- Road O SW, a Rural Road extending north-south through mainly agricultural lands that is primarily a local use road. The road runs through the western edge of Mattawa and connects between SR-243 to the south, and Road 24 SW its northern terminus. The road is two-lane and paved.
- Road 24 SW, a Rural Road extending east-west through mainly agricultural lands that is primarily a local use road. The road runs along through the central portion of Mattawa, with an eastern terminus at SR-24 and a western terminus at SR-243. The road is two-lane and paved.
- Road N SW, a Rural Road extending north-south through mainly agricultural lands that is primarily a local use road. The rural road designation applies primarily to the southernmost portion of the “Road N alignment.” There is no county ROW along most of this alignment. The unpaved Road N alignment road runs intermittently between parcels with crop production. There is no opportunity for thru-traffic. The road does not go any further north than Road 25.5 SW. To the south, the road ends approximately a 0.25 mile south of its intersection with Road 29.5 SW. The road is two-track to two-lane and is not paved.
- Road 27 SW, a Rural Road extending east-west through mainly agricultural lands that is primarily a local use road. The road runs along through the central portion of the Project study area within Grant County, with an eastern terminus at Road K SW and a western terminus at SR-243 near Desert Aire. The road is two-lane and paved.

In Kittitas County, the major roads in the Project study 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 study 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 study area include:

- Sage Trail Road, a Rural Road extending east from its western access point at East Selah Road. East Selah Road accesses I-82, as well as the Pomona Heights Substation. The road serves residences in the Yakima Ridge foothills and is a private road maintained collectively by property owners. 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. East of the substation, as the road crosses Selah-Moxee Canal, the road is private and becomes gravel.
- Mieras Road, a Rural Road running east from Birchfield through agricultural and large-lot residential areas. The road starts near the western edge of Yakima in the town of Birchfield and meets its eastern terminus at the intersection of Coombs Road. The road is two-lane and either paved or chip-sealed.
- Postma Road, a Rural Road extending east from its intersection with Beaudry Road to the west, through Moxee and further east through agricultural and large-lot residential areas. Postma Road meets its eastern terminus 0.75 mile west of the JBLM YTC. The road is two-lane and either paved or chip-sealed.
- 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.
- Coombs Road and Prairie Road are Rural Roads which run south between Mieras Road and Postma Road. They are two-lane paved or chip-sealed roads.

Average annual daily traffic (AADT) data was obtained where available for roads in the Project study area. Table 3.7-1 below shows AADT volumes in 2014 for roads in the Project study area.

Table 3.7-1 Road AADT in Project Study Area

ROAD AND LOCATION	TRAFFIC VOLUME (AADT)
I-82	
Near Selah Creek Rest Area-Both Ways (R048)	16,626
SR-243	
Junction w/SR-24 north of Vernita Bridge (S612)	4,289

Source: WSDOT 2014

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 (low, medium, and high) that allow for removal 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 routes identified through management objectives as 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 (MA) in Yakima and Kittitas counties, and the Saddle Mountains Management Area. Another 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. Within the Saddle Mountains MA, the BLM has designated lands as either “Open” for off-road use or “Limited” road restricted use. The southeast side of the Saddle Mountains MA is designated as “Limited” access for off-highway vehicle (OHV) use and most of the northwest side of the Saddle Mountains MA is designated as “Open” access for OHV use (see Appendix A- Jurisdiction, Recreation and Special Management Areas Map). In total, approximately 4,300 acres are designated as “Open” and 18,700 acres are designated as “Limited” within the Saddle Mountains MA.

Reclamation also regulates roads for public or private use on Reclamation land. Reclamation’s focus in the Project study 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 study 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 study 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 two locations. 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.

Section 4(f) Applicability
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 study 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 2015) is for the years 2015-2018. The WSDOT STIP provides planning guidance, necessity, and cost to programs such as road improvements, new road projects, and future transportation-related studies.

STIP roadway improvement projects in the Project study area include:

- Minor improvements totaling approximately $73,000 at the SR 26/243 intersection. These improvements include but are not limited to a Vehicle Speed Display, striping changes, and improved sight distance.
- Chip sealing on SR-24 starting two miles east of Badger Lane to 7.4 miles west of SR-241. There are no other projects within the STIP within Grant, Kittitas, and Yakima Counties which occur in the Project study 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.

> Full limited 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.
>
> Partial limited 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.
>
> Modified limited 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 study 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 WSDOT the authority to issue Permits and Franchises for the occupancy of state-owned highway ROW 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 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 does not 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 2015-2020 (Grant County 2014). Within the Project study area, there is one road receiving rehabilitation or improvements per the 2015-2020 TIP. The Beverly-Burke Road Overlay Project will consist of an asphalt overlay from SR-243 to SR-24.

Kittitas County utilizes a TIP known as the Kittitas County Six-Year TIP for 2015-2020 (Kittitas County Department of Public Works ND). The County also publishes a document of ongoing projects every two years, currently known as the Kittitas County Roadway Improvement Projects of 2015-2020. Within the Project study area, there are no roads receiving rehabilitation or improvements per the 2015-2020 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 2016-2021 for roadway system management (Yakima County 2015). Within the Project study area, there are no roads which will be receiving rehabilitation or improvements per the 2016-2021 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 study 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 Access Control Point (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 Route Segment Specific Considerations

3.7.4.1 Route Segment 1a/NNR-1

This Route Segment parallels the existing Pomona-Wanapum 230 kilovolt (kV) transmission line out of the Pomona Heights Substation for about 4,400 feet and turns north adjoining and paralleling within the existing PacifiCorp electrical distribution line easement for the private section of Sage Trail Road for approximately two miles. Project access would occur from the existing Pomona-Wanapum 230 kV transmission line access road and the private Sage Trail Road.

3.7.4.2 Route Segment 1b

Route Segment 1b would extend onto the JBLM YTC parallel to an existing fire break road along the JBLM YTC boundary.

3.7.4.3 Route Segment 1c

The transportation network in Kittitas Canyon where Route Segment 1c parallels and ascends Yakima Ridge is very sparse. Roza Hill Drive, Summerset Drive, Maple Place, Bohoskey Drive, Lamb Road, and E. Norman Road are existing unpaved roads that would provide access along Route Segment 1c. As the route extends south of the JBLM YTC, it turns east and would parallel Mieras Road, a two-lane paved road, for approximately 1.25 miles until the road ends.

3.7.4.4 Route Segment 2a

The road network in the area of Route Segment 2a is also very sparse and generally undeveloped, consisting of a limited number of dirt roads and two-track roads that extend from SR-24 and Deeringhoff Road across rangeland and cultivated farmland.

3.7.4.5 Route Segment 2b

This short segment is only accessible from private, 2-track roads extending from Deeringhoff Road and from a fire break road located at the perimeter of JBLM YTC.

3.7.4.6 Route Segment 2c

This route segment crosses private land that is generally inaccessible by the public. The Bonneville Power Administration (BPA) Midway-Moxee 115 kV transmission line and the PacifiCorp Union Gap – Midway 230 kV transmission line have existing access roads generally parallel to the lines within the existing ROW of the lines and accessible from SR 24.

3.7.4.7 Route Segment 2d

This route segment would be accessed from two-track road on private lands extending north from SR-24 and Cold Creek Road following the Umtanum Ridge. This area is mostly privately owned land and inaccessible by the public.

3.7.4.8 Route Segment 3a

Route Segment 3a would be accessible from the two-lane paved access road to the Vantage Substation that extends from SR-243.

3.7.4.9 Route Segment 3b

Route Segment 3b runs along the western banks of the Columbia River. In Benton County, access to this route segment would be from BPA's paved access road to the Midway Substation that extends from SR-24 and across an orchard access road to a point where the road transitions into the abandoned Chicago, Milwaukee, St. Paul, and Pacific railroad bed ROW. In Kittitas County, this route segment would be located parallel to Huntzinger Road to the south end of the Auvil Fruit Company. Just south of the Wanapum Dam, the route segment crosses the Columbia River to the Vantage Substation. The route segment would cross SR-243 north of Beverly as well as cross some dirt farmland access roads. Temporary and permanent access and permission to span SR-243 would be determined by WSDOT.

Authorization to span the Columbia River for Route Segment 3b would be required from the USACE through the Section 10 Rivers and Harbors Act permitting process. Permission to span SR-243 for Route Segment 3b or 3c would be determined by WSDOT.

3.7.4.10 Route Segment 3c

Route Segment 3c is located in the eastern part of the Project study area generally in a north-south orientation. The Route crosses the Columbia River and SR-243, and then runs mainly along Road N SW, Reclamation access roads and Road O SW. As the Route crosses Road 24 SW, it starts to turn in a northwest direction away from County roads and onto BLM lands. The BLM lands and access roads on Saddle Mountain where this route segment would be located can be accessed from Road R SW. This route crosses Limited use and Open use areas of the Saddle Mountains MA. Placing the transmission line within the ROW of Road 24 SW, Road N SW and Road O SW as well as crossing Road 24 SW and Lower Crab Creek Road would require approval by Grant County.

Authorization to span the Columbia River for Route Segment 3c 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.

3.7.4.11 Route Segment 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 approximately 1,200 feet.

3.7.4.12 Route Segment 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.

3.7.4.13 Route Segment 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.

3.7.4.14 Route Segment NNR-5

This short route segment generally parallels the perimeter JBLM YTC fire break access road.

3.7.4.15 Route Segment NNR-6

This route segment parallels the existing Pomona-Wanapum transmission line and access roads through the north end of JBLM YTC.

3.7.4.16 Route Segment NNR-7

This route segment parallels the existing Pomona-Wanapum transmission line and access roads through the north end of JBLM YTC, as well as those roads servicing the existing Schultz-Wautoma and Schultz-Vantage 500 kV transmission line corridor.

3.7.4.17 Route Segment NNR-8

This route segment crosses Huntzinger Road and a secondary access road servicing the northeastern portion of JBLM YTC and is 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.

3.7.4.18 Route Segment MR-1

This route segment does not follow existing roads, but crosses several roads accessing communication facilities and 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

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to visual resources along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and the U.S. Bureau of Land Management (BLM) has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

This section documents existing visual resources in the Project study area. Visual resources were inventoried and characterized in a six-mile wide Project study area (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 Action Alternatives. Site reconnaissance occurred during May 2011 and 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 study 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.

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. These modifications allow a consistent and equal level of analysis across all Action Alternatives for comparative purposes while following the requirements of the VRM and BLM policy.

The analysis considered issues raised during the public scoping process. Scoping comments included general concerns for scenic views and visual quality impacts, visual impacts on tourism, views from residences to the Cascade Mountains (Mount Adams and Mount Rainier), views of recreationists using the Columbia River to the Chicago, Milwaukee, St. Paul, and Pacific (C, M, SP, & P) Railroad Corridor, and desired consideration of the aesthetic values of vineyards and wineries. These comments were considered during the data collection efforts and analysis of visual resources within the Project study area.

The methodology for the inventory approach was identical to the approach done for the DEIS and SDEIS (see Section 3.8.2.1 and Appendix C of the DEIS). The inventory approach generally consisted of the following tasks:

27) Identification of potentially sensitive viewpoints and KOPs (representative views from potentially sensitive areas) and an assessment of the potential project visibility from these viewpoints using KOP field inventory form documentation, viewshed modeling, and field verification. This task includes an evaluation viewpoint sensitivity level in terms of high, moderate, and low sensitivity using distance zones;
28) Classification of existing scenic quality (where none has been established by the BLM) in natural, undeveloped landscapes; or the evaluation of existing development characteristics for potential Project compatibility in developed landscapes; and
29) Identification of federal and local agency visual resource management goals and objectives (Scenic Overlay Areas, VRM Inventory Classes, etc.) with jurisdiction over the Project.

Secondary data was initially collected on land use features that may have visual sensitivity. A sensitivity analysis 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). Data also came from county and federal planning documents, BLM databases, and existing online databases (e.g., WSDOT, Geocommunicator, Recreation.gov, Recreation-Public Lands Information Center, and Washington Department of Fish and Wildlife [WDFW]). Use data from WSDOT (e.g., average daily traffic) was collected to determine relative volumes of use or was estimated based on road county road status (e.g., major arterial, minor arterial, collector). Initial data collection was followed by ground reconnaissance and a supplemental data collection effort conducted in May 2011 and June 2013 to verify potentially sensitive areas and document any additional potentially sensitive areas.

Sensitivity Analysis

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. Each sensitive area or corridor was documented using a KOP inventory form documenting viewing conditions, existing uses, landscape context, and other pertinent features. These forms were also used to support the subsequent completion of Contrast Rating Worksheets (8400-4; see Section 4.8-Visual Impacts).

Viewer sensitivity was determined during the sensitivity analysis. Sensitive viewers were determined by an inventory of existing land uses in the Project study area. Visual sensitivity levels vary according to the types of users and their attitudes toward change in the landscape. Local, regional, or national significance of recreation viewpoints and travel routes was used to establish the attitudes of viewers. Views from communities and residences were all considered highly sensitive. Recreation viewpoints may be highly sensitive. However, some views from recreation areas are of less concern than others. Travelers on some highways and other roads may be less sensitive to changes than others. For example, some travel routes, used on a regular basis for going to and from work, are less sensitive than others used for scenic drives or as a route to a recreation destination of particular importance.

Views with longer duration are typically more sensitive than those with shorter duration. For example, residents viewing the landscape from their homes every day (long duration) are more sensitive than a tourist viewing the landscape while traveling through the area on a highway (short duration). Refer to Appendix C-1 – Sensitive Viewpoints: Definitions, Criteria and Viewpoint Summary Table.

Each viewpoint or area was assigned a value of high, moderate, or low for the volume of potential viewers who may be viewing a given area. While views seen by large numbers of people may potentially be more sensitive, a high volume of viewers who have no concern for the change would not warrant an increase in the visual sensitivity level. Using these criteria, views were assigned a final sensitivity level of high, moderate, or low on all non-BLM lands.

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 is classified in terms of visual diversity, cohesion, harmony of landform, water, and vegetation. Scenic quality is based on the evaluation of seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications and is expressed as Class A, Class B, or Class C. During the rating process, each of these factors is ranked on a comparative basis with similar features within the physiographic province. The sum of the numeric values for these elements determines the scenic quality class. Ratings of Class A (distinctive or unique), B (above average), or C (common or representative) were assigned. Scores of 25 or more receive Class A ratings, scores of 18 to 24 receive Class B ratings, and scores below 17 receive Class C ratings. Scenic Quality Classes as defined by the BLM are 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 were 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 Interstate (I) 82 and State Route (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 study area were provided by WSDOT to evaluate impacts based on the FHWA methodology utilized by WSDOT.

Agency management objectives were determined by a review of existing plans and policies of federal, state, and local planning documents. BLM VRM Classes establish specific values on the management of visual values. BLM Interim VRM Management Classes were developed by the Spokane District Office. VRM Classes are assigned through the RMP process. The assignment of visual management classes is ultimately based on the management decisions made in RMPs. Interim visual management classes are established where a project is proposed and there are no RMP approved VRM objectives. These classes are developed using the VRM methodology and must conform to the land-use allocations set forth in the RMP which covers the Project study area. BLM Interim VRM Management Classes were developed by the Spokane District Office for the Action Alternatives analyzed in the DEIS and SDEIS.

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.

3.8.2.2 Regional Setting and Landscape Character

The Project study 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 study 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, Benton 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 [DNR] and WSDOT) lands comprise most of the publicly owned lands (see Section 3.4 – Land Jurisdiction and Land Use).

The majority of undeveloped natural settings occur along much of the Project study area within or adjacent to the JBLM YTC and on BLM, state, and private land between the Yakima Canyon and I-82, in Yakima Ridge and Saddle Mountains, in the Rattlesnake Hills, and in the Lower Crab Creek Valley. Major geographical features in the Project study 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. Other valleys in the Project study area include the Black Rock Valley and the Cold Creek Valley.

Yakima Ridge stretches along the southern end of the Project study area and the south border of the JBLM YTC. Umtanum Ridge borders the south side of the Columbia River south of Priest Rapids Dam into Hanford Reach National Monument and Hanford Reach section of the river. The Rattlesnake Hills occur on the southern boundary of the Project study area, with Black Rock Valley bordering its north side. Selah Valley occurs along the Yakima River generally north of Pomona Heights Substation north and east of Selah. The Wahluke Slope occurs east and northeast of the Priest Rapids Dam and south of the Saddle Mountains, located on the north end of the Project study area. The Wahluke Slope is a major agricultural area in the region. 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.

Most of the valleys are dominated by agricultural development in the form of orchards (e.g., apple, cherry, and pear), hop yards, vineyards, mint, corn, wheat, and other crops. A portion of the undeveloped arid steppe grasslands are used for grazing. Major and minor urbanized areas include Selah, Yakima, Moxee City, Desert Aire, and Mattawa. Smaller developed areas include Schwana, Beverly, and Wanapum Village. Much of the developed area is characterized by low density residential farmland or lots. Much of the Project study area is also industrialized with hydroelectric dams, high voltage transmission line corridors, and associated infrastructure (e.g., Vantage Substation, Midway Substation, Pomona Heights Substation, Bonneville Power Administration [BPA] and Pacific Power transmission corridors). Major travel routes include I-82, U.S. Highway 12, and SR-24, SR-243, and SR-821. The old C, M, SP, & P Railroad corridor is located on the south and west side of the Columbia River adjacent to the JBLM YTC and across the north end of the Project study area through Beverly. Views of the distant Cascade Mountains (i.e., Mount Rainier and Mount Adams) often occur from residences, recreation areas, and travel corridors.

Agricultural development occurs in three primary areas: around Selah, in Grant County, 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 basalt cliffs along Yakima and Columbia river corridors, Selah Cliffs area, and elsewhere provide visual interest in the Project study area. The riparian valleys of Selah Creek, Burbank Creek, Lmuma Creek, Cold Creek, Lower Crab Creek, and drainages within JBLM YTC and other less developed and undeveloped areas contain more landform and vegetation variety.

The open water areas of Priest Rapids Reservoir, Wanapum Reservoir, 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 study area.

Scenic quality was identified in BLM's 2010 VRI and data gaps were filled as part of the visual resources analysis for the DEIS and SDEIS. Table 3.8-1 summarizes the SQRU BLM 2010 VRI unit within the Project study area; three units are located within the Project study 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-2.7 and C-2.8 in Appendix C-2 show the scenic quality from the IOPs in the Project study area. The locations of IOPs are shown in Appendix A-Visual Resources map.

Table 3.8-1 SQRUs Identified in 2010 BLM VRI Study in Project study area

BLM SQRU ID NUMBER	DESCRIPTION	SCENIC QUALITY RATING
022	Common landscape in region; some interesting features with several discordant elements; high level of agricultural development adds discordant elements to the landscape. The dominant landscape features in this unit are the Rattlesnake Hills and Yakima Ridge. It is characterized by undulating, rolling hills, with interesting erosional patterns and ephemeral drainages and draws. Colors tend to be muted, though with some contrast, and are likely more pronounced in growing seasons. Modifications include roads, fences, transmission lines, and agricultural fields in valley/low lying areas. Agricultural areas provide strong contrast with generally undeveloped higher elevation areas.	C
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
025	Common, with little vertical relief and interesting features. Unit includes the Wahluke Slope, the south facing aspect of the Saddle Mountains. The southern slope is characterized by low, rolling hills with periodic shallow to deeply cut ravines and drainages that add some texture to the landscape. Orchards and vineyards extend to the lower portion of the foothills. Transmission lines cross the ridge and off-highway vehicle and other road cuts are visible in several locations. While interesting as a large, relatively undeveloped ridgeline/slope against a largely agricultural backdrop, it is also common in the region and has few distinctive features.	C

BLM SQRU ID NUMBER	DESCRIPTION	SCENIC QUALITY RATING
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
064	Very prominent ridge line with interesting rock formations, outcrops, striations, and variability. Landscape is dominated by the north-facing slopes of the Saddle Mountains. Adjacent valley includes the Crab Creek Wildlife Area, portions of the Columbia National Wildlife Refuge, and the John Wayne Trail. The slopes of the Saddle Mountains contain multiple interesting features including rock outcrops, formations, striations, erosional plumes, and others. The adjacent wildlife areas create a distinct valley that contrasts and adds interest to the ridge/slopes. The slopes and valley have some discontinuous elements, though others appear harmonious. While prominent on the landscape, the slope and its interesting features are somewhat common in the region.	A

Source: BLM 2010

Table 3.8-2 Proposed Project SQRUS in Project Study Area

SQRU ID NUMBER	DESCRIPTION	SCENIC QUALITY RATING [1]	IOP
01_22v	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
02_24v	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
03_30v	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 study 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
04_26v	Inferred from BLM VRI and similar regional landscapes (see Table 3.8-1, Unit 26).	B	None

SQRU ID NUMBER	DESCRIPTION	SCENIC QUALITY RATING[1]	IOP
05_26v	This unit includes flat, sagebrush dominated, undeveloped land in the context of highly modified agricultural and industrial landscapes along the Columbia River. The unit is bordered by a steep bench transitioning to the Wahluke Slope to the north and by the Umtanum Ridge and Columbia River to the south. Cultural modifications a prevalent but not dominant, are not orderly or visually cohesive, and generally detract from the simple, natural, regionally common landscape.	C	D
06_25v	Inferred from BLM VRI and similar regional landscapes (see Table 3.8-1, Unit 25).	C	None
07_64v	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 Nunnally 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.	C	E
08_26v	Inferred from BLM VRI and similar regional landscapes (see Table 3.8-1, Unit 26).	B	None
09_26v	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 Nunnally 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
01_27v	This unit is associated with BLM Unit 27 located to the north (not in Project study 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 study 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

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 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 proposed route segment centerlines. 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 proposed 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 study area.

Federal

Areas with potential visibility of the Project are associated with BLM lands within the Yakima River Canyon Management Area (MA), and include:

- Columbia National Wildlife Refuge (NWR) – Public access to the refuge is very restricted in the Project study area. Its' steep topography and lack of access limit potential visual sensitivity to the scenic attributes of the area. Located on the north side of the Saddle Mountains and along Lower Crab Creek, scenic quality is high (Class A).
- Columbia River (and eligible Wild and Scenic River segment) – The Columbia River from one mile downstream of Priest Rapids Dam to through the Hanford Reach National Monument is accessed by the public from boat launches to the east of the Project study area (e.g., Vernita Bridge Fishing Access Site). This stretch of the river is used primarily for fishing.
- Hanford Reach National Monument (HRNM) – Access to the HRNM is restricted in the Project study area. The USFWS portion of the monument is the only area open to the public. However, there are no dedicated facilities.
- Sentinel Slope ACEC and McCoy Canyon ACEC – These ACECs are 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. Located on the cliffs of the Columbia River (McCoy Canyon) and Saddle Mountains (Sentinel Slope); however, scenic quality is generally moderate to high (Class B and A, respectively).

- Saddle Mountains MA – This BLM-administered area provides off-highway vehicle (OHV) riding in the open area, petrified wood collection, horseback riding, hunting, and other recreational opportunities. These activities are generally dispersed across western and eastern portions of the Saddle Mountains, with OHV riding being the dominant recreational activities on the west end. Numerous trails traverse the area and informational signing is located at the R Road access point. Access to the area is provided primarily by the R Road extension (see Saddle Mountain Recreation Access Route below).
- 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 WDFW.
    - *Lmuma Creek Recreation Site (BLM)* - 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 WDFW-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 area 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 NNL 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 study 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 DNR-managed NAP was established to protect the largest known population of basalt daisy (*Erigeron basalticus*). 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 NAP is provided from SR-821 along Selah Creek from a trailhead and parking area.
- Columbia Basin Wildlife Area - This WDFW managed area includes the Priest Rapids and Lower Crab Creek Units. Nunnally Lake is located within the Lower Crab Creek Unit of the Columbia Basin Wildlife Area and is used primarily for fishing. Public access to the site is provided by a parking lot located east of Beverly on Crab Creek Road.

Yakima County
Yakima County facilities in the Project study 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.

Benton County
There are no Benton County recreation sites in the Project study area.

Kittitas County
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
The following Grant County and Grant County Public Utility District (PUD) recreation sites are in the Project study area.

- Wanapum Heritage Center and 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 is 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.
- Burkett Lake/Crab Creek Corridor Recreation Area (Grant County PUD) - The Burkett Lake/Crab Creek Corridor Recreation Area is located on Crab Creek Road approximately 0.5 mile east of Beverly. Currently, a day use area with picnic tables and an informational kiosk is located on the northwest side of the park and a gated access road which allows for lake access is located on the east side. Existing uses of the area also include dispersed, non-motorized activities

such as hiking, hunting, fishing, scenery viewing, and wildlife and botanical watching. See Section 3.5-Recreation for a detailed description of the site.

- Priest Rapids Recreational Trail (Grant County PUD) - Priest Rapids Recreational Trail is a Grant County PUD administered undeveloped trail located along the east side of Priest Rapids Reservoir adjacent to the Desert Aire Community. Currently, a day use access site is located at the south end of Road U SW and the Desert Aire Dock is located south of the community. The trail generally follows the shoreline between Desert Aire Dock and the Grant County PUD Day Use Area.
- Priest Rapids Reservoir - Priest Rapids Reservoir is typically used for fishing, boating and sightseeing. See Section 3.5-Recreation for a detailed description.
- Wanapum Reservoir - Dispersed views also occur from Wanapum Reservoir. Access to the reservoir near the Project study 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 Reservoir, 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 Project study area 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 study area. Views of the Project would occur in the vicinity of the Pomona Heights Substation and from the I-82 corridor extending north from the substation. There are four separate rest areas and designated viewpoints associated with I-82 within the Project study area:

- East-bound Selah Creek Rest Area – This is the southern-most rest area along the interstate within the Project study 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 Selah Cliffs 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. Pacific Power's 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 Mount Adams and Mount Rainier can also be seen from this rest area.
- West-bound Manastash Ridge Viewpoint – Located on the northwest side of the Project study area at about I-82 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 west-bound viewpoint, but are not as extensive due to foreground hills within JBLM YTC blocking views of Badger Pocket.

The western portion of the Saddle Mountains MA is accessed via the R Road extension (Saddle Mountains Access Route) located on the southern side of the Saddle Mountains in Grant County. This road is located on BLM, Reclamation and private lands, and is located just east of Mattawa.

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 are screened by topography.

SR-24 is located primarily in Yakima County along the south end of the Project between Yakima Ridge and the Rattlesnake Hills. The highway connects Moxee and Yakima on the west with the HRNM area on the east in the Project study area. Both east and west bound travelers would potentially view the Project to the north.

SR-243 is located in Grant County and connects HRNM on the east with Desert Aire, Beverly, and Wanapum Dam on the north in the Project study area. Travelers would have immediate foreground views of the Project from this highway.

County/Local
Travelers on local roads have views within the Project study 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, Roza Creek Drive, Postama Road, Coombs Road, Mieras Road, Beane Road, and N. St. Hilaire Road. Other local roads such as Stateland Road, Spring View Drive, Bohoskey Drive, and Chapman Road were not included in the sensitivity analysis because these roads are very lightly used, service only a few residences, and are not identified as significant roads either by the county or WSDOT.

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 the following local and collector roads would potentially view the Project along O Road, N Road, Road 24 SW, Road 27 SW, Lower Crab Creek Road, and Beverly Berke Road. Other local roads such as N Road, Road 27 SW, and Road 23 SW were not included in the sensitivity analysis because these roads are very lightly used, service only a few residences, and are not identified as significant roads either by the county or WSDOT. R Road Southwest serves as the primary access road to the BLM-administered Saddle Mountains MA.

Key Observation Points
Visual sensitivity of all residences, parks and recreation areas, and travel corridors are summarized below in Table 3.8-3 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 study area.

Table 3.8-3 Sensitive Viewpoints Identified in Project Study Area

VIEWPOINT	SENSITIVITY[1]
Baldy Butte Hang Gliding Launch Area	M
Beverly Sand Dunes OHV Park	M
Beverly Sand Dunes OHV Park	M
Buckshot Boat Launch	M
Burkett Lake Recreation Area/Crab Creek Corridor	H
Columbia Basin Wildlife Area-Lower Crab Creek Unit/Nunnally Lake	H
Columbia Basin Wildlife Area-Priest Rapids Unit	M
Columbia NWR	M
Columbia River Corridor (Eligible Wild and Scenic River)	M
Desert Air Dock	M
Desert Air Golf Course	M
Desert Aire Boat Launch/Recreation Area	M
Getty's Cove Day Use and Boat Launch	M
Hanford Reach National Monument/Saddle Mountain NWR	M
Huntzinger Rd. Boat Launch	M
I-82	L/M
I-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
Priest Rapids Lake	M
Priest Rapids Recreational Trail	H
Residences – All Occupied	H
Roads – Collector Rural Roads (Huntzinger Rd. E. Selah Rd., Beverly Berke Rd., E. Pomona Rd., Thrall Rd. Postama Rd., Beane Rd., Coombs Rd., Mieras Rd., O Rd., 24 SW, 28 SW, Lower Crab Creek Rd., Beverly Berke Rd.)	M
Roads – Other Local Roads (Sage Trail Road, N. St Hilaire Rd. Firing Center Rd., Tipp Rd., Burbank Creek Road, 4th Parallel Rd.)	M
Saddle Mountain Hang Gliding Launch Area	H
Saddle Mountain Recreation Access Route (R Rd Extension)	H/M
Saddle Mountains MA	H/M
Sand Hollow South Boat Launch	M
Selah Butte Recreation Destination Route (Selah Creek Drive)	M
Selah Butte Watchable Wildflower Area	H
Selah Cliffs Natural Area Preserve Trail	H
SR-24	M
SR-243	M
Umtanum Ridge Water Gap NNL	H
Upper Wanapum Dam Boat Launch	M
Vernita Bridge Fishing Area and Boat Launch	M
Vernita Bridge Rest Stop	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

[1] H=High; M=Moderate, L=Low

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. KOPs were selected that represent typical views from sensitive areas. KOPs were used for contrast analysis and for the identification of potential photo simulations. A total of five were selected for the development of visual simulations (see Appendix C-4). The KOPs identified for the Project are summarized in Table 3.8-4.

Table 3.8-4 Key Observation Point Summary and DEIS/SDEIS Cross Reference

KOP NAME	DEIS/SDEIS KOP NAME	LOCATION	VISUAL SENSITIVITY (LAND USE TYPE)	SEGMENT
KOP 1 - Sage Trail Road*	KOP 1/1s - Sage Trail Road* (DEIS/SDEIS)	Sage Trail Road north of Koch Rd	High (Residential)	1a/NNR-1
KOP 2 - N. Hilaire Rd.	KOP 2 - N. Hilaire Rd. (DEIS)	N. Hilaire Rd/Tester Ln Intersection	High (Residential)	1b & 1c
KOP 3 - Mieras Rd	KOP 3 - Mieras Rd (DEIS)	Mieras Rd West of Prairie Rd	High (Residential)	1c
KOP 4 – SR-24 EB	KOP 4 - SR-24 EB (DEIS)	East-bound SR 24 1.5 mile west of Meeboer Ranch	Moderate (Travel)	2c
KOP 5 – SR-243	KOP 5 – SR-243 (DEIS)	SR-243 just west of Road O SW	Moderate (Travel)	3c
KOP 6 - 24 SW Rd	KOP 6 - 24 SW Rd (DEIS)	24 SW Rd 0.2 mile west of Road O SW	Moderate (Travel)	3c
KOP 7 - Saddle Mt OHV Access Route (R Road SW)	KOP 7 - Saddle Mt OHV Access Route (R Road SW) (DEIS)	OHV Area of Saddle Mountains c. 3.3 miles past BLM Gate on R Road SW	Moderate (Recreation)	3c
KOP 8- Burkett Lake Recreation Area	KOP 8- Burkett Lake Recreation Area (DEIS)	Burkett Lake Day Use Area	High (Recreational)	3c
KOP 9 - Milwaukee Road Corridor	KOP 9 - Milwaukee Road Corridor (DEIS)	Near Nunnally Lake Parking Lot/Trailhead East of Beverly	High (Recreational)	3c
KOP 10 - Beverly	KOP 10 – Beverly (DEIS)	East Side of Beverly north of Pasco St-1st Ave. Intersection	High (Residential)	3c
KOP 11– Wanapum Village	KOP 11 – Wanapum Village (DEIS)	West Side of Wanapum	High (Residential)	3b & NNR-8
KOP 12 - John Wayne-Iron Horse Trailhead	KOP 12 - John Wayne-Iron Horse Trailhead (DEIS)	Southwest of Wanapum Dam at Parking Lot/Trailhead	High (Recreational)	3b
KOP 13 - Desert Aire Residential	KOP 13 - Desert Aire Residential (DEIS)	Along the Lake in Desert Aire	High (Residential)	3b
KOP 14 – Temple Lane	KOP 2s – Temple Lane (SDEIS)	East Selah- East of Shotgun Ln. and south of YTC	High (Residential)	NNR-2
KOP 15 – YTC: Firing Center Road*	KOP 3s – YTC: Firing Center Road*	Main entry road of YTC	Moderate (Military/Travel)	NNR-2
KOP 16 – E. Pomona Rd.	KOP 4s – E. Pomona Rd. (SDEIS)	East end of road at YTC boundary	High (Residential)	NNR-2
KOP 17 – WSDOT Selah Cliffs Eastbound Rest Area Overlook*	KOP 5s – WSDOT Selah Cliffs Eastbound Rest Area Overlook* (SDEIS)	At interpretative area overlooking Selah Cliffs at rest area	High (Travel/ Interpretative) BLM Interim VRM Class III	NNR-3

KOP NAME	DEIS/SDEIS KOP NAME	LOCATION	VISUAL SENSITIVITY (LAND USE TYPE)	SEGMENT
KOP 18 - Selah Butte Wildflower Area	KOP 6s - Selah Butte Wildflower Area (SDEIS)	At 2-track road pull-off south of the butte	High (Dispersed Recreational) BLM Interim VRM Class III	NNR-3
KOP 19- Badger Pocket: Silika Rd.	KOP 7s- Badger Pocket: Silika Rd. (SDEIS)	1/2 –mile south of Upper Badger Pocket Rd.	High (Residential)	MR-1 & NNR-4
KOP 20 – Upper Badger Pocket Rd.	KOP 8s – Upper Badger Pocket Rd. (SDEIS)	675-feet east of Buffalo Lane	High (Residential)	NNR-5
KOP 21 – John Wayne Trail	KOP 9s – John Wayne Trail (SDEIS)	South of Wanapum Dam and existing transmission lines	High/Moderate (Recreation) BLM Interim VRM Class III	NNR-8

* KOP used for Visual Simulation; see Chapter 4.8 and Appendix C4.

3.8.2.5 Distance Zones

Distance zones were established based upon perception thresholds, the scale and nature of the objects being viewed, and the viewing environment. The perception of form, texture, color, and other visual elements in the landscape is a function of changing distance from a viewpoint. In general, landscape elements tend to become less obvious and detailed at greater distances. Elements of form and line become more dominant than color or texture at longer viewing distances. The BLM has defined distance zones for the primary purpose of establishing management classes (BLM 1986a).

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 the Project, a review of the Project region and previous studies in similar geographical, topographical, and environmental settings was performed (Jones and Jones 1976), and relevant visibility thresholds have been established based on previous experience conducting similar visual studies. As a result of studies conducted on transmission line visibility in the northwestern United States, visibility threshold trends were uncovered that correlated to tower type, corridor variables, and landscape settings. Visibility is dependent on the height and structure types of the typical transmission line with respect to the surrounding landscape. Distance zones were used to asses Project impacts on viewers (in conjunction with Contrast Rating Forms) and to quantify high-moderate-low impact miles on viewers for each Action Alternative. For the typical 65 to 95 foot high H-frame or monopole structures, distance zones identified for the Project are as 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 Action Alternative route segments with H-frame or monopole structures 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 study area in accordance with the Spokane District RMP (BLM 1985) and Record of Decision (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). Since the public scoping process for this planning effort was initiated in April 2010, the scope of this planning effort has changed. This planning effort only includes BLM-administered lands in eastern Washington. Originally, the BLM announced its intention to prepare a RMP for Eastern Washington and the San Juan Planning Areas; this RMP was intended to replace the existing Spokane RMP and expand the Planning Area to include the San Juan Islands (see April 30, 2010, Federal Register notice). On March 25, 2013, the President issued Presidential Proclamation 8947 and established the San Juan Islands National Monument. The new National Monument encompasses the BLM-administered lands in the San Juan Islands that were part of the expanded Planning Area described in the April 30, 2010 Notice of Intent to prepare an RMP. Subsequently, BLM determined that it would prepare an RMP specific to the San Juan Islands National Monument. On March 2, 2015, BLM announced its intention to prepare an RMP for the San Juan Islands National Monument and initiated the public scoping process for that effort. The Eastern Washington RMP planning effort does not include BLM-administered public lands in the San Juan Islands archipelago. 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 RMP 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 study area as detailed in BLM Memo 285003-OR WAOR 65753 and Memo 285003-OR W020 developed for the Project's DEIS and SDEIS. The Interim VRM Classes established by the BLM (Interim Class III) in the Project study 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 United States Code §4321 National Environmental Policy Act (NEPA):** NEPA (and the State Environmental Policy Act [SEPA]) requires 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 Code of Federal Regulations (CFR) Parts 1500-1508:** Council on Environmental Quality implements regulations requiring 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.
- **Revised Code of Washington (RCW) 43.21c SEPA:** 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.
- **Washington Administrative Code 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 of the Yakima County Comprehensive Plan. 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 2013) as follows:

Shoreline Use Activity

GPO 2.78: *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.

Upon completion, the applicant should restore the project area to a natural or near natural condition.

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 Program under the Shoreline Master Plan (SLMP) (see Section 3.4 Land Use). The 2010 Final SLMP 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 SLMP. 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 Route Segment Specific Considerations

3.8.4.1 Route Segment 1a/NNR-1

The landscape character along this route segment is low density residential, with adjacent undeveloped lands being Scenic Quality Class C. Route Segment 1a/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 Mount Rainier occur from most of the residences located along Sage Trail Road (see KOP 1-Sage Trail Road). The route segment would potentially be viewed from the moderately sensitive East Selah Road and I-82.

Other existing development along this route segment includes Pacific Power’s 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 Route Segment 1b

Route Segment 1b is located in the JBLM YTC along a primarily undeveloped Class C Scenic Quality landscape of low growing sagebrush and grassland. Scattered adjacent residential development occurs near to the route segment on its north end and graded dirt or gravels road are prevalent, especially the fire break road along the JBLM YTC border. Residential development is concentrated more heavily on the south end of this route segment and those located along St. Hilaire Road and Vissel Road would potentially have the route segment in middleground view against the Yakima Ridge (see KOP 2-N - Hilaire Road).

Other residences on the south along Mieras Road and Coombs Road are within the foreground and middleground distance zone from this route segment with the route segment crossing in a rolling, undeveloped sagebrush-steppe in front of the Yakima Ridge, Class C Scenic Quality landscape.

There are no other existing transmission lines or other significant developed vertical features along this route segment.

3.8.4.3 Route Segment 1c

Visual resources along Route Segment 1c are nearly identical to Route Segment 1b, with the route segment being located outside the JBLM YTC boundary, parallel, and slightly closer (500 feet) to potentially sensitive viewers than Route Segment 1b north of E. Norman Road, although generally in the middleground, also.

Route Segment 1b is located in JBLM YTC along a primarily undeveloped Class C Scenic Quality landscape of low growing sagebrush and grassland. Scattered adjacent residential development occurs adjacent to the route and graded dirt or gravels road are prevalent, especially the fire break road along the JBLM YTC border. Residences located along St. Hilaire Road and Vissel Road would potentially have the route segment in middleground view against the Yakima Ridge (see KOP 2-N - Hilaire Road).

Other residences on the south end of the route segment along Mieras Road and Coombs Road are within the immediate foreground and foreground distance zone from the route segment in a more developed residential and agricultural landscape (see KOP 3 - Mieras Road). Some residences in this area have views of Mount Adams and across Moxee Valley to the southwest.

There are no other existing transmission lines or other significant developed vertical features along this route.

3.8.4.4 Route Segment 2a

Route Segment 2a also crosses an undeveloped Class C Scenic Quality landscape. Residential viewers located on Deeringhoff Road and Postma Road would potentially see the route segment on the middleground or background distance zone.

3.8.4.5 Route Segment 2b

Route Segment 2b crosses Class C Scenic Quality landscapes south of the JBLM YTC primarily in an undeveloped landscape. The route segment would typically be in the background distance zone from several residences and or in the seldom seen distance zone for moderate sensitivity travelers using SR-24. BLM Interim VRM Classes crossed along this route segment are Class III.

3.8.4.6 Route Segment 2c

Route Segment 2c also crosses Class C Scenic Quality landscapes as well as agricultural development character areas. This route segment is located primarily in the middleground distance zone from residences located north of SR-24, but would also be in the foreground view for at least one residence. The route segment would also parallel existing transmission line infrastructure along a majority of the route and in areas of foreground visibility. Viewers travelling along SR-24 would potentially view the route segment in the middleground distance zone where the line parallels the 115 kV BPA and PacifiCorp 230 kV transmission lines, and in the middleground or background where the route segment crosses undeveloped or agricultural landscapes. The route segment would also cross a short segment of Class III Interim VRM across BLM lands.

3.8.4.7 Route Segment 2d

Route Segment 2d crosses undeveloped Class B and Class C landscapes along Cold Creek, Yakima Ridge, and Umtanum Ridge. The closest potential sensitive viewers are located on the north and the south end of the route segment. The route segment would potentially be viewed in the middleground viewing condition from SR-24 travelers on the south end of the route. On the north end of the route, dispersed Columbia River users would view the route segment in the immediate foreground and foreground distance zone. Also, SR-243 travelers would potentially view the route segment in the background distance zone. The route segment would also cross a short segment of Class III Interim VRM across BLM lands.

3.8.4.8 Route Segment 3a

Route Segment 3a is a very short segment located in the context of the existing Vantage Substation with associated dominant Industrial/Utility Development Character Area. Beverly-Burke Road travelers and nearby residences would potentially view the route segment in the middleground distance zone.

3.8.4.9 Route Segment 3b

This route segment 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 kV to 500 kV). The route segment also follows Huntington Road and the abandoned C, M, SP, & P Railroad on the west side of the Columbia River in agricultural and undeveloped Class B Scenic Quality landscapes. Sensitive viewers associated with this route segment include recreationists using the John Wayne Pioneer Trail and associated facilities who would view the route segment in the immediate foreground, as well as Huntzinger Road travelers and residences associated with Wanapum Village (see KOP 11-Wanapum Village), the Auvil Fruit Company, and Desert Aire Community located on the east side of the river. The Auvil residential area would view the route segment in the immediate foreground distance zone. 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 Reservoir-Columbia River. South of the Priest Rapids Dam, residences in the Priest Rapids Community would also view the route segment in the immediate foreground. Travelers using SR-243 would also potentially view the route segment in the background distance zone. The route segment would also cross a short segment of Class III Interim VRM across BLM lands adjacent to the John Wayne Pioneer Trail.

3.8.4.10 Route Segment 3c

Route Segment 3c would cross Class C and Class B scenic quality landscape and landscapes dominated by agricultural development. Class C landscapes are located in and around the Saddle Mountains area and Class B scenic quality landscapes are located on the north side of the Saddle Mountains and along the Lower Crab Creek corridor. Agricultural Development Character areas are associated primarily with the Wahluke Slope area of Grant County. Residential Development Character Areas are crossed northeast of Beverly and in isolated areas of the Wahluke Slope. Existing utility development occurs near the Columbia River crossing, in the Saddle Mountains MA, and north of Beverly. Immediate foreground views would potentially occur from Columbia River corridor users; SR-243 travelers (see KOP 5 - SR 243); several residences located in the Wahluke Slope area and north of Beverly; Road 24 SW and Road O NW travelers (see KOP 6 - SW Road); Saddle Mountains MA and Access route users (see KOP 7 - Saddle Mountain OHV Access Route); the private Saddle Mountain hang-gliding launch site; Beverly Sand Dunes Recreation Area; and the Milwaukee Trail/Crab Creek Road corridor (see KOP 9 - Milwaukee Road Corridor). Other foreground or middleground potential views occur from the Burkett Lake-Crab Creek Corridor recreation area (see KOP 8 - Burkett Lake Recreation Area); Wanapum Village; Beverly (see KOP 10 - Beverly); and Nunnally Lake Fishing Area. The route segment would also cross a short segment of Class III Interim VRM across BLM lands in the Saddle Mountains.

3.8.4.11 Route Segment 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 route segment from the vicinity of Temple Lane Shotgun Lane (see KOP 14 - Temple Lane), Firing Center Road (see KOP 15 - JBLM YTC: Firing Center Road), and East Pomona Road (KOP 16 - E. 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 route segment parallels or is co-located with existing transmission and distribution lines along about 2.4 miles of the route segment. Developed features within the viewshed of this route segment 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.

3.8.4.12 Route Segment 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 route 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 route segment, where residences and the travelers using the I-82 corridor and east-bound Selah Creek Rest Area (and overlook; see KOP 17 - WSDOT Selah Cliff Eastbound Rest Area Overlook) will view the route segment in the immediate foreground. This route segment crosses above and within view of the Selah Cliffs NAP and trail below the overlook. Once the Project crosses the Selah Canyon area, it diverges from the highway, and motorists travelling the interstate would view the route segment 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 route segment 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 route segment, depending on the location of viewing activities (see KOP 18 - Selah Butte Wildflower Area); views of the route segment are screened by topography 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 study area, but views are screened by topography. Route Segment NNR-3 also crosses a high sensitivity BLM Sensitivity Level Rating Unit 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.

3.8.4.13 Route Segment NNR-4

The landscape character along most of Route Segment NNR-4 is similar to that of Route Segment NNR-3: 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 segment.

The visual sensitivity associated with Route Segment NNR-4 is associated primarily with I-82 corridor travelers who would have perpendicular views of the route segment 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 route segment in the immediate foreground and foreground and local road travelers would potentially view the route segment in the middleground and background.

The route segment parallels the existing Pacific Power Pomona-Wanapum 230 kV transmission line and would be viewed within the developed context of the highway corridor and existing transmission 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.

3.8.4.14 Route Segment NNR-5

Route Segment 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 route segment is associated with residences and local roads in the Badger Pocket area. Potential views would be in the middleground and background.

The route segment deviates from Pacific Power's existing Pomona-Wanapum 230 kV transmission line as it follows the JBLM YTC boundary, but is within the visual influence of the existing transmission line and road network of JBLM YTC. The route segment would be viewed by sensitive viewers behind the existing transmission line.

3.8.4.15 Route Segment NNR-6

This route segment parallels the Pacific Power 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 transmission line and the 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 occur 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 route segment in the middleground and background. On the east end of the route segment, 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 route segment 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 study area along this route segment.

3.8.4.16 Route Segment NNR-7

This route segment also parallels existing transmission lines along its entire length. The natural landscape character of this route segment is similar to Route Segment 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 steel lattice and wood 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 Trail (Iron Horse Trail), which parallels the route segment within the immediate foreground and foreground on the west and the middleground on the east, generally (KOP 21 - John Wayne Trail). Ginkgo Petrified Forest NNL (Wanapum State Park boat launch) is located in the in the seldom seen distance zone within the Project study area and views are typically screened by topography.

The existing transmission lines currently in the Project viewshed dominate 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.

3.8.4.17 Route Segment NNR-8

Route Segment NNR-8 shares the same alignment with Route Segment 3b where the line crosses the Columbia River on its extreme north end. This route segment 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. 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 route segment 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 Reservoir-Columbia River. Travelers using SR-243 would also potentially view the route segment in the immediate foreground distance zone where the line would cross the highway. Ginkgo Petrified Forest NNL (Wanapum State Park boat launch) is located in the seldom seen distance zone within the Project study area. Route Segment NNR-8 also crosses a moderate BLM sensitivity level rating unit as identified by the 2010 study.

The visual context of this Route Segment NNR-8 is dominated by the industrial features of the Wanapum Dam, existing transmission lines, and Vantage Substation along its entire route.

3.8.4.18 Route Segment MR-1

Landscape character along this route segment is similar to Route Segments NNR-3 and NNR-4, with relatively undeveloped, rolling sagebrush steppe, and the I-82 transportation corridor and associated Manastash Ridge (MR) 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 Route Segment MR-1 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 Route Segment MR-1 is associated primarily with the MR Viewpoints (east-bound and west-bound) that would have immediate foreground, foreground, and middleground views of the route segment as it crosses the interstate. As with Route Segment NNR-3, this route segment 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 JBLM YTC, the route segment would be within the immediate foreground and foreground view of residences located on the southwest side of Badger Pocket (KOP 19 - Badger Pocket: Silka Road; KOP 20 - Upper Badger Pocket Road). The Umtanum Ridge Water Gap NNL (access road on the east side of SR-821) is located in the background within the Project study 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 MR Viewpoints. No existing transmission lines occur in the vicinity of this route segment except at each end of the route 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 MR Viewpoint and a cell tower are located west of I-82 within the viewshed of the I-82 corridor.

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3.9 SOCIOECONOMICS

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to socioeconomics along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

3.9.1 Data Sources

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 Employment Security Department (WESD). 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 (Project Study Area)

3.9.2.1 The Project Study Area

The *Project Study Area* and *Local Area* for this analysis are defined based on the geographic extent of potential Action Alternative impacts. The impacts of the Action Alternatives 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 with that hiring increase 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 recreational vehicle [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 Action Alternative routes are located in four counties: Yakima, Kittitas, Grant, and Benton. Impacts of the Action Alternatives in Benton County would be negligible because only a maximum of about four miles of Route Segment 3c would be located in the remote far northwest portion of the County, approximately 40 miles from any Benton County communities; thus, Benton County is not included in the Project study area (property tax revenues to Benton County are described). Figure 3.9-1 depicts the Project study area, including its primary communities.

Socioeconomic data, such as from the U.S. Department of Commerce (Bureau of Economic Analysis [BEA]), WESD, and Washington OFM are often tabulated at the county level, making the county level of analysis convenient for most statistical tabulations. Thus, the Project study area for the Socioeconomics section 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.

The *Local Area* is defined to better reflect the fact that much of the area in the Project study area will not be appreciably affected due to distance from the Action Alternatives. Communities that could experience the most noticeable temporary or long-term population increases will be those nearest the Action Alternatives in which housing for in-migrating workers is expected to be available. These include the Census County Divisions (CCDs) of: Sunnyside and Northeast Yakima County (Yakima County), Grant and Mattawa-Royal City (Grant County), and Kittitas (Kittitas County). In these CCDs are the incorporated communities of Moxee in Yakima County, George and Mattawa in Grant County, and unincorporated communities such as Vantage in Kittitas County and Beverly and Desert Aire in Grant County.

3.9.2.2 Population

The three-county Project study area is relatively rural, with an average population density of 41.7 persons per square mile, compared to a statewide density of 106.3. Much of the lands within the Project study area 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 Project study area are Yakima (Yakima County), Ellensburg (Kittitas County), and Moses Lake (Grant County). Each city is the county seat of its respective county. Of the three major cities, Yakima is the closest to the southwestern route segments and Ellensburg is closest to the NNR Alternative and Manastash Ridge (MR) Subroute.

The population of the three-county Project study area has increased steadily over the past two decades, from 270,346 in 1990 to 386,570 in 2015. This represented a 1.8 percent average annual growth rate, equal to the statewide average of 1.8 percent. Population data are shown in Table 3.9-1.

Population is extremely sparse in the vicinity of the Action Alternatives. The three CCDs traversed by the Action Alternatives had a combined population of only 28,231 persons in 2010. The Action Alternatives are not located in close proximity to populated areas except at the Pomona Heights Substation (Figure 3.9-1). The nearest communities to the Action Alternatives are: Unincorporated Vantage (2010 population of 74) in Kittitas County; the small settlement of Beverly (Beverly is not defined as a Census area, but approximately 50 residences are located there) in Grant County; and the municipalities of Moxee (2015 population of 3,810), Yakima city (2015 population of 93,220), Union Gap (2015 population of 6,150), and Selah (2015 population of 7,495) in Yakima County.

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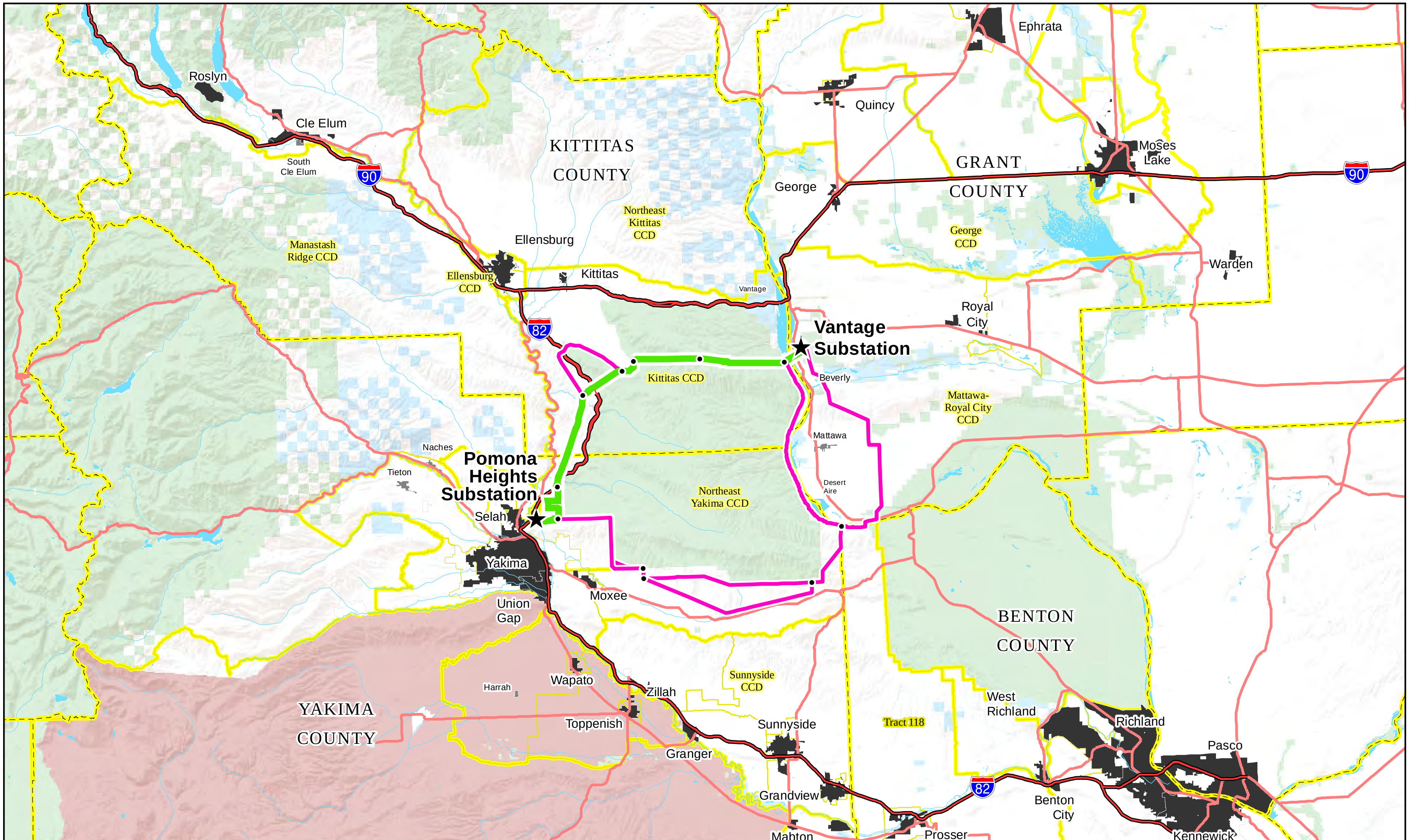

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 3.9-1 Socioeconomics Study Region

Project Features
- Agency Prefered Alternative
- Route Segment
- Project Substation

Transportation
- Interstate Highway
- US or State Highway

Boundaries
- County Boundary
- Census County Division (CCD)
- Census Tract
- City
- Town
- Census Designated Place

Land Ownership
- Federal
- State
- Bureau of Indian Affairs

Water
- River
- Water Body

0 5 10 15 20 25
Miles

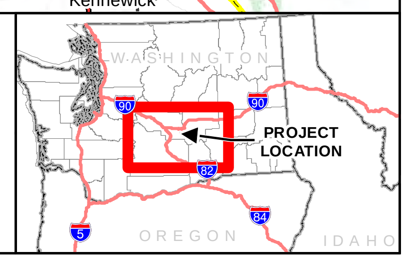

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Table 3.9-1 Historical Population in Project Study Area, 1990-2015

JURISDICTION	CENSUS 1990	CENSUS 2000	CENSUS 2010	2015	LAND AREA (SQ. MILES)	POPULATION DENSITY 2015 (PERSONS PER SQ. MILE)	AVERAGE ANNUAL GROWTH RATE, 2000-2015
Grant County	54,798	73,605	89,120	93,930	2,679.5	35.1	2.5%
Unincorporated Grant County	26,406	35,370	40,134	41,840	2,625.5	15.9	1.7%
Incorporated Grant County	28,392	38,235	48,986	52,090	54.0	964.6	3.3%
George city	324	528	501	720	2.0	360.0	3.3%
Mattawa town	941	2,609	4,437	4,535	0.7	6,478.6	6.7%
Moses Lake city (Grant County seat)	11,235	14,690	20,366	22,080	17.8	1,240.4	4.6%
Royal City	1,104	1,822	2,140	2,235	1.0	2,235.0	2.1%
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	42,670	2,297.3	18.6	3.3%
Unincorporated Kittitas County	10,418	13,588	18,063	19,120	2,281.6	8.4	3.7%
Incorporated Kittitas County	16,307	17,611	22,852	23,550	15.6	1,509.6	3.1%
Ellensburg city (Kittitas County seat)	12,360	13,277	18,174	18,810	7.1	2,649.3	3.8%
Kittitas city	843	1,105	1,381	1,455	0.6	2,425.0	2.9%
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	249,970	4,295.4	58.2	1.3%
Unincorporated Yakima County	88,214	92,414	83,755	85,985	4,234.4	20.3	-0.6%
Incorporated Yakima County	100,609	126,430	159,476	163,985	61.0	2,688.3	2.7%
Grandview city	7,169	8,270	10,862	11,200	6.8	1,647.1	3.2%
Moxee city	825	819	3,308	3,810	1.7	2,241.2	33.2%
Selah city	5,113	6,164	7,147	7,495	4.4	1,703.4	2.0%
Sunnyside city	11,238	13,700	15,858	16,280	6.2	2,625.8	1.7%
Union Gap city	3,120	5,517	6,047	6,150	4.9	1,255.1	1.0%
Yakima city (Yakima County seat)	54,843	69,706	91,196	93,220	27.0	3,452.6	3.1%
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	386,570	9,272	41.7	1.8%

JURISDICTION	CENSUS 1990	CENSUS 2000	CENSUS 2010	2015	LAND AREA (SQ. MILES)	POPULATION DENSITY 2015 (PERSONS PER SQ. MILE)	AVERAGE ANNUAL GROWTH RATE, 2000-2015
Total population, CCDs in which Action Alternative Routes are located except Benton County part	14,512	21,026	28,231	na			na
State of Washington	4,866,692	5,894,121	6,724,540	7,061,410	66,455.5	106.3	1.8%

Sources: OFM 2015; U.S. Census for 1990, 2000, and 2010
[1]Southern Slopes CCD was renamed Mattawa-Royal City CCD for the 2010 Census.
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).

Projected Population

Population projections for the Project study area, 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 Project study area 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 Project Study Area Through 2040

JURISDICTION	CENSUS 2010	2015	2020	2025	2030	2035	2040	AVERAGE ANNUAL GROWTH RATE, 2010-2040
High								
Grant	89,120	101,720	114,891	128,253	141,847	155,337	168,810	2.2%
Kittitas	40,915	47,759	52,359	57,065	61,652	66,075	70,431	1.8%
Yakima	243,231	300,341	321,341	342,341	363,341	384,341	405,341	1.7%
3-County Study Area	373,266	449,820	488,627	527,659	566,840	605,753	644,582	1.8%
Statewide	6,724,540	7,696,799	8,323,520	8,943,546	9,545,810	10,120,536	10,676,170	1.6%
Medium								
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 Study Area	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%

JURISDICTION	CENSUS 2010	2015	2020	2025	2030	2035	2040	AVERAGE ANNUAL GROWTH RATE, 2010-2040
Low								
Grant	89,120	90,398	94,134	98,061	102,220	106,275	110,313	0.3%
Kittitas	40,915	40,036	40,631	41,226	41,821	42,416	43,011	0.7%
Yakima	243,231	229,804	235,739	241,402	246,769	251,955	256,834	0.2%
3-County study Area	373,266	360,238	370,504	380,689	390,810	400,646	410,158	0.3%
Statewide	6,724,540	6,449,120	6,650,235	6,841,751	7,014,758	7,162,261	7,291,717	0.3

Source: OFM 2012

3.9.2.3 Demographics

Age and Sex

The Project study area population had a younger median age than the state of Washington in 2010. The statewide median age was 37.3 compared to 32.1 in Grant County, 31.9 in Kittitas County, and 32.2 in Yakima County. In all areas, the female median age was slightly higher than the male median age (U.S. Census 2010).

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 (90.0 and 90.2 percent, respectively), both of which are higher rates than the national average of 86.3 percent. In Grant (76.0 percent) and Yakima (72.0 percent) counties, the proportion of high school and college graduates are noticeably lower than statewide reflecting their predominantly farm economies (U.S. Census 2013).

3.9.2.4 Housing

Housing availability in the three-county Project study area 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 Project study area in 2010 (U.S. Census 2010). 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 Action Alternatives being in Yakima, Selah, and Union Gap cities (U.S. Census 2010).

Housing in Grant County is relevant for Alternatives D, F, and H which are located east of the Columbia River in Grant County. The George and Mattawa-Royal City CCDs had a total of 72 vacant units for rent in 2010. The City of George 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 Action Alternatives, in Ellensburg (303 vacant units for rent) and City of Kittitas (nine vacant units for rent) (U.S. Census 2010).

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 Project study area’s primary cities of Yakima, Ellensburg, and Moses Lake. However, closer to the Action Alternatives, very little transient housing is available (U.S. Census 2010).

There are approximately 2,000 hotel rooms in the vicinity of the City of Yakima. Occupancy rates over a month's period vary 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 events at the Yakima Convention Center. During some of these times, such as during the state high school basketball tournament in March, hotel availability is very low as far away as Ellensburg and Prosser in Benton County (U.S. Census 2010).

There are also numerous RV parks in the Yakima area. Among the closest to the Action Alternatives within Yakima County are Yakima Sportsman State Park, Circle H RV Park, Trailers Inn RV Park, and the KOA Campgrounds. However, east of Yakima near State Route 24 there are no hotels or RV parks. During the summer and fall peak season, vacancies are fairly low.

Ellensburg has 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 (approximately a 20-minute 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 approximately 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, approximately an hour from the Action Alternatives within Grant County.

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 Action Alternatives are the cities of Kittitas and Ellensburg (approximately a 30-minute drive to Vantage and 50 minutes to Moxee), which also have substantial hotel and RV availability.

Table 3.9-3 Housing Data for the Project Study Area, its CCDs, and Communities

SUBJECT		STATE OF WASHINGTON	COUNTIES				CCDS IN PROJECT VICINITY						COMMUNITIES IN PROJECT VICINITY									
			GRANT COUNTY	KITTITAS COUNTY	YAKIMA COUNTY	STUDY AREA 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	VANTAGE CDP	YAKIMA CITY
Total housing units	Number	2,885,677	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	39	34,829
Owner occupied	Number	1,673,920	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	24	17,907
	Percent	63.9	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	80.0	54.1
Renter occupied	Number	946,156	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	6	15,167
	Percent	36.1	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	20.0	45.9
Vacant housing units	Number	265,601	5,042	5,305	4,882	15,229	559	879	149	111	755	2,453	415	566	37	36	52	18	101	112	9	1,755
	Percent	9.2	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	23.1	5.0
For rent	Number	72,112	948	475	1,263	2,686	50	22	21	20	214	327	6	303	35	9	3	3	55	20	0	691
Rented, not occupied	Number	4,877	28	38	110	176	0	5	2	1	13	21	4	12	0	0	0	0	2	6	0	69
	Percent	1.8	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	0.0	3.9
For sale only	Number	41,417	401	315	747	1,463	15	38	21	26	113	213	25	87	2	8	0	8	55	19	0	322
Sold, not occupied	Number	7,623	52	34	163	249	4	5	0	3	33	45	4	9	0	0	0	0	2	12	0	57
	Percent	2.9	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	0.0	3.2
Vacant for seasonal, recreational, or occasional use	Number	89,907	2,688	3,860	869	7,417	460	627	50	13	66	1,216	365	46	0	0	4	1	6	2	4	124
	Percent	33.9	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	7.1
Vacant for migratory workers	Number	1,328	133	1	46	180	1	108	1	2	8	120	0	0	0	0	42	0	0	0	0	3
	Percent	0.5	2.6	0.0	0.9	1.2	0.2	12.3	0.7	1.8	1.1	1.1	0.0	0.0	0.0	0.0	80.8	0.0	0.0	0.0	0.0	0.2
Other vacant	Number	48,337	792	582	1,684	3,058	29	74	54	46	308	511	11	109	0	19	3	6	15	53	5	489
	Percent	18.2	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	55.6	27.9
Average household size, all occupied units (persons)	Number	2.51	2.93	2.32	2.97	2.74	2.93	4.06	2.60	2.99	3.51	3.22	2.91	2.16	3.82	2.54	5.61	3.26	2.64	2.90	2.47	2.68
Population in households	Number	6,585,165	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	3,307	7,022	5,985	74	88,619
Population in group quarters	Number	139,375	1,245	2,417	3,485	7,147	4	89	6	30	388	517	0	2,390	0	0	0	1	125	62	0	2,448

Source: U.S. Census 2010 (Summary File 1, Tables H3, H4, H5, H10, H12, and P29)

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3.9.2.5 Economy

Labor Force, Employment, and Unemployment

As was the case statewide and nationwide, the Project study area 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 2015. However, the unemployment rate remains high, at an 8.2 percent average for the first seven months of 2015 in the Project study area, compared to a statewide average of 5.8 percent. Kittitas County has fared slightly better than Grant or Yakima counties with a 2015 partial-year unemployment rate of 6.7 percent (WESD 2015a). Labor force data are shown in Table 3.9-4.

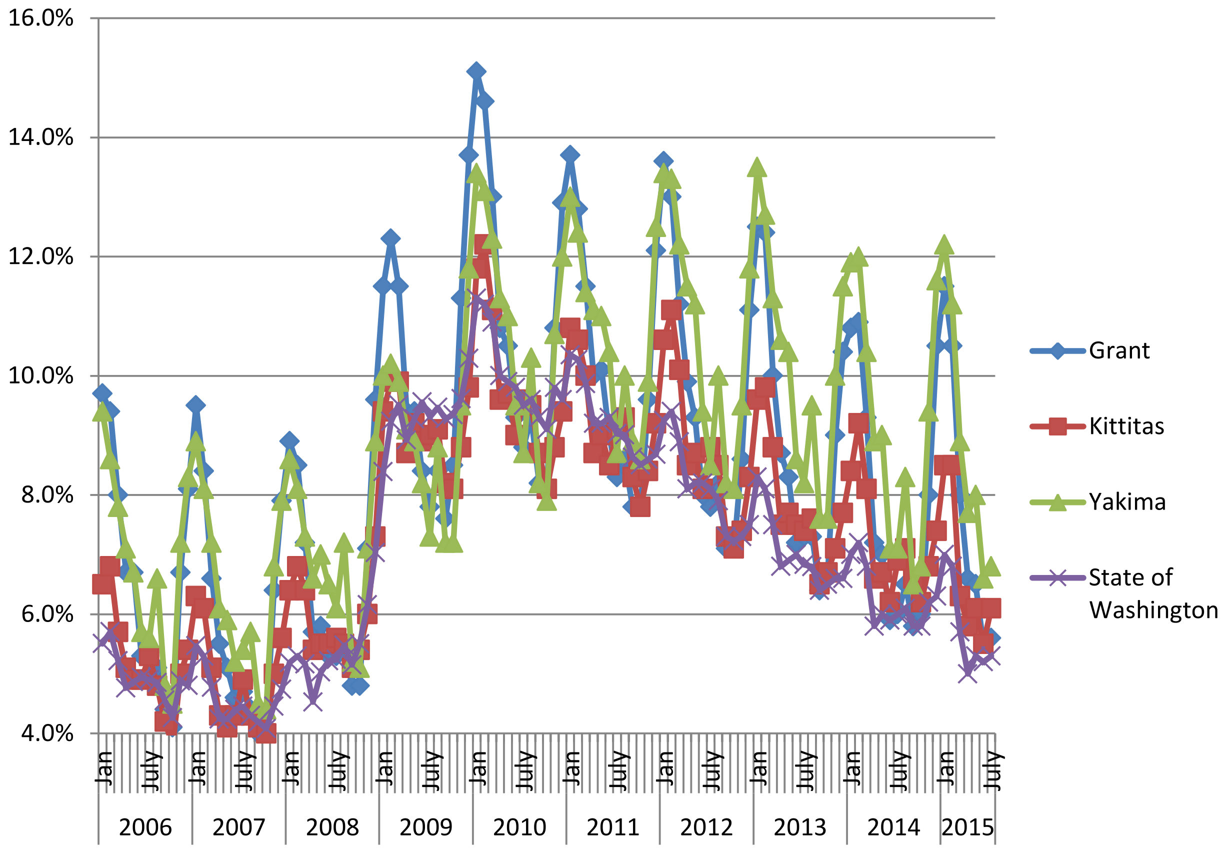
Table 3.9-4 Employment and Unemployment in the Project Study Area, 2011-2015

LABOR FORCE	2011	2012	2013	2014	2015 (JAN-JUL)
Grant					
Civilian Labor Force	42,750	43,922	43,950	44,677	45,728
Total Employment	38,470	39,767	40,096	41,228	42,248
Total Unemployment	4,208	4,155	3,854	3,449	3,479
Percent unemployed	10.0	9.5	8.8	7.7	7.6
Kittitas					
Civilian Labor Force	20,740	20,570	20,161	20,012	20,978
Total Employment	18,840	18,779	18,582	18,577	19,580
Total Unemployment	1,900	1,792	1,578	1,436	1,398
Percent unemployed	9.2	8.7	7.8	7.2	6.7
Yakima					
Civilian Labor Force	120,170	121,042	118,788	119,411	120,926
Total Employment	107,420	108,330	106,856	108,656	110,327
Total Unemployment	12,750	12,712	11,932	10,755	10,499
Percent unemployed	10.6	10.5	10.0	9.0	8.7
Yakima, Kittitas, and Grant					
Civilian Labor Force	183,660	185,534	182,899	184,100	187,632
Total Employment	164,730	166,876	165,534	168,461	172,155
Total Unemployment	18,858	18,659	17,364	15,640	15,376
Percent unemployed	10.3	10.1	9.5	8.5	8.2
State of Washington					
Civilian Labor Force	3,459,200	3,471,158	3,460,038	3,488,183	3,543,878
Total Employment	3,139,999	3,190,015	3,216,966	3,270,362	3,339,738
Total Unemployment	319,201	281,143	243,072	217,821	204,139
Percent unemployed	9.2	8.1	7.0	6.2	5.8

Source: WESD 2015a

Employment fluctuates seasonally in the Project study area, particularly in the more farming-dependent Grant and Yakima counties. This creates substantial seasonal changes in the unemployment rates in the Project study area, with Grant and Yakima counties typically experiencing swings of 5.3 percent in their unemployment rates over the course of a year. In 2014, Yakima County experienced high unemployment rate of 12.0 percent in January and a low of 6.5 percent in September (WESD 2015a). Monthly unemployment rates are depicted in Figure 3.9-2.

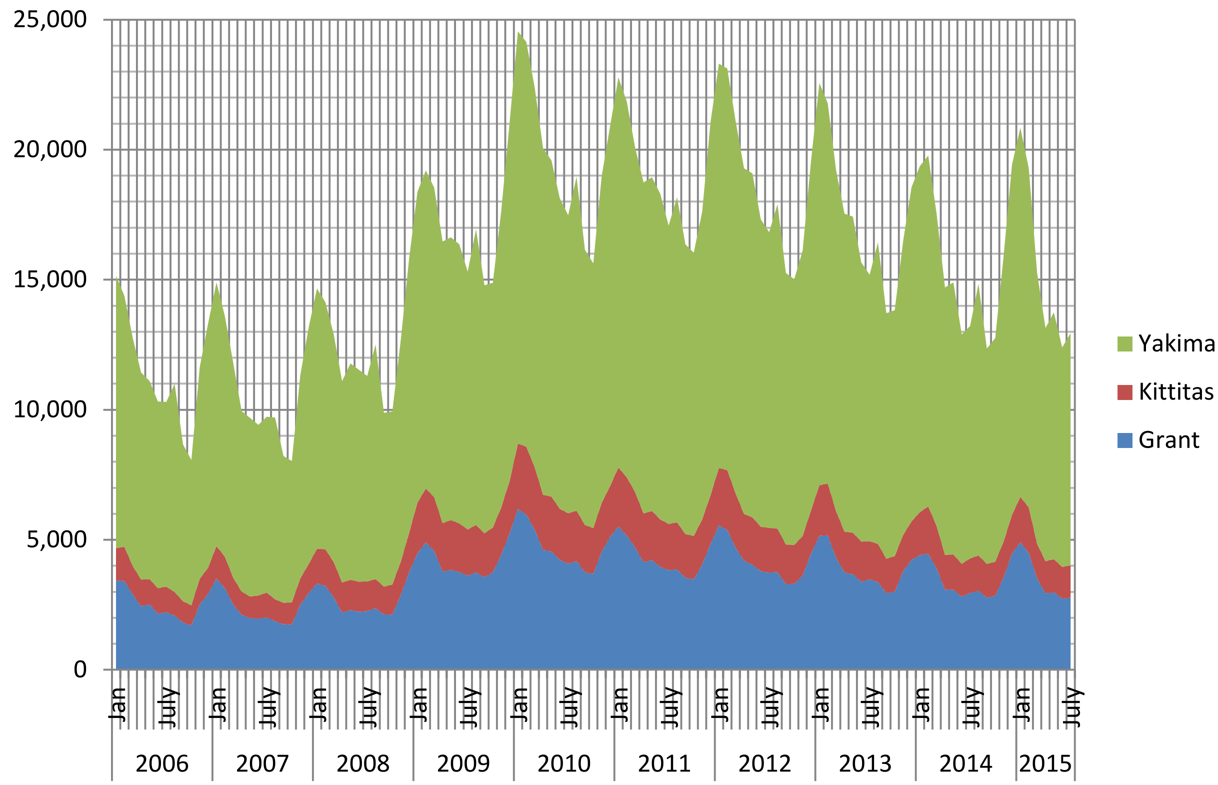
FIGURE 3.9-2 HISTORICAL UNEMPLOYMENT RATES, PROJECT STUDY AREA COUNTIES AND THE STATE OF WASHINGTON, 2006 - JULY 2015



Source: WESD 2015a.

The Project study area unemployed labor force reached a high of 24,550 in January 2010. As the local economy came out of the recession, in summer months, the number of unemployed was under 13,000 in 2014 and 2015 with the lowest unemployment level of 12,355 occurring in September 2014. With the historical unemployed labor force being around 10,000 in the relatively full-employment years of 2006-2007, indicating that even in the relatively busy summer months, there is substantial excess capacity in the local labor supply (WESD 2015a). Data on the historical unemployed labor force are shown in Figure 3.9-3.

FIGURE 3.9-3 HISTORICAL UNEMPLOYED LABOR FORCE, PROJECT STUDY AREA COUNTIES, 2006 – JULY 2015



Source: WESD 2015a

Employment by Industry

As shown in Table 3.9-5, the Project study area economy 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 within any of the Project study area counties. The proportions of wage and salary employment represented by the farming sector were 7.1, and 13.5 percent, respectively, for Kittitas and Yakima counties in 2013 (Grant County data not available), compared to the statewide average of 2.1 percent (BEA 2014a).

In the past, the Grant County economy has been reliant on export income almost solely from agriculture, with some contribution by tourism-related sectors. It is assumed that this is still the case with government employment remaining high; however, the data available for 2013 did not include employment for the agricultural or forestry sectors (BEA 2014a). Employment data are shown in Table 3.9-5.

Total employment in Yakima County grew the most slowly of the three Project study area counties from 2001 to 2013 (0.9 percent average annual growth rate, compared to 1.5 percent in both Kittitas and Grant counties) and was the only Project study area county to have lower employment growth than the 1.1 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 (17,789 jobs), farming (16,909 jobs), health care and social services (17,299 jobs), and retail trade (12,686 jobs; BEA 2014a).

Table 3.9-5 Number Employed by Industry in the Project Study Area, 2013 and Change Since 2001

EMPLOYMENT BY PLACE OF WORK	WASHINGTON			GRANT COUNTY			KITTITAS COUNTY			YAKIMA COUNTY		
	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-13	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-13	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-13	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-13
Total employment	3,984,905	100.0	1.1	45,534	100.0	1.5	20,888	100.0	1.5	125,270	100.0	0.9
Proprietors employment	782,625	19.6	2.1	7,553	16.6	1.1	5,471	26.2	2.0	20,282	16.2	0.7
Farm employment	84,342	2.1	0.5	D	D	D	1,486	7.1	0.3	16,909	13.5	0.8
Forestry, fishing, and related activities	42,148	1.1	1.1	D	D	D	D	D	D	9,223	7.4	5.6
Mining	9,183	0.2	4.0	33	0.1	2.7	D	0.2	3.1	152	0.1	11.3
Utilities	5,193	0.1	0.1	1,712	3.8	1.9	39	0.2	3.1	160	0.1	-2.5
Construction	203,720	5.1	-0.4	4,785	10.5	-0.2	1,236	5.9	2.1	4,288	3.4	-0.1
Manufacturing	306,416	7.7	-0.6	1,610	3.5	2.1	779	3.7	0.3	8,922	7.1	-2.2
Wholesale trade	139,595	3.5	0.5	4,106	9.0	0.4	637	3.0	1.4	4,753	3.8	0.2
Retail trade	404,345	10.1	0.4	1,330	2.9	2.3	2,203	10.5	-0.2	12,686	10.1	0.6
Transportation and warehousing	116,693	2.9	0.8	1,330	2.9	2.3	377	1.8	-1.6	4,015	3.2	1.9
Information	118,355	3.0	0.8	277	0.6	0.2	210	1.0	-0.8	939	0.7	-2.2
Finance and insurance	162,418	4.1	1.3	949	2.1	3.0	535	2.6	5.2	3,237	2.6	1.7
Real estate and rental and leasing	170,312	4.3	2.3	1,359	3.0	3.8	842	4.0	4.8	2,965	2.4	1.4
Professional, scientific, and technical services	285,252	7.2	2.0	865	1.9	D	754	3.6	D	3,163	2.5	-0.2
Management of companies and enterprises	41,066	1.0	2.4	54	0.1	D	D	D	D	720	0.6	1.7
Administrative and waste management services	193,834	4.9	1.5	1,296	2.8	2.2	D	D	D	2,824	2.3	-0.4
Educational services	72,781	1.8	2.7	244	0.5	1.9	291	1.4	3.8	1,829	1.5	2.4
Health care and social assistance	445,669	11.2	3.1	3,264	7.2	1.7	1,448	6.9	1.3	17,299	13.8	2.7
Arts, entertainment, and recreation	94,264	2.4	2.1	457	1.0	1.1	412	2.0	1.3	1,660	1.3	1.3
Accommodation and food services	259,960	6.5	1.3	2,389	5.2	2.1	2,613	12.5	3.4	6,328	5.1	0.9

EMPLOYMENT BY PLACE OF WORK	WASHINGTON			GRANT COUNTY			KITTITAS COUNTY			YAKIMA COUNTY		
	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-13	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-13	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-13	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-13
Other services, except public administration	206,862	5.2	0.8	1,797	3.9	0.5	1,114	5.3	0.7	5,409	4.3	-0.5
Government and government enterprises	622,497	15.6	0.7	8,323	18.3	1.3	4,953	23.7	1.3	17,789	14.2	0.5
Federal, civilian	71,772	1.8	0.7	734	1.6	1.6	147	0.7	-1.2	1,230	1.0	-0.9
Military	80,410	2.0	0.8	252	0.6	-0.8	119	0.6	-0.5	799	0.6	-0.7
State and local	470,315	11.8	0.7	7,337	16.1	1.3	4,687	22.4	1.4	15,760	12.6	0.7
State government	148,987	3.7	0.7	775	1.7	0.1	2,507	12.0	D	2,800	2.2	-0.3
Local government	321,328	8.1	0.8	6,562	14.4	1.5	2,180	10.4	D	12,960	10.3	0.9

Source: BEA 2014a: Tables CA25 and CA25N

Note: D = Data suppressed due to confidentiality regulations. Suppressed sectors are typically very small.

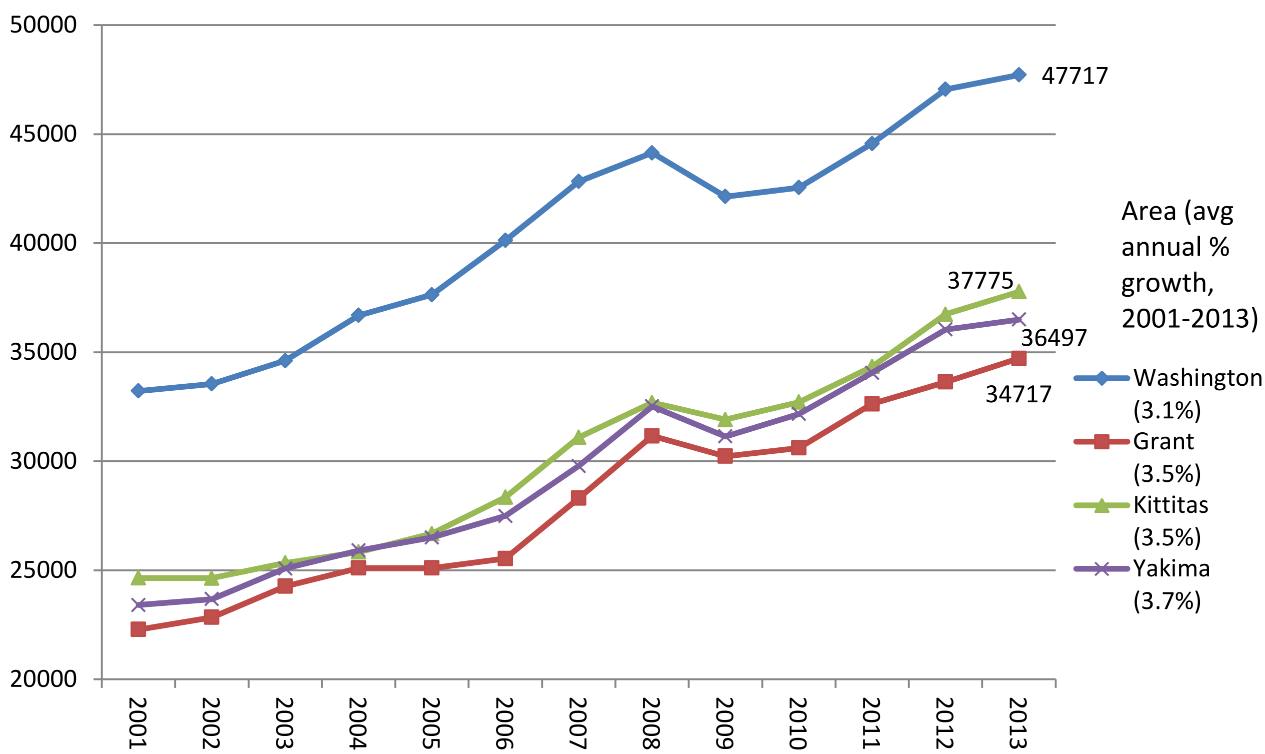
The Kittitas County economy is more connected to the Seattle regional economy than are Grant or Yakima counties. Employment in Kittitas County is more diversified and grew by an average of 1.5 percent annually. Utility, finance and insurance, real estate rental and leasing, and educational services grew most rapidly. As of 2013, the largest-employing sectors were government (4,953 jobs), accommodations and food services (2,613 jobs), retail trade (2,203 jobs), and construction (1,236 jobs). In terms of industry concentration relative to statewide (indicating importance as exporting sectors), the leading industries were state government, farming, accommodations, and utilities (BEA 2014a).

Income

In terms of personal income, Yakima County dominates the Project study area economy, accounting for approximately two-thirds of total personal income. While having the largest amount of personal income comprised by farm wage and salary income in 2013 ($791 million), Yakima County's economy was less reliant on farming as a proportion of total personal income (8.8 percent) than was the Grant County economy (15.7 percent). However, both Yakima and Grant counties were more reliant on farming as a proportion of total personal income when compared to Kittitas County or the state as a whole (1.7 and 0.9 percent, respectively; BEA 2014b). Income data are shown in Table 3.9-6.

Reflecting its reliance on farm wage and salary employment, the Project study area 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 Project study area counties ($37,775) in 2013, with the corresponding statewide figure being $47,717. All three counties' per capita personal income grew at faster rates than the state of Washington, 3.1 percent, from 2001 to 2013 (BEA 2014b). Per capita income trends are depicted in Figure 3.9-4.

FIGURE 3.9-4 PER CAPITA PERSONAL INCOME, PROJECT STUDY AREA COUNTIES AND STATEWIDE, 2001-2013.



Source: BEA 2014b. Table CA4.

Table 3.9-6 Income by Source in the Project Study Area, 2013 and Change Since 2001

DESCRIPTION	WASHINGTON		GRANT COUNTY		KITTITAS COUNTY		YAKIMA COUNTY	
	TOTAL 2013	ANNUAL PERCENT CHANGE 2001-2013	TOTAL 2013	ANNUAL PERCENT CHANGE 2001-2013	TOTAL 2013	ANNUAL PERCENT CHANGE 2001-2013	TOTAL 2013	ANNUAL PERCENT CHANGE 2001-2013
Personal income (thousands of dollars, by place of work)								
Nonfarm personal income	$329,494,796	4.4%	$2,690,139	4.8%	$1,550,419	5.5%	$8,225,692	4.4%
Farm income	$3,160,061	6.6%	$499,619	9.5%	$27,234	3.3%	$790,714	8.0%
Net earnings by place of residence	$211,903,297	3.8%	$1,935,696	5.6%	$843,513	4.3%	$5,097,096	4.1%
Components of earnings (thousands of dollars)								
Wages and salaries	$170,790,354	3.8%	$1,409,581	4.9%	$533,853	4.6%	$3,792,893	3.6%
Supplements to wages and salaries	$41,638,393	4.5%	$401,570	5.6%	$171,298	5.8%	$1,020,477	4.4%
Proprietors' income								
Farm proprietors' income	$1,372,427	10.8%	$280,331	13.9%	$2,601	-7.9%	$301,917	15.9%
Nonfarm proprietors' income	$23,906,096	2.9%	$142,258	2.2%	$109,699	3.4%	$622,565	3.4%

Source: BEA 2014b. Table CA4.

Farming Sector

For the entire state as well as the Project study area, agriculture has been the backbone of the local economies. Table 3.9-7 shows that farm income declined as a proportion of total income in Kittitas County from 2001 to 2013 (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 0.7 to 0.9 percent over the same period of time (BEA 2014b).

Table 3.9-7 Comparison of Percent of Total Personal Income Earned in Farm Sector, Project Study Area Counties and Statewide, 2013 and 2001

AREA/REGION	PERCENT OF TOTAL PERSONAL INCOME 2001	PERCENT OF TOTAL PERSONAL INCOME 2013
Grant County	9.9%	15.7%
Kittitas County	2.2%	1.7%
Yakima County	6.0%	8.8%
3-County Study Area	6.5%	9.6%
State of Washington	0.7%	0.9%

Source: BEA 2014b. Table CA4

Grant County's agricultural sales of $1.76 billion in 2012 ranked it the number one producer in the state, while Yakima County production ranks it at number two; Kittitas County ranked 21 out of a total of 39 counties in the state. Between 2007 and 2012, acreage in farms in Yakima County increased, while farm acreage in the rest of the Project study area and statewide decreased. The primary agricultural product in the Project study area is apples, which dominates 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 (U.S. Department of Agriculture [USDA] 2014). Agricultural sales data are summarized in Table 3.9-8.

Table 3.9-8 Summary of Farm Sector Characteristics, Project Study Area Counties, 2007 and 2012 (Dollar Figures in Thousands)

FARM SECTOR CHARACTERISTIC	GRANT	KITTITAS	YAKIMA
Land in farms, 2007 (acres)	1,087,952	191,087	1,649,281
Land in farms, 2012 (acres)	963,784	183,124	1,780,498
Market value of products sold, 2007	$1,190,191	$60,949	$1,203,806
Market value of products sold, 2012	$1,762,295	$68,911	$1,645,510
State rank	1	21	2
Value of crops including nursery and greenhouse, 2012	$1,333,149	$47,157	$1,069,497
State rank	1	17	2
Value of livestock, poultry, and their products, 2012	$429,145	$27,754	$576,013
State rank	2	16	1
Leading value of sales by type, 2012			
Fruits, tree nuts, and berries	$674,521	$4,144	$810,881
Milk from cows	(D)	(D)	$436,745
Other crops and hay	(D)	$35,684	$160,693
Cattle and calves	$294,086	$18,971	$128,577
Vegetables, melons, potatoes, and sweet potatoes	$293,074	$4,366	(D)
Nursery, greenhouse, floriculture, and sod	(D)	(D)	(D)

Sources: USDA 2009; USDA 2014. Tables 1 and 2 – County Data

Note: Dollar figures in thousands. D = Data suppressed due to confidentiality regulations. Suppressed sectors are typically very small.

Economic Projections

No published quantitative economic projections are available specifically for any of the Project study area counties. However, the WESD (2015b) produces employment projections for sub-regions of the state that may be indicative of likely conditions in the Project study area 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 1.6 percent annually from 2013 to 2018, then 1.2 percent growth from 2018 to 2023. Farming, fishing, and forestry occupations are projected to grow at a rate of 1.0 percent through 2018 and continue to grow at a slower rate of 0.6 percent through 2023. All growth projection rates are less than the projected statewide average annual growth projections of 2.0 percent from 2013-2018 or 1.4 percent from 2018-2023 (WESD 2015b).

Adams, Chelan, Douglas, Grant, and Okanogan counties comprise the North Central WDA. This region is projected to experience employment growth averaging 1.8 percent annually from 2013 to 2018, then 1.1 percent growth from 2018 to 2023. Farming, fishing, and forestry occupations are projected to increase by 1.2 percent annually through 2018 and then grow by only 0.5 percent annually through 2023 (WESD 2015b).

3.9.2.6 Government Fiscal Conditions

Fiscal conditions for Project study area counties are described in this section, including Benton County conditions. Benton County is included because a short portion of Route Segment 3c would be located in Benton County, meaning some tax revenues (e.g., property, sales and use, public utilities) would be paid to Benton County jurisdictions.

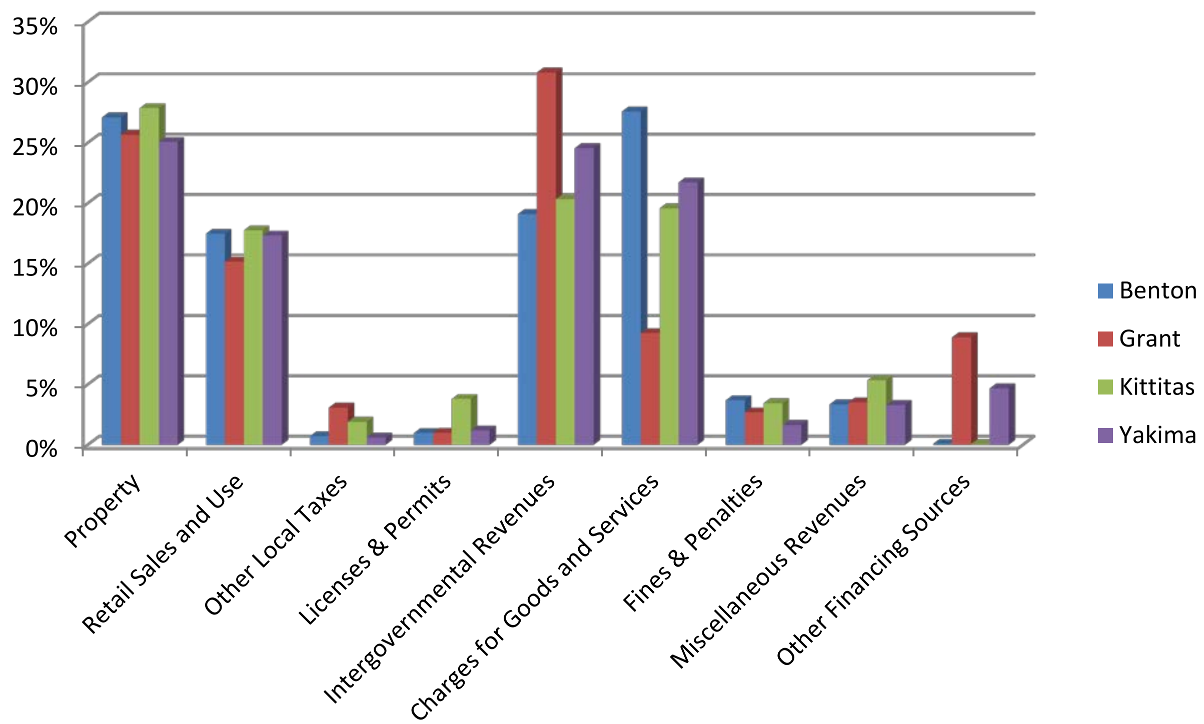
Overall County Budgets

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 2015). Because none of the Action Alternatives 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 Benton, Grant, Kittitas, and Yakima counties and shown in Figure 3.9.5.

Property and retail sales and use taxes would be the primary tax payments generated by the Action 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 Project study area and Benton County reduced their expenditures. Yakima County, in total, is an exception; however, 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 counties except Grant County increased from 2012 to 2014. Sales and use taxes increased in all four counties through the same period. In general, the primary fiscal condition for the four counties has had increasing intergovernmental revenues (Washington State Auditor 2015).

FIGURE 3.9-5 PERCENTAGE SOURCES OF COUNTY REVENUES FOR BENTON, GRANT, KITTITAS, AND YAKIMA COUNTIES, 2014



Source: Washington State Auditor 2015

Property Valuation and Taxation

Property tax receipts are the backbone of most cities' and counties' abilities to fund services. In the Project study area and Benton County, these receipts are the number one stable revenue source (intergovernmental revenues were higher in 2014, 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 percent 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 to individual properties (Revised Code of Washington [RCW] 84.55.010).

Benton County Property Valuation and Taxation

Benton County total property tax levies have continued to gradually increase since 2005. Including state school taxes, Benton County total property tax levies for 2015 were $191,635,722. 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 levy was $1.27986876 per $1,000 of assessed value. The statewide school levy is $2.30439871 per $1,000 of assessed value (Benton County 2015). Tax rate data is further detailed in Table 3.9-9.

Table 3.9-9 Benton County-Wide Property Tax Rates for Taxes Payable 2015

TAXING DISTRICT	RATE
State school levy	2.30439871
Benton County	1.27986876
Benton County road	1.37061429
Average county-wide rate*	11.72562824

Source: Benton County 2015
Rate = dollars per thousand dollars of valuation
*Average county-wide rate is an average of the total levy rates across all Tax Code Areas including appropriate school and fire districts

Grant County Property Valuation and Taxation
Including state school taxes, total Grant County property tax levies were $121.9 million (for 2015). 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 average county-wide property tax rate was $13.00442018 per $1,000 of assessed value. The state school property tax rate was $2.20744 per $1,000 of assessed valuation. Grant County levies for 2014 levies are shown in Table 3.9-10.

Table 3.9-10 Grant County Levies for Tax Year 2014 (Payment 2015)

TAXING DISTRICT	LEVY RATE	LEVY
State School	2.20744	$12,203,245
State School Refund	0.00025	$1,382
State School Total	*2.20769*	*$12,204,628*
County Current Expense	1.68308	$9,456,841
County Mental Health	0.02500	$140,469
County Veterans Relief	0.01125	$63,211
County-wide Total	*1.71933*	*$9,660,521*
Library	0.43250	$2,217,299
Roads	2.11182	$7,148,096

Source: Grant County 2014
*Levy = dollars per thousand dollars of valuation

Kittitas County Property Valuation and Taxation
Including state school taxes, total Kittitas property tax levies in 2014 (for payment in 2015) were $56.9 million. The total county general rate was $1.425122 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 2014 levies for county-wide property taxes are shown in Table 3.9-11.

Table 3.9-11 Kittitas County Levies for Tax Year 2014 (payment 2015)

TAXING DISTRICT	LEVY	LOCAL TAX
County General		
Current Expense	1.390351	$8,039,418.45
Community Service	0.025949	$150,042.67
Veterans' Assistance	0.007785	$45,015.16
County-Refund Levy Admin Fees	0.001037	$5,996.24
Total County General Taxes	*1.425122*	*$8,240,472.52*

TAXING DISTRICT	LEVY	LOCAL TAX
County Flood Control Zone District		
Flood Control Regular Levy	0.070054	$405,072.83
County Road		
Road District #1	0.896227	$3,695,186.19
Co. Road Diverted (RCW 36.33.220)	0.048509	$200,004.89
Total County Road Taxes	*0.944736*	*$3,895,191.08*

Source: Kittitas County 2014
*Levy = dollars per thousand dollars of valuation

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 Yakama Indian Reservation and, therefore, not subject to ad valorem taxation.

Ad valorem tax rates generally remained consistent between 2013 and 2014, with most taxing districts increasing their tax amounts by the one percent limit on the legally allowed increase from the previous highest levy. The 2014 total county assessment subject to property taxes was $15,024,702,587 (Yakima County 2014a).

There are 116 Tax Code Areas in the county, including the state school levy and 14 cities (no Action Alternatives are located within cities). County-wide tax rates set in 2014 for taxes paid in 2015 are shown in Table 3.9-12.

Table 3.9-12 Yakima County-Wide Property Tax Rates for Taxes Payable 2015

TAXING DISTRICT	RATE
County emergency medical services	0.24814391
County flood control	0.09024832
State school levy	2.26449492
Yakima County	1.70037791
Yakima County road	1.78238240
Yakima school bonds	1.68345866
Yakima school maintenance & operation	3.11543959
Yakima Valley regional library	0.47615861
Average county-wide rate*	11.61015177

Source: Yakima County 2014b
Rate = dollars per thousand dollars of valuation
*Average county-wide rate is an average of the total levy rates across all Tax Code Areas including appropriate school and fire districts

Yakima County property tax levies as reported by the County Treasurer (Yakima County 2014b) have increased gradually over the past three years. These levies are shown in Table 3.9-13. 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 3.9-13 Yakima County Property Tax Levies

ENTITIES	2012	2013	2014
State School	$35,071,913	$37,153,009	$39,047691
Local School	$63,513,155	$64,511,047	$65,200,397
Yakima County	$23,257,240	$26,012,213	$26,532,614
County Road	$13,021,298	$10,280,230	$10,566,421

ENTITIES	2012	2013	2014
County Flood	$1,313,692	$1,340,903	$1,371,978
Fire Districts	$7,241,185	$7,515,050	$7,678,914
Cities and towns	$26,117,359	$26,868,297	$27,042,282
EMS	$3,292,085	$3,353,052	$3,756,175
Other Districts*	$7,360,141	$7,615,320	$7,682,956
Special Assessments**	$7,049,123	$7,222,247	$7,690,066
Total	**$187,237,191**	**$191,871,368**	**$196,569,494**

Source: Yakima County 2014b
*Includes Library, Port, and Park Districts
**Includes Irrigation, Conservation, Mosquito, Diking, Drainage, Weed, Stormwater, Horticulture, State Game, and State Forest Patrol Assessments.

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 Project study area levy their own additional sales and use taxes. These are shown in Table 3.9-14. These data show that the combined state and local tax rate in the Project study area ranges from 7.9 to 8.2.

Table 3.9-14 Sales and Use Tax Rates in the Project Study Area 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
Selah and Yakima City	1.7
Union Gap	1.6
Other cities in Yakima County	1.4

Source: WDOR 2015

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 Utility 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 (96.8 percent in 2009; WDOR 2010) are distributed into the state general fund. The remainder is 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 Utility 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 BPA’s 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, Public Law 96-501, Sec. 5(c), 16 United States Code §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.

3.10 ENVIRONMENTAL JUSTICE

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to environmental justice (EJ) along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

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). 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 Project study area is an approximately three-mile radius surrounding the transmission centerline for each of the Action Alternatives. All census block groups, whole or in part, within 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 approximately 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 and Table C17002 from the American Community Survey 3-Year Estimates from 2011-2013 Ratio of Income to Poverty Level. For both analyses, data for all Census Block Groups that are within three miles of the Action Alternatives (in full or in part) were extracted, tabulated, and analyzed.

3.10.4 Current Conditions and Trends, Regional Overview (Project Study Area/ Counties)

3.10.4.1 Minority Population

In the three-mile radius Project 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 Project study area.

The Latino population represented 32.7 percent of the total population in the four-county Project study area, compared to 11.2 percent statewide. There was a lower concentration of non-Latinos of “two or more races”, although the percentages of the totals are low (1.9 percent in the Project study area and 3.7 percent statewide). All other 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 Project study area relative to statewide (U.S. Census 2010).

The differences in nearby populations’ racial and ethnic characteristics among the Action Alternatives were minimal; of the nine Action Alternatives in the three-mile Project study area, four were exact duplicates; only five different distributions resulted (Alternatives A and F; B and E; C and G; D and H; and NNR Alternative – Manastash Ridge [MR] Subroute). The differences that did exist among most Action Alternatives, in terms of racial and ethnic distributions and averages, were very small. However, there was a lower percentage of minorities present in the NNR Alternative - MR Subroute compared to other Action Alternatives. These results are tabulated in Table 3.10-1.

3.10.4.2 Low-Income Population

The Project study area has generally higher incidences of poverty than the statewide average. As shown in Table 3.10-2, data from the American Community Survey for 2013 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 poverty, Yakima County had 22 percent, Grant County 20.3 percent, and Kittitas County had 19.4 percent. The Washington statewide average was 12.5 percent (U.S. Census 2013).

Comparison of the poverty status of the population in the Project study area within three miles of the Action Alternatives 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. These data indicated higher proportions of persons living in poverty in the four-county region (Benton, Grant, Kittitas, and Yakima counties) as a whole than statewide in 1999, although Benton County had lower proportions of persons under the poverty level and under twice the poverty level than the Washington statewide average.

Table 3.10-1 Summary of Race and Ethnicity of Census Block Groups within Three Miles of Action Alternatives, Four-County Area, and State of Washington

RACE/ETHNICITY	ACTION ALTERNATIVES										FOUR-COUNTY AREA		STATE OF WASHINGTON	
	A AND F		B AND E		C AND G		D AND H		NNR - MR SUBROUTE					
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Hispanic or Latino	25,559	40.2%	25,559	40.2%	26,794	40.5%	26,794	40.5%	15,310	30.4%	179,450	32.7%	755,790	11.2%
Not Hispanic or Latino														
Total Not Hispanic or Latino	37,997	59.8%	37,992	59.8%	39,438	59.5%	39,443	59.5%	35,036	69.6%	368,993	67.3%	5,968,750	88.8%
White alone	35,162	55.3%	35,160	55.3%	36,537	55.2%	36,539	55.2%	32,510	64.6%	332,741	60.7%	4,876,804	72.5%
Black or African American alone	483	0.8%	483	0.8%	493	0.7%	493	0.7%	434	0.9%	4,823	0.9%	229,603	3.4%
American Indian and Alaska Native alone	788	1.2%	788	1.2%	806	1.2%	806	1.2%	701	1.4%	11,484	2.1%	88,735	1.3%
Asian alone	418	0.7%	417	0.7%	420	0.6%	421	0.6%	364	0.7%	8,558	1.6%	475,634	7.1%
Native Hawaiian and Other Pacific Islander alone	49	0.1%	49	0.1%	49	0.1%	49	0.1%	43	0.1%	473	0.1%	38,783	0.6%
Some Other Race alone	70	0.1%	70	0.1%	73	0.1%	73	0.1%	56	0.1%	738	0.1%	11,838	0.2%
Two or More Races	1,027	1.6%	1,025	1.6%	1,060	1.6%	1,062	1.6%	928	1.8%	10,176	1.9%	247,353	3.7%
Non-Hispanic Minority	1,808	2.8%	1,807	2.8%	1,841	2.8%	1,842	2.8%	1,598	3.2%	26,076	4.8%	844,596	12.6%

Numbers are rounded and may not sum exactly.
Source: U.S. Census 2010

Table 3.10-2 2013 Poverty Statistics for the Project Study Area and Statewide

RATIO OF INCOME TO POVERTY LEVEL	WASHINGTON		BENTON COUNTY		GRANT COUNTY		KITTITAS COUNTY		YAKIMA COUNTY	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Under .50	423,252	6.3	8,951	5.0	5,865	6.5	4,785	12.2	20,345	8.4
Under 1.0	936,456	13.9	22,711	12.6	17,764	19.7	9,453	24.1	53,979	22.3
Under 1.5	1,516,071	22.4	40,102	22.3	30,383	33.6	12,967	33.1	90,499	37.4
Under 2.0	2,084,763	30.8	57,325	31.8	40,733	45.1	15,928	40.6	122,422	50.6
2.0 or more	4,675,853	69.2	122,893	68.2	49,649	54.9	53,299	59.4	119,450	49.4
Total	6,760,616	100	180,218	100	90,382	100	39,227	100	241,892	100

Source: U.S. Census 2013

In 1999, persons with incomes below the poverty level (established by the U.S. Census Bureau [no date]) represented 16.5 percent of the total population in the four-county region, compared to 10.6 percent statewide.[1] The corresponding ratio of persons with incomes under twice the poverty level was 38.0 and 25.9 percent, respectively. Comparing these data to the 2009 data presented in Table 3.9-10 (refer to Section 3.9 Socioeconomics) indicates that the proportions and numbers of people living in poverty in both the state of Washington and the four-county region increased between 1999 and 2009. In part, this reflects the recession of 2008-09. Figure 3.9-4 (refer to Section 3.9 Socioeconomics) shows the dip in per capita incomes that occurred between 2008 and 2009. However, even accounting for the recession, the increase in poverty in the four-county region is notable.

In the three-mile radius Project study area, there were generally greater concentrations of low-income persons than in the state as a whole in 1999. For all Action Alternatives, the average ratios were 18.3 percent under the Poverty Level and 40.9 percent under twice the Poverty Level (U.S. Census 2000). These results are summarized in Table 3.10-3.

Table 3.10-3 Summary of Low Income Populations of Census Block Groups within Three Miles of Action Alternatives, Four-County Region, and State of Washington

ACTION ALTERNATIVES / REGION	TOTAL POPULATION	BELOW POVERTY LEVEL		BELOW 1.5 TIMES POVERTY LEVEL		BELOW TWICE THE POVERTY LEVEL	
		NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Alternatives A and F	53,766	9,831	18.3%	17,377	32.3%	22,630	42.1%
Alternatives B and E	56,714	10,368	18.3%	18,280	32.2%	18,280	40.6%
Alternatives C and G	56,714	10,368	18.3%	18,280	32.2%	23,033	40.6%
Alternatives D and H	56,751	10,368	18.3%	18,280	32.2%	23,946	42.2%
NNR Alternative - MR Subroute	43,763	7,964	18.2%	12,991	29.7%	17,031	38.9%
Four-County Region	464,966	76,518	16.5%	129,456	27.8%	176,489	38.0%
State of Washington	5,765,201	612,370	10.6%	1,037,422	18.0%	1,492,788	25.9%

Source: U.S. Census 2000

[1] It should be noted that differences in the poverty rate in the four-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 four-county region.

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3.11 CULTURAL RESOURCES AND NATIVE AMERICAN CONCERNS

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to cultural resources along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and the Bureau of Land Management (BLM) has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

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 this FEIS, cultural resources have been divided into archaeological resources, architectural resources, and traditional cultural properties (TCPs).

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

For the purpose of this FEIS, the Project study area for the cultural resource analysis included both a 150-foot wide corridor (75 feet to each side of the Action Alternative route segment centerlines) and a 500-foot wide corridor (250 feet to either side of the Action Alternative route segment centerlines). A cultural resource record search for the proposed Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project (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 Action 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 Alternative, 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)
- U.S. Bureau of Land Management (BLM)
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC)
- Washington Department of Fish and Wildlife (WDFW)
- Grant County Public Utility District (PUD)
- Washington Department of Natural Resources

Other data sources were examined to determine whether certain classes of specially designated cultural resources existed within or near the Project study area. These included:

- National Historic Landmarks. National Historic Landmarks (NHLs) 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 study 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 Route Segments 1b, 3a, and 3c along Alternative D and Route Segments NNR-3, NNR-4, NNR-6, NNR-7, and NNR-8 along the NNR Alternative (Camuso and Lally 2014, Camuso and Lally 2015) 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 study area (Lally and Camuso 2011, Lally and Camuso 2013) and conducted a second study for the NNR Alternative and portions of Alternative D (Camuso and Lally 2014). Also, because the NNR Alternative 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) conducted further TCP studies in the area and prepared a report (Oosahwee-Voss 2014).

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 Action Alternative route segment centerlines were entered into a geographic information system database. Over 2,750 cultural resources have been recorded within one mile of the centerline of each Action Alternative including the NNR Alternative (Camuso and Lally 2014). Only 190 of these are located within 250 feet of the centerlines. It is acknowledged that:

- Cultural resource site boundaries are sometimes not well defined; and

- Site data may be updated as other 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 Action Alternative centerlines, including the NNR Alternative. As a result of previous and recent surveys of federal land along some route segments by the YNCRP (Camuso and Lally 2014), the proportion of surveyed land is 67 percent within the 150-foot wide corridor and 65 percent within the 500-foot wide corridor.

3.11.2 Cultural History / Regional Overview

3.11.2.1 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) similar foraging subsistence patterns 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).

3.11.2.2 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 49^{th} 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 Project 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 Project 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 Project 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 Project study area. A portion of the Project 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 study 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 and east 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 land 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 Columbia Basin Reclamation 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 study 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 one of the longest canals 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. A year later, Reclamation also began construction on new canals and three divisions: the Roza, the Tieton, and the Storage Units. 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 study 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 study 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 Priest Rapids 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 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 Action Alternative following the terms of the PA. The APE for the Project 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 or 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 have been determined by the BLM and appropriate land managing agencies. The APE for assessing visual effects on cultural resources will extend no farther than 3.0 miles from the centerline of proposed transmission line ROW for the selected route. Certain classes of visually sensitive cultural resources, such as TCPs, beyond the 3.0-mile indirect APE may require analyses to assess visual effect. The BLM will consult with the Tribes, DAHP, and other Signatories to determine whether a change in the visual APE is necessary for these cultural resources.

The BLM, in consultation with the 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. Other treatment measures could include, but will not be limited to, data recovery, completion of National Register nomination forms, Historic American Building Survey/Historic American Engineering Record/Historic American Landscape Survey documentation, and creative mitigation options including video, podcasts, and support of Electronic Section 106 applications.

3.11.4 Route Segment Specific Considerations

As previously stated, for the purpose of this FEIS, the Project study area for the cultural resource analysis included both a 150-foot wide corridor (75 feet to each side of the Action Alternative route segment centerlines) and a 500-foot wide corridor (250 feet to either side of the Action 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 Alternative 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 for each Action Alternative (Table 3.11-1). Also, the TCP report was reviewed to determine if any resources of particular concern to Native Americans were located within the corridors.

The nine NNR Alternative route 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 Alternative route 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 Alternative has now been surveyed for cultural resources.

Excluding TCPs, there are 161 documented cultural resources within the 150-foot corridor and 259 cultural resources within the 500-foot corridor of the route segments for each Action Alternative (Tables 3.11-2 and 3.11-3), including those in DAHP records and sites recently recorded by the YNCRP. Also, 12 TCPs and one culturally sensitive area have been reported within the 150-foot and 500-foot corridors of the route segments. A TCP study was completed along the NNR Alternative and concluded that the NNR Alternative did not cross any known TCPs for the Moses Columbia people, a constituent tribes of the Colville Confederated Tribes (Oosahwee-Voss 2014).

3.11.4.1 Route Segment 1a/NNR-1

A total of 44 acres are within the 150-foot wide corridor and 148 acres are within the 500-foot wide corridor of Route Segment 1a/NNR-1. Project-specific cultural resource surveys have not been conducted for this route segment and no previous surveys have been conducted in association with other projects. Therefore, 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 wide and 500-foot wide 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 1a/NNR-1. As previously stated, a TCP study was completed along the NNR Alternative and concluded that the NNR Alternative and NNR Alternative with MR Subroute did not cross any known TCPs for the Moses Columbia people, a constituent tribes of the Colville Confederated Tribes (Oosahwee-Voss 2014).

3.11.4.2 Route Segment 1b

A total of 229 acres are within the 150-foot wide corridor and 764 acres are within the 500-foot wide corridor of Route Segment 1b. A total of 126.5 acres of this has been previously surveyed for cultural resources (Table 3.11-1).

A total of 18 cultural resources have been identified within the 150-foot wide corridor and a total of 20 have been identified with the 500-foot wide corridors of Route Segment 1b (Tables 3.11-2 and 3.11-3).

3.11.4.3 Route Segment 1c

There are 236 acres in the 150-foot wide corridor of Route Segment 1c and 780 acres in the 500-foot wide corridor. Project-specific cultural resource surveys have not been conducted for this route segment and no previous surveys have been conducted in association with other projects. Therefore, none of the acreage has been surveyed for cultural resources (Table 3.11-1).

There are no previously recorded cultural resources or identified TCPs within either the 150-foot wide corridor or the 500-foot wide corridor of Route Segment 1c (Tables 3.11-2 and 3.11-3).

3.11.4.4 Route Segment 2a

Along Route Segment 2a, a total of 18 acres are located within the 150-foot wide corridor and 63 acres are within the 500-foot wide corridor. Project-specific cultural resource surveys have not been conducted for this route segment and no previous surveys have been conducted in association with other projects. Therefore, none of these acres have been surveyed (Table 3.11-1).

No cultural resources have been documented or TCPs identified within either the 150-foot wide corridor or the 500-foot wide corridor of Route Segment 2a (Tables 3.11-2 and 3.11-3).

3.11.4.5 Route Segment 2b

There are 298 acres within the 150-foot wide corridor of Route Segment 2b. Of this total, only one acre (0.3 percent) has been previously surveyed for cultural resources. A total of 995 acres exists within the 500-foot wide corridor. Only five acres (0.5 percent) in this corridor have been surveyed (Table 3.11-1). Project-specific cultural resource surveys have not been conducted for this route segment and the acreages of surveys completed were associated with other projects.

No cultural resources have been documented and no TCPs have been identified within either the 150-foot wide or 500-foot wide Route Segment 2b corridors (Tables 3.11-2 and 3.11-3).

3.11.4.6 Route Segment 2c

A total of 330 acres of land exist within the 150-foot wide corridor of Route Segment 2c and 1,102 acres exist within the 500-foot wide corridor. Project-specific cultural resource surveys have not been conducted for this route segment and no previous surveys have been conducted in association with other projects. Therefore, none have been previously surveyed for cultural resources (Table 3.11-1).

No cultural resources have been previously recorded within the 150-foot wide corridor of Route Segment 2c. One prehistoric lithic scatter has been documented within the 500-foot wide corridor. This site has not been evaluated for eligibility for listing in the National Register (Tables 3.11-2 and 3.11-3). No TCPs have been documented within the Route Segment 2c corridors.

3.11.4.7 Route Segment 2d

Within the 150-foot wide corridor of Route Segment 2d there are 128 acres of land of which five acres (3.9 percent) have been previously surveyed for cultural resources. A total of 431 acres of non-inundated dry land exists within the 500-foot wide corridor; 14 acres (3.2 percent) have been previously surveyed (Table 3.11-1).

Two cultural resources have been previously recorded along this route segment. The Hanford Grade of the former Chicago, Milwaukee, St. Paul, and Pacific (C, M, SP, & P) Railroad, occurs within the 150-foot wide corridor and 500-foot wide corridor along the Route Segment 2d centerline at the Columbia River. This portion of the Hanford Grade has not been evaluated for National Register eligibility (Tables 3.11-2 and 3.11-3). A portion of the Route Segment 2d corridor is located within an identified TCP.

3.11.4.8 Route Segment 3a

Route Segment 3a is a very short segment (0.1 mile) that facilitates the interconnection of the transmission line into the Vantage Substation and extends west from the 3a-3b-3c route node.

All of the 150-foot wide and 500-foot wide corridors along this very short segment have been surveyed for cultural resources (Table 3.11-1).

A total of 3 cultural resources have been previously documented within the 150-foot wide corridor of Route Segment 3a, consisting of 2 archaeological sites and 1 architectural resource. A total of five cultural resources have been located within the 500-foot wide corridor that include those mentioned above plus two additional architectural resources (Tables 3.11-2 and 3.11-3). No TCPs have been identified within the 150-foot wide or 500-foot wide corridors. One architectural resource, the Vantage Substation, has been recorded within the 150- foot wide corridor of Route Segment 3a. Three architectural resources (the Vantage Substation, the Midway to Vantage No.1 Transmission Line, and the Vantage to Columbia No.1 Transmission Line) are within the 500-foot wide corridor. All of the architectural resources have been determined eligible to the National Register by the Washington DAHP.

3.11.4.9 Route Segment 3b

There are a total of 396 acres within the 150-foot wide corridor of Route Segment 3b. Of these, 15 acres are underwater leaving 381 acres of dry land. A total of 47 acres (12.3 percent) have been surveyed within the 150-foot wide corridor. Within the 500-foot wide corridor there are 1,322 acres. A total of 177 of these acres are underwater, leaving 1,145 acres of dry land. Of these, 157 acres (13.7 percent) have been previously surveyed by archaeologists (Table 3.11-1).

There are 44 documented archaeological resources within the 150-foot wide corridor. These include the prehistoric Wa Pai Xie Archaeological District, 25 prehistoric archaeological sites, seven historic archaeological sites, eight archaeological sites with evidence of both prehistoric and historic use, and three prehistoric isolated finds (usually three or fewer artifacts). These resources consist of lithic scatters, cairns and rock features, pictographs, rockshelters, talus pits, historic trash scatters, the Hanford Grade of the C, M, SP, & P Railroad, railroad camps, irrigation features, and the remains of a ranch. Two of the resources (the archaeological district and a site with pictographs) have been determined eligible to the National Register by the Washington DAHP. Five resources, including the isolated finds, are not eligible. Thirty-eight resources have not been evaluated for National Register eligibility (Table 3.11-2). There are no architectural resources within the 150-foot wide corridor of Route Segment 3b.

Eighty-one archaeological resources, including the 44 resources mentioned above, are within the 500-foot wide corridor of Route Segment 3b. These sites include the archaeological district, 47 prehistoric archaeological sites, 12 historic archaeological sites, 11 archaeological sites with evidence of both prehistoric and historic use, eight prehistoric isolated finds, and two historic isolated finds. The archaeological district and a site with pictographs and rockshelters have been determined eligible for listing in the National Register (Table 3.11-3). Ten resources, mostly isolated finds, are not eligible. Sixty-nine cultural resources have not been evaluated for National Register eligibility. One TCP is located within the 150-foot wide corridor in Route Segment 3b.

There is one architectural resource within the 500-foot wide corridor of Route Segment 3b. The Midway to Vantage No.1 Transmission Line has been determined eligible to the National Register by the Washington DAHP.

3.11.4.10 Route Segment 3c

There are 459 acres within the 150-foot wide corridor of Route Segment 3c. Nine acres are underwater leaving 450 acres of dry land. A total of 311 of these acres (67 percent) have been surveyed for cultural resources. A total of 1,532 acres are within the 500-foot wide corridor, of which 52 acres are underwater. Of the 1,480 acres of dry land, 377 acres (24 percent) have been surveyed for cultural resources (Table 3.11-1).

There are 17 cultural resources within the 150-foot wide corridor. Eight are prehistoric archaeological sites, one is a historic archaeological site, one is an archaeological site used both prehistorically and historically, three are prehistoric isolated finds, and three are historic isolated finds. Prehistoric sites consist of lithic scatters, cairns, and talus pits. The historic resource is a segment of the Hanford Grade of the C, M, SP, & P Railroad. One resource has been recommended eligible, three resources are not eligible, and 12 are unevaluated (Table 3.11-2).

There is one architectural resource within the 150-foot wide corridor. The Midway to Vantage No.1 Transmission Line has been determined eligible to the National Register by the Washington DAHP.

There are 36 archaeological resources within the 500-foot wide corridor. These include 14 prehistoric archaeological sites, three historic archaeological sites, four archaeological sites with evidence of both prehistoric and historic use, 11 prehistoric isolated finds, and four historic isolated finds. Prehistoric sites consist of lithic scatters, cairns, and talus pits. The historic resources include a trash scatter and a segment of the Hanford Grade of the C, M, SP, & P Railroad. Twelve resources, mostly isolated finds, are not eligible, two have been recommended eligible, and 22 are unevaluated for National Register eligibility (Table 3.11-3).

There is one architectural resource within the 500-foot wide corridor of Route Segment 3c, the Midway to Vantage No.1 Transmission Line. It has been determined eligible to the National Register by the Washington DAHP.

3.11.4.11 Route Segment NNR-2

There are a total of 92 acres within the 150-foot wide corridor and 317 acres within the 500-foot wide corridor of Route Segment NNR-2. Of these totals, all 92 acres (100 percent) within the 150-foot wide corridor and all 317 acres (100 percent) within the 500-foot wide 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 wide and 500-foot wide Route Segment NNR-2 corridors (Tables 3.11-2 and 3.11-3).

3.11.4.12 Route Segment NNR-3

A total of 169 acres are within the 150-foot wide corridor and 74 acres (43 percent) have been surveyed for cultural resources (including lands recently surveyed by the YNCRP). The 500-foot wide corridor totals 567 acres, with 144 acres (25 percent) that have been surveyed for cultural resources (Table 3.11-1).

Eleven 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 seven prehistoric isolated finds located within the 150-foot wide corridor. The 500-foot wide corridor has a total of 23 archaeological resources consisting of 8 sites and 15 isolated finds. Three of the archaeological sites have been recommended eligible and the remaining are unevaluated for National Register eligibility (Tables 3.11-2 and 3.11-3).

Two TCPs are reported within the 150-foot wide and 500-foot wide Route Segment NNR-3 corridors.

3.11.4.13 Route Segment NNR-4

Along Route Segment NNR-4 there are 84 acres within the 150-foot wide corridor, of which 61acres (73 percent) have been surveyed. There are 288 acres within the 500-foot wide corridor, of which 205 acres (71 percent) have been surveyed (Table 3.11-1).

A total of ten archaeological resources have been recorded within the 150-foot wide corridor along Route Segment NNR-4. These include two prehistoric lithic scatters and eight prehistoric isolated finds. A total of 14 archaeological resources are located within the 500-foot wide corridor. These include four prehistoric lithic scatters and ten prehistoric isolated finds. All of these are currently unevaluated for their National Register eligibility.

One TCP has been identified within the 150-foot wide and 500-foot wide Route Segment NNR-4 corridors.

3.11.4.14 Route Segment NNR-5

There are a total of 33 acres within the 150-foot wide corridor and 112 acres within the 500-foot wide corridor of Route Segment NNR-5. In both the 150-foot wide and 500-foot wide 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; however, one TCP has been reported within both the 150-foot wide and 500-foot wide Route Segment NNR-5 corridors (Tables 3.11-2 and 3.11-3).

3.11.4.15 Route Segment NNR-6

A total of 118 acres are within the 150-foot wide corridor and 395 acres are within the 500-foot wide corridor of Route Segment NNR-6. According to DAHP records, in both the 150-foot wide and 500-foot wide 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 route segment was recently re-surveyed by the YNCRP (Camuso and Lally 2014; Camuso and Lally 2015).

Within the 150-foot wide corridor of NNR-6 a total of 15 archaeological resources have been reported and one TCP. The archaeological resources include six prehistoric lithic scatters, four historic debris scatters, and five isolated finds. Within the 500-foot wide corridor of Route Segment NNR-6a total of 16 archaeological resources have been reported, which include those mentioned above and one additional isolated find. All of these are currently unevaluated for their National Register eligibility.

One TCP has been reported with both the 150-foot wide and 500-foot wide Route Segment NNR-6 corridors and is also unevaluated for its National Register eligibility.

3.11.4.16 Route Segment NNR-7

Along Route Segment NNR-7, there are a total of 150 acres within the 150-foot wide corridor and 503 acres within the 500-foot wide corridor. A total of 150 acres (100 percent) have been previously surveyed for cultural resources within the 150-foot wide corridor and 503 acres (100 percent) within the 500-foot wide corridor has been surveyed for cultural resources (Table 3.11-1). Some of the land within this route segment was recently re-surveyed by the YNCRP (Camuso and Lally 2014; Camuso and Lally 2015).

A total of 22 archaeological resources have been recorded within 150-foot wide corridor of Route Segment NNR-7. This includes 12 prehistoric lithic scatters, one prehistoric lithic quarry and scatter, four multi-component sites (sites include lithic debitage and historic artifacts including sanitary and hole in top cans), and five prehistoric isolated finds. Six of the sites have been recommended eligible for listing on the National Register and 16 are unevaluated.

The 500-foot wide corridor has a total of 25 archaeological resources, including 15 prehistoric lithic scatters, one prehistoric lithic quarry and scatter, four multi-component sites (sites include lithic debitage and historic artifacts including sanitary and hole in top cans), and five prehistoric isolated finds. Seven of the sites have been recommended eligible for listing on the National Register and 18 are unevaluated (Tables 3.11-2 and 3.11-3).

One TCP is located within the 150-foot wide and 500-foot wide Route Segment NNR-7 corridors.

3.11.4.17 Route Segment NNR-8

There are a total of 50 acres within the 150-foot wide corridor and 170 total acres within the 500-foot wide corridor. Only 16 acres (32 percent) within the 150-foot wide corridor and 42 acres (25 percent) within the 500-foot wide corridor have been previously surveyed for cultural resources (Table 3.11-1).

Sixteen archaeological resources have been documented within the 150-foot wide corridor of Route Segment NNR-8. These include two historic sites (segments of the C, M, SP, & P 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 Route Segment NNR-8, the National Register eligible Vantage Substation.

The 500-foot wide corridor has 34 cultural resources, including the 16 resources mentioned above for the 150-foot wide corridor. The route segment include two historic sites (segments of the C, M, SP, & P 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 wide and 500-foot wide Route Segment NNR-8 corridors.

3.11.4.18 Route Segment MR-1

A total of 216 acres are within the 150-foot wide corridor and 723 acres are within the 500-foot wide corridor of Route Segment Manastash Ridge (MR) 1. In all, 120 acres (56 percent) within the 150-foot wide corridor and 403 acres (56 percent) within the 500-foot wide corridor have been previously surveyed for cultural resources (Table 3.11-1).

Two historic sites (a debris scatter and a group of stacked rock features) are located within the 150-foot wide corridor of Route Segment MR-1. Three historic archaeological resources (the debris scatter, the stacked rock features, and a rock alignment) are located within the 500-foot wide corridor. None of the sites have been evaluated for National Register eligibility (Tables 3.11-2 and 3.11-3). One TCP has been reported within the 150-foot wide or 500-foot wide Route Segment MR-1 corridors.

3.11.5 Native American Concerns

3.11.5.1 Traditional Cultural Properties

The YNCRP, under contract with Pacific Power, conducted TCP studies for the Project study area (Lally and Camuso 2011; Lally and Camuso 2013) and another study specifically for the NNR Alternative and Alternative D (Camuso and Lally 2014). The current findings indicate the NNR Alternative 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.

The TCP study completed along the NNR Alternative by the Confederated Tribes of the Colville Reservation concluded that the NNR Alternative did not cross any known TCPs for the Moses Columbia people, a constituent tribes of the Colville Confederated Tribes (Oosahwee-Voss 2014).

YNCRP recently conducted intensive cultural resource surveys of route segments 1b, 3a, 3c, NNR-3, NNR- 4, NNR-6, NNR-7, and NNR-8 (Camuso and Lally 2015). Three archaeological sites identified during this study are associated with the Crab Creek TCP and are recommended eligible for listing on the NRHP because of their association with the gathering of plant species used in important ceremonial practices.

Based on this analysis, concern was expressed primarily about Route Segment 3b, which would pass near Wanapum Village at Priest Rapids Dam and other resources of concern to the Yakama and Wanapum. The study also identifies concerns with a portion of Route Segment 3c crossing the Saddle Mountains and Lower Crab Creek.

3.11.5.2 Native American Rights and Interests

Native American people have occupied the region for thousands of years utilizing lands in the Project 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. Federal agencies have 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 Project, 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 Project 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) have been prepared for the Project. The CCT prepared a confidential report for the NNR Alternative and concluded that the NNR Alternative (including Route Segments 1a/NNR-1 and NNR-2 through NNR-8, including the MR Subroute) did not cross any known TCPs for the Moses Columbia people, a constituent tribes of the Colville Confederated Tribes. The current findings indicate the NNR Alternative crosses three TCPs and a culturally sensitive area and is located near a fourth TCP of the Yakama Nation. The TCPs include ceremonial sites, traditional use sites, legendary sites, and other culturally sensitive properties.

Table 3.11-1 Cultural Resource Survey Coverage by Route Segment

ROUTE SEGMENT	LENGTH (MILES)	150-FOOT WIDE CORRIDOR				500-FOOT WIDE CORRIDOR			
		Total Acres	Acres Under Water	Surveyed Acres	Percentage of Land Surveyed	Total Acres	Acres Under Water	Surveyed Acres	Percentage of Land Surveyed
1a/NNR-1	2.4	44	0	0	0	148	0	0	0
1b	12.5	229	0	126	55	764	0	126	16
1c	23.9	236	0	0	0	780	0	0	0
2a	1.0	18	0	0	0	63	0	0	0
2b	16.4	298	0	1	0.3	995	0	5	0.5
2c	18.1	330	0	0	0	1,102	0	0	0
2d	7.0	128	0	5	3	431	0	14	3
3a	0.1	3	0	3	100.0	10	0	10	100.0
3b	21.7	396	15	47	12	1,322	177	157	13
3c	25.4	459	9	311	67	1,532	52	377	24
NNR-2	5.02	92	0	92	100	317	0	317	100
NNR-3	9.28	169	0	74	43	567	0	144	25
NNR-4	4.54	84	0	61	73	288	0	205	71
NNR-5	1.78	33	0	33	100	112	0	112	100
NNR-6	6.44	118	0	118	100	395	0	395	100
NNR-7	8.23	150	0	150	100	503	0	503	100
NNR-8	2.74	50	0	16	32	170	0	42	25
MR-1	11.85	216	0	120	56	723	0	403	56

Table 3.11-2 Cultural Resources within 150-foot Wide Corridors by Route Segment**

ROUTE SEGMENT	TOTAL CULTURAL RESOURCES	RESOURCE TYPE					NATIONAL REGISTER STATUS*				
		Districts	TCPs	Archaeological Sites	Isolated Finds	Architectural Resource	Listed	Recommended For Listing	Determined Eligible	Not Eligible	Unevaluated
1a/NNR-1	1	0	0	1	0	0	0	0	0	0	1
1b	18	0	0	12	6	0	0	1	0	0	17
1c	0	0	0	0	0	0	0	0	0	0	0
2a	0	0	0	0	0	0	0	0	0	0	0
2b	0	0	0	0	0	0	0	0	0	0	0
2c	0	0	0	0	0	0	0	0	0	0	0
2d	2	0	1	1	0	0	0	0	0	0	2
3a	3	0	0	2	0	1	0	0	1	1	1
3b	45	1	1	40	3	0	0	0	2	5	38
3c	17	0	0	10	6	1	0	1	1	3	12
NNR-2	1	0	1	0	0	0	0	0	0	0	1
NNR-3	13	0	2	4	7	0	0	0	0	0	13
NNR-4	11	0	1	2	8	0	0	0	0	0	11
NNR-5	1	0	1	0	0	0	0	0	0	0	1
NNR-6	16	0	1	10	5	0	0	0	0	0	16
NNR-7	23	0	1	17	5	0	0	6	0	0	17
NNR-8	19	0	2	13	3	1	0	0	1	1	17
MR-1	3	0	1	2	0	0	0	0	0	0	3

*National Register status determined by Washington DAHP.
**Excludes cultural resources with only DAHP buffers extending into the corridors.

Table 3.11-3 Cultural Resources within 500-foot Wide Corridor by Route Segment**

ROUTE SEGMENT	TOTAL CULTURAL RESOURCES	RESOURCE TYPE					NATIONAL REGISTER STATUS*				
		Districts	TCPs	Archaeological Sites	Isolated Finds	Architectural Resource	Listed	Recommended For Listing	Determined Eligible	Not Eligible	Unevaluated
1a/NNR-1	1	0	0	1	0	0	0	0	0	0	1
1b	20	0	0	14	6	0	0	1	0	0	19
1c	0	0	0	0	0	0	0	0	0	0	0
2a	0	0	0	0	0	0	0	0	0	0	0
2b	0	0	0	0	0	0	0	0	0	0	0
2c	1	0	0	1	0	0	0	0	0	0	1
2d	2	0	1	1	0	0	0	0	0	0	1
3a	5	0	0	2	0	3	0	0	3	1	1
3b	82	1	1	69	10	1	0	0	3	10	69
3c	37	0	0	21	15	1	0	2	1	12	22
NNR-2	1	0	1	0	0	0	0	0	0	0	1
NNR-3	25	0	2	8	15	0	0	3	0	0	22
NNR-4	15	0	1	4	10	0	0	0	0	0	15
NNR-5	1	0	1	0	0	0	0	0	0	0	1
NNR-6	17	0	1	10	6	0	0	0	0	0	17
NNR-7	26	0	1	20	5	0	0	7	0	0	19
NNR-8	34	0	2	23	8	1	0	0	1	1	32
MR-1	4	0	1	3	0	0	0	0	0	0	4

*National Register status determined by Washington DAHP.
**Excludes cultural resources with only DAHP buffers extending into the corridors.

3.12 WILDLAND FIRE ECOLOGY AND MANAGEMENT

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to wildland fire ecology and management along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

This section describes the wildland fire ecology and management issues for the Project area. For the purposes of this analysis, the Project study area was defined as a two-mile wide corridor; one mile on either side of the route segment centerlines for each of the Action Alternatives. 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.

3.12.1 Data Sources

The wildland fire assessment was conducted using planning documents, digital data sources and previously conducted studies. Sources reviewed included:

- Digital 2015 Fire History 1987-2015 from the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC).
- Digital Vegetation Data from the JBLM YTC.
- Digital Fire Data from the U.S. Bureau of Land Management (BLM) and GeoMAC Spatial Mapping (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 (Appendix B-2).
- Noxious Weed Survey Report (Appendix B-4).
- 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.
- Washington Gap Analysis Program (GAP) was obtained from the U.S. Geological Survey Gap Analysis Program.

3.12.2 Current Conditions and Trends, Regional Overview

3.12.2.1 Fire History

Fire is a natural disturbance in big sagebrush (*Artemisia tridentata*) 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 (*A. tridentata* ssp. *wyomingensis*) communities, mean fire return intervals have been estimated to span 50 to 240 years (Whisenant 1990; Baker 2006). Cheatgrass is common in the Project study 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 (*Ericameria* spp. and *Chrysothamnus* spp.) 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 study area is shown in Appendix A - Vegetation and Fire History.

Wildfires have occurred within and near the Project study area, the majority of which were concentrated within the JBLM YTC boundary. The Project wildland fire analysis used fire data from 1987-2016. Fires have been largely ignited by lightning or military training, but there are several instances of other human-caused fires (e.g., fireworks). 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 initial attack and suppression 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 and has installed approximately 25 dip ponds in strategic locations to provide a water supply for fire suppression activities (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 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 study area is within Fire Regime Group III (68 percent), typically mixed-low severity fires that occur approximately every 35 to 200 years and Fire Regime Group IV (26 percent), typically high-severity replacement fires that occur approximately every 35 to 200 years. The remaining vegetated areas fall within Fire Regime Groups I, II, and V (one percent combined). Five percent of the Project study area is within the category water or barren 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.

FIRE REGIME CONDITION CLASS	DESCRIPTION
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

Fifty-two percent of the Project study area is within FRCC 2 (moderate departure from reference conditions), 17 percent is within FRCC 3 (high departure), and eight percent is within FRCC 1 (low departure). The remaining 23 percent of the Project study area is within the category agriculture, barren, urban, or water and were not assigned a FRCC.

Based on FRCC classifications, it appears that the Project study area has experienced moderate to high alteration from historic conditions. In summary, the entire Project study area historically experienced fire return intervals of 35 to 200 years with a mixture of low to high severity fires (Fire Regime Groups III and IV), but, according to FRCC classifications, only eight percent of the Project study area has current fire regime conditions within the historic range of variability (FRCC 1); 69 percent of the Project study 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 study 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 study area, primarily associated with Route Segments 1a/NNR-1, 1b, 1c, 2a, 2b, 2c, 3c, NNR-2, NNR-3, NNR-4 and Manastash Ridge (MR) 1.

Operation and maintenance activities on the existing transmission lines within the Project study 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 proposed 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). PacifiCorp's Union Gap-Midway 230 kV Transmission Line is located near Route Segments 2a, 2b, 2c, and 2d. During 1995 to 2011, the Union Gap-Midway 230 kV Transmission Line had two instances of lightning striking transmission line structures. In July 2008, lightning struck the top of a pole and damaged it and in July

2010, lightning struck a side stack insulator. In both situations, the damage caused line outages but no fires were started. In August 2009, the Dry Creek Complex fire resulted in a transmission line outage on the Union Gap-Midway 230 kV Transmission Line from smoke and fire damage to two transmission line structures (DeNuccio 2011).

Recreational use of existing access roads and transmission line rights-of-way has the potential to increase the risk of wildland fire ignitions. Recreational use in the Project study 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 flammable fuels (e.g., catalytic converters, mufflers, etc., coming in contact with grasses) and smoking (BLM 1992).

Wildland fire risk in the Project study 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 geographic information system 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 study area include 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.
- Grant, Kittitas, and Yakima counties Comprehensive Emergency Management Plans (CEMPs) provide a framework for mitigation efforts in response to large scale incidents or a combination of incidents in these counties. The CEMPs describe functions and activities necessary to implement the four phases of emergency management: mitigation, preparedness, response, and recovery (Grant County 2012; Kittitas County 2012; Yakima County 2014).
- 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 Route Segment Specific Considerations

This section summarizes recent fire history (1987 through 2015), Fire Regime Groups (reference conditions), FRCC (departure from reference conditions), and vegetation class (GAP, JBLM YTC, and POWER vegetation data) within the Project study area.

3.12.4.1 Route Segment 1a/NNR-1

No recent fires have occurred along Route Segment 1a/NNR-1. The most common vegetation types along Route Segment 1a/NNR-1 include annual grassland (68 percent), agriculture (11 percent), open water/canal (nine percent), sagebrush/perennial grassland (seven percent), and perennial grassland (three percent). The majority of Route Segment 1a/NNR-1 is classified as FRCC 2 (66 percent) and is within Fire Regime Group III (79 percent).

3.12.4.2 Route Segment 1b

Route Segment 1b parallels an existing JBLM YTC fire break road. Several small fires have occurred along this route segment, primarily on the JBLM YTC. Vegetation along the fire break road is disturbed and dominated by non-native species including cheatgrass. The most common vegetation types for Route Segment 1b are annual grassland (46 percent), sagebrush/perennial grassland (26 percent), perennial grassland (21 percent), forb (three percent), and agriculture (three percent). Bonneville Power Administration's (BPA) Ellensburg-Moxee No.1 115 kV line crosses this route segment. The majority of Route Segment 1b is classified as FRCC 2 (68 percent) and is within Fire Regime Group III (72 percent).

3.12.4.3 Route Segment 1c

Route Segment 1c parallels Route Segment 1b for the majority of the route segment. Fire history and vegetation is similar to Route Segment 1b. The most common vegetation types in Route Segment 1c are annual grassland (48 percent), sagebrush/perennial grassland (23 percent), perennial grassland (18 percent), and agriculture (six percent). BPA's Ellensburg-Moxee No.1 115 kV line crosses this route segment. The majority of Route Segment 1c is classified as FRCC 2 (65 percent) and is within Fire Regime Group III (73 percent).

3.12.4.4 Route Segment 2a

Fire history records indicate that no recent fires have occurred along Route Segment 2a. The most common vegetation types in Route Segment 2a are annual grassland (64 percent) and sagebrush/perennial grassland (23 percent), with lesser amounts of perennial grassland (six percent) and agriculture (four percent). The majority of Route Segment 2a is classified as FRCC 2 (87 percent) and is entirely within Fire Regime Group III (100 percent).

3.12.4.5 Route Segment 2b

Several fires have occurred along Route Segment 2b, including the Dry Creek Complex that burned over 48,000 acres in 2009 and a 2,633-acre fire that burned within JBLM YTC in 2013. The Range 12 Fire of 2016 burned approximately 175,000 acres in areas located in Yakima and Benton counties, Washington. This fire burned approximately 13.2 miles along Route Segment 2b. The most common vegetation types for Route Segment 2b are sagebrush/perennial grassland (60 percent), annual grassland (20 percent), and agriculture (15 percent), with lesser amounts of perennial grassland (five percent). This route segment parallels a portion of JBLM YTC’s fire break. The majority of Route Segment 2b is classified as FRCC 2 (91 percent) and is within Fire Regime Group III (96 percent).

3.12.4.6 Route Segment 2c

Three fires have occurred within the Project study area along Route Segment 2c. The 2009 Dry Creek Complex fire occurred near and within the eastern end of this route segment and a smaller fire (2,633 acres) occurred within the JBLM YTC boundary in 2013. The Range 12 Fire of 2016 burned approximately 15.2 miles along Route Segment 2c. The most common vegetation types in Route Segment 2c are agriculture (42 percent), annual grassland (28 percent), and sagebrush/perennial grassland (27 percent). The majority of Route Segment 2c is classified as FRCC 2 (76 percent) and is within Fire Regime Group III (95 percent).

3.12.4.7 Route Segment 2d

The entire segment of Route Segment 2d occurs within the fire perimeter of the 2009 Dry Creek Complex fire. Additionally, the Range 12 Fire of 2016 burned approximately 4.5 miles along Route Segment 2d. Route Segment 2d is nearly entirely dominated by sagebrush/perennial grassland (90 percent), with lesser amounts of perennial grassland (five percent) and annual grassland (two percent). The majority of Route Segment 2d is classified as FRCC 2 (71 percent) and is within Fire Regime Group III (75 percent).

3.12.4.8 Route Segment 3a

Route Segment 3a is a short segment with no history of recent fires. Route Segment 3a is nearly entirely dominated by sagebrush/perennial grassland (97 percent). The majority of Route Segment 3a is classified as FRCC 3 (45 percent) or FRCC 2 (37 percent) and is within Fire Regime Group III (60 percent).

3.12.4.9 Route Segment 3b

Portions of this route segment burned in the late 1990s, 2004, and the 2009 Dry Creek Complex fire. In addition, the western edge of this route segment within the JBLM YTC has experienced an active fire history. A 23,261-acre fire started within the JBLM YTC boundary in 2014 and burned the northern portion of Route Segment 3b. The most common vegetation types for Route Segment 3b are sagebrush/perennial grassland (55 percent), open water/canal (25 percent), and perennial grassland (13 percent), and agriculture (three percent). A small section of this route segment also crosses basalt cliffs (0.1 percent). The majority of Route Segment 3b is classified as FRCC 2 (28 percent) or FRCC 3 (23 percent) and is within Fire Regime Group III (40 percent) or Fire Regime Group IV (32 percent).

3.12.4.10 Route Segment 3c

The Incident #243 fire perimeter is just within the Project study area for Route Segment 3c. The Incident #243 fire burned over 1,300 acres in 2008. The most common vegetation types for Route Segment 3c are sagebrush/perennial grassland (42 percent), agriculture (33 percent), and annual grassland (19 percent). BPA's Shultz-Wautoma 500 kV line and the Midway-Vantage 230 kV line cross this route segment. Three additional BPA lines are within the Project study area, but do not intersect this route segment. The majority of Route Segment 3c is classified as FRCC 2 (30 percent) or FRCC 3 (27 percent) and is within Fire Regime Group III (74 percent).

3.12.4.11 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 Route Segment NNR-2 is classified as FRCC 2 (50 percent) and FRCC 3 (14 percent) and is within Fire Regime Group III (84 percent).

3.12.4.12 Route Segment NNR-3

Vegetation along Route Segment NNR-3 consists primarily of intact sagebrush/perennial grassland (50 percent) and annual grassland (44 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. The majority of Route Segment NNR-3 is classified as FRCC 2 (56 percent) and FRCC 3 (22 percent) and is within Fire Regime Groups III (61 percent) and IV (36 percent).

3.12.4.13 Route Segment NNR-4

Route Segment NNR-4 is comprised primarily of sagebrush/perennial grassland (69 percent), with lesser amounts of annual grassland (17 percent), agriculture (seven percent), and perennial grassland (four percent). Fire history records indicate that two fires have occurred within the Project study 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 majority of Route Segment NNR-4 is classified as FRCC 2 (45 percent) and FRCC 3 (28 percent) and is within Fire Regime Groups III (52 percent) and IV (48 percent).

3.12.4.14 Route Segment NNR-5

Vegetation along this short route segment consists primarily of intact sagebrush/perennial grassland (67 percent), with lesser amounts of agriculture (20 percent) and forb (11 percent). 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 Route Segment NNR-5 Project study area is classified as FRCC 2 (40 percent) and FRCC 3 (20 percent), and is within Fire Regime Groups III (55 percent) and IV (45 percent).

3.12.4.15 Route Segment NNR-6

Vegetation along this route segment consists primarily of intact sagebrush/perennial grassland (78 percent), with lesser amounts of forb (12 percent), perennial grassland (five percent), and agriculture (five percent). Annual grassland contributes less than one percent. Three fires have occurred within JBLM YTC along Route Segment NNR-6. In 2014, a 23,261-acre fire burned within the JBLM YTC boundary, along and north of Route Segment NNR-6. In addition, 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 majority of Route Segment NNR-6 is classified as FRCC 1 (32 percent) and FRCC 2 (38 percent) and is within Fire Regime Groups III (42 percent) and IV (58 percent).

3.12.4.16 Route Segment NNR-7

The majority of the route segment consists primarily of intact sagebrush/perennial grassland (95 percent); perennial grassland contributes less than one percent. In 2014, a 23,261-acre fire burned the majority of Route Segment NNR-7. In addition, fire history data indicate that three small fires occurred within JBLM YTC north of Route Segment NNR-7 in 2010. The majority of Route Segment NNR-7 is classified as FRCC 2 (70 percent) and is within Fire Regime Group III (68 percent).

3.12.4.17 Route Segment NNR-8

This short route segment is comprised primarily of intact sagebrush/perennial grassland (84 percent), open water/canal (12 percent), and annual grassland (three percent). Fire history records indicate that the 23,261-acre fire that occurred in 2014 within JBLM YTC also burned a portion of Route Segment NNR-8. The majority of Route Segment NNR-8 is classified as FRCC 2 (26 percent) and FRCC 3 (36 percent) and is within Fire Regime Groups III (45 percent) and IV (42 percent).

3.12.4.18 Route Segment MR-1

This route segment is comprised primarily of a mixture of sagebrush/perennial grassland (38 percent), annual grassland (33 percent), agriculture (23 percent), and developed/disturbed/firebreak (four percent). Fire data indicate that three fires have occurred near Route Segment Manastash Ridge (MR) 1. One fire occurred within one mile of Route Segment MR-1 in 2010 on private land. The majority of Route Segment MR-1 is classified as FRCC 2 (43 percent) and FRCC 3 (18 percent) and is within Fire Regime Groups III (53 percent) and IV (46 percent).

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3.13 CLIMATE AND AIR QUALITY

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to climate and air quality along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

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, and Benton Clean Air Agency (BCAA) website.

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 average temperature in July was 74.3˚F with a range of 53.3˚F to 91.4˚F (low to high monthly averages) and the average in January was 31.5˚F with a range of 21.0˚F to 40.5˚F. Winter snowfall at Priest Rapids Dam and Yakima are 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

3.13.3.1 Federal

U.S. 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.

Bureau of Land Management Instruction Memorandum 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.

Bureau of Land Management Oregon IM-2010-012

This IM provides the Bureau of Land Management (BLM) Oregon/Washington State Office guidance on analyzing greenhouse gas emissions and addressing changing climate conditions in NEPA documents.

3.13.3.2 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 two local clean air agencies and two regional offices of the WDOE:

- YRCAA
- BCAA
- WDOE Eastern Regional office
- 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)

Each standard requires the pollutants be measured in one of three ways: parts per million (ppm) or parts per billion (ppb) by volume; milligrams per cubic meter (mg/m^3) of air, or micrograms per cubic meter (μg/m^3) of air.

Primary and secondary NAAQS have been set by the USEPA as required by the CAA. The CAA allows states to adopt ambient air quality standards and other regulations as long as they are at least as stringent as federal NAAQS standards. Washington State has established Washington Ambient Air Quality Standards (WAAQS) that apply throughout the state. The YRCAA and BCAA apply WAAQS standards.

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 2011a). 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 (U.S. Department of the 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 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/m³	15.0 μg/m³	12.0 μg/m³	3
	24-hour	35 μg/m³	35 μg/m³	35 μg/m³	4
Free particles <10 microns (PM_{10})	Annual (Arithmetic Mean)	-	-	50 μg/m³	5
	24-hour	150 μg/m³	150 μg/m³	150 μg/m³	6
Carbon monoxide (CO)	8-hour	9 ppm (10 mg/m³)	-	9 ppm (10 mg/m³)	7
	1-hour	35 ppm(40 mg/m³)	-	35 ppm (40 mg/m³)	7
Nitrogen dioxide (NO_2)	Annual (Arithmetic Mean)	0.053 ppm	0.053 ppm	0.05 ppb (100 mg/m³)	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/m³)	0.5 ppm	7
	1-hour	75 ppb	-	75 ppb	12
Lead (Pb)	Rolling 3-month average	0.15 μg/m³	0.15 μg/m³	0.15 μg/m³	11
	Quarterly average	1.5 μg/m³	1.5 μg/m³	-	-
Total suspended particulates (TSP)	Annual (Geometric Mean)	-	-	60 μg/m³	11
	24-hour	-	-	150 μg/m³	7

Source: USEPA 2011; WDOE 2013

1 The 3-year 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 2011a).

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 readings from Yakima City monitored ambient air quality at the 402 S 4th Ave. station for $PM_{2.5}$ and PM_{10} from 2011 to 2014. No exceedances were recorded for the 24-hour or annual averaging period between 2011 and 2014. 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	
		NUMBER OF OBSERVATIONS	1ST THROUGH 4TH MAX. RANGE (HIGH-LOW) (µG/M3)	98TH PERCENTILE	NUMBER OF EXCEED	MEAN	NUMBER OF EXCEED
$PM_{2.5}$	2011	65	43.4-35.3	36	0	13.2	0
	2012	341	65-38.3	31	0	10.4	0
	2013	344	51.5-39.5	38	0	9.6	0
	2014	332	44.6-36.5	27	0	8.6	0
PM_{10}	2011	58	59-43	N/A	0	43	0
	2012	58	58-54	N/A	0	54	0
	2013	54	59-55	N/A	0	55	0
	2014	59	53-41	N/A	0	41	0

Source: USEPA 2015

3.13.4 Route Segment Specific Considerations

3.13.4.1 Route Segment 1a/NNR-1

This segment is located within the YRCAA administrative area.

3.13.4.2 Route Segment 1b

This segment is located within the YRCAA administrative area.

3.13.4.3 Route Segment 1c

This segment is located within the YRCAA administrative area.

3.13.4.4 Route Segment 2a

This segment is located in the YRCAA and BCAA administrative areas.

3.13.4.5 Route Segment 2b
This segment is located in the YRCAA and BCAA administrative areas.

3.13.4.6 Route Segment 2c
This segment is located in the YRCAA and BCAA administrative areas.

3.13.4.7 Route Segment 2d
This segment is located in the YRCAA and BCAA administrative areas.

3.13.4.8 Route Segment 3a
This segment is located in the YRCAA, BCAA, and WDOE Central and Eastern Regional Office administrative areas.

3.13.4.9 Route Segment 3b
This segment is located in the YRCAA, BCAA, and WDOE Central and Eastern Regional Office administrative areas.

3.13.4.10 Route Segment 3c
This segment is located in the YRCAA, BCAA, and WDOE Central and Eastern Regional Office administrative areas.

3.13.4.11 Route Segment NNR-2
This segment is located within the YRCAA administrative area.

3.13.4.12 Route Segment NNR-3
This segment is located within the YRCAA and the WDOE Central Regional Office administrative areas.

3.13.4.13 Route Segment NNR-4
This segment is located within the WDOE Central Regional Office administration area.

3.13.4.14 Route Segment NNR-5
This segment is located within the WDOE Central Regional Office administration area.

3.13.4.15 Route Segment NNR-6
This segment is located within the WDOE Central Regional Office administration area.

3.13.4.16 Route Segment NNR-7
This segment is located within the WDOE Central Regional Office administration area.

3.13.4.17 Route Segment NNR-8
This segment is located within the WDOE Central and Eastern Regional Office administration areas.

3.13.4.18 Route Segment MR-1
The Manastash Ridge (MR) 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 (Energy Information Administration [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 into 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 increased 36 percent to 379 ppm in 2005, all of which is attributed to human activities (IPCC 2007).

Of the remaining three greenhouse gases, CH_4 is emitted during the production and transport of fossil fuels, through intensive animal farming, and by the decay of organic waste in landfills. CH_4 concentrations have increased 148 percent above pre-industrial levels. N_2O is emitted during agricultural and industrial activities and during the combustion of fossil fuels and solid waste. N_2O atmospheric levels have increased 18 percent since the beginning of industrial activities. Fluorinated gases, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride 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 are 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. However, an estimate of greenhouse gas emissions, a discussion of practicable mitigation to reduce the emissions, and a climate impact assessment are provided in Chapter 4-13 of this FEIS.

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 Federal Register [FR] 3919) and 13514 (74 FR 52117) 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).

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3.14 WATER RESOURCES

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to water resources along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

3.14.1 Data Sources

The analysis of water resources in the Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line (Project) area was conducted using planning documents, field studies, and digital data sources. For the purposes of this document, the water resources Project study area is a two-mile wide corridor within which potential impacts resulting from the Project were analyzed. Sources included:

- Surface water data from the United States (U.S.) Geological Survey (USGS) National Hydrography Dataset.
- Floodplain data for Yakima and Grant Counties from the Federal Emergency Management Agency's Digital Flood Insurance Rate Map 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 (WDOE).
- Aerial imagery used in analyzing water resources consists of the *National Agriculture Imagery Program* (*NAIP*) imagery, 2009.
- Digital Adopted Shoreline data were obtained from the WDOE.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) Cultural and Natural Resource Management Plan, January 2002.
- FEIS for Fort Lewis Army Growth and Force Structure Realignment, July 2010.
- Sage Grouse Habitat Assessment Report for the Project, August 2011.
- Special Status Plant Species Survey Report (POWER 2013).

3.14.2 Current Conditions and Trends, Regional Overview

3.14.2.1 Surface Water

Precipitation

The Project study area is located in south-central Washington generally between the Columbia River and Yakima River 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 2013).

Watersheds

A watershed is an area draining into a river, lake, or other waterbody. The WDOE and other state natural resource agencies have divided the state into 62 Water Resource Inventory Areas (WRIAs) to delineate the state's major watersheds. The Project study area 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 WRIA boundaries are shown in Appendix A - Water Resources and Wetlands map.

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.

The WDOE has designated two water features in the Project study area as impaired. The segment of the Columbia River at Priest Rapids Reservoir has been listed as water quality impaired due to temperature and pesticides from unknown sources. Lower Crab Creek has been listed as water quality impaired due to pH, temperature, and pesticides from unknown sources.

Shorelines

Washington's Shoreline Management Act (SMA) governs the use and development of Washington shorelines and creates a partnership between local and state government. The SMA strives to achieve responsible shoreline use and development, environmental protection, and public access. Local governments develop programs based on the SMA and state guidance, and the state ensures local programs consider statewide public interests.

Within the Project study 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 Master Plan for the shorelines along the reservoirs created by the two dams. The FERC prepared an Environmental Assessment for Grant County PUD's Shoreline Master Program (SMP) and Grant County adopted an updated SMP in September 2014 (WDOE 2015). The updated SMP requires that any development that takes place within 200 feet of the ordinary high water mark (OHWM) of a jurisdictional body of water result in a no net-loss of ecological function within the shoreline environment. If any of the support structures will be located within 200 feet of the OHWM of this portion of Priest Rapids Reservoir or if there will be any ground disturbing activities within this same area, additional mitigation measures will be required by Grant County PUD to ensure that no net-loss of ecological function of the shoreline is achieved.

Kittitas County has an approved SMP intended to promote the public health, safety and general welfare of the community by providing long range, comprehensive policies and effective, reasonable regulations for development and use of shorelines within Kittitas County; manage shorelines in a positive, effective, and equitable manner; assume and carry out the county's responsibilities established by the SMA; and to implement Revised Code of Washington (RCW) 90.58.020 for shorelines of the state (Kittitas County 2014). Water bodies in Kittitas County that correspond to the Project study area that are considered shorelines of statewide importance and regulated under the Kittitas County SMP include the Columbia River (Route Segment 3b below the Wanapum Dam) and Route Segment NNR-8 below the Wanapum

Dam (Wanapum Dam Reservoir). In Kittitas County, shoreline jurisdiction includes: all shorelines of the state; upland areas (shorelands) within 200 feet of the ordinary high water mark of those waters; associated wetlands and river deltas; and floodways and contiguous floodplain areas landward 200 feet from such floodways. All proposed uses and development occurring within shoreline jurisdiction must conform to the intent and requirements of RCW Chapter 90.58, the SMA, and the Kittitas County SMP whether or not a permit or other form of authorization is required. No substantial development shall be undertaken on shorelines of the state without first obtaining a permit. If any of the support structures will be located within 200 feet of the OHWM of the Columbia River or Manapum Dam Reservoir or if there will be any ground disturbing activities within this same area, the appropriate permit (substantial development, variance, or conditional use) will be acquired through Kittitas County.

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 study 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.

Hundred-year floodplains located within the Project study area (two-mile wide corridor) are associated with the Yakima River, Lower Crab Creek, Dry Creek, and Selah Creek. No 500-year floodplains are located within the Project study area. The 100-year floodplain associated with the Columbia River is located within the Project study area. Appendix A - Water Resources and Wetlands map shows floodplains in the Project study area.

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 study area, wetlands are scarce. The three wetland types found within the Project study area are palustrine, lacustrine, and Riverine System.

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 U.S. 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 study area, palustrine wetlands are associated with agricultural ponds, persistent and ephemeral wetlands, Lower Crab Creek, 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 study area are associated with Priest Rapids Reservoir and the Yakima and Columbia Rivers. Lacustrine wetlands are also associated with Lower Crab Creek.

The Riverine System includes all wetlands and deepwater habitats contained in natural or artificial channels which, periodically or continuously, contains flowing water or which forms a connecting link between the two bodies of standing water. Upland islands or Palustrine wetlands may occur in the channel, but they are not part of the Riverine System. Within the Project study area, a Riverine System is associated with Lower Crab Creek.

Perennial Streams/Creeks

The primary surface water features found within the Project study area include the Columbia River in the eastern portion of the Project study area and the Yakima River in the western portion. In addition to the Columbia River, Lower Crab Creek, Lmuma, Burbank, Johnson, Foster, and Selah Creeks are present within the Project study area and contain perennial flow for much of their length. Lmuma and Selah Creeks are crossed by the NNR Alternative and flow to the Yakima River, while Johnson and Foster Creeks, located outside of the right-of-way (ROW) of the proposed Project, flows to the Columbia River. Lower Crab Creek discharges into the Columbia River. For perennial streams within the Project study area, water often flows below the surface through coarse gravel prior to discharging into the Yakima and Columbia Rivers (JBLM YTC 2002).

Intermittent Drainage Courses

With the exception of the perennial streams and rivers mentioned above, water in the Project study area is scarce. Streams are generally unnamed, small, and intermittent or ephemeral, flowing for a short period of time in spring or in response to a large storm event. Named intermittent drainages in the Project study area include Hanson, Alkali Canyon, Dry, Coyote Springs, Coral Canyon, Sourdough Canyon, Cold, Scorpion Coulee, and Badger Creeks.

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 study area, primarily associated with Johnson and Foster Creeks (JBLM YTC 2002).

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 Hydroelectric Project provides power to Grant County and millions of homes and businesses in the Northwest.

On October 21, 1954, the Federal Power Commission (now 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.

Flowage Easements

Any easement is a right or privilege by one to use the land of another for a specific purpose. A flowage easement 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.

Irrigation Canals

There are several canals, wasteways, and other irrigation facilities in the Project study 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. The Wahluke Branch Canal, Saddle Mountain Wasteway, and the Mattawa Canal are all managed and operated by South Columbia Basin Irrigation District.

3.14.2.2 Groundwater

Groundwater

Groundwater in the Project study area occurs within four principal aquifers: surficial sedimentary units (principally Ellensburg Formation), Saddle Mountains Basalt, Wanapum Basalt, and Grande Ronde Basalt. The location of the four principal aquifers is 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 (U.S. Department of the Army [Army] 2010).

Wells

Drinking water supplies in the Project study 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 study 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 study area include developed and undeveloped well/water points (JBLM YTC 2002).

Critical Aquifer Recharge Areas

Critical aquifer recharge areas are areas designated by Washington Administrative Code (WAC) 365-190-100 that are determined to have a critical recharging effect on aquifers (i.e., maintain the quality and quantity of water) used for potable water as defined by WAC 364-190-030(3) (Kittitas County 2014). According to WAC 365-190-100, critical aquifer recharge areas include: recharge areas for sole source aquifers designated pursuant of the Safe Drinking Water Act; areas established for special protection pursuant to a groundwater management program; areas designated for wellhead protection pursuant to the Safe Drinking Water Act; areas near marine waters where aquifers may be subject to saltwater intrusion; and other areas meeting the definition of “areas with a critical recharging effect on aquifers used for potable water” (Washington State Legislature 2015).

Counties and cities must classify recharge areas for aquifers according to the aquifer vulnerability. Vulnerability is the combined effect of hydrogeological susceptibility to contamination and the contamination loading potential. High vulnerability is indicated by land uses that contribute directly or indirectly to contamination that may degrade groundwater and by hydrogeologic conditions that facilitate degradation. Low vulnerability is indicated by land uses that do not contribute contaminants that will degrade groundwater and by hydrogeologic conditions that do not facilitate degradation. Hydrological conditions may include those induced by limited recharge of an aquifer (Washington State Legislature 2015).

Benton County defines critical recharge areas as those where surface waters have connectivity to an underlying aquifer. Maps of the critical recharge aquifer areas in Benton County are not currently available; however, aquifer protection areas identified with suspected surface/groundwater connectivity include: areas within the riverine corridor; floodplain and wetlands; areas of known surface hydrology per information gather by the Benton Franklin Health District; and areas along the unlined main canals of local irrigation districts (Benton County 2006).

Grant County classifies critical recharge areas as: areas designated as wellhead protection areas pursuant to WAC 246-290-135(4) and the groundwater contribution area in WAC 246-291-100 (2)(e) including the identified recharge areas associated with either Group A public water supply wells and those Group B wells with a wellhead protection plan filed with the Grant County Health District; and any land identified by the Soil Survey of Grant County as having high potential for aquifer recharge, as determined by the administrative official (Grant County 2015). These areas have not been mapped within Grant County.

Kittitas County does not currently have critical aquifer recharge areas identified within the county. However, aquifer susceptibility ratings have been assigned to areas throughout the county and the ratings include: high susceptibility – structural fill basin aquifer, more extensive alluvial deposits, higher shallow well density; medium susceptibility – few shallow wells, bedrock aquifer, greater than 15 inches per year precipitation; and low susceptibility – low well density, bedrock aquifer, greater than 15 inches per year precipitation (Kittitas County 2015). Lower elevations along the Yakima River associated with the communities of Cle Elum and Ellensburg are identified as aquifers with high susceptibility. Additionally, an area along the Columbia River is identified as high susceptibility (Kittitas County 2013).

Yakima County identifies critical aquifer recharge areas as those with a critical recharging effect on aquifers used for potable water or areas where a drinking aquifer is vulnerable to contamination that would affect the potability of water. Yakima County relies on other regulatory agencies (e.g., WDOE) and hasn’t established review processes for potential impacts to these areas (Yakima County 2015).

3.14.3 Current Management Considerations

At the federal level, the USACE regulates wetlands and other waters of the U.S. 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 SMA. Applicable regulations and regulatory framework are presented below.

3.14.3.1 Federal Jurisdiction

Clean Water Act

The CWA regulates discharges into waters of the U.S. 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 U.S. 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 (NPDES). The WDOE, 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 U.S., 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 U.S., 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 U.S. (including wetlands) for each single and complete project. For linear projects (transmission line), a single and complete project constitutes all crossings of a single water of the U.S. (i.e., single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies and crossings of such features cannot be considered separately.

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 U.S. Pursuant to the implementing regulations, USACE Section 10 permits are required for electric transmission lines crossing navigable waters of the U.S. 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.

3.14.3.2 State Jurisdiction

Water Quality Certification

Applicants receiving a Section 404 permit from the USACE, a Coast Guard permit, or license from FERC are required to obtain a Section 401 water quality certification from the WDOE. Issuance of a certification means that WDOE anticipates 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.

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 (DNR), 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.

Additionally, if temporary construction impacts a state-owned aquatic land, DNR will require a separate use authorization known as a Right of Entry (ROE). A ROE is a temporary agreement allowing placement of improvements for construction purposes only. Prior to expiration of the ROE’s term, all improvements must be removed from state-owned aquatic lands. NNR-8 proposes to cross state-owned aquatic land and may require a ROE. Additionally, as part of the ROE, potential encroachment on the littoral (area of a sea, lake, or river located close to the shore) and near shore environment may impact aquatic species and associated habitat. These impacts may require Habitat Stewardship Review by the DNR and mitigation measures as part of the conditions of the temporary agreement.

3.14.3.3 Local Jurisdiction (County/City)

Shoreline Development/Shoreline Management Act

In Washington, the Coastal Zone Management Act is implemented through the SMA. The SMA 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 SMA regulates wetlands with 200 feet of shoreline water bodies and wetlands associated with these water bodies. The SMA 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 3b below the Wanapum Dam in Kittitas and Grant counties, Route Segment 3c below the Priest Rapids Dam in Benton and Grant counties, or Route Segment NNR-8 below the Wanapum Dam in Kittitas and Grant counties would require a Shoreline Substantial Development Permit. 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 SMA. 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 Substantial Development Permit. 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 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 Growth Management Act are required to protect Critical Areas (Washington State Department of Community, Trade and Economic Development 2003).

Local Critical Areas

In general, Benton, Grant, Kittitas, and Yakima counties identify the following as local critical areas: wetlands; critical aquifer recharge areas, and frequently flooded areas. These resources are addressed in Sections 3.14.2.1 – Wetlands, 3.14.2.2 – Critical Aquifer Recharge Areas, and 3.14.2.1 – Floodplains of this document, respectively.

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, Washington Department of Fish and Wildlife, and DNR) 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. The Joint Aquatic Resources Permit Application can be used for the permits and approvals listed above.

3.14.4 Route Segment Specific Considerations

3.14.4.1 Route Segment 1a/NNR-1

Route Segment 1a/NNR-1 is a relatively short route segment that crosses the Selah-Moxee Irrigation canal, an unnamed irrigation canal, and several intermittent or ephemeral drainages.

3.14.4.2 Route Segment 1b

Route Segment 1b crosses Kittitas Canyon Creek, which has an aspen grove and some riparian vegetation associated with it. Route Segment 1b also crosses several un-named intermittent or ephemeral drainages.

3.14.4.3 Route Segment 1c

Route Segment 1c parallels Route Segment 1b and crosses similar un-named intermittent or ephemeral drainages. Some riparian vegetation is present along the margins of Kittitas Canyon Creek that is crossed by Route Segment 1c.

3.14.4.4 Route Segment 2a

Route Segment 2a is a short route segment that crosses Coyote Springs Creek, which has some riparian vegetation present.

3.14.4.5 Route Segment 2b

Route Segment 2b crosses several ephemeral drainages with some riparian vegetation present.

3.14.4.6 Route Segment 2c

Route Segment 2c crosses several un-named ephemeral drainages. A portion of this route parallels but does not cross Dry Creek and its associated 100 year floodplain. At its nearest point, Dry Creek lies approximately one half mile south of Route Segment 2c.

3.14.4.7 Route Segment 2d

Some riparian vegetation is present along Cold Creek and un-named ephemeral drainages that are crossed.

3.14.4.8 Route Segment 3a

No water resources were identified along Route Segment 3a.

3.14.4.9 Route Segment 3b

Route Segment 3b parallels the Columbia River and Priest Rapids Reservoir for approximately 12 miles. This route segment roughly coincides with the designated shoreline and 100 year floodplain. Near its northern end, Route Segment 3b crosses the Columbia River below Wanapum Dam. This route would cross Hansen, Alkali Canyon, Corral Canyon, Cow Canyon, and Sourdough Canyon Creeks as well as several un-named ephemeral drainages that are seasonally moist with little or no riparian vegetation present. Both the Columbia River and Priest Rapids Reservoir are lacustrine wetland types. Some riparian vegetation is present along the portions of the Columbia River that occur within the Project study area.

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. Flowage easements are variously located along Route Segment 3b.

3.14.4.10 Route Segment 3c

Route Segment 3c parallels the Columbia River below Priest Rapids dam for approximately three miles. In this area, the route roughly coincides with the designated shoreline and 100 year floodplain. This route would also cross the Columbia River approximately five miles below Priest Rapids Dam. Both the Columbia River and Priest Rapids Reservoir are lacustrine wetland systems. Palustrine wetlands found in this area are comprised of agricultural ponds, and persistent and ephemeral wetlands. Route Segment 3c crosses Lower Crab Creek, which has some emergent riparian vegetation present and its 100 year floodplain. Wetland systems associated with Lower Crab Creek include both palustrine and lacustrine wetland types. Several irrigation canals would be crossed including Mattawa Drain, Saddle Mountain Wasteway, and Wahluke Branch Canal. Other water resources crossed by this route include several un-named ephemeral drainages. Riparian habitats along this route segment are typically dominated by non-native species, included noxious weeds.

3.14.4.11 Route Segment NNR-2

The Route Segment NNR-2 Project study area crosses an irrigation canal on JBLM YTC and several un-named intermittent or ephemeral drainages. This route segment Project study 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*).

3.14.4.12 Route Segment NNR-3

The Route Segment NNR-3 Project study 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 study area crosses several un-named intermittent or ephemeral drainages. The Project study 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 study area appears to be intermittent.

3.14.4.13 Route Segment NNR-4

The Route Segment NNR-4 Project study area crosses several un-named intermittent or ephemeral drainages with no riparian vegetation present.

3.14.4.14 Route Segment NNR-5

The Route Segment NNR-5 Project study area crosses several intermittent or ephemeral drainages with no riparian vegetation present. The Project study area for this route segment also crosses Badger Creek, which is intermittent or ephemeral within the Project study area.

3.14.4.15 Route Segment NNR-6

The Route Segment NNR-6 Project study 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.

3.14.4.16 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.

3.14.4.17 Route Segment NNR-8

The Route Segment NNR-8 Project study area crosses the Columbia River below Wanapum Dam. The Columbia is a lacustrine wetland type. Within the Route Segment NNR-8 Project study area, some riparian vegetation is present along the edges of the Columbia River.

3.14.4.18 Route Segment MR-1

The Project study 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 edge of JBLM YTC boundary.

3.15 GEOLOGY AND SOILS

As was done in the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS), this section describes the existing conditions (affected environment) and considers issues related to geology and soils along all Action Alternatives presented in the DEIS and SDEIS, including those raised during scoping. This Final Environmental Impact Statement (FEIS) section consolidates and builds on the information presented in the January 2013 DEIS as well as the January 2015 SDEIS and includes references to those documents throughout the text where appropriate. This FEIS identifies the New Northern Route (NNR) Alternative – Overhead Design Option as the Environmentally Preferred Alternative and the U.S. Bureau of Land Management (BLM) has selected the NNR Alternative – Overhead Design Option as the Agency Preferred Alternative.

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, parts of Kittitas and Yakima Counties, Washington (Natural Resources Conservation Service [NRCS] 2006); the 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. For the purposes of this document, a six-mile wide buffer (three miles each side of route segment centerlines for the Action Alternatives) is the Project study area and was analyzed for potential impacts to geology and soils.

3.15.2 Current Conditions and Trends, Regional Overview

3.15.2.1 Geology

The Project study area is located in the Columbia Plateau physiographic province. The geology of the Project study 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 Epoch (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 (NRCS 2006). 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).

The 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 study 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 Epoch; therefore, they are not considered active for transmission 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 study area was subject to as many as 40 catastrophic floods during the Pleistocene Epoch (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 study area consists of gently rolling to moderate hilly plateaus and steep slopes from Umtanum Ridge, Manastash Ridge (MR), and the Saddle Mountain Ridge to the Columbia River and Lower Crab Creek. Elevations in the Project study area range from 400 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, Pacific Power is required to consider the potential for seismic activity in the design of transmission line structures and facilities and must construct the transmission line structures and substation facilities to withstand seismic forces. The Project study 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 study area. The Saddle Mountains Fault is an active fault located along the bottom of the northern slope of the Saddle Mountains. Additional active faults identified in close proximity to the Action Alternative route segments included Umtanum Ridge-Gable Mountain-Associated Structure Faults (crossing at Route Segment NNR-3) and Saddle Mountains-Associated Structure Faults (Route Segments NNR-4, NNR-6, NNR-7, NNR-8, and MR-1). All of the structure faults within two miles of the Action Alternatives 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 faults 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's Action Alternatives. 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 area—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 Action Alternatives. 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 study area. The few exceptions include: 1) alluvium in some drainages and outburst flood deposits where small areas of low to moderate and moderate to high susceptibility occur; 2) moderate-to-high susceptibility in two alluvium deposits—one large deposit along the Columbia River on Route Segment NNR-8 and one small deposit on Route Segments NNR-2and NNR-3) low-to-moderate susceptibility within landslide deposits—several small deposits along Route Segment NNR-6, one large deposit along Route Segment MR-1, and one small deposit along Route Segment NNR-7. Additionally, the mapped landslides that are described below are mapped as moderate to high areas of susceptibility.

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. Historical landslides in the Project study 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 are located along Route Segments 1b, 1c, and 2d and include several small deposits along Route Segment NNR-6 and one small deposit along Route 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.

The northern slopes of the Saddle Mountains along Route Segment 3c are subject to rockfall and sluffing due to the steep slopes. While large mass-wasting events are improbable in their current undisturbed condition, large-scale modification of the existing slope conditions (e.g., access roads.) should be avoided.

Steep terrain is considered a geologic hazard and a local critical area. For the purposes of this FEIS, steep terrain is defined as slopes ranging from 15 to 30 percent and very steep terrain is defined as slopes greater than 30 percent. Potential impacts to these areas are addressed in Section 4.15 of this FEIS. Both Yakima County and Grant County consider slopes 40 percent or greater to be high risk [Yakima County Code, Section 16.08.02(3)(a)(1); Grant County Code, Section 24.08.500(c)(8)]. However, this FEIS provides a more conservative analysis than required by local codes and classifies steep slopes (high risk) as 30 percent or greater. Kittitas County is currently revising their critical areas ordinance and it is expected to be updated in 2017.

3.15.2.3 Soils

The soil types present in the Project study 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 3.15.4. 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 route segment 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.

3.15.3.1 Soil and Water Resources Conservation Act of 1977

Legislation provides for the collection and analysis of soil and related resource data and the appraisal of the status, condition, and trends for these resources. The Soil and Water Conservation Act (16 United States Code §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 Parts 600-699.

3.15.3.2 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.

3.15.3.3 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-Standards Association 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 capability of electrical substation equipment to withstand a seismic event. 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.

3.15.3.4 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.

3.15.3.5 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 geohazards within the county. Crossing of these areas in Yakima County may require a Critical Areas Permit.

3.15.3.6 Local Critical Areas

In general, Benton, Grant, Kittitas, and Yakima counties identify geologically hazardous areas as local critical areas. These areas are addressed in Sections 3.15.2.2 and 3.15.4 of this document. Additionally, potential impacts to these areas are addressed in Section 4.15 of this document.

3.15.4 Route Segment Specific Considerations

The study areas for geologic hazards for each route segment consisted of a six-mile wide study area (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 study area (250 feet either side of the Action Alternative route segment centerlines).

3.15.4.1 Route Segment 1a/NNR-1

Route Segments 1a/NNR-1, 1b, and 1c are located on the western-most end of Yakima Ridge, an east-west trending anticline as shown on the Geohazards Map in Appendix A. Route Segment 1a/NNR-1 parallels Yakima Ridge along its northwestern foothills. 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 Pacific Power’s Pomona Heights Substation, the entire route segment is classified as extremely low to low. A few historic and/or quaternary landslide deposits lie within the six-mile study area, but not within the route segment. This route segment crosses five intermittent/ephemeral creek washes and geologic hazards are limited to those drainages.

Route Segment 1a/NNR-1 corresponds to 137.2 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 60.4 acres of soils with low soil restoration potential.

3.15.4.2 Route Segment 1b

Route Segment 1b continues along the northwestern foothills prior to turning south and traversing the Yakima Ridge. In addition to ephemeral creek washes, there are three landslides mapped along the route segment alignment along the northwestern foothills. 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. Traversing Yakima Ridge, the route segment crosses an inactive thrust fault evidenced by exposed strata along the northern ridgeline. As the route segment continues to Route Segments 2a, 2b, and 2c along the southern foothills, ephemeral creek washes continue to pose a hazard.

Route Segment 1b corresponds to 151.3 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 379.6 acres of soils with low soil restoration potential.

3.15.4.3 Route Segment 1c

Route Segment 1c continues along the northwestern foothills prior to turning south and traversing the Yakima Ridge. In addition to ephemeral creek washes, there are three landslides mapped along this route segment alignment along the northwestern foothills. 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. Traversing Yakima Ridge, the route segment crosses an inactive thrust fault evidenced by exposed strata along the northern ridgeline. As the route segment alignment continues to Route Segments 2a, 2b, and 2c along the southern foothills, ephemeral creek washes continue to pose a hazard.

Route Segment 1c corresponds to 231.3 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 261.6 acres of soils with low soil restoration potential.

3.15.4.4 Route Segment 2a

Route Segments 2a, 2b, and 2c parallel Yakima Ridge along its southern foothills as shown on the Geohazards Map in Appendix A. No significant geologic hazards are present along Route Segment 2a. Ephemeral creek washes are present, but there are no landslides or fault lines mapped along Route Segment 2a.

Route Segment 2a corresponds to 41.4 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 13.9 acres of soils with low soil restoration potential.

3.15.4.5 Route Segment 2b

No significant geologic hazards are present along Route Segment 2b. Ephemeral creek washes are present, but there are no landslides or fault lines mapped along Route Segment 2b.

Route Segment 2b corresponds to 373.9 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 334.3 acres of soils with low soil restoration potential.

3.15.4.6 Route Segment 2c

No significant geologic hazards are present along Route Segment 2c. Ephemeral creek washes are present, but there are no landslides or fault lines mapped along Route Segment 2c.

Route Segment 2c corresponds to 904.4 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 210.0 acres of soils with low soil restoration potential.

3.15.4.7 Route Segment 2d

Route Segment 2d traverses south to north over Yakima Ridge terminating at the Columbia River at the bottom of Umtanum Ridge. This route segment is in the vicinity of three active, though Class B (undefined age), faults. It is also in the vicinity of several landslides features. 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.

Route Segment 2d corresponds to 274.7 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 147.1 acres of soils with low soil restoration potential.

3.15.4.8 Route Segment 3a

Route Segment 3a is a short segment (approximately 750 feet long) of the proposed transmission line that extends from the existing Vantage Substation to the northeast where it would tie into route segments 3b and 3c. No active faults, mapped landslides, or areas of liquefaction susceptibility correspond to Route Segment 3a according to the Geohazards Map provided in Appendix A.

Route Segment 3a corresponds to 0.0 acres of soils with high water erosion potential, 13.2 acres of soils with high wind erosion potential, and 13.2 acres of soils with low soil restoration potential.

3.15.4.9 Route Segment 3b

Route Segment 3b proceeds west along the edge of the Columbia River and crosses the river below Wanapum Dam. While there are no landslide features along the route segment, rockfall and ephemeral washes do pose a hazard. In addition, there are some localized zones of moderate to high liquefaction susceptibility along the southern portion. The northern portion of the route segment crosses larger moderate to high areas of liquefaction susceptibility, including the crossing location. There are some active (Class B) faults in the southern portion and the northern portion of the route segment crosses the Late Quaternary Period (<130,000 years) Saddle Mountain thrust fault.

Route Segment 3b corresponds to 364.2 acres of soils with high water erosion potential, 111.6 acres of soils with high wind erosion potential, and 779.4 acres of soils with low soil restoration potential.

3.15.4.10 Route Segment 3c

Route Segment 3c proceeds east along the Columbia River, then crosses the river and continues north across a bench to the Saddle Mountains as shown on the Geohazards Map in Appendix A. The Columbia River crossing location is in an area of low liquefaction susceptibility. At the southern foot of the Saddle Mountains, the liquefaction susceptibility increases to moderate. During the traverse of the Saddle Mountains, ephemeral creek washes become more numerous. Some active (Class B) faults are located near Route Segment 3c at the top of the Saddle Mountains and the Late Quaternary Period (<130,000 years) Saddle Mountain thrust fault is located at the northern foot of the mountains. This inferred fault trace parallels the mountains and Lower Crab Creek. The northern slopes of the Saddle Mountains along Route Segment 3c is subject to rockfall and sluffing due to the steep slopes. While large mass-wasting events are improbable in their current undisturbed condition, large-scale modification of the existing slope conditions (e.g., access roads) should be avoided. As Route Segment 3c crosses the confluence of the Columbia and Lower Crab Creek, there are significant areas mapped as exhibiting moderate to high liquefaction potential.

Route Segment 3c corresponds to 106.7 acres of soils with high water erosion potential, 1,149.5 acres of soils with high wind erosion potential, and 942.3 acres of soils with low soil restoration potential.

3.15.4.11 Route Segment NNR-2

Route Segment NNR-2 runs through developed areas, approximately 0.5 mile east of the Yakima River. One thin strip of moderate to high liquefaction susceptibility lies along a creek that passes through the route segment. Class B Structure Faults associated with the Umtanum Ridge-Gable Mountain Fault pass through the six-mile wide study area—the nearest is approximately 1.5 miles from the route segment. A few historic and/or quaternary landslide deposits lie within the six-mile wide study area, but not within the route segment. The route segment crosses two intermittent/ephemeral creek washes.

Route Segment NNR-2 corresponds to 184.3 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 34.7 acres of soils with low soil restoration potential.

3.15.4.12 Route Segment NNR-3

Route Segment NNR-3 crosses Umtanum Ridge, an east-west trending anticline, west of Interstate (I) 82. The route segment crosses several Class B structure faults associated with the Umtanum Ridge-Gable Mountain Fault System. The six-mile study area contains a few strips of moderate to high liquefaction susceptibility along rivers and creeks, but none pass through the route segment. Several historic and/or quaternary landslide deposits lie within the six-mile study area, but not within the route segment. The route segment crosses three intermittent/ephemeral creek washes.

Route Segment NNR-3 corresponds to 36.5 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 137.0 acres of soils with low soil restoration potential.

3.15.4.13 Route Segment NNR-4

Route Segment NNR-4 crosses MR, east of I-82. The route segment crosses a Class B structure fault associated with the Saddle Mountains Fault System. The route segment is all classified as extremely low to low liquefaction susceptibility and crosses no landslide deposits—the six-mile study area contains a few small landslide deposits and pockets of low-to-moderate liquefaction susceptibility. The route segment crosses four intermittent/ephemeral creek washes.

Route Segment NNR-4 corresponds to 9.5 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 20.9 acres of soils with low soil restoration potential.

3.15.4.14 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 study area contains a few Class B structure faults associated with the Saddle Mountains Fault System. The route segment is all classified as extremely low to low liquefaction susceptibility and crosses no landslide deposits—the six–mile study area contains a few small landslide deposits. The route segment crosses two intermittent/ephemeral creek washes.

Route Segment NNR-5 corresponds to 38.7 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 0.8 acre of soils with low soil restoration potential.

3.15.4.15 Route Segment NNR-6

Route Segment NNR-6 crosses the Saddle Mountains, an anticline feature, and traverses the mountains' northern slopes. The route segment roughly follows the Class B Saddle Mountains Fault System and associated structure faults. Along the north-facing slopes of the mountains, the route segment 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 study area contains one small strip of moderate to high liquefaction susceptibility along Johnson Creek. The route segment crosses five intermittent/ephemeral creek washes.

Route Segment NNR-6 corresponds to 33.2 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 12.4 acres of soils with low soil restoration potential.

3.15.4.16 Route Segment NNR-7

Route Segment NNR-7 traverses along the Saddle Mountains' northern slopes. The route roughly follows the Class B Saddle Mountains Fault System and associated structure faults. The six-mile study area contains several small historic/quaternary landslide deposits and the route segment 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 study area contains a few small strips of moderate to high liquefaction susceptibility along creeks. The route segment crosses 13 intermittent/ephemeral creek washes.

Route Segment NNR-7 corresponds to 9.7 acres of soils with high water erosion potential, 0.0 acres of soils with high wind erosion potential, and 129.5 acres of soils with low soil restoration potential.

3.15.4.17 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 study area 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 Period in age (<130,000 years) and ends just within the six-mile study area. 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.

Route Segment NNR-8 corresponds to 0.0 acres of soils with high water erosion potential, 113.0 acres of soils with high wind erosion potential, and 135.1 acres of soils with low soil restoration potential.

3.15.4.18 Route Segment MR-1

The Route Segment MR-1wraps around MR and crosses the ridge at I-82. The route segment crosses a Class B structure fault associated with the Saddle Mountains Fault System. The six-mile study area contains several historic/quaternary landslide deposits and the route segment 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 route segment crosses 22 intermittent/ephemeral creek washes.

Route Segment MR-1 contains 23.4 acres of soils with high water erosion potential, 0.0 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	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
1a/NNR-1				
Esquatzel silt loam, 0 to 2 percent slopes	Moderate	High	Moderate potential	4.4
Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes	Moderate	High	Low potential	6.8
Harwood-Burke-Wiehl silt loams, 2 to 5 percent slopes	Moderate	High	Low potential	0.4
Kiona stony silt loam, 15 to 45 percent slopes	Low	High	Low potential	53.2
Meloza-Roza complex, 15 to 30 percent slopes	Low	Low	Moderate potential	0.6
Ritzville silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	71.7
Roza clay loam, 15 to 30 percent slopes	Moderate	Low	Moderate potential	11.0
Starbuck-Rock outcrop complex, 45 to 60 percent slopes	Moderate	High	Moderate potential	0.6
1b				
Argabak-Horseflat complex, 3 to 15 percent slopes	Low	Moderate	Low potential	1.2
Disage very cobbly loam, 3 to 15 percent slopes	Low	Moderate	Not Rated	2.0

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Drysel loam, 5 to 10 percent slopes	Moderate	Moderate	Low potential	5.5
Kiona stony silt loam, 15 to 45 percent slopes	Low	High	Low potential	16.8
Kiona stony silt loam, 15 to 45 percent slopes	Low	Moderate	Low potential	37.2
Lickskillet very stony silt loam, 5 to 45 percent slopes	Low	Moderate	High potential	363.7
Meloza-Roza complex, 15 to 30 percent slopes	Low	Low	Moderate potential	5.2
Palerf-Ralock-Vantage complex, 15 to 30 percent slopes	Low	Moderate	High potential	0.0
Ralock silt loam, 15 to 30 percent slopes	Moderate	High	High potential	0.0
Renslow silt loam, basalt substratum, 5 to 15 percent slopes	Moderate	High	Moderate potential	0.0
Rock Creek very stony silt loam, 0 to 30 percent slopes	Low	Moderate	Low potential	50.2
Roza clay loam, 15 to 30 percent slopes	Moderate	Low	Moderate potential	4.0
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	Moderate	High	Low potential	127.2
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	Moderate	High	Moderate potential	7.3
Vantage-Clerf-Rubble land complex, 30 to 45 percent slopes	Low	Moderate	Moderate potential	2.6
Wanapum cobbly loam, 2 to 5 percent slopes	Low	Moderate	Low potential	8.6
Wanapum complex, 10 to 15 percent slopes	Low	Moderate	Low potential	30.0
Wanapum complex, 5 to 10 percent slopes	Low	Moderate	Low potential	102.9
1c				
Bakeoven very cobbly silt loam, 0 to 30 percent slopes	Low	Moderate	Low potential	0.0
Kiona stony silt loam, 15 to 45 percent slopes	Low	High	Low potential	39.9
Lickskillet very stony silt loam, 5 to 45 percent slopes	Low	Moderate	High potential	356.5
Meloza-Roza complex, 15 to 30 percent slopes	Low	Low	Moderate potential	1.0
Moxee cobbly silt loam, 0 to 30 percent slopes	Low	High	Moderate potential	0.7
Moxee silt loam, 2 to 15 percent slopes	Moderate	High	Moderate potential	28.2

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Renslow silt loam, basalt substratum, 5 to 15 percent slopes	Moderate	High	Moderate potential	0.0
Rock Creek very stony silt loam, 0 to 30 percent slopes	Low	Moderate	Low potential	63.0
Roza clay loam, 15 to 30 percent slopes	Moderate	Low	Moderate potential	3.7
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	Moderate	High	Low potential	26.2
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	Moderate	High	Moderate potential	123.5
Starbuck-Rock outcrop complex, 45 to 60 percent slopes	Moderate	High	Moderate potential	8.6
Wanapum cobbly loam, 2 to 5 percent slopes	Low	Moderate	Low potential	19.8
Wanapum complex, 10 to 15 percent slopes	Low	Moderate	Low potential	34.9
Wanapum complex, 5 to 10 percent slopes	Low	Moderate	Low potential	77.7
Willis silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	4.2
2a				
Bakeoven very cobbly silt loam, 0 to 30 percent slopes	Low	Moderate	Low potential	13.9
Lickskillet very stony silt loam, 5 to 45 percent slopes	Low	Moderate	High potential	8.0
Moxee cobbly silt loam, 0 to 30 percent slopes	Low	High	Moderate potential	26.8
Moxee silt loam, 2 to 15 percent slopes	Moderate	High	Moderate potential	1.7
Renslow silt loam, basalt substratum, 5 to 15 percent slopes	Moderate	High	Moderate potential	12.9
2b				
Argabak-Horseflat complex, 3 to 15 percent slopes	Low	Moderate	Low potential	0.1
Bakeoven very cobbly silt loam, 0 to 30 percent slopes	Low	Moderate	Low potential	222.8
Benwy silt loam, 10 to 15 percent slopes	Moderate	High	Moderate potential	0.0
Benwy silt loam, 5 to 10 percent slopes	Moderate	High	Moderate potential	0.5
Cleman very fine sandy loam, 2 to 5 percent slopes	Moderate	High	Moderate potential	0.1
Finley cobbly fine sandy loam, 0 to 5 percent slopes	Moderate	Moderate	Low potential	2.6
Finley fine sandy loam, 0 to 5 percent slopes	Moderate	Low	Low potential	1.2

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Kiona stony silt loam, 15 to 45 percent slopes	Low	High	Low potential	78.4
Kiona stony silt loam, 15 to 45 percent slopes	Low	Moderate	Low potential	29.1
Lickskillet very stony silt loam, 5 to 45 percent slopes	Low	Moderate	High potential	344.7
Moxee cobbly silt loam, 0 to 30 percent slopes	Low	High	Moderate potential	31.1
Moxee silt loam, 2 to 15 percent slopes	Moderate	High	Moderate potential	38.6
Renslow silt loam, basalt substratum, 5 to 15 percent slopes	Moderate	High	Moderate potential	2.6
Ritzville silt loam, 15 to 30 percent slopes	Moderate	High	Moderate potential	2.4
Ritzville silt loam, 2 to 5 percent slopes	Moderate	High	Moderate potential	7.7
Ritzville silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	36.5
Selah silt loam, 10 to 15 percent slopes	Moderate	Moderate	Moderate potential	11.2
Selah silt loam, 2 to 5 percent slopes	Moderate	High	Moderate potential	14.8
Selah silt loam, 2 to 5 percent slopes	Moderate	Moderate	Moderate potential	7.9
Selah silt loam, 5 to 10 percent slopes	Moderate	Moderate	Moderate potential	1.3
Selah silt loam, 5 to 8 percent slopes	Moderate	High	Moderate potential	1.8
Selah silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	30.9
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	Moderate	High	Moderate potential	5.3
Willis silt loam, 2 to 5 percent slopes	Moderate	High	Moderate potential	18.0
Willis silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	105.1
Zen silt loam, 5 to 10 percent slopes	Moderate	Moderate	Moderate potential	0.3
2c				
Bakeoven very cobbly silt loam, 0 to 30 percent slopes	Low	Moderate	Low potential	92.9
Cleman very fine sandy loam, 2 to 5 percent slopes	Moderate	High	Moderate potential	2.5
Finley cobbly fine sandy loam, 0 to 5 percent slopes	Moderate	Moderate	Low potential	21.8
Finley fine sandy loam, 0 to 5 percent slopes	Moderate	Low	Low potential	22.0
Harwood-Burke-Wiehl very stony silt loams, 15 to 30 percent slopes	Moderate	High	Low potential	46.1

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Kiona stony silt loam, 15 to 45 percent slopes	Low	High	Low potential	27.2
Lickskillet very stony silt loam, 5 to 45 percent slopes	Low	Moderate	High potential	60.9
Moxee cobbly silt loam, 0 to 30 percent slopes	Low	High	Moderate potential	144.3
Moxee silt loam, 2 to 15 percent slopes	Moderate	High	Moderate potential	202.3
Ritzville silt loam, 15 to 30 percent slopes	Moderate	High	Moderate potential	1.7
Ritzville silt loam, 2 to 5 percent slopes	Moderate	High	Moderate potential	54.2
Ritzville silt loam, 30 to 60 percent slopes	Moderate	High	Moderate potential	0.2
Ritzville silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	1.7
Ritzville silt loam, basalt substratum, 0 to 5 percent slopes	Moderate	High	Moderate potential	10.8
Ritzville silt loam, basalt substratum, 5 to 15 percent slopes	Moderate	High	Moderate potential	50.8
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	Moderate	High	Moderate potential	4.9
Willis silt loam, 2 to 5 percent slopes	Moderate	High	Moderate potential	115.4
Willis silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	242.3
2d				
Bakeoven very cobbly silt loam, 0 to 30 percent slopes	Low	Moderate	Low potential	68.0
Finley fine sandy loam, 0 to 5 percent slopes	Moderate	Low	Low potential	1.2
Kiona stony silt loam, 15 to 45 percent slopes	Low	High	Low potential	77.9
Kiona very stony silt loam, 0 to 30 percent slopes	Low	High	Moderate potential	0.2
Kiona very stony silt loam, 30 to 65 percent slopes	Low	High	Moderate potential	0.6
Lickskillet silt loam, 5 to 30 percent slopes	Low	Moderate	High potential	0.8
Lickskillet very stony silt loam, 5 to 45 percent slopes	Low	Moderate	High potential	42.6
Moxee silt loam, 2 to 15 percent slopes	Moderate	High	Moderate potential	21.8
Ritzville silt loam, 15 to 30 percent slopes	Moderate	High	Moderate potential	13.3
Ritzville silt loam, 15 to 30 percent slopes, severely eroded	Moderate	High	Moderate potential	0.4

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Ritzville silt loam, 30 to 60 percent slopes	Moderate	High	Moderate potential	8.1
Ritzville silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	66.9
Selah silt loam, 5 to 8 percent slopes	Moderate	High	Moderate potential	0.9
Starbuck silt loam, 2 to 15 percent slopes	Moderate	High	Moderate potential	2.9
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	Moderate	High	Moderate potential	14.6
Starbuck-Rock outcrop complex, 45 to 60 percent slopes	Moderate	High	Moderate potential	3.8
Willis silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	63.3
3a				
Schawana complex, 0 to 15 percent slopes	Low	High	13.2	Low
3b				
Argids, strongly sloping	High	Low	Not Rated	7.0
Burbank loamy fine sand, 0 to 5 percent slopes	High	Low	Low potential	47.0
Burbank very cobbly loamy sand, 0 to 15 percent slopes	Moderate	Low	Low potential	4.6
Drino-Disage-Kiona complex, 30 to 45 percent slopes	Low	Moderate	Low potential	8.1
Esquatzel silt loam, 0 to 2 percent slopes	Moderate	High	Moderate potential	75.0
Esquatzel silt loam, 2 to 5 percent slopes	Moderate	High	Moderate potential	60.0
Esquatzel-Weirman complex, channeled, 0 to 2 percent slopes	Moderate	High	Moderate potential	8.3
Finley fine sandy loam, 0 to 5 percent slopes	Moderate	Low	Low potential	14.5
Fortyday-Nevo-Rock outcrop, 3 to 15 percent slopes	Moderate	Low	Low potential	65.1
Fortyday-Rubble land-Rock outcrop complex, 45 to 70 percent slopes	Not Rated	Low	Not Rated	8.4
Haploxerolls complex, 3 to 5 percent slopes	Moderate	Low	Moderate potential	11.2
Kiona stony silt loam, 15 to 45 percent slopes	Low	High	Low potential	120.9
Kiona stony silt loam, 15 to 45 percent slopes	Low	Moderate	Low potential	2.9
Kiona very stony loam, 45 to 60 percent slopes	Low	Moderate	Low potential	40.1
Malaga cobbly sandy loam, 3 to 15 percent slopes	Moderate	Low	Low potential	104.7

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Malaga gravelly sandy loam, 5 to 10 percent slopes	Moderate	Low	Low potential	43.9
Rock outcrop	Not Rated	Low	Not Rated	0.9
Rubble land-Rock outcrop-Kiona complex, 60 to 120 percent slopes	NR or UNK	Low	Not Rated	115.1
Schawana complex, 0 to 15 percent slopes	High	Low	Low potential	57.6
Scooteney silt loam, 2 to 5 percent slopes	Moderate	High	Low potential	12.5
Scooteney silt loam, 5 to 15 percent slopes	Moderate	High	Low potential	30.0
Semal complex, 3 to 15 percent slopes	Moderate	Low	Low potential	37.4
Sohappy-Fortyday complex, 15 to 30 percent slopes	Moderate	High	Not Rated	20.9
Starbuck-Rock outcrop complex, 3 to 15 percent slopes	Moderate	Moderate	Low potential	176.1
Starbuck-Rock outcrop complex, 45 to 60 percent slopes	Moderate	High	Low potential	0.2
Starbuck-Rock outcrop complex, 45 to 60 percent slopes	Moderate	High	Moderate potential	36.5
Timmerman complex, 2 to 5 percent slopes	Moderate	Low	Low potential	13.8
Water	Not Rated	Low	Not Rated	191.4
3c				
Adkins loamy fine sand, 5 to 15 percent slopes	High	Low	Low potential	37.7
Bakeoven very cobbly loam, 0 to 35 percent slopes	Low	Moderate	Low potential	42.2
Burbank loamy fine sand, 0 to 5 percent slopes	High	Low	Low potential	128.4
Burbank loamy fine sand, 5 to 15 percent slopes	High	Low	Low potential	24.0
Burbank stony loamy sand, 2 to 15 percent slopes	High	Low	Low potential	23.5
Burbank very cobbly loamy sand, 0 to 15 percent slopes	Moderate	Low	Low potential	11.8
Ekrub fine sand, 0 to 25 percent slopes	High	Low	Low potential	15.9
Finley-Taunton complex, 0 to 5 percent slopes	Moderate	High	Low potential	21.4
Kennewick silt loam, 0 to 2 percent slopes	Moderate	High	Low potential	5.5
Kennewick silt loam, 2 to 5 percent slopes	Moderate	High	Low potential	10.2
Kiona cobbly very fine sandy loam, 25 to 65 percent slopes	Moderate	Moderate	Low potential	22.0

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Lickskillet very cobbly loam, 35 to 65 percent slopes	Low	Low	Moderate potential	7.8
Prosser very fine sandy loam, 10 to 15 percent slopes	Moderate	High	Low potential	7.2
Quincy fine sand, 2 to 15 percent slopes	High	Low	Moderate potential	105.4
Quincy loamy fine sand, 0 to 15 percent slopes	High	Low	Moderate potential	250.3
Quincy loamy fine sand, 15 to 35 percent slopes	High	Low	Moderate potential	14.9
Quincy sand, 5 to 25 percent slopes, eroded	High	Low	Moderate potential	17.7
Quinton-Schawana complex, 5 to 20 percent slopes	High	Low	Low potential	161.9
Royal loamy fine sand, 0 to 10 percent slopes	High	Low	Low potential	15.9
Royal very fine sandy loam, 2 to 5 percent slopes	Moderate	High	Low potential	11.0
Rubble land-Rock outcrop complex	Not Rated	Low	Not Rated	5.8
Schawana cobbly loamy fine sand, 15 to 55 percent slopes	High	Low	Low potential	81.7
Schawana complex, 0 to 15 percent slopes	High	Low	Low potential	73.2
Scoon silt loam, 0 to 5 percent slopes	Moderate	High	Moderate potential	10.5
Scoon silt loam, 5 to 15 percent slopes	Moderate	High	Moderate potential	10.3
Taunton fine sandy loam, 2 to 5 percent slopes	Moderate	Moderate	Moderate potential	1.3
Timmerman coarse sandy loam, 0 to 2 percent slopes	Moderate	Low	Low potential	4.2
Timmerman coarse sandy loam, 5 to 10 percent slopes	Moderate	Low	Low potential	15.0
Timmerman loamy sand, 0 to 5 percent slopes	High	Low	Low potential	98.6
Torrifluvents, nearly level	Low	High	Low potential	30.7
Wanser-Quincy fine sands, 0 to 5 percent slopes	High	Low	Low potential	18.8
Water	Not Rated	Low	Not Rated	10.7
Wiehl fine sandy loam, 2 to 5 percent slopes	Moderate	Moderate	Low potential	0.0
Winchester sand, 2 to 5 percent slopes	High	Low	Low potential	81.5
NNR-2				
Drysel loam, 5 to 10 percent slopes	Moderate	Moderate	Low potential	5.9
Esquatzel silt loam, 0 to 2 percent slopes	Moderate	High	Moderate potential	6.8
Esquatzel-Weirman complex, channeled, 0 to 2 percent slopes	Moderate	High	Moderate potential	19.1

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Fortyday-Drino-Nevo complex, 15 to 30 percent slopes	Low	Moderate	Low potential	0.4
Kiona stony silt loam, 15 to 45 percent slopes	Low	High	Low potential	1.1
Kiona stony silt loam, 15 to 45 percent slopes	Low	Moderate	Low potential	1.3
Meloza-Roza complex, 10 to 15 percent slopes	Low	Low	Moderate potential	6.2
Meloza-Roza complex, 15 to 30 percent slopes	Low	Low	Moderate potential	35.3
Meloza-Roza complex, 5 to 10 percent slopes	Low	Low	Moderate potential	4.3
Palerf-Ralock-Vantage complex, 15 to 30 percent slopes	Low	Moderate	High potential	0.0
Ralock silt loam, 15 to 30 percent slopes	Moderate	High	High potential	0.3
Rock Creek very stony silt loam, 0 to 30 percent slopes	Low	Moderate	Low potential	13.2
Roza clay loam, 15 to 30 percent slopes	Moderate	Low	Moderate potential	7.2
Roza clay loam, 5 to 8 percent slopes	Moderate	Low	Moderate potential	1.3
Roza clay loam, 8 to 15 percent slopes	Moderate	Low	Moderate potential	1.5
Scoon loam, 5 to 10 percent slopes	Moderate	Moderate	Low potential	12.8
Scoon silt loam, 5 to 8 percent slopes	Moderate	High	Moderate potential	4.2
Scoon silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	6.7
Selah silt loam, 10 to 15 percent slopes	Moderate	Moderate	Moderate potential	37.4
Willis silt loam, 2 to 5 percent slopes	Moderate	High	Moderate potential	115.5
Willis silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	30.7
NNR-3				
Argabak very cobbly loam, 15 to 30 percent slopes	Low	Moderate	Low potential	14.4
Argabak very cobbly loam, 3 to 15 percent slopes	Low	Moderate	Low potential	14.1
Argabak-Vantage complex, 3 to 15 percent slopes	Low	Moderate	Low potential	32.2
Argabak-Zen-Grinrod complex, 3 to 15 percent slopes	Low	Moderate	Low potential	6.1
Clerf very cobbly loam, 15 to 30 percent slopes	Low	Low	Moderate potential	19.3
Clerf very cobbly loam, 30 to 45 percent slopes	Low	Low	Moderate potential	52.0

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Esquatzel silt loam, 0 to 2 percent slopes	Moderate	High	Moderate potential	7.6
Esquatzel-Aquolls-Weirman complex, 0 to 5 percent slopes	Moderate	High	Moderate potential	1.9
Grinrod-Horseflat complex, 45 to 60 percent slopes	Low	Moderate	Moderate potential	5.0
Kiona stony silt loam, 15 to 45 percent slopes	Low	Moderate	Low potential	5.8
Kiona-Rubble land complex, 30 to 75 percent slopes	Low	Moderate	Low potential	6.3
Marlic-Zen-Laric complex, 3 to 15 percent slopes	Low	Moderate	Moderate potential	28.1
Neviot-Palerf-Vantage complex, 30 to 60 percent slopes	Low	Moderate	High potential	0.0
Nevo complex, 3 to 15 percent slopes	Low	High	Low potential	6.5
Niben-Vantage-Benwy complex, 15 to 30 percent slopes	Low	Moderate	High potential	13.9
Norod-Horseflat complex, 45 to 60 percent slopes	Low	Moderate	High potential	0.6
Palerf-Vantage complex, 15 to 30 percent slopes	Low	Moderate	High potential	12.4
Ralock-Palerf complex, 15 to 30 percent slopes	Moderate	Moderate	High potential	20.1
Ralock-Palerf complex, 30 to 45 percent slopes	Moderate	Moderate	High potential	59.9
Rock Creek very stony silt loam, 0 to 30 percent slopes	Low	Moderate	Low potential	48.3
Rubble land-Rock outcrop complex, 60 to 120 percent slopes	Not Rated	Low	Not Rated	41.7
Rubbleland-Rock outcrop association	Not Rated	Low	Not Rated	24.0
Scoon loam, 5 to 10 percent slopes	Moderate	Moderate	Low potential	2.6
Scoon silt loam, 5 to 8 percent slopes	Moderate	High	Moderate potential	13.1
Selah-Terlan complex, 10 to 15 percent slopes	Moderate	Moderate	Moderate potential	12.4
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	Moderate	High	Low potential	0.7
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	Moderate	High	Moderate potential	3.9
Vantage very cobbly loam, 3 to 15 percent slopes	Low	Moderate	Moderate potential	26.6
Vantage very cobbly loam, 3 to 15 percent slopes (m)	Low	Moderate	Moderate potential	39.0

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Vantage-Clerf complex, 15 to 30 percent slopes	Low	Moderate	Moderate potential	8.1
Vantage-Clerf complex, 3 to 15 percent slopes	Low	Moderate	Moderate potential	7.0
Vantage-Clerf complex, 30 to 70 percent slopes	Low	Moderate	Moderate potential	14.3
Vantage-Clerf-Wipple complex, 15 to 30 percent slopes	Low	Moderate	Moderate potential	7.2
Willis silt loam, 5 to 8 percent slopes	Moderate	High	Moderate potential	0.7
Willis silt loam, 8 to 15 percent slopes	Moderate	High	Moderate potential	2.1
Wipple cobbly clay loam, 30 to 45 percent slopes	Low	Low	Moderate potential	8.7
NNR-4				
Argabak very cobbly loam, 15 to 30 percent slopes	Low	Moderate	Low potential	0.9
Argabak very cobbly loam, 3 to 15 percent slopes	Low	Moderate	Low potential	3.7
Argabak-Vantage complex, 3 to 15 percent slopes	Low	Moderate	Low potential	2.9
Argabak-Zen-Grinrod complex, 3 to 15 percent slopes	Low	Moderate	Low potential	13.3
Benwy silt loam, 10 to 15 percent slopes	Moderate	High	Moderate potential	9.5
Clerf very cobbly loam, 15 to 30 percent slopes	Low	Low	Moderate potential	2.5
Clerf very cobbly loam, 15 to 30 percent slopes	Low	Moderate	Moderate potential	1.7
Clerf very cobbly loam, 30 to 45 percent slopes	Low	Low	Moderate potential	9.5
Manastash loam, 2 to 5 percent slopes	Low	Moderate	Moderate potential	6.8
Manastash-Durtash complex, 5 to 10 percent slopes	Low	Moderate	Moderate potential	22.6
Marlic-Zen-Laric complex, 3 to 15 percent slopes	Low	Moderate	Moderate potential	29.1
Meloza-Roza complex, 15 to 30 percent slopes	Low	Low	Moderate potential	0.6
Meloza-Roza complex, 5 to 10 percent slopes	Low	Low	Moderate potential	16.4
Norod-Ralock-Horseflat complex, 45 to 60 percent slopes	Low	Moderate	High potential	2.3
Ralock-Palerf complex, 30 to 45 percent slopes	Moderate	Moderate	High potential	0.5
Selah loam, 2 to 5 percent slopes	Moderate	Moderate	Moderate potential	9.1
Selah loam, 5 to 10 percent slopes	Moderate	Moderate	Moderate potential	3.9

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Selah silt loam, 2 to 5 percent slopes	Moderate	Moderate	Moderate potential	28.9
Vantage very cobbly loam, 15 to 30 percent slopes	Low	Moderate	Moderate potential	13.5
Vantage very cobbly loam, 3 to 15 percent slopes	Low	Moderate	Moderate potential	39.7
Vantage-Clerf complex, 15 to 30 percent slopes	Low	Moderate	Moderate potential	33.2
Vantage-Clerf complex, 3 to 15 percent slopes	Low	Moderate	Moderate potential	8.5
Zen silt loam, 10 to 15 percent slopes	Moderate	Moderate	Moderate potential	8.5
Zen-Marlic-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	Moderate potential	11.5
NNR-5				
Argabak-Zen-Grinrod complex, 3 to 15 percent slopes	Low	Moderate	Moderate potential	0.2
Benwy silt loam, 5 to 10 percent slopes	Moderate	High	Moderate potential	35.2
Benwy silt loam, 5 to 10 percent slopes	Moderate	Moderate	Moderate potential	2.0
Esquatzel-Weirman complex, 0 to 2 percent slopes	Moderate	High	Low potential	0.8
Esquatzel-Weirman complex, channeled, 0 to 2 percent slopes	Moderate	High	Moderate potential	2.8
Laric-Zen complex, 3 to 15 percent slopes	Low	Moderate	Not Rated	1.7
Selah silt loam, 5 to 10 percent slopes	Moderate	Moderate	Moderate potential	1.6
Terlan-Durtash-Selah complex, 2 to 5 percent slopes	Low	Moderate	Moderate potential	0.1
Terlan-Durtash-Selah complex, 2 to 5 percent slopes	Moderate	Moderate	Moderate potential	57.1
Vantage very cobbly loam, 3 to 15 percent slopes	Low	Moderate	Moderate potential	10.9
Vantage-Benwy-Argabak complex, 3 to 15 percent slopes	Low	Moderate	Moderate potential	0.3
NNR-6				
Benwy silt loam, 5 to 10 percent slopes	Moderate	High	Moderate potential	10.3
Camaspatch very cobbly loam, 15 to 30 percent slopes	Low	Moderate	Moderate potential	8.4
Camaspatch very cobbly loam, thin, 3 to 15 percent slopes	Low	Moderate	Moderate potential	25.5

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Camaspatch-Tanksel complex, 30 to 45 percent slopes	Low	Moderate	Moderate potential	15.7
Camaspatch-Tanksel-Lainand complex, 45 to 60 percent slopes	Low	Moderate	High potential	89.6
Camaspatch-Whiskeydick complex, 30 to 45 percent slopes	Low	Moderate	Moderate potential	1.0
Camaspatch-Whiskeydick complex, 45 to 60 percent slopes	Low	Moderate	Moderate potential	12.1
Grinrod-Horseflat complex, 45 to 60 percent slopes	Low	Moderate	Moderate potential	3.1
Lainand-Tanksel complex, 30 to 45 percent slopes	Low	Low	High potential	7.6
Laric-Zen complex, 3 to 15 percent slopes	Low	Moderate	Not Rated	20.3
Norod-Ralock-Horseflat complex, 45 to 60 percent slopes	Low	Moderate	High potential	3.0
Palerf-Ralock-Vantage complex, 15 to 30 percent slopes	Low	Moderate	High potential	7.0
Ralock-Palerf complex, 15 to 30 percent slopes	Moderate	High	High potential	8.2
Ralock-Palerf complex, 30 to 45 percent slopes	Moderate	High	High potential	14.7
Tanksel-Wockum complex, 30 to 45 percent slopes	Low	Low	High potential	6.3
Tanskel-Patron-Camaspatch complex, 15 to 30 percent slopes	Low	Low	High potential	13.0
Terlan gravelly loam, 2 to 5 percent slopes	Low	Moderate	Moderate potential	2.9
Terlan-Durtash-Selah complex, 2 to 5 percent slopes	Moderate	Moderate	Moderate potential	6.0
Terlan-Durtash-Selah complex, 5 to 15 percent slopes	Moderate	Moderate	Moderate potential	2.1
Vantage very cobbly loam, 15 to 30 percent slopes	Low	Moderate	Moderate potential	14.2
Vantage very cobbly loam, 3 to 15 percent slopes	Low	Moderate	Moderate potential	13.8
Vantage very cobbly loam, thin, 3 to 15 percent slopes	Low	Moderate	Moderate potential	55.6
Vantage-Clerf complex, 15 to 30 percent slopes	Low	Moderate	Moderate potential	16.1
Vantage-Clerf complex, 3 to 15 percent slopes	Low	Moderate	Moderate potential	9.5

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Vantage-Clerf complex, 30 to 45 percent slopes	Low	Moderate	Moderate potential	7.7
Vantage-Clerf-Rubble land complex, 30 to 45 percent slopes	Low	Moderate	Moderate potential	0.4
Wipple cobbly clay loam, 3 to 15 percent slopes	Low	Low	Low potential	12.4
Zen-Benwy-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	Moderate potential	8.5
Zen-Marlic-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	Moderate potential	0.0
NNR-7				
Argabak very cobbly loam, 3 to 15 percent slopes	Low	Moderate	Low potential	7.9
Argabak very stony loam, 3 to 15 percent slopes	Low	Moderate	Low potential	8.0
Brehm-Gorskel-Gorst complex, 10 to 15 percent slopes	Moderate	Moderate	Moderate potential	13.7
Disage-Clenage complex, 15 to 30 percent slopes	Low	Moderate	Not Rated	22.3
Drino cobbly loam, 15 to 30 percent slopes	Low	Moderate	Low potential	1.7
Drino-Disage-Kiona complex, 30 to 45 percent slopes	Low	Moderate	Low potential	4.3
Drino-Rubble land-Rock outcrop complex, 30 to 75 percent north slopes	Not Rated	Low	Not Rated	0.1
Drysel loam, 5 to 10 percent slopes	Moderate	Moderate	Low potential	51.6
Finley complex, 3 to 15 percent slopes	Moderate	Low	Low potential	10.1
Fortyday-Nevo-Rock outcrop, 3 to 15 percent slopes	Moderate	Low	Low potential	8.2
Grinrod-Horseflat complex, 15 to 30 percent slopes	Low	Moderate	Moderate potential	0.1
Laric-Zen complex, 3 to 15 percent slopes	Low	Moderate	Not Rated	20.3
Marlic-Zen-Laric complex, 3 to 15 percent slopes	Low	Moderate	Moderate potential	71.0
Norod-Horseflat complex, 15 to 30 percent slopes	Low	Moderate	High potential	19.3
Norod-Horseflat complex, 30 to 45 percent slopes	Low	Moderate	High potential	7.7
Norod-Ralock-Horseflat complex, 30 to 45 percent slopes	Moderate	Moderate	High potential	1.1
Norod-Ralock-Horseflat complex, 45 to 60 percent slopes	Low	Moderate	High potential	0.1
Nosser-Levnik complex, 3 to 15 percent slopes	Low	Moderate	Low potential	10.0

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Palerf-Ralock-Vantage complex, 15 to 30 percent slopes	Low	Moderate	High potential	47.3
Ralock-Palerf complex, 15 to 30 percent slopes	Moderate	High	High potential	3.7
Ralock-Palerf complex, 30 to 45 percent slopes	Moderate	High	High potential	6.0
Selah silt loam, 10 to 15 percent slopes	Moderate	Moderate	Moderate potential	41.1
Selah silt loam, 5 to 10 percent slopes	Moderate	Moderate	Moderate potential	42.2
Timmerman complex, 2 to 5 percent slopes	Moderate	Low	Low potential	17.8
Vantage very cobbly loam, 15 to 30 percent slopes	Low	Moderate	Moderate potential	1.3
Vantage very cobbly loam, thin, 3 to 15 percent slopes	Low	Moderate	Moderate potential	4.3
Vantage-Clerf complex, 15 to 30 percent slopes	Low	Moderate	Moderate potential	9.0
Vantage-Clerf complex, 30 to 45 percent slopes	Low	Moderate	Moderate potential	0.2
Wanapum complex, 5 to 10 percent slopes	Low	Moderate	Low potential	9.8
Zen-Benwy-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	Moderate potential	47.3
Zen-Marlic-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	Moderate potential	15.6
NNR-8				
Burbank loamy fine sand, 0 to 5 percent slopes	High	Low	Low potential	47.0
Burbank very cobbly loamy sand, 0 to 15 percent slopes	Moderate	Low	Low potential	4.6
Fortyday-Nevo-Rock outcrop, 3 to 15 percent slopes	Moderate	Low	Low potential	17.4
Fortyday-Rubble land-Rock outcrop complex, 45 to 70 percent slopes	Not Rated	Low	Not Rated	8.7
Schawana complex, 0 to 15 percent slopes	High	Low	Low potential	66.0
Water	Not Rated	Low	Not Rated	26.3
MR-1				
Argabak extremely cobbly loam, 3 to 15 percent slopes	Low	Moderate	Low potential	3.8
Argabak very cobbly loam, 3 to 15 percent slopes	Low	Moderate	Low potential	3.7
Argabak-Vantage complex, 3 to 15 percent slopes	Low	Moderate	Low potential	41.3
Argabak-Zen-Grinrod complex, 15 to 30 percent slopes	Low	Moderate	Low potential	6.6

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Argixerolls-Durixerolls complex, 30 to 70 percent south slopes	Low	Low	Moderate potential	0.5
Argixerolls-Durixerolls complex, steep south	Low	Low	Moderate potential	20.1
Benwy silt loam, 10 to 15 percent slopes	Moderate	High	Moderate potential	12.9
Benwy silt loam, 10 to 15 percent slopes	Moderate	Moderate	Moderate potential	0.1
Benwy silt loam, 5 to 10 percent slopes	Moderate	Moderate	Moderate potential	4.5
Blint very cobbly ashy loam, 45 to 60 percent slopes	Low	Low	High potential	0.0
Blint very cobbly loam, 15 to 30 percent slopes	Low	Moderate	High potential	0.7
Blint very cobbly loam, 45 to 60 percent slopes	Low	Moderate	High potential	3.3
Cheviot-Rubble land complex, 30 to 75 percent slopes	Low	Low	Moderate potential	3.9
Clerf very cobbly loam, 15 to 30 percent slopes	Low	Low	Moderate potential	20.0
Clerf very cobbly loam, 30 to 45 percent slopes	Low	Low	Moderate potential	23.6
Grinrod-Horseflat complex, 45 to 60 percent slopes	Low	Moderate	Moderate potential	7.6
Manastash-Selah-Durtash complex, 15 to 30 percent slopes	Moderate	Moderate	Moderate potential	22.2
Marlic-Zen-Laric complex, 3 to 15 percent slopes	Low	Moderate	Moderate potential	35.6
Niben-Vantage-Benwy complex, 15 to 30 percent slopes	Low	Moderate	High potential	25.3
Palerf-Ralock-Vantage complex, 15 to 30 percent slopes	Low	Moderate	High potential	13.8
Palerf-Ralock-Vantage complex, 30 to 70 percent slopes	Low	Moderate	High potential	5.2
Patron-Camaspatch complex, 15 to 30 percent slopes	Low	Moderate	High potential	3.5
Ralock silt loam, 30 to 45 percent slopes	Moderate	High	High potential	4.6
Ralock-Palerf complex, 30 to 45 percent slopes	Moderate	High	High potential	6.0
Ralock-Palerf complex, 30 to 45 percent slopes	Moderate	Moderate	High potential	4.7
Rollinger ashy silt loam, 10 to 15 percent slopes	Moderate	Moderate	High potential	0.7

MAP UNIT NAME/SLOPE	WIND EROSION POTENTIAL	WATER EROSION POTENTIAL	SOIL RESTORATION POTENTIAL	ACRES WITHIN 500-FOOT CORRIDOR (WITHIN 250 OF CENTERLINE)
Rollinger ashy silt loam, 45 to 60 percent slopes	Moderate	Moderate	High potential	0.3
Rollinger ashy silt loam, 5 to 10 percent slopes	Moderate	Moderate	High potential	1.2
Rollinger silt loam, 10 to 15 percent slopes	Moderate	Moderate	High potential	190.6
Rollinger silt loam, 15 to 30 percent slopes	Moderate	Moderate	High potential	9.4
Rollinger silt loam, 30 to 45 percent slopes	Moderate	Moderate	High potential	21.2
Rollinger silt loam, 45 to 60 percent slopes	Moderate	Moderate	High potential	23.0
Rollinger silt loam, 5 to 10 percent slopes	Moderate	Moderate	High potential	25.7
Selah loam, 5 to 10 percent slopes	Moderate	Moderate	Moderate potential	0.0
Selah silt loam, 5 to 10 percent slopes	Moderate	Moderate	Moderate potential	14.7
Vantage very cobbly loam, 3 to 15 percent slopes	Low	Moderate	Moderate potential	30.3
Vantage-Clerf complex, 15 to 30 percent slopes	Low	Moderate	Moderate potential	31.3
Vantage-Clerf complex, 30 to 70 percent slopes	Low	Moderate	Moderate potential	3.8
Wipple cobbly clay loam, 15 to 30 percent slopes	Low	Low	Moderate potential	34.3
Wipple cobbly clay loam, 30 to 45 percent slopes	Low	Low	Low potential	5.4
Wipple cobbly clay loam, 30 to 45 percent slopes	Low	Low	Moderate potential	26.2
Wockum-Blint-Windry complex, 45 to 60 percent slopes	Moderate	Moderate	High potential	3.0
Zen-Marlic-Laric complex, 3 to 15 percent slopes	Moderate	Moderate	Moderate potential	28.1

Table 3.15-2 Soil Series Descriptions

SERIES	DESCRIPTION
Adkins	Found on uplands at elevations of 250 to 2,300 feet. The parent material consists of eolian deposits. Depth to a root restrictive layer is > 78 inches. The natural drainage class is well drained.
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.
Argids	Found on terraces. The parent material consists of alluvium. Depth to a root restrictive layer is >78 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.

SERIES	DESCRIPTION
Bakeoven	Found on mountains, ridgetops, hillslopes, mesas, and benches. The parent material consists of mixed slope alluvium, loess, and residuum weathered from basalt. Depth to a root restrictive layer, lithic bedrock, is 10 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.
Cleman	Found on alluvial fans and floodplains. The parent material consists of alluvium. Depth to a root restrictive layer is > 78 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.
Ekrub	Found on terraces. The parent material consists of eolian sands. Depth to a root restrictive layer, duripan, is 18 inches. The natural drainage class is somewhat excessively 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.
Haploxeralls	Found on stream terraces and floodplains. The parent material consists of alluvium. Depth to a root restrictive layer is >78 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.
Kennewick	Found on terraces and terrace escarpments and foot slopes. The parent material consists of lacustrine sediments. Depth to a root restrictive layer is >78 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.
Lickskillet	Found on benches, shoulders of plateaus, canyon side slopes, hills, and ridgetops. The parent materials consist of residuum and colluvium derived from basalt. Depth to a root restrictive layer, lithic bedrock, is 20 inches The natural drainage class is well drained.
Malaga	Found on terraces. The parent material consists of glacial outwash. Depth to a root restrictive layer is 15 inches. The natural drainage class is somewhat excessively 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.
Moxee	Found on upland terraces. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 18 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.

SERIES	DESCRIPTION
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.
Prosser	Found on hillslopes, benches, and plateaus. The parent material consists of loess and glaciofluvial sediments with minor components of volcanic ash. Depth to a root restrictive layer, lithic bedrock, is 28 inches. The natural drainage class is well drained.
Quincy	Found on uplands, fan piedmonts, and terraces. The parent material consists of sands on dunes and terraces. Depth to a root restrictive layer is 78 inches. The natural drainage class is excessively drained.
Quinton	Found on hillslopes, benches, and terraces. The parent material consists of mixed eolian sands. Depth to a root restrictive layer, lithic bedrock, is 22 inches. The natural drainage class is excessively 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.
Renslow	Found on long, broad ridges, plateaus, hills and stream terraces. The parent material consists of loess. Depth to a root restrictive layer, lithic bedrock, is 44 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.
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.
Royal	Found on footslopes and terraces. The parent material consists of sandy alluvium and wind modified glaciofluvial sediments. Depth to a root restrictive layer is >78 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.
Rubble	Found on rock outcrops. Depth to a root restrictive layer is >78 inches. The natural drainage class is somewhat excessively 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.
Scooteney	Found on nearly level to steep alluvial fans and terraces. The parent material consists of alluvium. Depth to a root restrictive layer is >78 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.
Semal	Found on terraces. The parent material consists of glacial outwash mixed with loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.
Sohappy	Found on structural benches, footslopes and toeslopes. The parent material consists of loess over colluvium. Depth to a root restrictive layer, lithic bedrock, is 47 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.
Taunton	Found on terraces and basalt plains, fan terraces, and mesas. The parent material consists of alluvium. Depth to a root restrictive layer, duripan, is 27 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.

SERIES	DESCRIPTION
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
Torrifluvents	Found on floodplains. The parent material consists of alluvium. Depth to a root restrictive layer is >78 inches. The natural drainage class is somewhat excessively 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.
Wanser	Found on floodplains or depressional areas. The parent material consists of sand derived from mixed sources. Depth to a root restrictive layer is >78 inches. The natural drainage class is poorly 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.
Winchester	Found on terraces, dunes, and terrace escarpments. The parent material consists of sandy alluvial and eolian sand or glacial outwash. Depth to a root restrictive layer is >78 inches. The natural drainage class is excessively 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.

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 Project. Also described are the effects of taking no action (No Action 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 commitments 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 transmission line. 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).

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 2.2.2). Short-term, long-term, and access road disturbance was estimated and the disturbance model calculations and assumptions are presented in Chapter 2, Section 2.2.3.2. 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 New Northern Route Alternative - 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 2.2.5. 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 (i.e., vegetation is crushed, but not cropped and 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 2-3).

The short-term, long-term, and access road disturbance calculations by route segment and end-to- end Action Alternatives are presented in Section 2.6 and Tables 2-7 through 2-16.

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

Required Design Features (RDFs) and environmental protection measures described in Chapter 2 (Section 2.3) 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 RDFs 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 RDFs to address identified impacts.

4.1.1.4 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 Action 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 construction of the proposed Project, the Proponent would coordinate the implementation of mitigation with the BLM, other cooperating agencies, and landowners at specific locations.

A Framework for Development of a Sage-Grouse Compensatory Mitigation Plan (Mitigation Framework) has been developed and is included in Appendix B-6. This Mitigation Framework was developed to compensate for residual impacts from the proposed Project to 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

To calculate impacts to vegetation from the proposed Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project (Project), the number of miles traversed and corresponding vegetative cover types for each of the transmission line Action Alternative route segments were calculated. 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 of 1973 (ESA) and ESA Section 7 Consultation guidelines (U.S. Fish and Wildlife Service [USFWS] and National Marine Fisheries Service 1998). Other rare plant species of concern were analyzed following U.S. 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 within the 150-foot wide survey corridor for proposed route segments (Appendix B-3 Special Status Plants Reports). Sections of some route segments and the majority of Manastash Ridge Subroute (MR-1) were not surveyed due to route adjustments that were made following the completion of the pedestrian surveys and additional survey timing being outside the appropriate seasonal survey period. Federal and state lands comprise approximately 43 percent of the total survey corridor for all of the Action Alternatives. The remaining 57 percent is comprised of non-federal (private and county) land and was not surveyed. Of the 1,378.9 acres of federal and state lands within the 150-foot wide survey corridor, 645.9 acres (47 percent) were accessible and surveyed (see Table 3.2-3). As not all land within the 150-foot survey corridor was surveyed, the analysis for special status plants is based upon several assumptions which have been incorporated into Required Design Features (RDFs). First, right-of-way (ROW) clearance surveys on federal land would be completed prior to construction and during the appropriate season for the detection of special status plants 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 to 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 the proposed 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; therefore, 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 the proposed Project may have on special status plants on private land.

For the New Northern Route (NNR) Alternative - Underground Design Option, the analysis assumed that open cut trenching would be used for the entire length of the underground section/route segment. Open cut trenching is the most common method of construction for underground transmission line installation. Also for the NNR Alternative - 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 study 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 communities (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[1]	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.
Rock/Basalt Cliffs	Moderate	Reduction in quality habitat that supports sensitive obligate species and is limited in distribution.
Intermittent Stream or Dry Gully	Moderate	Reduction in habitat (abundance and quality) that is slow to recover to pre-disturbance state.
Sagebrush/Annual Grassland 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 Grassland, Perennial Grassland	Low	Reduction in habitat (abundance and quality).

[1]Based on 2011 and 2013 survey data (Appendix B-3) and WNHP buffered occurrence data (WNHP 2015a).

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 the intensity of impacts, duration of impacts was considered. 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 proposed Project are presented in Table 4.2-2.

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.

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.

4.2.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Impact levels are based on vegetation types that occur along the assumed transmission line centerline. 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 overhead transmission line construction. To assess impacts to vegetation resources, a 150-foot wide survey corridor was analyzed. Impacts to vegetation resources from the NNR Alternative - 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 above-ground 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 (*Artemisia* sp.) and rabbitbrush (*Chrysothamnus viscidiflorus* and *Ericameria nauseosa*), may require 30 to 50 years (Olson et al. 2000; Lesica et al. 2005). RDFs would be implemented during construction and operation and are anticipated to be effective at minimizing the amount of vegetation that would be impacted (refer to Section 2.3 - Required Design Features Common to Action Alternatives). RDFs 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 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 (*Bromus tectorum*), 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. RDFs 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 ongoing maintenance activities 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. RDFs 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 a 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 development (JBLM YTC 2002; Rice et al. 2008; Shaw et al. 1999). RDFs would be implemented during construction, operation, and maintenance and are anticipated to be effective at reducing further degradation of habitat. RDFs 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 ongoing maintenance activities 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 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 RDFs described above to reduce impacts to general vegetation, the following RDFs 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 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 are based on: known occurrences in the 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 proposed Project is located in. To provide a regional context for special status plants, the region is defined as the Yakima River Basin and Upper Columbia River Basin watersheds. Impacts to these species are discussed below.

Umtanum Desert Buckwheat

The entire known range of Umtanum desert buckwheat (*Eriogonum codium*) is on federally owned land within 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. Critical Habitat for Umtanum desert buckwheat, which was designated December 2013, is located outside of the Project area, approximately 1.5 miles from Route Segment 3c (USFWS 2013a). 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 (*Spiranthes diluvialis*) is known to occur in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, Wyoming, and Canada (British Columbia). 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 other 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 2011 or 2013. Since these surveys were conducted, USFWS Information for Planning and

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]																	
			1a/ NNR -1	1b	1c	2a	2b	2c	2d	3a	3b	3c	NNR -2	NNR -3	NNR- 4o/ NNR- 4u	NNR -5	NNR- 6o/ NNR- 6u	NNR -7	NNR -8	MR- 1
Awned halfchaff sedge	*Lipocarpha aristulata*	BLM-S	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	MIN	NE	NE	NE	NE	NE	NE	NE	NE
Basalt daisy	*Erigeron basalticus*	SOC, BLM-S	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	MIN	NE	NE	NE	NE	NE	NE
Beaked cryptantha	*Cryptantha rostellata* (synonym = *Cryptantha flaccida)*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Columbia cress	*Rorippa columbiae*	SOC, BLM-S	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	NE	NE	NE	NE	NE	NE	NE	NE
Columbia milkvetch	*Astragalus columbianus*	SOC, BLM-S	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	NE	NE	NE	NE	MIN	MIN	MIN	NE
Coyote tobacco	*Nicotiana attenuata*	BLM-S	MIN	NE	NE	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Dwarf evening-primrose	*Eremothera pygmaea* (synonym = *Camissonia pygmaea)*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Fuzzytongue penstemon	*Penstemon eriantherus var. whitedii*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	NE	NE	NE	NE	NE	NE	NE	NE
Geyer's milkvetch	*Astragalus geyeri*	BLM-S	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	NE	NE	NE	NE	NE	NE	MIN	NE
Grand redstem	*Ammannia robusta*	BLM-S	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	NE	NE	NE	NE	NE	NE	NE	NE
Gray cryptantha	*Cryptantha leucophaea*	SOC, BLM-S	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	MIN	NE	NE	NE	NE	NE	MIN	MIN	NE
Hoover's desert-parsley	*Lomatium tuberosum*	SOC, BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Hoover's tauschia	*Tauschia hooveri*	SOC, BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Longsepal globemallow	*Iliamna longisepala*	BLM-S	MIN	NE	NE	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN

COMMON NAME	SCIENTIFIC NAME	LEGAL STATUS [2]	EFFECTS DETERMINATION BY ROUTE SEGMENT[1]																	
			1a/ NNR -1	1b	1c	2a	2b	2c	2d	3a	3b	3c	NNR -2	NNR -3	NNR-4o/ NNR-4u	NNR -5	NNR-6o/ NNR-6u	NNR -7	NNR -8	MR-1
Naked-stemmed evening-primrose	*Chylismia scapoidea ssp. scapoidea (synonym = Camissonia scapoidea ssp. scapoidea)*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	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	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Pauper milkvetch	*Astragalus misellus var. pauper*	BLM-S	MIN	NE	NE	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Piper's daisy	*Erigeron piperianus*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	NE	NE	NE	NE	NE	NE	NE	NE
Snake River cryptantha	*Cryptantha spiculifera*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	NE	NE	NE	NE	NE	NE	NE	NE
Snowball cactus	*Pediocactus nigrispinus*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Suksdorf's monkeyflower	*Erythranthe suksdorfii (synonym = Mimulus suksdorfii)*	BLM-S	MIN	NE	NE	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Umtanum desert buckwheat	*Eriogonum codium*	T	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ute ladies'-tresses	*Spiranthes diluvialis*	T	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN
Wanapum crazyweed	*Oxytropis campestris var. wanapum*	SOC, BLM-S	NE	NE	NE	NE	NE	NE	NE	NE	NE	MIN	NE	NE	NE	NE	NE	NE	NE	NE
Wenatchee Mountain checker-mallow	*Sidalcea oregana* var. *calva*	E	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN
White Bluffs bladderpod	*Physaria douglasii* ssp. *tuplashensis*	T	NE	NE	NE	NE	NE	NE	NE	NE	MN	MN	NE	NE	NE	NE	NE	NE	NE	NE

COMMON NAME	SCIENTIFIC NAME	LEGAL STATUS [2]	EFFECTS DETERMINATION BY ROUTE SEGMENT[1]																	
			1a/ NNR -1	1b	1c	2a	2b	2c	2d	3a	3b	3c	NNR -2	NNR -3	NNR-4o/ NNR-4u	NNR -5	NNR-6o/ NNR-6u	NNR -7	NNR -8	MR-1
Wormskiold's northern wormwood	*Artemisia campestris ssp. borealis var. wormskioldii (synonym = Artemisia borealis* var. *wormskioldii)*	BLM-S	NE/ NE	NE/ NE	NE/ NE	NE/ NE	NE/ NE	NE/ NE	NE/ NE	MIN	MIN	MIN	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. For Federally Listed Species: NE=No effect; MN=May affect, not likely to adversely affect.
[2] E – Endangered; T – Threatened; C – Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive.

Conservation no longer considers Ute ladies'-tresses as having the potential to occur within the Project area (USFWS 2015). 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, RDFs that have been incorporated into the proposed Project are anticipated to minimize impacts to special status species. RDFs include: adhering to measures and terms and conditions that are identified during the consultation period under Section 7 of the ESA; 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.

Wenatchee Mountain Checker-Mallow

The known historical and current range of Wenatchee Mountain checker-mallow (*Sidalcea oregana* var. *calva*) 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. 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. The nearest population is located approximately 50 miles north of the Project area. No occurrences of this species were found during the special status plant surveys in 2011 or 2013. Primary threats to the species 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, RDFs that have been incorporated into the proposed Project are anticipated to minimize impacts to special status species. RDFs include: adhering to measures and terms and conditions developed during the consultation period under Section 7 of the ESA 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 a Plant Protection Plan 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 (*Physaria douglasii* ssp. *tuplashensis*) 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 non-native weeds, OHV use, and wildland fire. No occurrences of this species were found during the special status plant surveys in 2011 or 2013. The effects determination of no effect was made for all route segments except for Route Segments 3b and 3c. For these route segments, 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. RDFs that have been incorporated into the proposed Project are anticipated to minimize impacts to special status species. RDFs include: adhering to measures and terms and conditions developed during the consultation period under Section 7 of the ESA 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.

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 1a/NNR-1

General Vegetation

Route Segment 1a/NNR-1 parallels Sage Trail Road and an existing distribution line. Construction of Route Segment 1/aNNR-1 would result in approximately 4.9 acres of long-term ground disturbance to vegetation (Table 4.2-4). Long-term disturbance to vegetation communities would occur in 0.3 acre of annual grasslands and noxious weeds, 0.9 acre of rabbitbrush/annual grassland, and 3.7 acres of big sagebrush (*Artemisia tridentata*) perennial grassland (Table 4.2-4). Short-term disturbance would occur to approximately 5.2 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 RDFs designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

With the implementation of RDFs, long-term impacts to vegetation from the construction of Route Segment 1a/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 1a/NNR-1 (Table 4.2-5). No known WNHP priority ecosystems would be disturbed through construction of Route Segment 1a/NNR-1. No special status plant surveys were conducted on Route Segment 1a/NNR-1 because there are no federal or state lands within this route segment’s 44.1-acre survey corridor. All of Route Segment 1a/NNR-1 is comprised of non-federal or state land and was not surveyed (Table 3.2-3). As this route segment corridor was not 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 0.4 acre unsuitable habitat (Table 4.2-5). In addition to RDFs described above to reduce impacts to general vegetation, the following RDFs 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.

With the implementation of RDFs described above, impacts to special status plant species and potential suitable habitat are 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 1b

General Vegetation

Construction of Route Segment 1b would result in long-term disturbance of approximately 33.8 acres of vegetation. The majority of long-term disturbance, 28.4 acres, would occur in areas classified as sagebrush/perennial grassland (Table 4.2-4). Long-term disturbance would also occur to annual (1.7 acres) and perennial (3.1 acres) grasslands, rabbitbrush/annual grasslands (0.5 acre), and quaking aspen (*Populus tremuloides*; 0.1 acre). Short-term disturbance would occur to approximately 19.2 acres of vegetation. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

With the implementation of RDFs, long-term impacts to vegetation from the construction of Route Segment 1b are anticipated to be: 1.1 miles of no identifiable, 5.1 miles of low, and 6.4 miles of moderate.

Special Status Species and Priority Habitats

No federally listed plants are known to occur along Route Segment 1b (Table 4.2-5). Nuttall's sandwort (*Minuartia nuttallii ssp. fragilis*) and snowball cactus (*Pediocactus nigrispinus*) were documented during special status plant surveys along Route Segment 1b, as described below, and WNHP data indicate that Hoover's tauschia (*Tauschia hooveri*) occurs within one mile of Route Segment 1b (Table 4.2-5). No WNHP priority ecosystems are known to occur or would be disturbed through construction of Route Segment 1b. Approximately 57 percent (138.2 acres) of federal lands within this route segment were surveyed for special status plants (Table 3.2-3). The remaining un-surveyed area consisted of 103.7 acres of inaccessible federal lands and 1.9 acres of non-federal lands. As not all land within the route segment corridor was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants, including 5.1 acres of suitable, 5.4 acres of marginal, and 0.8 acre unsuitable habitat. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment 1b to minimize impacts to special status plants.

With the implementation of RDFs, impacts to special status plant species and potential suitable habitat are anticipated to include 0.9 mile of no identifiable, 5.0 miles of low impacts, and 6.7 miles of moderate impacts.

Nuttall's Sandwort

Nuttall's sandwort is a BLM Sensitive and a Washington Threatened species. This species is found in Oregon, California, Nevada, and Grant County, Washington. Within the region, two populations occupying approximately 884 acres are known to occur. One occurrence of Nuttall's sandwort was documented during the special status plant surveys along Route Segment 1b. This occurrence consisted of approximately 10 individuals scattered throughout 34 square feet. Approximately 0.1 acre of long-term disturbance and 0.4 acre of short-term disturbance in known occupied habitat are anticipated to occur along this route segment, less than 0.1 percent of the known occupied habitat of Nuttall's sandwort in the region. As all potential habitat was not surveyed, additional Nuttall's sandwort occurrences could be present. For the proposed Project, direct impacts to Nuttall’s sandwort could occur due to habitat loss from ground disturbance, injury and/or mortality from vehicle and human trampling during construction and maintenance and increased OHV activity. Indirect impacts could occur through the degradation in habitat quality through the establishment of noxious weeds and invasive plants [e.g., cheatgrass] and increased wildland fire. In addition to RDFs described above, the following RDFs would be also be implemented to reduce direct and indirect impacts to Nuttall’s sandwort from the proposed Project: maintain intact vegetation wherever possible; minimize the blading of native plant communities during construction, consistent with safe construction practices; utilize overland travel where feasible; reseed disturbed areas using an agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and develop and incorporate a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. It was assumed that the occurrence of Nuttall’s sandwort will be spanned and no construction activities will disturb this occurrence. With the implementation of RDFs described above and the assumption that this occurrence will be spanned, Project construction, operation, and maintenance could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

Snowball Cactus

Snowball cactus is a BLM Sensitive and Washington Sensitive Species. Snowball 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 approximately 11,895 acres are known to occur. Two occurrences of snowball cactus were documented during the special status plant survey along Route Segment 1b. This species was not added to the BLM sensitive plant list until after the surveys were complete; therefore, its mapped location is based on field notes and retrospective mapping. As such, information on number of individuals and acres occupied was not collected. As all potential habitat was not surveyed, additional snowball cactus occurrences could be present. Approximately 0.3 acre of long-term disturbance and 1.9 acres of short-term disturbance in known occupied habitat are anticipated to occur along this route segment, less than 0.1 percent of the known occupied habitat of snowball cactus in the region. WNHP indicates that an additional snowball cactus occurrence is located along a 0.4-mile section of Route Segment 1b. Direct and indirect impacts that could occur and RDFs that would be implemented for snowball cactus are similar to those described above for Nuttall’s sandwort. In addition, closing access roads that are not required for operation and maintenance would minimize potential impacts from cactus collectors. With the implementation of RDFs described above and the assumption that occurrences will be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

4.2.4.3 Route Segment 1c

General Vegetation

Route Segment 1c parallels Route Segment 1b for the majority of the route segment. Long-term disturbance to approximately 33.5 acres of land (Table 4.2-4) would occur with the construction of Route Segment 1c. Over half of the long-term disturbance, 17.2 acres, would occur in areas classified as sagebrush/perennial grassland. Construction would result in the long-term disturbance of 13.6 acres of annual grasslands, small amounts of intermittent stream/gully (0.1 acre), perennial grassland (2.0 acres), and rabbitbrush/annual grasslands (0.6 acre). Short-term disturbance would occur to approximately 32.3 acres of vegetation. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

Impacts for Route Segment 1c are anticipated to be: 1.2 miles of no identifiable, 8.7 miles of low, and 3.1 miles of moderate.

Special Status Species and Priority Habitats

No federally listed plants are known to occur along Route Segment 1c (Table 4.2-5). WNHP data indicate that snowball cactus is known to occur along Route Segment 1c and Nuttall's sandwort and Hoover's tauschia occur within one mile of Route Segment 1c. No WNHP priority ecosystems are known to occur along Route Segment 1c. One hundred percent (1.7 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 1c is comprised of non-federal land (249.6 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants, including 6.0 acres of suitable, 16.2 acres of marginal, and 0.8 acre unsuitable habitat. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment 1c to minimize impacts to special status plants.

With the implementation of RDFs, impacts to special status plant species and potential suitable habitat are anticipated to include 1.2 miles of no identifiable, 8.6 miles of low impacts, and 3.2 miles of moderate impacts.

Snowball Cactus

WNHP data indicate that snowball cactus intersects Route Segment 1c for 0.5 mile. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. All potential habitat on federal and state lands was surveyed; therefore, it is unlikely snowball cactus occurs in Route Segment 1c. With the implementation of RDFs 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 a trend toward federal listing. Refer to Route Segment 1b for more information on snowball cactus.

4.2.4.4 Route Segment 2a

General Vegetation

Long-term disturbance to approximately 2.1 acres of land would occur with the construction of Route Segment 2a (Table 4.2-4). Construction would result in the long-term disturbance of 1.9 acres of annual grasslands and 0.2 acre of perennial grasslands. Short-term disturbance would occur to approximately 3.9 acres of vegetation. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

Impacts for Route Segment 2a are anticipated to be: 1.0 mile of low.

Special Status Species and Priority Habitats

No special status plant species or priority ecosystems are known to occur along Route Segment 2a (Table 4.2-5). No WNHP priority ecosystems are known to occur along Route Segment 2a. The entirety of Route Segment 2a is comprised of non-federal land (19.3 acres) and was not surveyed (Table 3.2-3). As land within the route segment corridor was not surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to 2.1 acres of marginal habitat for special status plants. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment 2a 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 RDFs, impacts to special status plant species and potential suitable habitat are anticipated to include 1.0 mile of low impacts.

4.2.4.5 Route Segment 2b

General Vegetation

Construction of Route Segment 2b would result in long-term disturbance to approximately 73.8 acres of land (Table 4.2-4). The majority of long-term disturbance, 65.8 acres, would occur in areas classified as sagebrush/perennial grassland. Long-term disturbance would also occur to annual (5.7 acres) and perennial (1.6 acres) grasslands and a small amount (0.7 acre) of intermittent stream/gully. Short-term disturbance would occur to approximately 15.3 acres of vegetation. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

Impacts for Route Segment 2b are anticipated to be: 1.1 miles of no identifiable, 4.2 miles of low, and 11.1 miles of moderate.

Special Status Species and Priority Habitats

No federally listed plant species were identified along Route Segment 2b. Columbia milkvetch (*Astragalus columbianus*) was documented in special status plant surveys for Route Segment 2b (Table 4.2-5), as described below. No WNHP priority ecosystems are known to occur along Route Segment 2b. Eighty-five percent (43.0 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2b is comprised of non-federal land (266.9 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants and include 26.2 acres of suitable, 7.3 acres of marginal and 2.3 acres unsuitable habitat. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment 2b 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 RDFs, impacts to special status plant species and potential suitable habitat are anticipated to include 1.1 miles of no identifiable, 3.8 miles of low impacts, and 11.5 miles of moderate impacts.

Columbia Milkvetch

Columbia milkvetch is a federal Species of Concern and BLM Sensitive and Washington Sensitive species. Columbia milkvetch is restricted to an area of approximately 25 miles by 5 miles located 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. This species was identified along a 0.5-mile section of Route Segment 2b (Table 4.2-5). This occurrence was near a previously documented WNHP population and consisted of approximately 116 individuals scattered throughout 1.9 acres.

Approximately 0.9 acres of long-term disturbance and 1.8 acres of short-term disturbance in known occupied habitat are anticipated to occur along this route segment, less than 0.1 percent of the known occupied habitat of Columbia milkvetch in the region. WNHP indicates that a second Columbia milkvetch occurrence is located along a 0.6 mile section of Route Segment 2b. As all potential habitat was not surveyed, additional Columbia milkvetch occurrences could be present. 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). For the proposed Project, direct and indirect impacts to Columbia milkvetch are similar to those described above for Nuttall's sandwort. With the implementation of RDFs described above and the assumption that this occurrence will be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

4.2.4.6 Route Segment 2c

General Vegetation

Construction of Route Segment 2c would result in long-term disturbance to approximately 34.3 acres of land (Table 4.2-4). The majority of long-term disturbance, 24.8 acres, would occur in areas classified as sagebrush/perennial grassland. Long-term disturbance would also occur to annual (9.4 acres) and perennial (0.1 acre) grasslands. Short-term disturbance would occur to approximately 22.1 acres of vegetation. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

Impacts for Route Segment 2c are anticipated to be: 7.6 miles of no identifiable, 6.0 miles of low, and 4.6 miles of moderate.

Special Status Species and Priority Habitats

No special status plant species or priority ecosystems are known to occur along Route Segment 2c (Table 4.2-5). Columbia milkvetch occurs within one mile of Route Segment 2c. No WNHP priority ecosystems are known to occur along Route Segment 2c. Fifty percent (0.1 acre) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2c is comprised of non-federal land (351.5 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants and include 8.0 acres of suitable, 9.5 acres of marginal and 5.2 acres unsuitable habitat. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment 2c to minimize impacts to special status plants.

With the implementation of RDFs, impacts to special status plant species and potential suitable habitat are anticipated to include 7.6 miles of no identifiable, 6.0 miles of low impacts, and 4.6 miles of moderate impacts.

4.2.4.7 Route Segment 2d

General Vegetation

Long-term disturbance to approximately 36.6 acres of land would occur through the construction of Route Segment 2d (Table 4.2-4). The majority of disturbance, 34.1 acres, would occur in areas classified as sagebrush/perennial grassland. Annual and perennial grasslands (1.4 and 1.1 acres, respectively) would also be disturbed on a long-term basis. Short-term disturbance would occur to approximately 5.2 acres of vegetation. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

Impacts for Route Segment 2d are anticipated to be: 1.4 miles of low and 5.7 miles of moderate.

Special Status Species and Priority Habitats

No federally listed plant species are known to occur along Route Segment 2d (Table 4.2-4). Two special status plant species are known to occur along sections of this route segment: awned halfchaff sedge (*Lipocarpha aristulata*; 0.2 mile; WNHP occurrence) and Columbia milkvetch (2.0 miles; documented in special status plant surveys), as described below. Beaked spike-rush (*Eleocharis rostellata*), gray cryptantha (*Cryptantha leucophaea*), Hoover's desert-parsley (*Lomatium tuberosum*), Nuttall's sandwort, and Piper's daisy (*Erigeron piperianus*) also occur within one mile of Route Segment 2d. No WNHP priority ecosystems are known to occur along Route Segment 2d. One hundred percent (19.7 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2d is comprised of non-federal land (117.3 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 would occur to potential habitat for special status plants and include 12.8 acres of suitable and 2.6 acres of marginal habitat. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment 2d to minimize impacts to special status plants.

With the implementation of RDFs, impacts to special status plant species and potential suitable habitat anticipated to include 0.2 mile of low impacts and 6.9 miles of moderate impacts.

<u>Awned Halfchaff Sedge</u>

Awned halfchaff sedge is a BLM Sensitive and Washington Threatened species. This species is found from California north to Washington and west to Idaho, Wyoming, Utah, Arizona, Colorado, New Mexico, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, and Indiana. In Washington, awned halfchaff sedge is known from two recent occurrences occupying approximately 2,718 acres along the Columbia River in Benton, Grant, and Franklin counties and five historical occurrences from Klickitat, Whitman, Benton, and Asotin counties. WNHP data indicate that awned halfchaff sedge occurrences intersect Route Segment 2d for 0.2 mile. This location includes a large buffer, so it is difficult to accurately determine whether this occurrence truly intersects the ROW corridor. The known occurrences of awned halfchaff sedge are within wetlands along the Columbia River. With the proposed Project, wetlands and the area immediately adjacent to the Columbia River would be avoided. All potential habitat on federal and state lands was surveyed; therefore, it is unlikely awned halfchaff sedge occurs in Route Segment 2d. With the implementation of RDFs 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 a trend toward federal listing.

<u>Columbia Milkvetch</u>

Refer to Route Segment 2b for more information on Columbia milkvetch. Columbia milkvetch was documented during special status plant surveys along a 0.6-mile section of Route Segment 2d. Approximately 1.2 acres of long-term disturbance and 2.2 acres of short-term disturbance in known and potentially occupied habitat are anticipated to occur along this route segment, less than 0.1 percent of the known occupied habitat of Columbia milkvetch in the region. WNHP and BLM Geographic Biotic Observations (GeoBOB) data indicate that this species occurs along an additional 1.4-mile section of Route Segment 2d. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. All potential habitat on federal and state lands was surveyed, so it is unlikely Columbia milkvetch occurs elsewhere in Route Segment 2d. In addition, it was assumed that this occurrence will be spanned and construction activities would avoid this occurrence. Direct and indirect impacts and RDFs that would be implemented to minimize impacts to occurrences Columbia milkvetch are similar to those described above for Route Segment 2b. With the implementation of RDFs described above and the assumption that this occurrence will be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

4.2.4.8 Route Segment 3a

General Vegetation

Long-term disturbance to approximately 1.2 acres of land would occur through the construction of Route Segment 3a and would be entirely in sagebrush/perennial grasslands (1.2 acre; Table 4.2-4). No short-term disturbance to vegetation is anticipated. Impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

Impacts for Route Segment 3a are anticipated to be moderate for the total length (0.2 mile).

Special Status Species and Priority Habitats

No special status plant species or WNHP priority ecosystems are known to occur along Route Segment 3a (Table 4.2-5). Annual sandwort (*Minuartia pusilla* var. *pusilla*), beaked spike-rush, Geyer's milkvetch (*Astragalus geyeri*), gray cryptantha, and Great Basin gilia (*Aliciella leptomeria*) occur within one mile of Route Segment 3a. The entirety of this route segment is comprised of non-federal land (3.3 acres) and was not surveyed (Table 3.2-3). As land within the route segment corridors was not surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to 0.1 acre potential suitable habitat for special status plants. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment 3a to minimize impacts to special status plants.

With the implementation of RDFs, impacts to special status plant species and potential suitable habitat are anticipated to include 0.2 mile of moderate impacts.

4.2.4.9 Route Segment 3b

General Vegetation

Long-term disturbance to approximately 28.9 acres of land would occur through the construction of Route Segment 3b (Table 4.2-4). Over three-quarters of the disturbance would occur in areas classified as sagebrush/perennial grassland (25.3 acres). The remaining disturbance would occur in annual (0.4 acre) and perennial (0.7 acre) grasslands, rabbitbrush/annual grassland (0.3 acre), sagebrush/annual grassland (0.4 acre), riparian/wetland (0.4 acre), trees (1.2 acres), and rock/basalt cliff (0.2 acre) cover types. Short-term disturbance would occur to approximately 13.1 acres of vegetation. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

Impacts for Route Segment 3b are anticipated to be: 12.6 miles of no identifiable, 1.9 miles of low, and 7.3 miles of moderate.

Special Status Species and Priority Habitats

No federally listed plant species were identified along Route Segment 3b (Table 4.2-5). Special status plant species known to occur along sections of this route segment include: annual sandwort (WNHP occurrence), awned halfchaff sedge (WNHP occurrence), beaked spike-rush (WNHP occurrence), bristle-flowered collomia (*Collomia macrocalyx*; WNHP occurrence), caespitose evening-primrose (*Oenothera caespitosa* ssp. *caespitosa*; documented in special status plant surveys), Columbia milkvetch (documented in special status plant surveys), Hoover's desert-parsley (WNHP occurrence), gray cryptantha (WNHP occurrence), and Kalm's lobelia (*Lobelia kalmii*; WNHP occurrence). BLM GeoBOB and WNHP data indicate that the following species are also within one mile of Route Segment 3b: beaked cryptantha (*Cryptantha rostellata*), dwarf evening-primrose (*Eremothera pygmaea*), grand redstem (*Ammannia robusta*), Great Basin gilia, naked-stemmed evening-primrose (*Chylismia scapoidea ssp. scapoidea*), Nuttall's sandwort, snowball cactus, white eatonella (*Eatonella nivea*), and Wormskiold's northern wormwood. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor.

No WNHP priority ecosystems are known to occur along Route Segment 3b. Thirty-six percent (61.1 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 3b is comprised of non-federal land (250.6 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 would occur to potential habitat for special status plants and include 6.5 acres of suitable, 1.5 acres of marginal, and 22.7 acres of unsuitable habitat. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment 3b to minimize impacts to special status plants.

With the implementation of RDFs, impacts to special status plant species and potential suitable habitat are anticipated to include 6.8 miles of no identifiable, 0.8 mile of low impacts, and 14.2 miles of moderate impacts.

Annual Sandwort

Annual sandwort is a Washington Sensitive 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. Within the region, one population occupying approximately 23 acres is known to occur. The primary threat to annual sandwort is from OHVs. WNHP data indicate that annual sandwort intersects Route Segment 3b for approximately 0.4 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. With the implementation of RDFs 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.

Awned Halfchaff Sedge

Awned halfchaff sedge is described above for Route Segment 2d. WNHP data indicate that awned halfchaff sedge intersects Route Segment 3b for 0.3 mile. This location includes a large buffer, so it is difficult to accurately determine whether this occurrence truly intersect the ROW corridor. The known occurrences of awned halfchaff sedge are within wetlands along the Columbia River. Within the proposed Project, wetlands and the area immediately adjacent to the Columbia River would be avoided. As not all federal and state land were surveyed, additional awned halfchaff sedge occurrences could be present. With the implementation of RDFs 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 a trend toward federal listing.

Beaked Spike-Rush
Beaked spike-rush is a BLM Strategic and Washington Sensitive species. 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. Within the region, beaked spike-rush is known from six populations occupying approximately 563 acres. The primary threats to this species are the invasion of habitat by exotic species and loss of habitat through the increased density of woody species (WNHP and BLM 2005). WNHP data indicate that beaked spike-rush intersects Route Segment 3b for 0.7 mile. Impacts from the proposed Project are similar to those described above for Nuttall's sandwort. With the implementation of RDFs described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

Bristle-flowered Collomia
Bristle-flowered collomia is a BLM Strategic 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 indicate that bristle-flowered collomia intersects Route Segment 3b 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 RDFs 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
Caespitose evening-primrose is a BLM Strategic 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. This species was identified along a 0.4-mile section of Route Segment 3b during special status plant surveys (Table 4.2-5). The occurrence of caespitose evening primrose was located within a previously documented location and consisted of approximately 75 individuals scattered along the ROW. Approximately 0.3 acre of long-term disturbance and 1.4 acres of short-term disturbance are anticipated to occur in this location, 0.1 percent of known occupied habitat for caespitose evening-primrose in the region. WNHP data indicate additional occurrences of caespitose evening-primrose may occur along Route Segment 3b. These locations include large buffers; therefore, it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Direct impacts to this species could occur due to habitat loss from ground disturbance, injury and/or mortality from vehicle and human trampling during construction and maintenance, and increased OHV activity. Indirect impacts could occur through the degradation in habitat quality through the establishment of noxious weeds and invasive plants (e.g., cheatgrass) and increased wildland fire. In addition to RDFs described above, the following RDFs would be also be implemented to reduce direct and indirect impacts

to caespitose evening-primrose from the proposed Project: maintain intact vegetation wherever possible; minimize the blading of native plant communities during construction, consistent with safe construction practices; utilize overland travel where feasible; reseed disturbed areas using an agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and develop and incorporate a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. It was assumed that this occurrence will be spanned and construction activities would avoid this occurrence. With the implementation of RDFs described above and the assumption that this occurrence will be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

Columbia Milkvetch
Refer to Route Segment 2b for information on Columbia milkvetch. Columbia milkvetch was documented along a 0.7-mile section of Route Segment 3b during special status plant surveys. The occurrence of Columbia milkvetch contained over 220 individuals within and was located near previously documented populations. WNHP data indicates that an additional Columbia milkvetch occurrence intersects Route Segment 3b for 0.2 mile. These locations include large buffers; therefore, it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Direct impacts and RDFs that would be implemented to minimize impacts to occurrences Columbia milkvetch are similar to those described above for Route Segment 2b. Approximately 0.9 acres of long-term disturbance and 3.2 acres of short-term disturbance are anticipated to occur in this location, less than 0.1 percent of the known occupied habitat for Columbia milkvetch in the region. It was assumed that these occurrences will be spanned and construction activities would avoid occurrences. With the implementation of RDFs 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 a trend toward federal listing.

Gray Cryptantha
Gray cryptantha is a federal Species of Concern and BLM Sensitive and Washington Sensitive species. This species 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. Within the region, gray cryptantha is known from 33 populations occupying approximately 16,169 acres. The primary threats to this species include OHV use, increased weed invasions, changes in sand deposition, and agricultural conversion (WNHP and BLM 2005). WNHP data indicate that gray cryptantha intersects Route Segment 3b for 1.8 miles. These locations include large buffers; therefore, it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Impacts from the proposed Project are similar to those described above for Nuttall’s sandwort. With the implementation of RDFs described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

Hoover’s Desert-Parsley
Hoover’s desert-parsley is a federal Species of Concern and 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. The primary threats to this species include gravel extraction, road construction, military training activities, grazing herbicide drift from nearby agricultural land and noxious weed establishment (WNHP and BLM 2005). WNHP data indicate that Hoover’s desert-parsley intersects Route Segment 3b for 3.8 miles. These locations include large buffers; therefore, it is difficult to accurately determine whether these occurrences truly intersect the ROW

corridor. Impacts from the proposed Project are similar to those described above for Nuttall's sandwort. With the implementation of RDFs described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

Kalm's Lobelia
Kalm's lobelia is a BLM Strategic and Washington Endangered species. Kalm's lobelia occurs from Newfoundland to Pennsylvania, west to British Columbia, and Colorado to Hudson Bay and the southern Mackenzie District. In Washington, it occurs in Yakima County. Within the region, Kalm's lobelia is known from one population occupying approximately 92 acres. WNHP data indicates that one Kalm's lobelia occurrence intersects Route Segment 3b for 0.3 mile. Kalm's lobelia has been documented along the Columbia River near Alkali Canyon Creek and Borden Springs. The primary threats to this species include habitat degradation from livestock, weedy species and altering the flow of the natural spring (WNHP and BLM 2005). Impacts from the proposed Project are similar to those described above for Nuttall's sandwort. With the implementation of RDFs described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation ,and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

4.2.4.10 Route Segment 3c

General Vegetation
Construction of Route Segment 3c would result in the long-term disturbance to approximately 59.5 acres of land (Table 4.2-4). Over three-quarters of the disturbance (49.6 acres) would occur in areas classified as sagebrush/perennial grassland. The remaining disturbance would occur in areas classified as annual grassland (3.8 acres), rabbitbrush/annual grassland (2.4 acres), riparian/wetland (0.3 acre), sagebrush/annual grassland (2.8 acre), and rock/basalt cliff (0.6 acre). Short-term disturbance would occur to approximately 22.0 acres of vegetation. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

Impacts for Route Segment 3c are anticipated to be: 9.2 miles of no identifiable, 6.0 miles of low, and 10.1 miles of moderate.

Special Status Species and Priority Habitats
No federally listed plant species are known to occur along Route Segment 3c. WNHP data on special status plant occurrences indicate that Route Segment 3c intersects awned halfchaff sedge, Columbia milkvetch, gray cryptantha, hairy bugseed (*Corispermum villosum*), and Hoover's desert-parsley. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. In addition, the following species are within one mile of Route Segment 3c: annual sandwort, beaked spike-rush, caespitose evening-primrose, Columbia cress (*Rorippa columbiae*), fuzzytongue penstemon (*Penstemon eriantherus var. whitedii*), Geyer's milkvetch, Great Basin gilia, Piper's daisy, Nuttall's sandwort, Snake River cryptantha (*Cryptantha spiculifera*), Wanapum crazyweed (*Oxytropis campestris var. wanapum*), and Wormskiold's northern wormwood.

Ninety-nine percent (179.8 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 3c is comprised of non-federal land (308.7 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment corridor was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants and include 12.2 acres of suitable, 6.8 acres of marginal, and 6.7 acres unsuitable habitat. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment 3c to minimize impacts to special status plants.

WNHP data indicates that Route Segment 3c intersects a WNHP Priority Ecosystem, Intermountain Basins Active and Stabilized Dune two times. Approximately 2.7 miles of the Route Segment 3c crosses this plant community just north of the Columbia River. The second occurrence, 0.2 mile, is located in the Saddle Mountains. Impacts to this WNHP 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.

With the implementation of RDFs, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems are anticipated to include 8.0 miles of no identifiable, 2.8 miles of low impacts, and 14.5 miles of moderate impacts.

Awned Halfchaff Sedge

Refer to Route Segment 2d for information on awned halfchaff sedge. WNHP data indicate that awned halfchaff sedge intersects Route Segment 3c for 0.1 mile. This location includes a large buffer; therefore, it is difficult to accurately determine whether this occurrence truly intersect the ROW corridor. Known occurrences of awned halfchaff sedge are within wetlands along the Columbia River. Within the proposed Project, wetlands and the area immediately adjacent to the Columbia River would be avoided. Nearly all potential habitat on federal and state lands was surveyed, so it is unlikely awned halfchaff sedge occurs in Route Segment 3c. With the implementation of RDFs 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 a trend toward federal listing.

Columbia Milkvetch

Refer to Route Segment 2b for information on Columbia milkvetch. WNHP data indicate that Columbia milkvetch occurrences intersect Route Segment 3c for 1.6 miles. These locations include large buffers; therefore, it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Direct impacts and RDFs that would be implemented to minimize impacts to potential occurrences Columbia milkvetch are similar to those described above for Route Segment 2b. Nearly all potential habitat on federal and state lands was surveyed, so it is unlikely Columbia milkvetch sedge occurs in Route Segment 3c. With the implementation of RDFs 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 a trend toward federal listing.

Gray Cryptantha

Refer to Route Segment 3b for information on gray cryptantha. WHHP data indicates that gray cryptantha occurrences intersect Route Segment 3c for 2.9 miles. These locations include large buffers; therefore, it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Impacts from the proposed Project are similar to those described above for Route Segment 3b. Nearly all potential habitat on federal and state lands was surveyed, so it is unlikely gray cryptantha occurs in Route Segment 3c. With the implementation of RDFs described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

Hairy Bugseed

Hairy bugseed is a Washington Sensitive Species. This species is found in Colorado, Minnesota, Missouri, Montana, Nebraska, Nevada, North Dakota, Wisconsin, Wyoming, most Canadian provinces, and Grant County, Washington (NatureServe 2015). At the regional level, three populations occupying approximately 1,267 acres are known to occur. Threats are not documented but are presumed to be similar to sensitive species in sandy habitats, including OHV use, increased weed invasions, changes in sand deposition, and agricultural conversion. WNHP indicates that hairy bugseed occurrences intersect a 0.6-mile section of Route Segment 3c. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. For the proposed Project, direct and indirect impacts to hairy bugseed are similar to those described above for Nuttall's sandwort. Nearly all potential habitat on federal and state lands was surveyed, so it is unlikely hairy bugseed occurs within Route Segment 3c. With the implementation of RDFs 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 a trend toward federal listing.

Hoover's Desert-Parsley

Refer to Route Segment 3b for information on Hoover's desert-parsley. WNHP and BLM GeoBOB data indicates that Hoover's desert-parsley may intersect Route Segment 3c for 2.1 miles. These locations include large buffers; therefore, it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Impacts from the proposed Project are similar to those described above for Route Segment 3b. Nearly all potential habitat on federal and state lands was surveyed, so it is unlikely Hoover's desert-parsley occurs in Route Segment 3c. With the implementation of RDFs described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but would not contribute a trend toward federal listing.

4.2.4.11 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 8.7 acres of vegetation. Disturbance would occur in 1.0 acre of annual grasses and noxious weeds, 0.4 acre of perennial grassland, 0.3 acre of rabbitbrush annual grassland, 2.4 acres of sagebrush annual grassland, 4.4 acres of sagebrush perennial grassland, and 0.2 acre of trees (Table 4.2-4). Short-term disturbance would occur to approximately 9.2 acres of vegetation. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1 and Impacts Common for All Route Segments (Section 4.2.3). Disturbance would be minimized by RDFs designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

With the implementation of RDFs, long-term impact levels for Route Segment NNR-2 include 1.5 miles of no identifiable, 2.4 miles of low, and 1.3 miles of moderate impacts.

Special Status Species and Priority Ecosystem

WNHP data indicate that basalt daisy (*Erigeron basalticus*), Hoover's desert-parsley, and pauper milkvetch (*Astragalus misellus var. pauper*) 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. 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 corridor 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). RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment NNR-2 to minimize impacts to special status.

With the implementation of RDFs, impacts to special status plant species and potential suitable habitat are anticipated to include 1.5 miles of no identifiable impacts, 2.4 miles of low impacts, and 1.3 miles of moderate impacts.

4.2.4.12 Route Segment NNR-3

General Vegetation

Long-term disturbance to approximately 45.3 acres of land (Table 4.2-4) would occur with the construction of Route Segment NNR-3. The majority, 39.8 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 2.0 acres sagebrush annual grassland. Approximately 6.7 acres of vegetation would be temporarily disturbed. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

Impact levels for Route Segment NNR-3 include 0.1 mile of no identifiable impacts, 2.2 miles of low, and 7.0 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). WNHP data indicate that Hoover’s tauschia is known to occur along Route Segment NNR-3. Special status plant surveys conducted for the proposed Project documented Hoover’s desert-parsley, pauper milkvetch, and snowball cactus within Route Segment NNR-3. In addition, WNHP data indicate that basalt daisy and Hoover’s tauschia occurrences intersect 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 13.6 acres of suitable and 3.6 acres of marginal habitat. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction and maintenance of Route Segment NNR-3 to minimize impacts to special status.

With the implementation of RDFs, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems are anticipated to include 0.7 mile of low impacts and 8.6 miles of moderate impacts.

Basalt Daisy

Basalt daisy is a federal Species of Concern and 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 RDFs 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.

Hoover's Desert-Parsley

Refer to Route Segment 3b for information on Hoover's desert-parsley. One occurrence of Hoover's desert-parsley was documented for Route Segment NNR-3 during the special status plant surveys. This occurrence consisted of approximately 21 individuals scattered across 0.2 acre of a basalt flow. Approximately 0.8 acres of long-term disturbance and 1.5 acres of short-term disturbance are 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. Since not all federal and state lands were surveyed, there may be additional occupied habitat for Hoover's desert-parsley in the disturbance footprint that would be identified during pre-construction surveys. WNHP data indicate Hoover's desert-parsley intersects Route Segment NNR-3 for an additional 0.3 miles; however, these locations include large buffers, so it is uncertain whether additional occurrences intersect the ROW corridor. RDF For the proposed Project, it was assumed that any occurrences would be spanned and construction activities would avoid these occurrences. With the implementation of RDFs 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 Tauschia

Hoover's tauschia is a federal species of concern and BLM Sensitive and Washington Sensitive Species (Interagency Special Status/Sensitive Species Program 2015). 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. 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 occurrences intersect 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. Since not all federal and state lands were surveyed, there may be occupied habitat for Hoover's tauschia in the disturbance footprint that would be identified during pre-construction surveys. Direct impacts and RDFs that would be implemented to minimize impacts to potential occurrences of Hoover's tauschia are similar to those described above for Nuttall's sandwort. With the implementation of RDFs described above and the assumption that any occurrences found during pre-construction surveys will be spanned and avoided, Project construction, operation, and maintenance activities could impact individuals or habitat (moderate impact), but will not contribute a trend toward federal listing.

<u>Pauper Milkvetch</u>
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 11.9 acres of occupied habitat remains within the ROW. Approximately 4.1 acres of long-term disturbance and 7.9 acres of short-term disturbance are anticipated to occur where pauper milkvetch was documented; 0.1 percent of the known occupied habitat of pauper milkvetch in the region. In addition, WNHP data indicate pauper milkvetch occurrences intersect Route Segment NNR-3 for an additional 0.1 mile; however, these locations include large buffers, so it is uncertain whether additional occurrences intersect the ROW corridor. Since not all federal and state lands were surveyed, there may be additional occupied habitat for pauper milkvetch in the disturbance footprint that would be identified during pre-construction surveys. Direct impacts and RDFs that would be implemented to minimize impacts to potential occurrences of pauper milkvetch are similar to those described above for Nuttall’s sandwort. With the implementation of RDFs 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.

<u>Snowball Cactus</u>
Refer to Route Segment 1b for information on snowball cactus. One occurrence of snowball 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. Approximately 1.6 acres of long-term disturbance and 3.0 acres of short-term disturbance are anticipated to occur where snowball cactus was documented, less than 0.1 percent of the known occupied habitat of snowball cactus in the region. WNHP data indicate that snowball cactus intersects Route Segment NNR-3 for an additional 0.6 miles. These locations include large buffers; therefore, it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Since not all federal and state lands were surveyed, there may be additional occupied habitat for snowball cactus in the disturbance footprint that would be identified during pre-construction surveys. For the proposed Project, it was assumed that these occurrences would be spanned and construction activities would avoid these occurrences. With the implementation of RDFs 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.

4.2.4.13 Route Segment NNR-4o/NNR-4u

<u>General Vegetation</u>

<u>Overhead Design Option</u>
Long-term disturbance to approximately 20.6 acres of land (Table 4.2-4) would occur with the construction of Route Segment NNR-4o. Long-term disturbance would occur in 9.2 acres of sagebrush annual grassland, 10.8 acres of sagebrush/perennial grassland, 0.2 acre of annual grassland and noxious weeds, 0.3 acre of bitterbrush perennial grassland, and 0.1 acre of perennial grassland. Approximately 2.3 acres of vegetation would be disturbed on a short-term basis for Route Segment NNR-4o. General vegetation impacts and RDFs 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 1a/NNR-1. Refer to Section 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

With the implementation of RDFs, long-term impact levels for Route Segment NNR-4o would include 2.1 miles of low and 2.5 miles of moderate impacts.

Underground Design Option

Construction of NNR-4u would result in approximately 42.3 acres of long-term disturbance to vegetation. Long-term disturbance would occur primarily in sagebrush annual grassland (19.0 acres) and sagebrush/perennial grassland (22.7 acres). The remaining disturbance would occur in 0.2 acre of annual grassland and noxious weeds, 0.3 acre of bitterbrush perennial grassland, and 0.1 acre of perennial grassland. Approximately 4.4 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. RDFs described above for Section 4.2.3 and for Route Segment 1a/NNR-1 would also be implemented for the Underground Design Option.

Following the implementation of RDFs, long-term impact levels to vegetation for NNR-4u would include 2.1 mile of low and 2.5 miles of moderate impacts.

Special Status Species and Priority Ecosystem

No federally listed special status plant species or priority ecosystems are known to occur along Route Segment NNR-4o/NNR-4u. Special status plant surveys conducted for the proposed Project documented snowball cactus within Route Segment NNR-4o/NNR-4u (Table 4.2-5). However, following the special status plant surveys, the NNR-4o/NNR-4u route was realigned and the snowball cactus occurrence is now located outside of the Project ROW and, therefore, won't be impacted by the proposed Project. 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 3.0 acres of marginal habitat. With the Underground Design Option (NNR-4u), long-term disturbance to potential habitat for special status species would occur to 6.3 acres of suitable and 7.0 acres of marginal habitat. Route Segment NNR-4o/NNR-4u corresponds to one priority ecosystem (big sagebrush-bluebunch wheatgrass [*Pseudoroegneria spicata*]). RDFs described above for Route Segment 1a/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 RDFs, impacts to special status plant species and potential suitable habitat are anticipated to include 2.1 mile of low impacts and 2.5 miles of moderate impacts for both the NNR-4o and NNR-4u route segments.

Snowball Cactus

Refer to Route Segment 1b for information on snowball cactus. One occurrence of snowball cactus was documented during the special status plant survey along Route Segment NNR-4o/NNR-4u. This occurrence consisted of 1 – 50 individuals at a single point. As previously stated, following the special status plant surveys, a route realignment occurred for Route Segment NNR-4o/NNR-4u resulting in the snowball cactus occurrence being located outside the Project ROW. Since not all federal and state lands were surveyed, there may be additional occupied habitat for snowball cactus in the disturbance footprint that would be identified during pre-construction surveys. For the proposed Project, it was assumed that these occurrences would be spanned and construction activities would avoid these occurrences. With the implementation of RDFs 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.

4.2.4.14 Route Segment NNR-5

General Vegetation

Construction of Route Segment NNR-5 would result in long-term disturbance to approximately 8.6 acres of land (Table 4.2-4). The majority of disturbance (8.4 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 0.4 acres would be disturbed on a short-term basis. General vegetation impacts and RDFs designed to reduce impacts are similar to those described for Route Segment 1a/NNR-1. Refer to Section 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

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), although WNHP data indicate that snowball cactus occurs within one mile. 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 suitable habitat for special status plants.

With the implementation of RDFs described above for Route Segment 1a/NNR-1 and in Section 4.2.3, impact levels to special status plant species and potential suitable habitat are anticipated to include 0.1 mile of low impacts and 1.7 miles of moderate impacts.

4.2.4.15 Route Segment NNR-6o/NNR-6u

General Vegetation

Overhead Design Option

Long-term disturbance to approximately 27.3 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 26.5 acres of sagebrush/perennial grassland, with 0.6 acre also occurring in areas classified as forbs (e.g., narrowleaf mock goldenweed [*Nestotus stenophyllus*] and thyme-leaf buckwheat [*Eriogonum thymoides*]) and 0.2 acre of perennial grassland. Approximately 3.3 acres of vegetation would be disturbed on a short-term basis. General vegetation impacts and RDFs 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 1a/NNR-1. Refer to Section 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

With the implementation of RDFs, 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 50.9 acres of long-term disturbance to vegetation. Long-term disturbance would occur primarily in sagebrush/perennial grassland (50.1 acres), with the remaining disturbance occurring in 0.6 acre of forbs and 0.2 acre of perennial grassland. Approximately 6.5 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. RDFs described above for Section 4.2.3 and for Route Segment 1a/NNR-1 would also be implemented for the Route Segment NNR-6u.

Following the implementation of RDFs, long-term impact levels to vegetation for NNR-6u 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). No special status plants were documented during special status plant surveys conducted for the proposed Project within Route Segment NNR-6o/NNR-6u. WNHP data shows an occurrence of Suksdorf's monkeyflower (*Erythranthe suksdorfii*) intersects this route segment near its eastern terminus and that beaked cryptantha, caespitose evening-primrose, coyote tobacco (*Nicotiana attenuata*), longsepal globemallow (*Iliamna longisepala*), and snowball cactus all are known to occur within one mile of Route Segment NNR-6o/NNR-6u. 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, which is comprised entirely of federal land (117.1 acres; Table 3.2-3).

Overhead Design Option
With Route Segment 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. RDFs described above for Route Segment 1a/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 RDFs, impacts to special status plant species and potential suitable habitat are anticipated to include 0.9 mile of low impacts and 5.6 miles of moderate impacts for Route Segment NNR-6o.

Underground Design Option
With the Underground Design Option (NNR-6u), long-term disturbance to potential habitat for special status species would occur to 10.0 acres of suitable and 0.2 acre of marginal habitat. RDFs described above for Route Segment 1a/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 transmission transition station would be needed. If preconstruction surveys document any special status plants within trenching or transition stations, 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 RDFs such as: implementing measures identified in the Reclamation, Re-vegetation, and Monitoring 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 RDFs, impacts to special status plant species and potential suitable habitat is anticipated to include 0.9 mile of low impacts and 5.6 miles of moderate impacts with Route Segment NNR-6u.

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; therefore, it is uncertain whether this occurrence intersects the ROW corridor. As no federal land was surveyed, there may be occupied habitat for Suksdorf's monkeyflower in the disturbance footprint that would be identified during pre-construction surveys. Direct impacts and RDFs that would be implemented to minimize impacts to potential occurrences of Suksdorf's monkeyflower are similar to those described above for snowball cactus (Route Segment 1b). With the implementation of RDFs 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.

4.2.4.16 Route Segment NNR-7

General Vegetation

Long-term disturbance to approximately 38.1 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. No vegetation is anticipated to be temporarily disturbed. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

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 indicate Route Segment NNR-7 intersects occurrences of beaked cryptantha, bristle-flowered collomia, caespitose evening-primrose, dwarf evening-primrose, gray cryptantha, miner's candle (*Cryptantha scoparia*), and Suksdorf's monkeyflower. In addition, WNHP data indicate that Columbia milkvetch, naked-stemmed evening-primrose, snowball cactus, 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. RDFs described above for Route Segment 1a/NNR-1 would also be implemented during construction, operation, and maintenance of Route Segment NNR-7 to minimize impacts to special status plants.

With the implementation of RDFs, impacts to special status plant species and potential suitable habitat are anticipated to be moderate for 8.3 miles.

Beaked Cryptantha

Beaked cryptantha is a BLM Sensitive species and a Washington Threatened species. Beaked cryptantha is known from Kittitas County, Washington south through Oregon to central California. In Washington, it is currently known in Kittitas, Grant, Klickitat, Garfield, and Asotin counties in the Columbia Basin physiographic province. Six populations occupying approximately 817 acres are known to occur within the region. Primary threats to beaked cryptantha include grazing, erosion, and invasion of habitat by exotic species. WNHP data indicate that beaked 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 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 RDFs 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 3b for more information on bristle-flowered collomia. WNHP data indicate 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 RDFs 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 3b for information on caespitose evening-primrose. WNHP data indicate 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 RDFs 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 indicate 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 RDFs 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 3b for more information on gray cryptantha. WNHP data indicate 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, gray cryptantha could be present. With the implementation of RDFs 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 Strategic 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 data indicate 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 RDFs 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 indicate 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 RDFs 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.

4.2.4.17 Route Segment NNR-8

General Vegetation

Long-term disturbance to approximately 10.0 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 8.9 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 0.5 acre of sagebrush annual grassland. Approximately 3.2 acres of vegetation would be temporarily disturbed. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

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 0.9 mile, and moderate for 1.5 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). Based on WNHP data, annual sandwort, dwarf evening-primrose, and gray cryptantha are located along Route Segment NNR-8. In addition, WNHP data indicate that beaked spike-rush, caespitose evening-primrose, bristle-flowered collomia, Columbia milkvetch, Geyer's milkvetch, Great Basin gilia, naked-stemmed evening-primrose, and white eatonella are known to occur within one mile of Route Segment NNR-8. Approximately 93 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 1.6 acres of suitable habitat and 0.7 acre of marginal for special status plants. RDFs described above for Route Segment 1a/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 RDFs, impacts to special status plant species and potential suitable habitat are anticipated to be: no identifiable for 0.4 mile, low for 0.5 mile, and moderate for 1.9 miles.

Annual Sandwort

Refer to Route Segment 3b for information on annual sandwort. WNHP data indicate that annual sandwort intersects Route Segment NNR-8 for approximately 0.4 mile; however, special status species locations include large buffers, so it is uncertain whether this occurrence intersects the ROW corridor. With the implementation of RDFs 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 indicate that dwarf evening-primrose intersects Route Segment NNR-8 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 RDFs 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 3b for information on gray cryptantha. WNHP data indicate that gray cryptantha intersects Route Segment NNR-8 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 RDFs 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.

4.2.4.18 Route Segment MR-1

General Vegetation

Long-term disturbance to approximately 42.1 acres of land (Table 4.2-4) would occur with the construction of Route Segment MR-1. The long-term disturbance would occur within 29.3 acres of sagebrush/perennial grassland and 12.8 acres of annual grassland/noxious weeds. Approximately 18.6 acres of vegetation would be temporarily disturbed. General vegetation impacts are similar to those described above for Route Segment 1a/NNR-1. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. RDFs 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 2.3 - Required Design Features Common to Action Alternatives for a complete list and description of RDFs.

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 along Route Segment MR-1 (Table 4.2-5). WNHP data indicate snowball cactus occurs within one mile of Route Segment MR-1. WNHP data also indicate 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 with 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 0.4 percent (0.5 acre) of federal and state lands along Route Segment MR-1 were 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, 12.8 acres of marginal, and 8.6 acres of unsuitable habitat. RDFs described above for Route Segment 1a/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 RDFs, impacts to special status plant species, potential suitable habitat and priority ecosystems are 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 and Residual Impacts

The RDFs and environmental protection measures described in Section 2.3 (Required 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. If desired biological objectives are not achieved for vegetation with the existing RDFs, additional mitigation measures may be implemented. Additionally, a Framework for Development of a Greater Sage-Grouse Compensatory Mitigation Plan (Framework) was developed to address the residual impacts (i.e., the unavoidable impacts) to the Greater Sage-Grouse (*Centrocercus urophasianus*; Sage-Grouse) which may result from the construction maintenance, and operation of the proposed Project. The Framework is intended to facilitate Pacific Power's development of a Greater Sage-Grouse Compensatory Mitigation Plan (CMP). With the development and implementation of the CMP, Pacific Power will be taking the necessary steps to compensate for the Project's residual impacts and to achieve net conservation gain for the species and its habitat.

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			TREES			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
1a/NNR-1 2.4 miles	0.3	0.3	6.1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	0.9	18.4	0	0	0	0	0	0	0	0	0	0.7	3.7	75.5	0	0	0	1.9	4.9
1b 12.5 miles	1.8	1.7	5.0	0	0	0	0	0	0	0	0	0	2.8	3.1	9.2	0.5	0.5	1.5	0	0	0	0	0	0	0	0	0	6.3	28.4	84.0	0.1	0.1	0.3	11.5	33.8
1c 12.9 miles	7.3	13.6	40.6	0	0	0	0	0	0	0.1	0.1	0.3	1.0	2.0	6.0	0.3	0.6	1.8	0	0	0	0	0	0	0	0	0	3.1	17.2	51.3	0	0	0	11.8	33.5
2a 1.0 mile	0.9	1.9	90.5	0	0	0	0	0	0	0	0	0	0.1	0.2	9.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	2.1
2b 16.3 miles	3.2	5.7	7.7	0	0	0	0	0	0	0.3	0.7	0.9	0.7	1.6	2.2	0	0	0	0	0	0	0	0	0	0	0	0	11.1	65.8	89.2	0	0	0	15.3	73.8
2c 18.1 miles	5.9	9.4	27.4	0	0	0	0	0	0	0	0	0	0.1	0.1	0.3	0	0	0	0	0	0	0	0	0	0	0	0	4.6	24.8	72.3	0	0	0	10.6	34.3
2d 7.0 miles	0.7	1.4	3.8	0	0	0	0	0	0	0	0	0	0.7	1.1	3.0	0	0	0	0	0	0	0	0	0	0	0	0	5.7	34.1	93.2	0	0	0	7.1	36.6
3a 0.1 mile	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	0.2	1.2	100	0	0	0	0.2	1.2
3b 21.7 miles	0.5	0.4	1.4	0	0	0	0	0	0	0	0	0	0.7	0.7	2.4	0.5	0.3	1.0	0.2	0.4	1.4	0.1	0.2	0.7	0.1	0.4	1.4	5.4	25.3	87.5	1.7	1.2	4.2	9.2	28.9
3c 25.2 miles	3.0	3.8	6.4	0	0	0	0	0	0	0	0	0	0	0	0	2.1	2.4	4.0	0.3	0.3	0.5	0.3	0.6	1.0	0.6	2.8	4.7	9.8	49.6	83.4	0	0	0	16.1	59.5
NNR-2 5.1 miles	1.2	1.0	11.5	0	0	0	0	0	0	0	0	0	0.5	0.4	4.6	0.3	0.3	3.4	0	0	0	0	0	0	0.5	2.4	27.6	0.9	4.4	50.6	0.3	0.2	2.3	3.7	8.7
NNR-3 9.3 miles	0.1	0.2	0.4	0	0	0	0	0	0	0	0	0	1.4	2.9	6.4	0	0	0	0	0	0	0.3	0.4	0.9	0.4	2.0	4.4	7.0	39.8	87.9	0	0	0	9.2	45.3
NNR-4o 4.5 miles	0.3	0.2	1.0	0.2	0.3	1.5	0	0	0	0	0	0	0.1	0.1	0.5	0	0	0	0	0	0	0	0	0	1.7	9.2	44.7	2.3	10.8	52.4	0	0	0	4.6	20.6
NNR-4u 4.5 miles	0.3	0.2	0.5	0.2	0.3	0.7	0	0	0	0	0	0	0.1	0.1	0.2	0	0	0	0	0	0	0	0	0	1.7	19.0	44.9	2.3	22.7	53.7	0	0	0	4.6	42.3
NNR-5 1.8 miles	0	0	0	0	0	0	0	0	0	0.1	0.2	2.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	8.4	97.7	0	0	0	1.8	8.6
NNR-6o 6.4 miles	0	0	0	0	0	0	0.7	0.6	2.2	0	0	0	0.2	0.2	0.7	0	0	0	0	0	0	0	0	0	0	0	0	5.6	26.5	97.1	0	0	0	6.5	27.3
NNR-6u 6.4 miles	0	0	0	0	0	0	0.7	0.6	1.2	0	0	0	0.2	0.2	0.4	0	0	0	0	0	0	0	0	0	0	0	0	5.6	50.1	98.4	0	0	0	6.5	50.9
NNR-7 8.2 miles	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	8.3	38.1	100	0	0	0	8.3	38.1
NNR-8 2.7 miles	0.6	0.5	5.0	0	0	0	0	0	0	0	0	0	0.2	0.1	1.0	0	0	0	0	0	0	0	0	0	0.1	0.5	5.0	1.5	8.9	89.0	0	0	0	2.4	10.0
MR-1 11.9 miles	4.9	12.8	30.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.4	29.3	69.6	0	0	0	9.3	42.1

[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, developed/road/fire break, or water body which are not shown). Short-term disturbance to sagebrush/annual grassland and sagebrush/perennial grassland are considered long-term disturbance and are included in this table disturbance.
[2] Total long-term disturbance to vegetation does not include disturbance to agriculture, developed/road/fire break, or water body. Acres of short-term disturbance are presented in the discussion section for each route segment.

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4.2.6 Impact Summary by Alternative

4.2.6.1 No Action Alternative

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 Action Alternatives

Table 4.2-6 presents a summary of the impacts for all Action Alternatives, by design option and impact levels following the implementation of RDFs for vegetation resources. The impact summary for special status plants and priority ecosystems is presented separately in Table 4.2-7.

Alternative A

General Vegetation

Long-term disturbance to approximately 210.1 acres of land (Table 4.2-6) would occur with the construction of Alternative A. The long-term disturbance would occur within 182.2 acres of sagebrush/perennial grassland, 14.6 acres of annual grassland/noxious weeds, 0.7 intermittent stream/dry gully, 6.0 acres of perennial grassland, 3.0 acres of rabbitbrush annual grassland, 0.3 acre of riparian/wetland, 0.6 acre of rock/basalt cliff, 2.8 acres of sagebrush annual grassland, and 0.1 acre of trees. Approximately 71.0 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for Alternative A are anticipated to be: no identifiable for 11.9 miles; low for 18.9 miles, and moderate for 34.2 miles. Of the nine Action Alternatives, Alternative A has the highest vegetation impacts at the moderate level.

Special Status Species and Priority Ecosystem

Alternative A crosses 9.6 miles of WNHP special status plant polygons, 1.5 miles of special status plant occurrences found during Project-specific surveys, and 3.8 miles of WNHP priority ecosystems (Table 4.2-7). With Alternative A, long-term disturbance to special status species potential habitat would occur to 33.7 acres of suitable, 17.1 acres of marginal, and 11.5 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for Alternative A is anticipated to include 10.5 miles of no identifiable, 14.0 miles of low impacts, and 40.5 miles of moderate impacts. Of the nine Action Alternatives, Alternative A has the highest impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems at the moderate level.

Table 4.2-5 Long-Term Disturbance to Special Status Species and Habitat by Route Segment

ROUTE SEGMENT	HABITAT SUITABILITY[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
1a/NNR-1 2.4 miles	0.7	0.7	29.5	1.2	1.1	50.6	0.5	0.4	19.9	0	0	0
1b 12.5 miles	6.3	5.1	45.4	5.1	5.4	47.5	1.2	0.8	7.0	0.5	0.4	0

ROUTE SEGMENT	HABITAT SUITABILITY[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
1c 12.9 miles	3.2	6.0	26.1	8.6	16.2	70.2	1.2	0.8	3.6	0.5	0	0
2a 1.0 mile	0.0	0.0	0.0	1	2.1	100.0	0.0	0.0	0.0	0	0	0
2b 16.3 miles	11.4	26.2	73.3	3.9	7.3	20.4	1.1	2.3	6.3	0.6	0.5	0
2c 18.1 miles	4.6	8.0	35.4	6	9.5	41.8	7.6	5.2	22.8	0	0	0
2d 7.0 miles	5.7	12.8	83.3	1.4	2.6	16.7	0.0	0.0	0.0	2.1	0.6	0
3a 0.1 mile	0.2	0.1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0
3b 21.7 miles	5.6	6.5	20.9	1.8	1.5	4.9	14.3	22.7	73.5	9.5	1.2	0
3c 25.2 miles	10.1	12.2	46.2	5.7	6.8	26.0	9.2	6.7	25.5	6.4	0	2.9
NNR-2 5.1 miles	0.9	0.7	18.5	2.4	1.8	45.7	1.9	1.4	35.8	0	0	0
NNR-3 9.3 miles	7.0	13.6	77.3	1.9	3.6	20.2	0.1	0.0	0.0	4.1	2.6	0
NNR-4o 4.5 miles	2.5	2.3	43.4	2.1	3.0	56.6	0.0	0.0	0.0	0	0	0
NNR-4u 4.5 miles	2.5	6.3	47.4	2.1	7.0	52.6	0.0	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	0.0	0	0	0
NNR-6o 6.4 miles	6.3	6.4	97.4	0.2	0.2	2.6	0.0	0.0	0.0	0.3	0	0
NNR-6u 6.4 miles	6.3	10.0	98.4	0.2	0.2	1.6	0.0	0.0	0.0	0.3	0	0
NNR-7 8.2 miles	8.3	7.2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0	0
NNR-8 2.7 miles	1.5	1.6	68.9	0.9	0.7	31.1	0.4	0.0	0.0	0.6	0	0
MR-1 11.9 miles	4.4	12.5	36.9	4.9	12.8	37.7	2.6	8.6	25.3	0	0	0.4

[1] Linear 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 Segment.

[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.

Alternative B

General Vegetation
Long-term disturbance to approximately 179.6 acres of land (Table 4.2-6) would occur with the construction of Alternative B. The long-term disturbance would occur within 157.9 acres of sagebrush/perennial grassland, 11.1 acres of annual grassland/noxious weeds, 0.7 acres of intermittent stream/dry gully, 6.7 acres of perennial grassland, 0.9 acres of rabbitbrush annual grassland, 0.4 acre of riparian/wetland, 0.2 acre of rock/basalt cliff, 0.4 acres of sagebrush annual grassland, and 1.3 acres of trees. Approximately 62.1 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for Alternative B are anticipated to be: no identifiable for 15.3 miles; low for 14.8 miles, and moderate for 31.4 miles. Of the nine Action Alternatives, Alternative B has the second highest vegetation impacts at the moderate level.

Special Status Species and Priority Ecosystem
Alternative B crosses 12.7 miles of WNHP special status plant polygons, 2.7 miles of special status plant occurrences found during Project-specific surveys, and no WNHP priority ecosystems (Table 4.2-7). With Alternative B, long-term disturbance to special status species potential habitat would occur to 29.2 acres of suitable, 13.2 acres of marginal, and 16.6 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for Alternative B is anticipated to include 9.3 miles of no identifiable, 12.0 miles of low impacts, and 40.2 miles of moderate impacts. Of the nine Action Alternatives, Alternative B has the second highest impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems at the moderate level.

Alternative C

General Vegetation
Long-term disturbance to approximately 140.1 acres of land (Table 4.2-6) would occur with the construction of Alternative C. The long-term disturbance would occur within 116.9 acres of sagebrush perennial grassland, 14.8 acres of annual grassland/noxious weeds, 5.2 acres of perennial grassland, 0.9 acres of rabbitbrush annual grassland, 0.4 acre of riparian/wetland, 0.2 acre of rock/basalt cliff, 0.4 acre of sagebrush annual grassland, and 1.3 acres of trees. Approximately 68.9 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for Alternative C are anticipated to be: no identifiable for 21.8 miles; low for 16.6 miles, and moderate for 24.9 miles. Of the nine Action Alternatives, Alternative C has among the lowest vegetation impacts at the moderate level.

Special Status Species and Priority Ecosystem
Alternative C crosses 12.1 miles of WNHP special status plant polygons, 2.2 miles of special status plant occurrences found during Project-specific surveys, and no WNHP priority ecosystems (Table 4.2-7). With Alternative C, long-term disturbance to special status species potential habitat would occur to 22.4 acres of suitable, 15.3 acres of marginal, and 23.1 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for Alternative C is anticipated to include 15.8 miles of no identifiable, 14.2 miles of low impacts, and 33.3 miles of moderate impacts. Of the nine Action Alternatives, Alternative C is near the middle of the Action Alternatives for impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems at both the moderate and low level.

Alternative D

General Vegetation

Long-term disturbance to approximately 170.6 acres of land (Table 4.2-6) would occur with the construction of Alternative D. The long-term disturbance would occur within 141.2 acres of sagebrush/perennial grassland, 18.3 acres of annual grassland/noxious weeds, 4.5 acres of perennial grassland, 3.0 acres of rabbitbrush annual grassland, 0.3 acre of riparian/wetland, 0.6 acre of rock/basalt cliff, 2.8 acres of sagebrush annual grassland, and 0.1 acre of trees. Approximately 77.7 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for Alternative D are anticipated to be: no identifiable for 18.4 miles; low for 20.7 miles, and moderate for 27.7 miles. Of the nine Action Alternatives, Alternative D has among the lowest vegetation impacts at the moderate level.

Special Status Species and Priority Ecosystem

Alternative D crosses 9.0 miles of WNHP special status plant polygons, 1.0 mile of special status plant occurrences found during Project-specific surveys, and 3.8 miles of WNHP priority ecosystems (Table 4.2-7). With Alternative D, long-term disturbance to special status species potential habitat would occur to 26.9 acres of suitable, 19.2 acres of marginal, and 18.0 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for Alternative D is anticipated to include 17.0 miles of no identifiable, 16.2 miles of low impacts and 33.6 miles of moderate impacts. Of the nine Action Alternatives, Alternative D is near the middle of the Action Alternatives for impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems at the moderate level.

Alternative E

General Vegetation

Long-term disturbance to approximately 179.2 acres of land (Table 4.2-6) would occur with the construction of Alternative E. The long-term disturbance would occur within 146.7 acres of sagebrush/perennial grassland, 23.0 acres of annual grassland/noxious weeds, 0.8 acre of intermittent stream/dry gully, 5.6 acres of perennial grassland, 0.9 acres of rabbitbrush annual grassland, 0.4 acre of riparian/wetland, 0.2 acre of rock/basalt cliff, 0.4 acre of sagebrush annual grassland, and 1.2 acres of trees. Approximately 75.2 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for Alternative E are anticipated to be: no identifiable for 15.4 miles, low for 18.4 miles, and moderate for 28.1 miles. Of the nine Action Alternatives, Alternative E is near the middle of the Action Alternatives for vegetation impacts at the moderate level.

Special Status Species and Priority Ecosystem

Alternative E crosses 12.7 miles of WNHP special status plant polygons, 2.3 miles of special status plant occurrences found during Project-specific surveys, and no WNHP priority ecosystems (Table 4.2-7). With Alternative E, long-term disturbance to special status species potential habitat would occur to 26.1 acres of suitable, 16.7 acres of marginal, and 16.6 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for Alternative E is anticipated to include 9.6 miles of no identifiable, 15.6 miles of low impacts, and 36.7 miles of moderate impacts. Of the nine Action Alternatives, Alternative E is near the middle of the Action Alternatives for impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems at the moderate level.

Alternative F

General Vegetation

Long-term disturbance to approximately 209.7 acres of land (Table 4.2-6) would occur with the construction of Alternative F. The long-term disturbance would occur within 170.9 acres of sagebrush/perennial grassland, 26.5 acres of annual grassland/noxious weeds, 0.8 acre of intermittent stream/dry gully, 4.9 acres of perennial grassland, 3.0 acres of rabbitbrush annual grassland, 0.3 acre of riparian/wetland, 0.6 acre of rock/basalt cliff, and 2.8 acres of sagebrush annual grassland. Approximately 84.0 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for Alternative F are anticipated to be: no identifiable for 12.0 miles; low for 22.5 miles, and moderate for 30.9 miles. Of the nine Action Alternatives, Alternative F has among the highest vegetation impacts at the moderate level.

Special Status Species and Priority Ecosystem

Alternative F crosses 9.6 miles of WNHP special status plant polygons, 1.1 miles of special status plant occurrences found during Project-specific surveys, and 3.8 miles of WNHP priority ecosystems (Table 4.2-7). With Alternative F, long-term disturbance to special status species potential habitat would occur to 30.6 acres of suitable, 20.6 acres of marginal, and 11.5 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for Alternative F is anticipated to include 10.8 miles of no identifiable, 17.6 miles of low impacts, and 37.0 miles of moderate impacts. Of the nine Action Alternatives, Alternative F has among the highest impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems at the moderate level.

Alternative G

General Vegetation

Long-term disturbance to approximately 139.7 acres of land (Table 4.2-6) would occur with the construction of Alternative G. The long-term disturbance would occur within 105.7 acres of sagebrush/perennial grassland, 26.7 acres of annual grassland/noxious weeds, 0.1 acre of intermittent stream/dry gully, 4.1acres of perennial grassland, 0.9 acres of rabbitbrush annual grassland, 0.4 acre of riparian/wetland, 0.2 acre of rock/basalt cliff, 0.4 acres of sagebrush annual grassland, and 1.2 acres of trees. Approximately 81.9 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for Alternative G are anticipated to be: no identifiable for 21.9 miles, low for 20.2 miles, and moderate for 21.6 miles. Of the nine Action Alternatives, Alternative G has the lowest vegetation impacts at the moderate level.

Special Status Species and Priority Ecosystem

Alternative G crosses 12.1 miles of WNHP special status plant polygons, 1.8 miles of special status plant occurrences found during Project-specific surveys, and no WNHP priority ecosystems (Table 4.2-7). With Alternative G, long-term disturbance to special status species potential habitat would occur to 19.3 acres of suitable, 18.8 acres of marginal, and 23.1 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for Alternative G is anticipated to include 16.1 miles of no identifiable, 17.8 miles of low impacts, and 29.8 miles of moderate impacts. Of the nine Action Alternatives, Alternative G has the lowest impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems at the moderate level.

Alternative H

General Vegetation

Long-term disturbance to approximately 170.2 acres of land (Table 4.2-6) would occur with the construction of Alternative H. The long-term disturbance would occur within 129.9 acres of sagebrush/perennial grassland, 30.2 acres of annual grassland/noxious weeds, 0.1 acre of intermittent stream/dry gully, 3.4 acres of perennial grassland, 3.0 acres of rabbitbrush annual grassland, 0.3 acre of riparian/wetland, 0.6 acre of rock/basalt cliff, and 2.8 acres of sagebrush annual grassland. Approximately 90.8 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for Alternative H are anticipated to be: no identifiable for 18.5 miles, low for 24.3 miles, and moderate for 24.4 miles. Of the nine Action Alternatives, Alternative H has among the lowest vegetation impacts at the moderate level.

Special Status Species and Priority Ecosystem

Alternative H crosses 9.0 miles of WNHP special status plant polygons, 0.6 miles of special status plant occurrences found during Project-specific surveys, and 3.8 miles of WNHP priority ecosystems (Table 4.2-7). With Alternative H, long-term disturbance to special status species potential habitat would occur to 23.8 acres of suitable, 22.7 acres of marginal, and 18.0 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for Alternative H is anticipated to include 17.3 miles of no identifiable, 19.8 miles of low impacts, and 30.1 miles of moderate impacts. Of the nine Action Alternatives, Alternative H has among the lowest impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems at the moderate level.

NNR Alternative – Overhead Design Option

General Vegetation

Long-term disturbance to approximately 163.5 acres of land (Table 4.2-6) would occur with the construction of NNR Alternative – Overhead Design Option. The long-term disturbance would occur within 140.7 acres of sagebrush/perennial grassland, 2.2 acres of annual grassland/noxious weeds, 0.3 acre of bitterbrush perennial grassland, 0.6 acre of forbs, 0.2 acre of intermittent stream/dry gully, 3.6 acres of perennial grassland, 1.1 acres of rabbitbrush annual grassland, 0.4 acre of rock/basalt cliff, 14.1 acres of sagebrush annual grassland, and 0.2 acre of trees. Approximately 30.5 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for NNR Alternative – Overhead Design Option are anticipated to be: no identifiable for 2.5 miles, low for 9.8 miles, and moderate for 28.6 miles. Of the nine Action Alternatives, NNR Alternative – Overhead Design Option has vegetation impacts near the middle of the Action Alternatives at the moderate level.

Special Status Species and Priority Ecosystem

NNR Alternative – Overhead Design Option crosses 8.4 miles of WNHP special status plant polygons, 2.7 miles of special status plant occurrences found during Project-specific surveys, and no WNHP priority ecosystems (Table 4.2-7). With NNR Alternative – Overhead Design Option, long-term disturbance to special status species potential habitat would occur to 29.0 acres of suitable, 8.7 acres of marginal, and 2.9 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for NNR Alternative – Overhead Design Option is anticipated to include 2.4 miles of no identifiable, 7.9 miles of low impacts, and 30.6 miles of moderate impacts. Of the nine Action Alternatives, NNR Alternative – Overhead Design Option has among the lowest impacts to special status plant species and potential suitable habitat and no impacts to WNHP priority ecosystems.

NNR Alternative – Underground Design Option

General Vegetation
Long-term disturbance to approximately 208.7 acres of land (Table 4.2-6) would occur with the construction of NNR Alternative – Underground Design Option. The long-term disturbance would occur within 176.3 acres of sagebrush perennial grassland, 2.2 acres of annual grassland/noxious weeds, 0.3 acre of bitterbrush perennial grassland, 0.6 acre of forbs, 0.2 acre of intermittent stream/dry gully, 3.6 acres of perennial grassland, 1.1 acres of rabbitbrush annual grassland, 0.4 acre of rock/basalt cliff, 23.9 acres of sagebrush annual grassland, and 0.2 acre of trees. Approximately 35.8 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for NNR Alternative – Underground Design Option are anticipated to be: no identifiable for 2.5 miles, low for 9.8 miles, and moderate for 28.6 miles. Of the nine Action Alternatives, NNR Alternative – Underground Design Option has vegetation impacts near the middle of the Action Alternatives at the moderate level.

Special Status Species and Priority Ecosystem
NNR Alternative – Underground Design Option crosses 8.4 miles of WNHP special status plant polygons, 2.7 miles of special status plant occurrences found during Project-specific surveys, and no WNHP priority ecosystems (Table 4.2-7). With NNR Alternative – Underground Design Option, long-term disturbance to special status species potential habitat would occur to 29.0 acres of suitable, 8.7 acres of marginal, and 2.9 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for NNR Alternative – Underground Design Option is anticipated to include 2.4 miles of no identifiable, 7.9 miles of low impacts and 30.6 miles of moderate impacts. Of the nine Action Alternatives, NNR Alternative – Underground Design Option has among the lowest impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems at the moderate level.

NNR Alternative – Manastash Ridge Subroute

General Vegetation
Long-term disturbance to approximately 184.9 acres of land (Table 4.2-6) would occur with the construction of NNR Alternative – MR Subroute. The long-term disturbance would occur within 159.2 acres of sagebrush/perennial grassland, 14.7 acres of annual grassland/noxious weeds, 0.6 acre of forbs, 0.2 acre of intermittent stream/dry gully, 3.6 acres of perennial grassland, 1.1 acres of rabbitbrush annual grassland, 0.4 acre of rock/basalt cliff, 4.8 acres of sagebrush annual grassland, and 0.2 acre of trees. Approximately 46.8 acres of vegetation would be temporarily disturbed. Disturbance would be minimized by RDFs described above that are designed to reduce impacts to vegetation resources. Vegetation impacts for NNR Alternative – MR Subroute are anticipated to be: no identifiable for 5.1 miles, low for 12.6 miles, and moderate for 30.5 miles. Of the nine Action Alternatives, NNR Alternative – MR Subroute is near the middle of the Action Alternatives for vegetation impacts at the moderate level.

Special Status Species and Priority Ecosystem
NNR Alternative – MR Subroute crosses 8.4 miles of WNHP special status plant polygons, 2.6 miles of special status plant occurrences found during Project-specific surveys, and 0.4 miles of WNHP priority ecosystems (Table 4.2-7). With NNR Alternative – MR Subroute, long-term disturbance to special status species potential habitat would occur to 30.9 acres of suitable, 11.5 acres of marginal, and 5.5 acres of unsuitable habitat. Long-term disturbance to special status plant species, potential suitable habitat, and WNHP priority ecosystems for NNR Alternative – MR Subroute is anticipated to include 4.9 miles of no identifiable, 10.7 miles of low impacts and 32.6 miles of moderate impacts. Of the nine Action Alternatives, NNR Alternative – MR Subroute is near the middle of the Action Alternatives for impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems at the moderate level.

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Table 4.2-6 Long-Term Disturbance to Vegetation and Impact Summary of action Alternatives

ACTION ALTERNATIVES	VEGETATION TYPE[1,2]																																			IMPACTS[3]			
	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
Alternative A 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3c 64.7 miles	9.9	14.6	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	0.7	4.3	6.0	6.5	3.5	3.0	3.2	0.3	0.3	0.3	0.3	0.6	0.6	0.6	2.8	1.1	33.8	182.2	74.7	0.1	0.1	0.1	53.1	210.1	0.0	34.2	18.9	11.9
Alternative B 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3b 61.2 miles	7.4	11.1	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	0.7	5.0	6.7	6.9	1.9	0.9	0.9	0.2	0.4	0.4	0.1	0.2	0.2	0.1	0.4	0.2	29.4	157.9	70.1	1.8	1.3	1.3	46.2	179.6	0.0	31.4	14.8	15.3
Alternative C 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3b 63.0 miles	10.1	14.8	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	5.2	6.2	1.9	0.9	1.0	0.2	0.4	0.4	0.1	0.2	0.2	0.1	0.4	0.2	22.9	116.9	50.4	1.8	1.3	1.5	41.5	140.1	0.0	24.9	16.6	21.8
Alternative D 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3c 66.5 miles	12.6	18.3	22.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	4.5	5.6	3.5	3.0	3.7	0.3	0.3	0.3	0.3	0.6	0.7	0.6	2.8	1.1	27.3	141.2	56.4	0.1	0.1	0.1	48.4	170.6	0.0	27.7	20.7	18.4
Alternative E 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3b 61.6 miles	12.9	23.0	21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	0.7	3.2	5.6	5.1	1.7	0.9	0.8	0.2	0.4	0.3	0.1	0.2	0.2	0.1	0.4	0.2	26.2	146.7	64.8	1.7	1.2	1.1	46.5	179.2	0.0	28.1	18.4	15.4
Alternative F 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3c 65.1 miles	15.4	26.5	25.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	0.7	2.5	4.9	4.7	3.3	3.0	2.9	0.3	0.3	0.2	0.3	0.6	0.6	0.6	2.8	1.1	30.6	170.9	69.8	0.0	0.0	0.0	53.4	209.7	0.0	30.9	22.5	12.0
Alternative G 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3b 63.4 miles	15.6	26.7	27.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	2.6	4.1	4.3	1.7	0.9	1.0	0.2	0.4	0.4	0.1	0.2	0.2	0.1	0.4	0.2	19.7	105.7	45.4	1.7	1.2	1.2	41.8	139.7	0.0	21.6	20.2	21.9
Alternative H 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3c 66.8 miles	18.1	30.2	32.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	1.9	3.4	3.7	3.3	3.0	3.3	0.3	0.3	0.3	0.3	0.6	0.6	0.6	2.8	1.1	24.1	129.9	51.7	0.0	0.0	0.0	48.7	170.2	0.0	24.4	24.3	18.5
NNR Alternative – Overhead Design Option* 1a/NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.5 miles	2.5	2.2	4.6	0.2	0.3	0.6	0.7	0.6	1.3	0.1	0.2	0.5	2.4	3.6	7.8	1.2	1.1	2.4	0.0	0.0	0.0	0.3	0.4	0.9	2.7	14.1	9.0	28.0	140.7	89.6	0.3	0.2	0.4	38.4	163.5	0.0	28.6	9.8	2.5
NNR Alternative – Underground Design Option 1a/NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.5 miles	2.5	2.2	3.7	0.2	0.3	0.5	0.7	0.6	1.0	0.1	0.2	0.4	2.4	3.6	6.2	1.2	1.1	1.9	0.0	0.0	0.0	0.3	0.4	0.7	2.7	23.9	12.2	28.0	176.3	89.8	0.3	0.2	0.3	38.4	208.7	0.0	28.6	9.8	2.5
NNR Alternative – MR Subroute 1a/NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6o, NNR-7, NNR-8 47.8 miles	7.1	14.7	19.5	0.0	0.0	0.0	0.7	0.6	0.8	0.1	0.2	0.3	2.3	3.6	4.7	1.2	1.1	1.5	0.0	0.0	0.0	0.3	0.4	0.6	1.0	4.8	2.6	30.1	159.2	86.2	0.3	0.2	0.3	43.1	184.9	0.0	30.5	12.6	5.1

[1] Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of vegetation type disturbed compared to the total amount of long-term disturbance for each Action 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. RDFs described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.
* Agency Preferred Alternative

Table 4.2-7 Long-Term Disturbance to Special Status Plant Species and Habitat and Impact Summary of Action ALternatives

ACTION 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
Alternative A 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3c 64.7 miles	9.6	1.5	3.8	33.7	17.1	11.5	0.0	40.5	14.0	10.5
Alternative B 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3b 61.2 miles	12.7	2.7	0.0	29.2	13.2	16.6	0.0	40.2	12.0	9.3
Alternative C 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3b 63.0 miles	12.1	2.2	0.0	22.4	15.3	23.1	0.0	33.3	14.2	15.8
Alternative D 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3c 66.5 miles	9.0	1.0	3.8	26.9	19.2	18	0.0	33.6	16.2	17.0
Alternative E 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3b 61.6 miles	12.7	2.3	0.0	26.1	16.7	16.6	0.0	36.7	15.6	9.6
Alternative F 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3c 65.1 miles	9.6	1.1	3.8	30.6	20.6	11.5	0.0	37.0	17.6	10.8
Alternative G 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3b 63.4 miles	12.1	1.8	0.0	19.3	18.8	23.1	0.0	29.8	17.8	16.1
Alternative H 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3c 66.8 miles	9.0	0.6	3.8	23.8	22.7	18	0.0	30.1	19.8	17.3
NNR Alternative – Overhead Design Option* 1a/NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.5 miles	8.4	2.7	0.0	29	8.7	2.9	0.0	30.6	7.9	2.4
NNR Alternative - Underground Design Option 1a/NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.5 miles	8.4	2.7	0.0	29	8.7	2.9	0.0	30.6	7.9	2.4
NNR Alternative - MR Subroute 1a/NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6o, NNR-7, NNR-8 47.8 miles	8.4	2.6	0.4	30.9	11.5	5.5	0.0	32.6	10.7	4.9

[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.
* Agency Preferred Alternative
Numbers may not sum precisely due to rounding.

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, and 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. In addition to localized effects to wildlife, the proposed transmission line could fragment habitat and reduce connectivity among patches of habitat. 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 that was ran to calculate the proposed Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project (Project) impacts and to Section 4.2 for a discussion of the impacts specific to vegetation.

For the purposes of the analysis for general wildlife and special status animal species and habitat, the Project study area was defined as a two-mile wide corridor (i.e., one mile on either side of the route segment centerlines of each Action Alternative). However, where appropriate, the Project study area was expanded to address potential impacts to species based on known ranges and their potential to occur within the Project vicinity. The Project study area was expanded to address impacts to Greater Sage-Grouse (*Centrocercus urophasianus*; Sage-Grouse) based on input from Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) and U.S. Fish and Wildlife Service (USFWS). For Sage-Grouse, the analysis area is defined as an eight-mile wide corridor surrounding each Action Alternative (i.e., four miles on either side of the route segment centerline of each Action Alternative). 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 Action Alternative.

The impact analysis for Sage-Grouse was guided and informed by agency conservation objectives, including the Conservation Objectives Team (COT) Greater Sage-Grouse Conservation Objectives: Final Report (USFWS 2013b), the Washington State Greater Sage-Grouse Recovery Plan (Stinson et al. 2004), and the JBLM YTC Western Sage-Grouse Management Plan (Livingston 1998). Agency objectives for Sage-Grouse conservation and mitigation are described in Appendix B-5—Sage-Grouse Analysis and Mitigation Report and Appendix B-7—Compliance with Applicable Greater Sage-Grouse Policies, Plans, and Procedures. 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 systems (GIS) data analysis of existing habitat within the Project study area; 2) habitat loss calculated by using typical disturbance types associated with the construction, operation and maintenance of the proposed Action Alternatives (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 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 habitat assessments (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 Segments) and then collectively by Alternative (Section 4.3.6).

4.3.1.2 Impact Criteria

Sensitivity classifications were assigned to wildlife resources that occur within the Project study 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 quality or extent.
Bald eagle winter roost - within 1 mile	High	Disturb important bald eagle habitat during a sensitive period in the species lifecycle.
Raptor nesting area - within 1 mile of the proposed transmission line	High	Disturb breeding raptors, nest abandonment, and reduction in quality or extent of breeding habitat.
Riparian/Wetland	High	Reduction in extent or quality of a fragile sensitive habitat.
Sagebrush/Perennial Grassland	High	Reduction in quality or extent of 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 quality or extent of species habitat.
Trees (Aspen and Poplar)	High	Reduction in quality or extent of habitat that supports important obligate species and is slow to recover from disturbance.
Basalt cliffs	Moderate	Reduction in quality or extent of 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 quality or extent of a fragile sensitive habitat (abundance and quality).
Sagebrush and Rabbitbrush/Annual Grassland	Moderate	Reduction in quality or extent of habitat that is slow to recover to pre-disturbance state.
Salmonid spawning area	Moderate	Reduce quality of a fragile habitat.
Agricultural land	Low	Reduce quality or extent of habitat.
Urban/developed	Low	Reduce quality or extent of habitat.

Table 4.3-2 Sage-Grouse Resource Sensitivity Classification

RESOURCE CATEGORY	SENSITIVITY	POTENTIAL IMPACT FROM THE PROPOSED PROJECT
Greater Sage-Grouse lek – within 0 to 4 miles of the proposed Action Alternatives	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.

RESOURCE CATEGORY	SENSITIVITY	POTENTIAL IMPACT FROM THE PROPOSED PROJECT
Sagebrush/Perennial Grassland (Breeding, Late Brood-rearing/Summer, and Winter Habitat)	High	Reduction in quality habitat that is slow to recover from disturbance.
Greater 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.
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 (habitat)	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 Project 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 Project ROW. Long-term for access roads.

IMPACT	PROJECT ATTRIBUTE	POTENTIAL IMPACT AND WILDLIFE RESOURCE EFFECT	IMPACT CATEGORY AND LONGEVITY
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 and disrupt breeding, migration, and foraging.	Biological disturbance. Short-term within the footprint from construction. Long-term from access roads.
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 Project 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 Project.

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 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 biological 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 transmission line 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 study area. However, the extent of the impact would vary among species and for each species impact levels would depend on: species occurrence within and near the Project right-of-way (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; and long-term disturbance or displacement due to operation and maintenance of the transmission line infrastructure. Construction activities are generally short-term and related to temporary disturbances associated with transmission structure installation, staging areas, access road improvements, new access road construction, and temporary pulling/tensioning sites.

The Required Design Features (RDFs) and environmental protection measures described in Section 2.3 - Required 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. RDFs 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, county, and federal agencies and made a part of the authorizations to be issued by these agencies for the proposed Project. Initial impacts described below take into account the implementation of these RDFs.

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 study 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 [*Artemesia* spp.]) 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 all of the Project Action Alternatives parallel existing transmission lines for at least part of their length, utilizing nearby existing roads will reduce the need for new access roads, thus decreasing the amount of direct habitat loss associated with the proposed Project. RDFs implemented during construction and operation are anticipated to be effective at minimizing the amount of vegetation that would be impacted (refer to Section 2.3 - Required Design Features Common to Action Alternatives). RDFs include: minimizing construction sites within native plant communities; maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction while being 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 habitat disturbance is presented in Table 4.3-4 and discussed for each route segment in Section 4.3.4.

Indirect Habitat Degradation

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 RDFs: 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 transmission 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). RDFs 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 ongoing maintenance activities; 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 (*Bromus tectorum*) 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 study area by a wildland fire event. Non-native plants, particularly cheatgrass, create a more continuous fuel source 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 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 RDFs 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 ongoing maintenance activities; 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

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[2]									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			RIPARIAN / WETLAND			TREES			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
1a/NNR-1		3.7	1.2					4.8	9.1	1.3	0.3	0.0																			2.2	0.4	0.5
1b		28.4	0.6					2.4	1.3	6.7	1.7	0.1				10.4	3.1	0.4											0.5	32.7	4.1	0.7	0.8
1c		17.2	0.4					1.7	0.9	27.1	13.6	0.5				3.7	2.0	0.2				0.4	0.1	3.4							4.3	0.8	0.4
2a										3.6	1.9	0.3				0.4	0.2	0.3															
2b		65.8	0.5							11.7	5.7	0.4				2.5	1.6	0.4				1.1	0.7	15.8							4.0	2.3	0.2
2c		24.8	0.4							21.7	9.4	0.4				0.4	0.1	0.1													27.3	5.2	0.3
2d		34.1	0.3							2.6	1.4	2.1				2.6	1.1	0.7															
3a		1.2	0.1																														
3b		25.3	0.2		0.4	7.5		2.1	10.5	1.9	0.4	0.4				2.5	0.7	0.1	0.3	0.2	2.6				0.7	0.4	0.3		7.1	34.0	42.3	21.5	6.4
3c		49.6	0.4		2.8	0.5		10.7	11.4	11.5	3.8	0.2							1.1	0.6	20.2				1.2	0.3	0.8				32.1	6.5	0.3
NNR-2		4.4	0.2		2.4	15.0		1.5	2.8	4.8	1.0	0.2				2.0	0.4	0.8											1.3	38.2	5.8	1.1	0.4
NNR-3		39.8	0.6		2.0	9.7				0.4	0.2	0.0				5.2	2.9	13.4	1.1	0.4	15.4										0.4	0.0	0.1
NNR-4o*		10.8	0.2		9.2	53.3		1.1	20.3	1.1	0.2	0.1				0.4	0.1	0.2															
NNR-4u*		24.7	0.5		17.0	98.3		1.7	33.3	2.2	0.2	0.2				0.7	0.1	0.3															
NNR-5		8.4	0.3																			0.4	0.2	48.5									
NNR-6o*		26.5	0.3										2.6	0.6	0.3	0.7	0.2	0.2															
NNR-6u*		50.1	0.6										5.1	0.6	0.5	1.5	0.2	0.3															
NNR-7		38.1	0.3																														
NNR-8		8.9	0.2		0.5	24.6				2.4	0.5	1.6				0.8	0.1	4.8															
MR-1		29.3	0.5							18.6	12.8	0.6																			9.9	8.6	0.4

[1]Percentage of habitat within the one-mile buffer of the route segment centerline (Project study 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).
[2]Open water will be spanned; no direct disturbance will occur in open water
*o = overhead design option; u = underground design option.

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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.

Habitat Connectivity Impairment

A potential indirect effect of habitat loss is habitat fragmentation, which may affect wildlife 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 wildlife behavioral avoidance of the Project ROW, even where habitat is not directly removed. Loss of connectivity through habitat fragmentation may inhibit daily movements of animals 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 (*Corvus corax*), a common predator of many wildlife species.

Maintenance and restoration of habitat connectivity has 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). Given predicted climate change, connectivity conservation may have especially important implications in the future as species must move to adapt to changing vegetation patterns and shifting habitats (Heller and Zavaleta 2009). Development and agriculture have fragmented sagebrush-steppe within Washington and habitat connectivity is degraded and threatened for many species (WHCWG 2010).

The WHCWG was formed to address the need to identify the most important areas for maintaining and enhancing habitat connectivity within the state. The partnership is among several state and federal agencies, tribes, and non-governmental organizations and is co-led by Washington Department of Fish and Wildlife (WDFW) and Washington State Department of Transportation (WSDOT). The WHCWG has completed a statewide connectivity analysis (WHCWG 2010) and a Columbia Plateau connectivity analysis (WHCWG 2012).

The general WHCWG analyses identified the “Connected Backbone”, running north-south through JBLM YTC, as the most important linkage zone in the Columbia Plateau Ecoregion. A second important corridor in the JBLM YTC area was identified as the “Lower Crab Creek Linkage Zone”, stretching east from JBLM YTC and facilitating east-west movement between the “Connected Backbone” and another north-south band in eastern Washington, the Braided Scablands Swath” (WHCWG 2012). The proposed Project has potential to impede connectivity among wildlife populations, with implications for the genetic and demographic health of the populations. While the most important linkage areas vary by species, each of the Action Alternatives has potential to reduce connectivity for wildlife species. RDFs aimed at reducing effects of habitat loss, human disturbance, and predation are anticipated to minimize impairment of connectivity for wildlife species. These include: minimizing construction sites within native plant communities; maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction while being 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 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 Project ROW; whenever possible, locations of the new transmission line structures will be in sync with the adjacent existing transmission lines; adhering to reasonable speed limits in construction and maintenance areas; closing and revegetating new or improved access roads that are not required for ongoing maintenance activities; 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.

4.3.3.2 General Wildlife

Collisions

Construction, operation, and maintenance of the proposed Project have 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 transmission lines 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 transmission 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 transmission lines are located near wetlands (Erickson et al. 2005; Faanes 1987; Anderson 1978). In general, raptors are considered less susceptible to collisions with transmission lines than other groups of birds; however, an increased risk of collision occurs where there are repeated flights across transmission lines, especially during bad weather or while pursuing prey (Avian Power Line Interaction Committee [APLIC] 1994 and 2006; Manosa and Real 2001). RDFs would be incorporated and implemented to minimize wildlife injury and mortality associated with the proposed Project. Specific RDFs 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 Project ROW during the bird nesting season. Pacific Power’s Bird Management Program Guidelines include protocols for documenting the incidence of mortalities from collision with transmission lines, contacting the appropriate resource agency and additional actions to be taken to reduce mortalities such as installing bird flight diverters and 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’ and ‘raptor-safe’ design guidelines for new transmission lines (APLIC 2006; APLIC and USFWS 2005). Research has indicated that most avian electrocutions occur on low-medium voltage lines (4 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 Project, a 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 line 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 Project study area, avian predators are more likely to benefit from a transmission line structures than mammalian predators. Armentrout and Hall (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). While these effects have mainly been documented for terrestrial prey species, predators of fish may also perch on transmission structures and/or transmission lines.

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 structures 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 et al. 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 line 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 transmission line structure (Paulus and Malkin 1995). In 2013, 47 raven nests were located on JBLM YTC, a 68 percent increase relative to 1994. 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 2014a).

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 Pacific Power's existing Pomona-Wanapum 230 kV transmission line structures that the proposed New Northern Route (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 2.0 miles south and west of Route Segments 1b and 1c 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 existing transmission lines near the southern part of the Project study area are located outside of JBLM YTC, raven nest data are not available in these areas.

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. All Action Alternatives parallel existing transmission lines for at least part of their length. As part of the proposed Project design, whenever feasible, new transmission line structures will be placed in sync with existing nearby transmission line structures. Given the territorial nature of raptor and corvid species and density limitations imposed by food availability, it seems unlikely that adding a new transmission line structure within 0.25 mile of a similar existing structure would have much, if any, effect on the nesting density of corvids or raptors. That said, the new perches could increase the amount of landscape that is within view of a perch and slightly widen the corridor of increased predation risk.

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 4.3-5 presents the number of transmission line 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 structure. 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 3a, NNR-4, NNR-6, NNR-7, or NNR-8. Other route segments, for which fewer than half of the transmission line structures would be farther than 0.25 mile from existing structures, include Route Segments 1a/NNR-1, 2c, NNR-2, and NNR-3.

Table 4.3-5 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
1a/NNR-1	2.4	1.1 (44%)	31	14
1b	12.5	12.0 (96%)	89	85
1c	12.9	12.3 (95%)	92	88
2a	1.0	1.0 (100%)	7	7
2b	16.3	16.3 (100%)	116	116
2c	18.1	8.8 (48%)	124	60
2d	7.0	7.0 (100%)	50	50
3a	0.1	0.0%	3	0
3b	21.7	19.2 (88%)	181	160
3c	25.2	16.1 (64%)	186	119
NNR-2	5.1	2.0 (40%)	48	21
NNR-3	9.3	0.6 (7%)	69	5
NNR-4o*	4.5	0.0%	35	0
NNR-4u*	4.5	0.0%	4	0
NNR-5	1.8	1.2 (67%)	16	10

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-6o*	6.4	0.0%	48	0
NNR-6u*	6.4	0.0%	2	0
NNR-7	8.2	0.0%	61	0
NNR-8	2.7	0.0%	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.

To minimize the potential for increased predation rates the following RDFs will be implemented: whenever possible, locations of the new transmission line 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.

Disturbance from Human Presence and Avoidance of Infrastructure

Another direct impact on wildlife from the construction and maintenance 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 Project 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 new permanent structures may have a long-term visual impact, essentially creating indirect habitat loss surrounding the transmission line 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 RDFs 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 Project ROW; whenever possible, locations of the new transmision line structures will be in sync with the adjacent existing transmission lines; adhering to reasonable speed limits in construction and maintenance areas; and closing and revegetating new or improved access roads that are not required for ongoing maintenance activities.

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 other special status species, including U.S. Bureau of Land Management (BLM) special status species, are discussed below and by route segment.

Bull Trout
Critical habitat for bull trout (*Salvelinus confluentus*) occurs within the Project study 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 study 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 transmission line structure or road construction work would occur directly within the Columbia or Yakima rivers. For the Columbia River crossing (Route Segments 3c or NNR-8), 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 RDFs 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 (*Oncorhynchus tshawytscha*) has designated critical habitat within the Project study 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 (Route Segments 3c or NNR-8). Tributaries of the Columbia River in and near the Project study 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 study area. No structure or road construction work would occur within the Columbia River. For the Columbia River crossings, 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 RDFs 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.

Gray Wolf
As of March 2015, Washington had 16 confirmed gray wolf (*Canis lupus*) packs, none of which are located in or near the Project area (WDFW 2011b). The closest confirmed wolf packs are located approximately 25 to 30 miles north of the Project area (Becker et al. 2013). The proposed Project would have no identifiable impact on the gray wolf or its habitat.

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 (*Oncorhynchus mykiss*) Distinct Population Segment (DPS). The Yakima River and Burbank Creek, also within the Project study area, are within critical habitat for the Middle Columbia River steelhead DPS. No transmission line structure or road construction work would occur directly 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 (Route Segments 3c or NNR-8), 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 RDFs 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.

4.3.3.4 Greater Sage-Grouse

Potential impacts to Sage-Grouse are analyzed and discussed at length in Appendix B-5 - Sage-Grouse Analysis and Mitigation 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. While the RDFs and environmental protection measures described in Section 2.3 - RDFs Common to Action Alternatives will avoid and minimize much of the impact to Sage-Grouse, it will not be possible to avoid all impacts. Residual impacts to Sage-Grouse and compensatory mitigation will be analyzed and quantified using methodology described in the Framework for Development of a Sage-Grouse Compensatory Mitigation Plan (Appendix B-6; Framework). Principles developed by the interagency Sage-Grouse Subgroup and described in the Framework will guide Pacific Power's development of the Vantage to Pomona Heights 230 kV Transmission Line Project Greater Sage-Grouse Compensatory Mitigation Plan to ensure that the compensatory mitigation will achieve a *net conservation gain* for Sage-Grouse and its habitat.

Sage-Grouse 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 (potential habitat) 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 source 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; Recovery Plan) 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 RDFs anticipated to be effective at minimizing habitat loss and degradation are discussed in Section 4.3.3.1. Potential mitigation actions to compensate for residual habitat loss and degradation impacts are described in Appendix B-6 - Framework for Development of a Sage-Grouse Compensatory Mitigation Plan.

Sage-Grouse 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 the operation of transmission line infrastructure. Because research data on Sage-Grouse collisions with transmission 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 transmission 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 transmission lines have occurred, including in Douglas County, Washington (Schroeder 2010).

RDFs 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 line structures. Raven populations have increased dramatically in the west following human alteration of the landscape and may be more abundant near transmission 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 transmission 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 RDFs anticipated to be effective at minimizing increased predation are discussed in Section 4.3.3.1. Potential mitigation actions to compensate for residual predation impacts are described in Appendix B-6 - Framework for Development of a Sage-Grouse Compensatory Mitigation Plan.

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 proposed 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 Project 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 lines are: 1) Sage-Grouse directly avoid tall structures because they are adapted to inhabit treeless environments; 2) Sage-Grouse indirectly avoid transmission lines because they are avoiding the avian predators that are more abundant near transmission 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 (*Pica hudsonia*), golden eagles (*Aquila chrysaetos*), and *Buteo* hawks compared with random locations.

Reports on direct Sage-Grouse avoidance of transmission 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 transmission lines is minimal and evidence of decreased lek attendance and/or persistence is inconsistent, avoidance of transmission 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 proposed Project. Large portions of Alternatives A-H pass through the YTC Sage-Grouse 95 percent population range (Figure 3.3-4 and Table 4.3-4). Route segments passing through the population range include Route Segments 1b, 1c, 2a, 2b, 2c, and 2d. Of those six route segments, all but Route Segment 2d also pass through the core population range. The proposed NNR Alternative ROW is located entirely outside of the YTC Sage-Grouse population range, where 95 percent of Sage-Grouse use is estimated to occur. 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 and Table 4.3-4). Recent use has been documented near Route Segments NNR-4, NNR-5, and NNR-6, but use appears to be infrequent. No Sage-Grouse were seen during ground transect surveys conducted in May and July of 2013; scat was observed in six locations adjacent to Route Segment NNR-6, one location on Route Segment NNR-5, and one location on Route Segment NNR-4 (Appendix B-1 - Sage-Grouse Survey Report).

Based on 2015 data, there are four active leks, two inactive leks, and numerous historic leks known to occur within four miles of the proposed Project (Table 4.3-6). To ascertain the length of the proposed route segments that could have an impact on active leks and the nesting habitat that surrounds them, the length (miles) of the centerline within four miles of active leks was calculated (Table 4.3-6). Eight of the 18 route segments are within four miles of an active lek. Route Segment 2b has the longest length of line that is within four miles of an active lek (7.3 miles).

RDFs expected to minimize the beneficial effect to avian predators and, thus, reduce Sage-Grouse avoidance of the proposed 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 RDFs 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 [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 Sage-Grouse during vulnerable breeding and winter periods. Additional RDFs are anticipated to be effective at minimizing disturbance and avoidance of the proposed Project infrastructure by Sage-Grouse and other wildlife are discussed in Section 4.3.3.1. Potential mitigation actions to compensate for residual disturbance and avoidance impacts are described in Appendix B-6 - Framework for Development of a Sage-Grouse Compensatory Mitigation Plan.

TABLE 4.3-6 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
1a/NNR-1	0	0.0
1b	3 (Lek #s 1, 3, 4)	4.7
1c	3 (Lek #s 1, 3, 4)	4.3
2a	1 (Lek #4)	0.6
2b	1 (Lek #4)	7.3
2c	1 (Lek #4)	5.5
2d	0	0.0
3a	0	0.0
3b	0	0.0
3c	0	0.0
NNR-2	1 (Lek #1)	1.2
NNR-3	1 (Lek #1)	4.1
NNR-4o and NNR-4u*	0	0.0
NNR-5	0	0.0
NNR-6o and NNRu6u*	1 (Lek #2)	3.7
NNR-7	0	0.0
NNR-8	0	0.0
MR-1	0	0.0

[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 YTC Sage-Grouse population is one of two geographically distinct populations in Washington; the second population is located in the Mansfield Plateau/Moses Coulee area in Douglas and Grant Counties (Stinson et al. 2004). The YTC population is isolated from the Mansfield Plateau/Moses Coulee population by more than 30 miles and from populations in Oregon and Idaho by approximately 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).

The proposed Project has the 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.

Sage-Grouse-specific WHCWG analyses identified four Habitat Concentration Areas (HCA) within Washington. These include the 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 Indian Reservation in Yakima County. Sage-Grouse were translocated to the Yakama Indian Reservation in 2006, but, as of 2012, there were no confirmed observations of breeding activity (Robb and Schroeder 2012).

The WHCWG analysis identified the linkage between the YTC 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 two wind energy developments. 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 Alternative, the linkage is constricted by wind energy developments on private and state land (including both WDFW-managed land and Washington Department of Natural Resources state trust land; Robb and Schroeder 2012).

The least-cost pathway of the linkage zone appears to intersect the NNR Alternative near Route Segments NNR-6 and NNR-7. Local patterns of Sage-Grouse distribution suggest that Route Segment 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 Route Segments NNR-4, NNR-5 and western Route Segment NNR-6 than near eastern Route Segment NNR-6 and Route Segment NNR-7, but the presence of the two existing wind developments 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).

According to Robb and Schroeder (2012), there is no direct linkage between the YTC HCA and the Upper Crab Creek HCA, but the two connect via the Mansfield Plateau/Moses Coulee HCA. Thus there is no identified Sage-Grouse connectivity habitat in or near the east side of the proposed Project (Route Segments 3a, 3b, and 3c).

Of the three main Sage-Grouse connectivity zones identified by WHCWG, the one linking the YTC population with the reintroduced Yakama Indian Reservation population was the weakest. That connectivity zone would cross Alternatives A-H, with the most valuable zone crossing Route Segments 2b and 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 YTC population, and potential for movement between the two areas “looks dismal.” None of the proposed route segments are likely to impact Sage-Grouse connectivity to the south; given the existing barriers, it is unlikely that movement would occur between the YTC and Yakama Indian Reservation populations with or without development of any of the Action Alternatives.

Because the proposed NNR Alternative 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 Alternative 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 NNR Alternative - Underground Design Option could alleviate Sage-Grouse avoidance of the NNR Alternative; 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 Sage-Grouse use of the area north of the proposed NNR Alternative has been limited, even two decades ago when the YTC population was higher (over 400 birds).

The impact of the proposed NNR Alternative 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 RDFs would be implemented: the NNR Alternative would closely parallel the existing Pacific Power 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 installed on transmission line structures 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 Route Segment NNR-6 that is within the most likely zone for movement between populations to occur. The RDFs 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 RDFs may also minimize the visual impact of the transmission line structures on Sage-Grouse which would reduce an avoidance effect of the structures. Potential mitigation actions to compensate for residual connectivity impacts are described in Appendix B-6 - Framework for Development of a Sage-Grouse Compensatory Mitigation Plan.

4.3.3.5 State Listed and Other Special Status Species

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, Washington State Department of Natural Resources, and the U.S. Bureau of Reclamation). In cases where such species are identified, appropriate action will be taken to avoid adverse impacts on the species and their habitats.

Fish, Amphibians, and Invertebrates

Several special status aquatic species have the potential to occur within the Project study area, especially along the Columbia River and Yakima River, as described in Section 3.3.2.3. Coho salmon (*Oncorhynchus kisutch*), leopard dace (*Rhinichthys falcatus*), and mountain sucker (*Catostomus* *platyrhynchus*) occur in the Yakima and Columbia river watersheds. Sockeye salmon (*Oncorhynchus nerka*) occur in the Columbia River Watershed, migrating through the Project study area on its way to and from the ocean. It is very unlikely that any special status fish species spawn in any streams within the Project area. Two special status species of mussels occur in the Columbia River (California floater [*Anodonta californiensis*] and western ridged mussel [*Gonidea angulata*]) and a special status dragonfly (Columbia clubtail [*Gomphus lynnae*]) occurs on the Yakima River. All three species are likely to occur within the Project study area. Three special status species of amphibian could possibly occur in the Project study 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 directly 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 RDFs: 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 proposed Project.

Reptiles

Several special status reptiles have the potential to occur within the Project study area including four that have been documented in the Project study area—night snake (*Hypsiglena torquata*), striped whipsnake (*Masticophis taeniatus*), sagebrush lizard (*Sceloporus graciosus*), and side-blotched lizard (*Uta stansburiana*). 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. RDFs will minimize disturbance and change to habitat and wildlife as described in Sections 4.3.3.1 and 4.3.3.2. Species-specific impact levels will range from moderate to no identifiable impact depending on the location. Route 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 study 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 study 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. RDFs are expected to reduce impacts to MBTA-protected birds. Some of the key RDFs 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; and adherence to reasonable speed limits. Specific impacts and RDFs are discussed in detail below, under Raptors, Waterfowl and Other Aquatic Birds, and Other Special Status Upland Bird Species. Impacts to Migratory Birds are discussed further in Appendix B-8 - Migratory Bird Conservation Plan.

Raptors

Five special status raptor species are documented to nest within the Project study area: golden eagle, bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), ferruginous hawk (*Buteo regalis*), and burrowing owl (*Athene cunicularia*). Other raptor species documented or likely to nest within the

Project area include prairie falcon (*Falco mexicanus*), osprey (*Pandion haliaetus*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), short-eared owl (*Asio flammeus*), and great-horned owl (*Bubo virginianus*). 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 proposed 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 RDFs such as seasonal restrictions and buffers to avoid nesting raptors during construction would limit disturbance to breeding raptors (refer to RDFs in Section 2.3 for a list of nest buffers by species). Implementation of RDFs 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 on four waterbodies within one mile of the proposed Project: the Selah Waterfowl Concentration Area/Selah Gravel Pit Wetlands associated with the Yakima River, located just northwest of the Pomona Heights Substation; the Wanapum Pools Waterfowl Concentration Area within Wanapum Lake on the Columbia River located just northwest of the Vantage Substation; the Priest Rapids Lake Waterfowl Concentration Area on the Columbia River located alongside Route Segment 3b; and the Nunnally Lake Concentration Area on the small lake located just north of Lower Crab Creek along Route Segment 3c. Wanapum Pool and Priest Rapids Lake are also identified by WDFW Priority Habitats and Species (PHS) as regularly occupied by common loons (*Gavia immer*) in low densities. American white pelicans (*Pelecanus erythrorhynchos*) have also been documented within the Project study area on the Columbia River. Overall, eight special status aquatic bird species occur or are likely to occur within the Project study area: black-crowned night heron (*Nycticorax nycticorax*); great blue heron (*Ardea herodias*); Clark's, western, and eared grebes (*Aechmophorus clarkia, A. occidentalis, and Podiceps nigricollis*); tundra swan (*Cygnus columbianus*); American white pelican; and common loon. Waterfowl and aquatic bird injury and mortality could occur through collision with the transmission line. The only route segments with suitable habitat for waterfowl and other aquatic species are the Columbia River crossings at Route Segments NNR-8 and 3c. In the area of Route Segment NNR-8, the transmission line would parallel four existing transmission lines within 350 to 1,300 feet. To the extent that collision potential exists, the additional transmission line will likely not add greater risk than what already occurs at this crossing. The crossing at Route Segment 3c would not be near any existing transmission lines and may pose a greater collision risk. It is conceivable that waterfowl and other aquatic species occasionally travel across the proposed Project study area en route from the Yakima River to the Columbia River or vice versa and/or between aquatic zones and terrestrial feeding areas such as agricultural fields. The NNR Alternative more or less parallels one or more existing transmission line for its entire route while Alternatives A-H parallel existing transmission lines for a smaller portion of their lengths. RDFs include installing bird flight diverters in locations with known avian mortality through collision with transmission line infrastructure. 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 study area include regular concentration areas for chukar (*Alectoris chukar*), loggerhead shrike (*Lanius ludovicianus*), and long-billed curlew (*Numenius americanus*; a shorebird that breeds in upland grassland or shrub-steppe). Eight other special status upland bird species occur or are likely to occur within the Project study area: ring-necked pheasant (*Phasianus colchicus*), Vaux's swift (*Chaetura vauxi*), gray flycatcher (*Empidonax* *wrightii*), cedar waxwing (*Bombycilla cedrorum*), sage thrasher (*Oreoscoptes montanus*), sage sparrow (*Amphispiza belli*), black-throated sparrow (*Amphispiza bilineata*), and Oregon vesper sparrow (*Pooecetes gramineus affinis*). The latter four species breed in relatively high densities in sagebrush-steppe and are likely to nest within the proposed ROWs of the Action Alternatives 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 transmission line 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 proposed Project will be relatively small. Total short- and long-term direct disturbance for all habitat types combined ranges from one to 120 acres, depending on the route segment (Table 4.3-4). The implementation of RDFs 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; utilizing 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 ongoing maintenance activities; implementing a noxious weed control plan; and adherence to reasonable speed limits. Segment-specific impact levels are discussed in Section 4.3.4.

Mammals

Ten special status mammal species are documented or likely to occur within the Project study area: black-tailed and white-tailed jackrabbits (*Lepus californicus* and *L. townsendii*), Merriam's shrew (*Sorex merriami*), Townsend's ground squirrel (*Urocitellus townsendii*), pallid bat (*Antrozous pallidus*), elk (*Cervus canadensis*), little brown myotis (*Myotis lucifugus*), bighorn sheep (*Ovis canadensis*), and two subspecies of mule deer: Columbian black-tailed deer (*Odocoileus hemionus columbianus* ; west of I-82) and Rocky Mountain mule deer (*O. hemionus hemionus*; east of I-82). The occurrence of five special status mammal species including Preble's shrew (*Sorex preblei*), northwest white-tailed deer (*Odocoileus virginianus ochrourus*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), and Washington ground squirrel (*Urocitellus washingtoni*) within the Project study area has not been documented and based on habitat specifications, these species are not likely to occur within the Project study area. Therefore, impacts to those five species are not discussed in the following sections. For all ten species that do or are likely to occur within the Project study area, 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 proposed Project will be relatively small. Total short-term and long-term direct disturbance for all habitat types combined for a given route segment is anticipated to range from one to 120 acres, depending on the route segment (Table 4.3-4). RDFs 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 ten 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 depends on the Action Alternative. The effect of NNR Alternative on predators is anticipated to be relatively small because the Action Alternative closely follows an existing 230 kV line with similar structures with the exception of Route Segment Manastash Ridge (MR) 1 which would not be sited close to an existing transmission 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. WDFW's Wenas 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 study area, construction disturbance would be unlikely to impact wintering populations within the Wenas Wildlife Area. The southeast portion of the Project study area is also winter range for elk (Route Segments 1c, 2a, 2b, 2c, 2d, 3a, and 3b). The area extending south from the Saddle Mountains and west from the Columbia River has been identified as a mule deer regular large concentration area (Route Segments 2d, 3b, 3c, NNR-6, and NNR-7). Another mule deer regular concentration area occurs on Wanapum Bench, immediately north of the Vantage Substation. Adherence to seasonal restrictions on construction activities within these areas should minimize disturbance impacts to elk and mule deer. A bighorn sheep population with roughly 200 to 300 animals inhabits the Wenas 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 study area, primarily west of the Yakima River. Area designated as bighorn sheep winter range overlaps portions of Route Segment NNR-3, as well as the southwestern end of Route Segments NNR-4 and MR-1. These route segments cross 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 RDFs to minimize disturbance impacts are described in Section 4.3.3.2. Segment-specific impact levels are discussed in Section 4.3.4.

4.3.3.6 Local Critical Areas

Local critical areas for wildlife include streams, lakes, and riparian areas; big game winter range, and priority habitats and species.

Aquatic and riparian 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. Riverine and associated riparian areas include the Columbia and Yakima rivers, Lower Crab Creek, Lmuma, Burbank, Johnson, Foster, and Selah creeks. While the greatest amount of aquatic and riparian habitat occurs within Route Segments 1a/NNR-1, 2d, 3b, 3c, NNR-7, and NNR-8, all route segments have at least some aquatic and/or riparian habitat with the exception of Route Segments 2b and NNR-5. Impacts to these areas and RDFs to minimize impacts are described in Section 4.3.3.1 Habitat, Section 4.3.4 Impacts Specific to Route Segments, Section 4.2 Vegetation and Special Status Plant Species, and Section 4.14 Water Resources.

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. As previously stated, winter range for elk, mule deer, and bighorn sheep occurs within the Project study area in Route Segments 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, NNR-3, NNR-7, and NNR-8. Impacts to these areas and RDFs to minimize impacts are described in Section 4.3.3.5 State-listed and Other Special Status Species: Mammals and in Section 4.3.4 Impacts Specific to Route Segments.

Twenty-six special status species have been documented to occur within the Project study area, with one or more locations occurring in every route segment. Impacts related to these occurrence areas and RDFs to minimize impacts are described in Section 4.3.3.5 State-listed and Other Special Status Species and in Section 4.3.4 Impacts Specific to Route Segments.

The Action Alternatives do not pass through any special management areas, but one or more special management areas occur within one mile of each Action Alternative—the Columbia National Wildlife Refuge (at Route Segment 3c), Hanford Reach National Monument (at Route Segment 3c), Columbia Basin State Wildlife Area (at Route Segments 3b and 3c), and Wenas Wildlife Area (at Route Segment NNR-3). Impacts to Special Management areas are discussed in Section 4.6 Special Management Areas.

4.3.4 Impacts Specific to Route Segments

Impacts to habitat and species are discussed below for each route segment. Digital element occurrence records for PHS documented within the analysis area were obtained from WDFW in June 2014 (WDFW 2014). A map showing special status wildlife locations and management areas is included in Appendix A; however, due to the sensitive nature of location information, certain locations (such as nest locations) are not shown and this map is presented at a small-scale (WDFW 2011b; Guggenmos 2012).

4.3.4.1 Route Segment 1a/NNR-1

Approximately 3.5 acres of long-term and 9.2 acres of short-term disturbance would occur through the construction of Route Segment 1a/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 (*Chrysothamnus viscidiflorus* and *Ericameria nauseosa*; 4.8 acres long-term disturbance), exotic annual grasses (0.3 acre long-term and 1.3 acres short-term), and developed areas, such as agricultural and residential areas (0.4 acre long-term and 2.2 acres short-term; Table 4.3-4). The remaining 3.7 acres of long-term disturbance would occur within areas classified as sagebrush/perennial grassland. RDFs 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 new transmission line 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 1a/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 4.3-5).

Within one mile of Route Segment 1a/NNR-1, potentially suitable habitat is present for 54 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 RDFs 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 1a/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 1a/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 directly within the Yakima River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of RDFs 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.

The reach of the Yakima River within one mile of Route Segment 1a/NNR-1 is within designated critical habitat for the Middle Columbia River steelhead DPS. No structure or road construction work would occur directly 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 1a/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 new transmission line, though it is not very likely because the route segment 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 Route Segment 1a/NNR-1. RDFs include installing bird flight diverters in locations with known avian mortality through collision with transmission line infrastructure. Route Segment 1a/NNR-1 is expected to have no identifiable impacts to waterfowl or aquatic bird species. Route Segment 1a/NNR-1 is expected to have 0.3 mile of low impact level on bald eagles.

All habitat disturbance associated with Route Segment 1a/1a/NNR-1 is within the Regularly Occupied Habitat Management Unit (MU) for Sage-Grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7). 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. Approximately 3.7 acres of disturbance is predicted to occur within suitable Sage-Grouse habitat; 6.4 acres of disturbance is anticipated to occur in marginal habitat, and 2.6 acres within unsuitable habitat (Table 4.3-8). However, given the proximity of the route segment to surrounding disturbance and urban development, it is doubtful that the immediate area would be used by Sage-Grouse. Considering the existing degraded habitat available within Route Segment 1a/NNR-1 and with the implementation of RDFs, 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 1a/NNR-1 from buildings, trees, fences associated with developed areas and existing distribution and 230 kV H-frame transmission lines. Construction of Route Segment 1a/NNR-1 would require approximately 31 new structures; approximately 14 (45 percent) of these new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Table 4.3-7 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 (ACRES DISTURBED)
		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	
1a/NNR-1	12.8	12.8	20,162	0.06%	0.0	2,379	0.00%	0.0	0.0	NA	0.0
1b	57.9	57.9	63,443	0.09%	0.0	13,373	0.00%	0.0	0.0	NA	0.0
1c	70.9	70.1	62,707	0.11%	0.8	14,753	0.01%	0.0	0.0	NA	0.0
2a	6.0	6.0	23,547	0.03%	0.0	12,989	0.00%	0.0	0.0	NA	0.0
2b	95.3	95.3	83,356	0.11%	0.0	31,859	0.00%	0.0	0.0	NA	0.0
2c	88.8	81.8	68,493	0.12%	6.9	54,723	0.01%	0.0	0.0	NA	0.0
2d	41.9	41.9	38,643	0.11%	0.0	16,220	0.00%	0.0	3,146	0.00%	0.0
3a	1.2	0.0	11,182	0.00%	1.2	18,395	0.01%	0.0	837	0.00%	0.0
3b	107.9	78.3	76,187	0.10%	20.5	39,278	0.05%	0.0	3,802	0.00%	9.2
3c	121.8	10.5	34,114	0.03%	58.9	59,284	0.10%	17.9	19,031	0.09%	34.5
NNR-2	24.8	22.9	29,574	0.08%	0.5	7,442	0.01%	0.0	0.0	NA	1.3
NNR-3	52.4	52.0	61,214	0.09%	0.4	13,210	0.00%	0.0	0.0	NA	0.0
NNR-4o*	23.0	23.0	52,525	0.04%	0.0	1,440	0%	0.0	0.0	NA	0.0
NNR-4u*	46.7	46.7	52,525	0.09%	0.0	0.0	NA[3]	0.0	0.0	NA	0.0
NNR-5	9.1	9.1	39,635	0.02%	0.0	0.0	NA	0.0	0.0	NA	0.0
NNR-6o*	30.6	30.6	64,157	0.05%	0.0	0.0	NA	0.0	0.0	NA	0.0
NNR-6u*	57.4	57.4	64,157	0.09%	0.0	0.0	NA	0.0	0.0	NA	0.0
NNR-7	38.1	38.1	63,322	0.06%	0.0	10,825	0.00%	0.0	0.0	NA	0.0
NNR-8	13.3	2.7	22,266	0.01%	10.6	19,507	0.05%	0.0	837	0.00%	0.0
MR-1	79.2	79.2	63,699	0.12%	0.0	7,751	0%	0.0	0.0	NA	0.0

[1]No designated Connectivity Habitat, is present within the Project study area.
[2]The Project area is defined as an eight-mile wide corridor; four miles from either side of route segment centerlines.
[3]NA= Not Applicable
*o = overhead design option; u = underground design option.
Numbers are rounded and may not sum exactly

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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[1]	Total Acres Disturbed[1]	Acres Present Within Analysis Area[2]	Total Acres Disturbed[1]	Acres Present Within Analysis Area[2]
1a/NNR-1	3.7	6,770	6.4	1,374	2.6	35,125
1b	28.4	26,910	24.2	1,736	5.2	64,404
1c	17.7	26,960	48.1	1,716	5.1	65,642
2a	0.0	11,786	6.0	91	0.0	25,239
2b	67.6	57,485	21.5	157	6.3	58,149
2c	24.8	51,815	31.5	143	32.4	71,834
2d	34.1	35,130	7.8	104	0.0	31,499
3a	1.2	17,568	0.0	744	0.0	14,573
1a/NNR-1	26.9	81,970	8.0	2,888	72.9	55,339
1b	52.7	65,477	28.8	8,359	40.3	80,022
NNR-2	4.4	11,168	11.5	1,392	8.8	38,442
NNR-3	41.4	42,197	10.7	2,145	0.4	35,113
NNR-4o*	11.9	35,502	11.1	912	0.0	18,774
NNR-4u*	24.5	35,502	22.3	912	0.0	18,774
NNR-5	9.1	28,425	0.0	71	0.0	12,193
NNR-6o*	26.5	52,922	4.1	187	0.0	11,968
NNR-6u*	50.1	52,922	7.3	187	0.0	11,968
NNR-7	38.1	63,145	0.0	3,20	0.0	10,681
NNR-8	8.9	28,583	4.4	1,333	0.0	15,183
MR-1	29.3	44,094	31.4	3,881	18.5	35,312
Total[2]	501.2	277,276	285.1	16,633	192.6	287,840

[1] Habitat Suitability is derived from land cover types. Land cover types are a composite of GAP vegetation data, JBLM YTC vegetation data, and POWER Engineers Inc. (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, trees, and other (includes agriculture, developed/residential areas and open water).
[2] Total within analysis area is less than the sum of all route segment analysis areas due to overlapping buffers
* o = overhead design option; u = underground design option.

The estimated Sage-Grouse population range does not overlap the Route Segment 1a/NNR-1 ROW (Figure 3.3-4). There are no active leks within four miles of Route Segment 1a/NNR-1. Potential impacts to lekking Sage-Grouse would be minimized by the implementation of RDFs (refer to Sections 4.3.3.1 and 4.3.3.2). With the implementation of RDFs combined with no known active or inactive leks within four miles, impacts to lekking Sage-Grouse with the construction of Route Segment 1a/NNR-1 is anticipated to be low.

4.3.4.2 Route Segment 1b

Approximately 36.8 acres of long-term and 21.2 acres of short-term disturbance would occur through the construction of Route Segment 1b. Fire history records indicate there have been several fires within and near this route segment. Two fire breaks are present within most of the route segment's ROW corridor consisting of bare ground, cheatgrass, and Russian thistle (*Kali tragus*). Despite this disturbance, the adjacent habitat is predominantly high quality big sagebrush (*Artemisia tridentata*) and stiff sagebrush (*A. rigida*) with abundant native perennial bunchgrasses, low non-native species cover, and a diverse and abundant native forb layer. Permanently disturbed areas would include 28.4 acres of sagebrush/perennial grassland, 2.4 acres of other shrublands, and 3.1 acres of perennial grassland (Table 4.3-4). Perennial grassland accounts for about half of the short-term disturbance (10.4 acres) disturbance, with the remaining short-term disturbance in agriculture/disturbed areas and annual grassland. Route Segment 1b would also require the permanent removal of approximately 0.5 acre of quaking aspen (*Populus tremuloides*) trees. This area is important to wildlife, especially during dry times of the year because riparian habitats are relatively limited in the area. Unless it is determined during Project design that this area should be spanned, removal of riparian vegetation and aspen would constitute a moderate impact level. RDFs 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 6.1 miles and moderate for 6.4 miles (6.3 miles of sagebrush/perennial grassland, and 0.1 mile of trees/aspen).

The presence of new transmission line 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 1b would require an estimated 89 structures, of which 85 would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Within one mile of Route Segment 1b, 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 RDFs 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 1b include priority species regional areas for regular concentrations of loggerhead shrikes and long-billed curlews, curlew breeding occurrences, elk winter range, five burrowing owl nests, and black-tailed jackrabbit occurrences.

There is a small loggerhead shrike concentration area on the north slope of Yakima Ridge just east of the route segment's ROW corridor (0.1 mile away). 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 new transmission line structures, and disturbance or displacement from noise or visual disturbance, especially during construction. RDFs would be implemented to minimize impacts, as described in Sections 4.3.3.1 and 4.3.3.2. The loggerhead shrike concentration area is located outside of the route segment's ROW and RDFs are anticipated to successfully minimize impacts to loggerhead shrike; no identifiable impacts are anticipated.

Route Segment 1b crosses 3.2 miles of long-billed curlew Priority Species Regional Area and additional potential habitat is present. Impacts to long-billed curlew include a reduction and degradation of habitat, disturbance during nesting and brood-rearing periods, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. RDFs that would be implemented include closing access roads not required for ongoing maintenance activities, reseeding disturbed areas, implementing a noxious weed control plan, adherence to reasonable speed limits, and employing seasonal restrictions and buffers to avoid nesting long-billed curlews. Impact levels are expected to include 3.2 miles of moderate and 9.3 miles of low impacts for long-billed curlews.

Five burrowing owl nests were documented within one mile of Route Segment 1b in 2000. While these particular nests are not likely to have persisted to the present, they demonstrate potential for burrowing owls to nest within one mile of Route Segment 1b. 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. Additional impacts to burrowing owls could occur from the mechanical disturbance or crushing of burrows. Noise from construction equipment and general construction activities could disturb and displace individuals on a short-term basis with little impact. Long-term impacts would be related to loss of foraging habitat, reduction in preferred habitat for prey species, and disturbance or mortality from vehicle strikes or interactions with other equipment used for maintenance. If an occupied burrowing owl nesting site is found within 0.25 mile of the proposed route segment's ROW, a seasonal restriction on construction would be enacted from March to August within the 0.25-mile buffer. Additional RDFs 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 3.5 miles and low for 9.0 miles.

The west edge of the Rattlesnake Elk Winter Range Regular Concentration area is approximately 0.3 mile east of Route Segment 1b. RDFs to minimize impacts to elk will include a seasonal restriction on construction. No construction is anticipated to occur within the winter range area. If construction does occur within elk winter range, seasonal restrictions would be adhered to (Section 2.3). No identifiable impacts are anticipated for elk for Route Segment 1b.

Black-tailed jackrabbit have been documented with a half mile of a 1.7-mile long section of Route Segment 1b. 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. RDFs 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 1.7 miles and low for 10.8 miles.

All habitat disturbance associated with Route Segment 1b is within the Regularly Occupied Habitat MU for Sage-Grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7). Anticipated ground disturbance includes 28.4 acres of suitable Sage-Grouse habitat, 24.2 acres of marginal habitat, and 5.2 acres of unsuitable habitat (Table 4.3-8). RDFs 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 6.2 miles and moderate for 6.3 miles.

Existing perching, roosting and nesting sites are available along Route Segment 1b from buildings, trees, and fences associated with developed areas and existing distribution and transmission lines. Construction of Route Segment 1b would require approximately 89 new structures; approximately 85 (96 percent) of these new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Seventy-three percent of the Route Segment 1b ROW corridor is within the estimated Sage-Grouse population range and 18 percent of the ROW corridor is within the core population range (Figure 3.3-4).

Three active leks (Leks #1, #3, and #4) and one inactive lek occur within four miles of Route Segment 1b (Table 3.3-7). Approximately 6.8 miles of Route Segment 1b are within four miles of an active or inactive lek. Lek #1 is located approximately 3.6 miles north of Route Segment 1b. As it is slightly closer to Route Segment NNR-3, Lek #1 is described in more detail for Route Segment NNR-3. Lek #3 occurs approximately 2.9 miles northeast of Route Segment 1b. Lek #3 had four males attending in 2015, and four in 2014 (SEE 2015). An inactive lek within the same complex (complex #3) is located approximately 1.6 miles southwest of the active Lek #3, and 1.3 miles northeast of Route Segment 1b.This lek was last active in 2006 (SEE 2015). Lek #4 occurs approximately 3.9 miles east of Route Segment 1b; it is described in more detail for Route Segment 2b, to which it is more closely located. Potential impacts to lekking Sage-Grouse would be minimized by the implementation of RDFs (refer to Sections 4.3.3.1 and 4.3.3.2). Lek impact levels are anticipated to be low for 5.7 miles and moderate for 6.8 miles.

4.3.4.3 Route Segment 1c

Approximately 35.4 acres of long-term and 35.5 acres of short-term disturbance would occur through the construction of Route Segment 1c. The majority of the habitat along and immediately adjacent to this route segment is highly disturbed and poor quality and borders agricultural land, roads, and residences. However, much of the surrounding habitat is predominantly high quality big sagebrush and stiff sagebrush with abundant native perennial bunchgrasses, low non-native species cover, and a diverse and abundant native forb layer. Permanently disturbed areas would include 17.2 acres of sagebrush/perennial grassland, 13.6 acres of annual grassland/noxious weeds, 1.7 acres of other shrublands, and 2.0 acres of perennial grassland (Table 4.3-4). Short-term disturbance would include 3.7 acres of perennial grassland and 27.1 acres of annual grassland/noxious weeds. RDFs 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 9.8 miles and moderate for 3.2 miles (3.1 miles of sagebrush/perennial grassland and 0.1 mile of intermittent stream/dry gully).

The presence of new transmission line 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 1c would require an estimated 92 structures, of which 88 would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Within one mile of Route Segment 1c, 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 RDFs 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 1c include priority species regional areas for regular concentrations of loggerhead shrikes and long-billed curlews, curlew breeding occurrences, elk winter range, five burrowing owl nests, and black-tailed jackrabbit occurrences.

There is a small loggerhead shrike concentration area on the north slope of Yakima Ridge just east of the route segment’s ROW (0.1 mile away). 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 new structures, and disturbance or displacement from noise or visual disturbance, especially during construction. RDFs would be implemented to minimize impacts, as described in Sections 4.3.3.1 and 4.3.3.2. The loggerhead shrike concentration area is located outside of the route segments’ ROW and RDFs are anticipated to successfully minimize impacts to loggerhead shrike; no identifiable impacts are anticipated.

Route Segment 1c skirts the edge of long-billed curlew Priority Species Regional Area for a few miles and potential habitat is present within the Route Segment 1c ROW. Impacts to long-billed curlew include a reduction and degradation of habitat, disturbance during nesting and brood-rearing periods, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. RDFs that would be implemented include closing access roads not required for ongoing maintenance activities, reseeding disturbed areas, implementing a noxious weed control plan, adherence to reasonable speed limits, and employing seasonal restrictions and buffers to avoid nesting long-billed curlews. Impact levels are expected to include 12.9 miles of low impacts for long-billed curlews.

Five burrowing owl nests were documented within one mile of Route Segment 1c in 2000. While these particular nests are not likely to have persisted to the present, it demonstrates potential for burrowing owls to nest within one mile of Route Segment 1c. 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. Additional impacts to burrowing owls could occur from the mechanical disturbance or crushing of burrows. Noise from construction equipment and general construction activities could disturb and displace individuals on a short-term basis with little impact. Long-term impacts would be related to loss of foraging habitat, reduction in preferred habitat for prey species, and disturbance or mortality from vehicle strikes or interactions with other equipment used for maintenance. If an occupied burrowing owl nesting site is found within 0.25 mile of the proposed route segment's ROW, a seasonal restriction on construction would be enacted from March to August within the 0.25-mile buffer. Additional RDFs 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 3.2 miles and low for 9.7 miles.

The west edge of the Rattlesnake Elk Winter Range Regular Concentration area is approximately 0.3 mile east of Route Segment 1c. RDFs to minimize impacts to elk will include a seasonal restriction on construction. No construction is anticipated to occur within the winter range area. If construction does occur within elk winter range, seasonal restrictions would be adhered to (Section 2.3). No identifiable impacts are anticipated for elk for Route Segment 1c.

Black-tailed jackrabbit have been documented within 0.5 of a 1.5-mile long section of Route Segment 1c. 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. RDFs 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 1.5 miles and low for 11.4 miles.

The majority of the habitat disturbance associated with Route Segment 1c is within the Regularly Occupied Habitat MU for Sage-Grouse, with the remainder being in occasionally occupied habitat MU. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7). Anticipated ground disturbance includes 17.7 acres of suitable Sage-Grouse habitat, 48.1 acres of marginal habitat, and 5.1 acres of unsuitable habitat (Table 4.3-8). RDFs 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 to be low for 9.8 miles and moderate for 3.1 miles.

Existing perching, roosting and nesting sites are available along Route Segment 1c from buildings, trees, and fences associated with developed areas and existing distribution and transmission lines. Construction of Route Segment 1c would require approximately 92 new structures; approximately 88 (96 percent) of these new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Seventy-three percent of the Route Segment 1c ROW is within the estimated Sage-Grouse population range, and 14 percent of the route segment's ROW is within the core population range (Figure 3.3-4). Three active leks (Leks #1, #3, and #4) and one inactive lek occur within four miles of Route Segment 1c. Because each of these leks is located closer to another route segment, they are described more fully for the route segment to which they are closest (Table 3.3-7). Lek #1 is located approximately 3.7 miles north of Route Segment 1c (described for Route Segment NNR-3), Lek #3 occurs approximately 3.0 miles northeast of Route Segment 1c (described for Route Segment 1b), Lek #4 occurs approximately 3.9 miles east of Route Segment 1c (described for Route Segment 2b), and an inactive lek is located approximately 1.4 miles northeast of Route Segment 1c (described for Route Segment 1b). Approximately 6.3 miles of Route Segment 1c are within four miles of an active or inactive lek. Potential impacts to lekking Sage-Grouse would be minimized by the implementation of RDFs (refer to Sections 4.3.3.1 and 4.3.3.2). Lek impact levels are anticipated to be low for 6.6 miles and moderate for 6.3 miles.

4.3.4.4 Route Segment 2a

Habitat along and immediately adjacent to this route segment appears to be highly disturbed and of poor quality. Long-term disturbance of approximately 2.1 acres of habitat would occur from the construction of Route Segment 2a, including 1.9 acres of annual grassland, and 0.2 acre of perennial grassland. Short-term disturbance would occur to approximately four acres, 3.6 acres of annual grassland, and 0.4 acre of perennial grassland (Table 4.3-4). RDFs 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 the entire one-mile route segment.

The presence of new transmission line 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 2a would require an estimated 7 structures, all of which would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Within one mile of Route Segment 2a, potentially suitable habitat is present for 35 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 RDFs 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 2a include priority species regional areas for long-billed curlews nesting area and elk winter range.

Route Segment 2a is located approximately 0.8 mile from the edge of a long-billed curlew Priority Species Regional Area and potential habitat is present within the Route Segment 2a ROW. Impacts to long-billed curlew include a reduction and degradation of habitat, disturbance during nesting and brood-rearing periods, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. RDFs that would be implemented include closing access roads not required for ongoing maintenance activities, reseeding disturbed areas, implementing a noxious weed control plan, adherence to reasonable speed limits, and employing seasonal restrictions and buffers to avoid nesting long-billed curlews. Impact levels are expected to include 1 mile of low impacts for long-billed curlews.

Approximately 0.3 mile of Route Segment 2a would be just within the west edge of the Rattlesnake Elk Winter Range Regular Concentration area. RDFs to minimize impacts to elk will include a seasonal restriction on construction. Specifically construction would be avoided during the wintering season, typically December 1 through March 1, or as defined by WDFW for each big game population in question (Section 2.3). The avoidance RDF is anticipated to be effective at minimizing impacts to elk, so impacts are expected to be low for the 0.3 miles of the route segment within winter range, with no identifiable impacts to elk outside of the winter range.

All habitat disturbance associated with Route Segment 2a is within the Regularly Occupied Habitat MU for Sage-Grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7). All 6.0 acres of anticipated ground disturbance would occur in marginal Sage-Grouse habitat (Table 4.3-8). RDFs 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 to be low for the entire 1.0-mile long route segment.

Construction of Route Segment 2a would require approximately 7 structures, all of which would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5). One hundred percent of the Route Segment 2a ROW is within the estimated core Sage-Grouse population range (Figure 3.3-4). One active lek (Lek #4) occurs within four miles of Route Segment 2a (Table 3.3-7). Lek #4 is located approximately 3.9 miles east of Route Segment 2a; it is described in more detail for Route Segment 2b to which it is more closely located. Approximately 0.6 miles of Route Segment 2a are within four miles of an active or inactive lek. Potential impacts to lekking Sage-Grouse would be minimized by the implementation of RDFs (refer to Sections 4.3.3.1 and 4.3.3.2). Lek impact levels are anticipated to be low for 0.4 mile and moderate for 0.6 mile.

4.3.4.5 Route Segment 2b

Approximately 76.1 acres of long-term and 19.3 acres of short-term disturbance would occur through the construction of Route Segment 2b. Most of the permanently disturbed area would be sagebrush/perennial grassland (65.8 acres), with the remaining. 10.3 acres split among annual grassland, noxious weeds, agriculture, disturbed ground, perennial grassland, and intermittent stream/dry gully (Table 4.3-4). Short-term disturbance is prominently annual grassland (11.7 acres), along with agriculture/disturbed land (4 acres), perennial grassland (2.5 acres), and intermittent stream/dry gully (1.1 acres). RDFs 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 five miles and moderate for 11.4 miles (sagebrush/perennial grassland for 11.1 miles and intermittent stream/dry gully for 0.3 miles).

The presence of new transmission line 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 2b would require an estimated 116 structures in a landscape dominated by low growing grasses and shrubs. All new structures would be located greater than 0.25 mile from an existing transmission line or trees (Table 4.3-5).

Within one mile of Route Segment 2b, 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 RDFs 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 2b include elk winter range and a black-tailed jackrabbit occurrence.

All 16.3 miles of Route Segment 2b are within the Rattlesnake Elk Winter Range Regular Concentration area. RDFs to minimize impacts to elk will include a seasonal restriction on construction. Specifically, construction would be avoided during the wintering season, typically December 1 through March 1, or as defined by WDFW for each big game population in question (Section 2.3). The avoidance RDF is anticipated to be effective at minimizing impacts to elk; therefore, impacts are expected to be low for the entire 16.3-mile long route segment.

Black-tailed jackrabbit have been documented with a half mile of a 1.9 mile section of Route Segment 2b. 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. RDFs 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 14.4 miles.

All habitat disturbance associated with Route Segment 2b is within the Regularly Occupied Habitat MU for Sage-Grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7). Approximately eight miles of this route segment borders JBLM YTC's southern boundary. This route segment has been disturbed by an existing fire break, fence line, agriculture, and road network and was selected to minimize additional impacts to Sage-Grouse habitat. Anticipated ground disturbance includes 67.6 acres of suitable Sage-Grouse habitat, 21.5 acres of marginal habitat, and 6.3 acres of unsuitable habitat (Table 4.3-8). RDFs are anticipated to be effective at reducing impacts to Sage-Grouse habitat (refer to Sections 4.3.3.1 and 4.3.3.2). With the implementation of RDFs, the scale of disturbance and degradation to Sage-Grouse habitat is anticipated to be low for 5.2 miles and moderate for 11.1 miles.

The Range 12 Fire of 2016 burned approximately 175,000 acres in areas located in Yakima and Benton counties, Washington. This fire burned approximately 13.2 miles along Route Segment 2b. Post-fire restoration efforts for the Range 12 fire are in development and impacts to wildlife habitat have not been fully assessed following the fire.

Construction of Route Segment 2b would require an estimated 116 structures in a landscape dominated by low growing grasses and shrubs. All new structures would be located greater than 0.25 mile from an existing transmission line or trees (Table 4.3-5).

Eighty four percent of the Route Segment 2b ROW is within the estimated Sage-Grouse population range and 41 percent of the ROW corridor is within the core population range (Figure 3.3-4). Approximately 7.3 miles of Route Segment 2b are within four miles of an active 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 RDFs (refer to Sections 4.3.3.1 and 4.3.3.2). Lek impact levels are anticipated to be low for 9 miles and moderate for 7.3 miles.

4.3.4.6 Route Segment 2c

Habitat along this Route Segment has been fragmented and disturbed by roads, developed land, agricultural/cropland, and annual grass establishment. The eastern portion of this route segment parallels two existing transmission lines for approximately 8.5 miles. Fire records indicate that several fires have occurred within and adjacent to this route segment. The Range 12 Fire of 2016 burned approximately 15.2 miles along Route Segment 2c. As previously stated, post-fire restoration efforts for the Range 12 fire are in development and impacts to wildlife habitat have not been fully assessed following the fire.

Approximately 39.5 acres of long-term and 49.4 acres of short-term disturbance would occur through the construction of Route Segment 2c. Most of the permanently disturbed area would be sagebrush/perennial grassland (24.8 acres), annual grassland (9.4 acres), and agriculture/disturbed ground (5.2 acres; Table 4.3-4). Short-term disturbance is predominately agricultural/disturbed areas (27.3 acres) and annual grassland (21.7 acres). Perennial grassland makes up the remaining 0.5 acre of disturbance. RDFs 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 13.5 miles and moderate for 4.6 miles (sagebrush/perennial grassland).

The presence of new transmission line 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 2c would require an estimated 124 structures in a landscape dominated by low growing grasses and shrubs. An estimated 60 of the new structures would be located greater than 0.25 mile from an existing transmission line or trees (Table 4.3-5).

Within one mile of Route Segment 2c, potentially suitable habitat is present for 35 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 RDFs 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 2c include elk winter range burrowing owl nests and breeding long-billed curlews.

All 18.1 miles of Route Segment 2c are within the Rattlesnake Elk Winter Range Regular Concentration area. RDFs to minimize impacts to elk will include a seasonal restriction on construction. Specifically construction would be avoided during the wintering season, typically December 1 through March 1, or as defined by WDFW for each big game population in question (Section 2.3). The avoidance RDF is anticipated to be effective at minimizing impacts to elk; therefore, impacts are expected to be low for the entire 18.1-mile long route segment.

Three burrowing owl nests were documented within one mile of Route Segment 2c in 2000. While these particular nests are not likely to have persisted to the present, it demonstrates potential for burrowing owls to nest within one mile of Route Segment 2c. 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. Additional impacts to burrowing owls could occur from the mechanical disturbance or crushing of burrows. Noise from construction equipment and general construction activities could disturb and displace individuals on a short-term basis with little impact. Long-term impacts would be related to loss of foraging habitat, reduction in preferred habitat for prey species, and disturbance or mortality from vehicle strikes or interactions with other equipment used for maintenance. If an occupied burrowing owl nesting site is found within 0.25 mile of the proposed route segment's ROW, a seasonal restriction on construction would be enacted from March to August within the 0.25-mile buffer. Additional RDFs 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 5.3 miles and low for 12.8 miles.

A long-billed curlew nesting area has been documented approximately 0.4 mile from Route Segment 2c. Additional suitable habitat is present. Impacts to long-billed curlew include a reduction and degradation of habitat, disturbance during nesting and brood-rearing periods, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. RDFs that would be implemented include closing access roads not required for ongoing maintenance activities, reseeding disturbed areas, implementing a noxious weed control plan, adherence to reasonable speed limits, and employing seasonal restrictions and buffers to avoid nesting long-billed curlews. Impact levels are expected to include 18.1 miles of low impacts for long-billed curlews.

A majority of the habitat disturbance associated with Route Segment 2c is within the Regularly Occupied Habitat MU for Sage-Grouse, with the remainder occurring in Occasionally Occupied Habitat MU. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7). Approximately eight miles of this route segment borders JBLM YTC's southern boundary. Habitat along this route segment is fragmented by roads, developed land, agricultural/cropland, and annual grass establishment. The eastern portion of this route segment parallels two existing transmission lines for approximately 8.5 miles. Anticipated ground disturbance includes 24.8 acres of suitable Sage-Grouse habitat, 31.5 acres of marginal habitat, and 32.4 acres of unsuitable habitat (Table 4.3-8). RDFs are anticipated to be effective at reducing impacts to Sage-Grouse habitat (refer to Sections 4.3.3.1 and 4.3.3.2). With the implementation of RDFs, the scale of disturbance and degradation to Sage-Grouse habitat is anticipated to be low for 13.5 miles and moderate for 4.6 miles.

Construction of Route Segment 2c would require an estimated 124 structures in a landscape dominated by low growing grasses and shrubs. An estimated 60 (48 percent) of the new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Fifty-nine percent of the Route Segment 2c ROW is within the estimated Sage-Grouse population range, and 29 percent of the ROW corridor is within the core population range (Figure 3.3-4). Approximately 5.5 miles of Route Segment 2c are within four miles of an active 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 RDFs (refer to Sections 4.3.3.1 and 4.3.3.2). Lek impact levels are anticipated to be low for 12.6 miles and moderate for 5.5 miles.

4.3.4.7 Route Segment 2d

Approximately 36.6 acres of long-term and 5.2 acres of short-term disturbance would occur through the construction of Route Segment 2d. Most of the long-term disturbance would be sagebrush/perennial grassland (34.1 acres). Perennial grassland and annual grassland compose the remainder of long-term and all short-term disturbance (Table 4.3-4). RDFs 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 5.7 miles (sagebrush/perennial grassland).

The presence of new transmission line 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 2d would require an estimated 50 structures, all of which would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Within 1.0 mile of Route Segment 2d, potentially suitable habitat is present for 62 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 RDFs 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 2d include critical habitat for bull trout, Chinook salmon, and steelhead, occurrences of loggerhead shrike, white-tailed jackrabbit; and regular concentrations of chukar, mule deer, and elk. Cliffs along the Columbia River provide nesting habitat for raptors; several prairie falcon nests have been documented on the cliffs. Ferruginous hawk nests have also been documented near the route segment.

The Hanford Reach supports the larger of the only two remaining healthy naturally spawning fall Chinook salmon populations in the Columbia River System (Nugent et al. 2002). Route Segment 2d approaches to within 150 feet of the Columbia River where it connects with Route Segments 3b or 3c. No structure or road construction work would occur directly within the Columbia River. Impacts to Chinook salmon from the construction of Route Segment 2d could include increased erosion, sedimentation, and elevated turbidity. The potential for impacts would be minimized by implementing RDFs that apply and maintain standard erosion and sediment control methods. Specific erosion and sediment control measures and locations would be specified in the SWPPP. These may include straw wattles, straw bale barriers, and silt fencing which would be placed at construction boundaries. The implementation of RDFs is anticipated to be effective at minimizing impacts. Following implementation of RDFs, no identifiable impacts are anticipated from Route Segment 2d.

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 2d 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). Aside from the Columbia River, 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 directly within the Columbia River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of RDFs 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.

Breeding loggerhead shrikes were observed within a half mile of Route Segment 2d in 1993. Potential impacts to shrikes include direct habitat loss, indirect habitat loss or degradation, increased predation from corvids and raptors attracted to nesting and/or perching opportunities on the new transmission line structures, and disturbance or displacement from noise or visual disturbance, especially during construction. RDFs would be implemented to minimize impacts, as described in Sections 4.3.3.1 and 4.3.3.2. Impact levels to loggerhead shrike are estimated to be moderate for 2.0 miles of the route segment.

White-tailed jackrabbit has been documented within a half mile of Route Segment 2d. 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. RDFs 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 2.0 miles and low for 5.0 miles.

Route Segment 2d crosses 0.9 miles of chukar Priority Species Regional Area. 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 line structures would serve as perch sites for raptor species, which could prey on chukar. The implementation of RDFs, as described in Sections 4.3.3.1 and 4.3.3.2, is anticipated to reduce impacts to chukar. Impact levels to chukar are anticipated to be moderate for the 0.9 mile of the route segment that cross the chukar concentration area.

Much of the area along the southwest side of the Columbia River has been identified as a mule deer regular large concentration area. This area comes within approximately 0.1 mile of Route Segment 2d 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 2d does not cross the designated concentration area, no identifiable impacts are anticipated to occur to mule deer through construction, operation, and maintenance of the proposed Project.

Route Segment 2d passes through the Rattlesnake Elk Winter Range Regular Concentration Area for 6.2 miles of the seven-mile route segment. RDFs to minimize impacts to elk will include a seasonal restriction on construction. Specifically, construction would be avoided during the wintering season, typically December 1 through March 1, or as defined by WDFW for each big game population in question (Section 2.3). The avoidance RDF is anticipated to be effective at minimizing impacts to elk; therefore, impacts are expected to be low for the 6.2 miles of the route segment that are within designated winter range.

As Route Segment 2d descends the slopes near the Columbia River, it passes near and over steep bluffs and bands of cliffs, which provide nesting substrates for raptors. Several nests of prairie falcons have been documented within one mile of the route segment—the closest of which is approximately 0.4 mile away. Prairie falcon is not a special status species, but it is sensitive to nest disturbance and indicates suitable nesting cliffs that could provide nesting substrates for other raptor species. Further south, on the south-facing slopes between Cold Creek and the Columbia River, a ferruginous hawk nesting territory with three documented nests was recorded in 2010. Two of the three nests are within a half mile of the route segment with the nearest located approximately 0.25 from the route segment. Potential impacts to raptors would occur from biological disturbance during construction activities or from injury or mortality from vehicle strikes or interactions with other equipment used during construction. Noise from construction equipment and general construction activities could disturb and displace individuals during the sensitive nesting period. RDFs to minimize impact on raptors are described in Sections 4.3.3.1 and 4.3.3.2. RDFs include the stipulation that, within the breeding season, construction would be avoided within species-specific raptor nest buffers to avoid disturbing nesting birds (0.5 mile for ferruginous hawk and 0.25 mile for prairie falcon; see RDFs in Chapter 2). Following implementation of RDFs, impact levels on prairie falcons are expected to be moderate for 2.8 miles.

All habitat disturbance associated with Route Segment 2d 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 4.3-7). Anticipated ground disturbance includes 34.1 acres of suitable Sage-Grouse habitat and 7.8 acres of marginal habitat (Table 4.3-8). With the implementation of RDFs (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 1.3 miles and moderate for 5.7 miles.

The Range 12 Fire of 2016 burned approximately 4.5 miles along Route Segment 2d. As previously stated, post-fire restoration efforts for the Range 12 fire are in development and impacts to wildlife habitat have not been fully assessed following the fire.

Construction of Route Segment 2d would require an estimated 50 new structures, all of which would be located greater than 0.25 mile of an existing transmission line (Table 4.3-5).

Fourteen percent of the Route Segment 2d ROW is within the estimated Sage-Grouse population range, but none of the route segment's ROW is within the core population range (Figure 3.3-4). No active or inactive leks are known to occur within four miles of Route Segment 2d (Table 4.3-6). Impacts to lekking Sage-Grouse associated with the construction of Route Segment 2d are anticipated to be low for the entire 7.0-mile length of the route segment.

4.3.4.8 Route Segment 3a

The entirety of anticipated ground disturbance for this short route segment is anticipated to occur in sagebrush/perennial grassland (1.2 acres) and, thus, is considered a long-term impact. RDFs 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 the 0.1-mile route segment (sagebrush/perennial grassland).

The presence of new transmission line 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 3a would require an estimated three structures, but none of the structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Within 1.0 mile of Route Segment 3a, potentially suitable habitat is present for 58 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 RDFs 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 3a include critical habitat for bull trout, Chinook salmon, steelhead, striped whipsnake, night snake, sagebrush lizard, side-blotched 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 3a 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 transmision line structures or road construction work would occur directly within the Columbia River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of RDFs 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.

Striped whipsnake, night snake, side-blotched lizard, and sagebrush lizard have been documented within one mile of Route Segment 3a. An area north of Vantage Substation with rock outcrops and shallow soils is considered an overwintering area for striped whipsnakes and side-blotched lizards occur there as well. Striped whipsnake is rare and localized in Washington. According to WDFW, occupied habitat extends from Highway 26, located north of Vantage Substation, south to Lower Crab Creek. Potential impacts to these four 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 RDFs 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 the 0.1-mile route segment.

The Wanapum Pool fall and winter waterfowl area and common loon use area is located within 1.0 mile of Route Segment 3a 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. RDFs include installing bird flight diverters in locations with known avian mortality through collision with transmission line infrastructure. Route Segment 3a 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 3a. 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. RDFs 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 the 0.1-mile route segment.

A mule deer regular concentration area has been identified on Wanapum Bench within one mile of Route Segment 3a, 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 route segment, but does not intersect the route segment's ROW corridor. 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.

All habitat disturbance associated with Route Segment 3a would be located within the Occasionally Occupied Habitat MU for Sage-Grouse. Construction activities would not disturb any Regularly Occupied Habitat (Table 4.3-7). All anticipated ground disturbance (1.2 acres) would be in suitable Sage-Grouse habitat (Table 4.3-8). With the implementation of RDFs (Sections 4.3.3.1 and 4.3.3.2), the scale of disturbance and degradation to Sage-Grouse habitat is anticipated to be moderate for the 0.1-mile route segment.

Existing perching, roosting, and nesting sites for avian predators are available along Route Segment 3a from buildings, trees, and fences associated with developed areas and existing distribution and 230 kV H-frame transmission lines. Construction of Route Segment 3a would require an estimated three structures, but none of the structures would be located greater than 0.25 located within 0.25 mile of an existing transmission line (Table 4.3-5).

The estimated Sage-Grouse population range does not overlap the Route Segment 3a ROW (Figure 3.3-4). No active leks are known to occur within four miles of Route Segment 3a (Table 4.3-6). With the implementation of RDFs (Sections 4.3.3.1 and 4.3.3.2), impacts to lekking Sage-Grouse associated with the construction of Route Segment 3a is anticipated to be low for the 0.1-mile route segment.

4.3.4.9 Route Segment 3b

The majority of disturbance for this route segment would occur on developed land, primarily occurring within an abandoned railroad ROW corridor. The remaining part of Route Segment 3b is a mixture of high quality sagebrush with a diverse forb layer, sagebrush adjacent to agriculture, a watered poplar wind row, basalt cliffs, and a seasonally moist alkaline swale habitat resulting from cliff runoff. Fire history records indicate that large portions of Route Segment 3b have burned since the late 1980s, including a large fire that burned much of the northern part of the route segment in 2014. Approximately 58.1 acres of long-term and 47.7 acres of short-term disturbance would occur through the construction of Route Segment 3b. Most of the permanently disturbed areas would be sagebrush/perennial grassland (25.3 acres) and disturbed ground (21.5 acres). Other long-term disturbance includes 7.1 acres of trees and 0.4 acres of riparian wetland. Short-term disturbance would primarily be on ground that is already disturbed (42.3 acres; Table 4.3-4). RDFs 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 16.5 miles and moderate for 5.2 miles (sagebrush/perennial grassland).

The presence of new transmission line 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 3b would require an estimated 181 structures, of which 160 structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Within 1.0 mile of Route Segment 3b, potentially suitable habitat is present for 66 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 RDFs 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 3b include critical habitat for bull trout, Chinook salmon, and steelhead; occurrences of striped whipsnake, night snake, sagebrush lizard, loggerhead shrike, American white pelican, black-tailed jackrabbit, pallid bat, and regular concentrations of chukar, mule deer, waterfowl, and common loons; and a breeding colony of black-crowned night herons and great blue herons. Basalt cliffs and bluffs provide nesting substrates for raptors and several nests of golden eagles, peregrine falcons, and prairie falcons. Bald eagles nest and winter within one mile of the route segment.

The Hanford Reach supports the larger of the only two remaining healthy naturally spawning fall Chinook salmon populations in the Columbia River System (Nugent et al. 2002). Route Segment 3b parallels the Hanford Reach for 2.7 miles to the Priest Rapids Dam. No structure or road construction work would occur directly within the Columbia River. For the Columbia River crossing the structures would be approximately 200 foot tall lattice steel structures for the up to 2,800 foot crossing. Impacts to Chinook salmon from the construction of Route Segment 3b could include increased erosion, sedimentation and elevated turbidity. The potential for impacts would be minimized by implementing RDFs that apply and maintain standard erosion and sediment control methods. Specific erosion and sediment control measures and locations would be specified in the SWPPP. These may include straw wattles, straw bale barriers, and silt fencing which would be placed at construction boundaries. The implementation of RDFs is anticipated to be effective at minimizing impacts. Impact levels are expected to be low for the entire route segment.

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 3b 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). Aside from the Columbia River, 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 directly within the Columbia River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of RDFs 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.

Striped whipsnake, night snake, and sagebrush lizard have been documented within one mile of Route Segment 3b. 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 RDFs 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 5.3 miles of the route segment.

Nesting loggerhead shrikes were observed within a half mile of Route Segment 3b in 1994. While this particular nest is not likely to have persisted to the present, it demonstrates potential for loggerhead shrikes to nest near Route Segment 3b. 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 new structures, and disturbance or displacement from noise or visual disturbance, especially during construction. RDFs would be implemented to minimize impacts, as described in Sections 4.3.3.1 and 4.3.3.2. Impact levels to loggerhead shrike are estimated to be moderate for 2.0 miles of the route segment.

Black-tailed jackrabbit has been documented within a half mile of Route Segment 3b. 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. RDFs 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 3.4 miles and low for 8.3 miles.

Pallid bats were detected acoustically in two areas within a half mile of Route Segment 3b in 1994. RDFs to address habitat loss and degradation (Section 4.3.3.1) will reduce impacts to pallid bats. Impact levels are expected to be moderate for 4.1 miles of the route segment.

Route Segment 3b crosses 3.0 miles of chukar Priority Species Regional Area. The majority of this area occurs away from this route segment, along draws created by intermittent streams on JBLM YTC property. 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 new transmission line structures would serve as perch sites for raptor species, which could prey on chukar. The implementation of RDFs, as described in Sections 4.3.3.1 and 4.3.3.2, is anticipated to reduce impacts to chukar. Impact levels to chukar are anticipated to be moderate for the 3.0 miles of the route segment that cross the chukar concentration area.

Route Segment 3b runs along the edge of a mule deer Priority Species Regional Area (designated concentration area) for much of its length. Mule deer have been observed in this area utilizing uplands and riparian habitat for forage, water, and cover. 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 and during parturition when fawns are relatively immobile and vulnerable. 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 12.7 miles of the route segment that overlap the edge of the designated concentration area.

Priest Rapids Reservoir is a waterfowl and a common loon Priority Species Regional Area. This area has high concentrations of waterfowl present during the fall and winter months and common loon have been observed in the area during migration and winter. Approximately five miles of this route segment runs along the margin of, but does not cross, this waterfowl and common loon area. Goose Island, situated within Priest Rapids Reservoir and almost one mile east of Route Segment 3b, has a mixed-species breeding colony of great blue herons and black-crowned night herons located there. Concentrations of non-breeding American white pelican, Caspian tern (*Hydroprogne caspia*), and Forster's tern (*Sterna forsteri*) have been documented on an island south of Wanapum Dam and approximately 0.5 mile east of Route Segment 3b. Waterfowl and shorebird injury and mortality could occur through collision with the new transmission line. Available literature indicates that waterfowl, including ducks, geese, swans, cranes, and shorebirds appear to be most susceptible to collisions when transmission lines are located near wetlands (Erickson et al. 2005; Faanes 1987; Anderson 1978). Large, heavy-bodied birds with longer wings (i.e., herons, cranes, swans, and pelicans) tend to be less maneuverable than smaller birds and can be more susceptible to collision with overhead wires (CEC 2002; APLIC 1994). Bird movement patterns in the area are not known; however, migrating waterfowl arriving and departing from Priest Rapids Reservoir could collide with the transmission line structures, including overhead grounding/shield wires. Most of the wetlands associated with Priest Rapids Reservoir are located along the river bank and east of the route segment; however, there are several inlets that this route segment would bisect and collisions could occur if these species are flying between these inlets and open water. No agricultural fields are located to the west of this route segment that may be seasonally attractive to flocking species such as cranes and waterfowl. In addition to collision with the transmission line structures, waterfowl could experience increased predation by raptors using the transmission structures as perch sites. The Pacific Power's Bird Management Program Guidelines includes protocol for documenting the incidence of mortalities from collision with the line, contacting the appropriate resource agency and implementing, where practicable, additional actions to reduce mortalities (i.e., installing bird flight diverters or marking static wires in sensitive areas where warranted; PacifiCorp 2006). RDFs include installing bird flight diverters in locations with known avian mortality through collision with transmission line infrastructure. With the implementation of RDFs, impacts to waterfowl, common loons, and other aquatic birds is anticipated to include 5.0 miles of moderate and 16.7 miles of low impacts.

Route Segment 3b passes several cliff bands along the Columbia River. The cliffs attract high concentrations of raptors, including prairie falcons (not a special status species, but sensitive to nest disturbance), several golden eagle nests, and several peregrine falcon nests. Near the north end of the route segment a one-mile long cliff runs parallel to the route segment approximately 0.25 miles away; there is a golden eagle nest (documented in 2005), three prairie falcon nests (1988 and 2001), and three peregrine falcon nests (documented in 2002, 2006, and 2009) on the cliff. A cliff near the center of the route segment has three prairie falcon nests (documented in the 1980s) and one peregrine falcon nest (documented in 2009) within a 0.5-mile section of cliff—all of the nests in this cliff area are located within approximately 250 feet of the route segment. Near the southern end of the route segment, a third cliff area approximately four miles long has four prairie falcon nests (documented in the 1980s) and a peregrine falcon nest (documented in 2008)—the peregrine nest is approximately 400 feet from the route segment, while the prairie falcon nests range from about 0.2 to 0.5 mile away from the route segment. A bald eagle nest is located on the east shore of Priest Rapids Reservoir approximately 0.8 mile east of the route segment and another bald eagle nest is located on Goose Island, approximately 0.9 mile east of the route segment. Potential impacts to raptors would occur from biological disturbance during construction activities or from injury or mortality from vehicle strikes or interactions with other equipment used during construction. Noise from construction equipment and general construction activities could disturb and displace individuals during the sensitive nesting period. RDFs to minimize impact on raptors are described in Sections 4.3.3.1 and 4.3.3.2. RDFs include the stipulation that within the breeding season, construction would be avoided within species-specific raptor nest buffers to avoid disturbing nesting birds (1.0 mile for peregrine falcon and bald eagle, 0.5 mile for golden eagle, and 0.25 mile for prairie falcon; see RDFs in Chapter 2). Following implementation of RDFs, impact levels on nesting bald eagles are anticipated to be moderate for 1.8 miles, impact levels on peregrine falcons are anticipated to be moderate for 6.5 miles, impact levels on golden eagles are anticipated to be moderate for 2.3 miles, and impact levels on prairie falcons are expected to be moderate for 10.2 miles.

Route Segment 3b also crosses 10.2 miles of JBLM YTC's Bald Eagle Protection Area and 0.6 mile of WDFW's Bald Eagle Management Zone. Bald eagles are known to winter along the Columbia River's western edge. Roosting bald eagles have been documented within one mile of Route Segment 3b at Borden Springs, Hanson Creek, and Alkali Canyon Creek. Habitat in Borden Springs and Alkali Canyon has been altered by fires occurring in 1996. Two suitable roost trees remained and were utilized at Borden Springs following the fire, while no evidence of roosting at Alkali Canyon Creek has been documented since the fire. Bald eagles wintering in the area have been observed foraging along Priest Rapids Reservoir during the day. Wintering bald eagles are typically present from between November and April, with peak abundance occurring in February (JBLM YTC 2002). Noise from construction equipment and general construction activities could disturb and displace wintering bald eagles. It is anticipated that no large trees suitable for roosting, perching and nesting would be removed. As described in Sections 4.3.3.1 and 4.3.3.2, RDFs would be implemented to reduce short- and long-term impacts and include avoidance of bald eagle winter roost areas between 8 am and 5 pm during the winter roosting season. With the implementation of RDFs, the impact on wintering eagles is anticipated to include 10.5 miles of moderate and 11.2 miles of low impacts.

The majority of the habitat disturbance associated with Route Segment 3b would be located within the Regularly Occupied Habitat MU for Sage-Grouse (107.9 acres) with the remainder of disturbance within Occasionally Occupied Habitat MU (20.5 acres). Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7). Anticipated ground disturbance includes 26.9 acres of suitable Sage-Grouse habitat, 8.0 acres of marginal habitat, and 72.9 acres of unsuitable habitat (Table 4.3-8). With the implementation of RDFs (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 18.4 miles and moderate for 3.3 miles.

Construction of Route Segment 3b would require an estimated 181 new structures, of which 160 (88 percent) would be located greater than 0.25 mile of an existing transmission line (Table 4.3-5).

The estimated Sage-Grouse population range does not overlap the Route Segment 3b ROW. Approximately seven percent (14,616 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment 3b (Figure 3.3-4). No active leks are known to occur within four miles of Route Segment 3b (Table 4.3-6). One inactive lek is located approximately 3.9 miles west of Route Segment 3b. This lek was last occupied in 2007. With the implementation of RDFs (Sections 4.3.3.1 and 4.3.3.2), impacts to lekking Sage-Grouse associated with the construction of Route Segment 3b is anticipated to be moderate for the 0.6 miles that are within four miles of the inactive lek.

4.3.4.10 Route Segment 3c

Approximately 74.3 acres of long-term and 45.9 acres of short-term disturbance would occur through the construction of Route Segment 3c. Most of the permanently disturbed areas would be sagebrush/perennial grassland (49.6 acres) and agriculture/disturbed ground (32.1 acres). Short-term disturbance would primarily be on agriculture/disturbed land (32.1 acres) and annual grassland (11.5 acres; Table 4.3-4). Riparian/wetland habitat occurs along Lower Crab Creek and estimated disturbance to these areas would be 0.3 acres of long-term and 1.3 acres of short-term disturbance, though this disturbance would be avoided if possible by spanning the riparian area. RDFs 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 14.5 miles and moderate for 10.7 miles (sagebrush/perennial grassland).

The presence of new transmission line 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 3c would require an estimated 186 structures, of which 119 structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Within 1.0 mile of Route Segment 3c, potentially suitable habitat is present for 66 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 RDFs 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 3c include critical habitat for bull trout, Chinook salmon, and steelhead; occurrences of striped whipsnake, night snake, sagebrush lizard, side-blotched lizard, and black-tailed jackrabbit; and regular concentrations of chukar, mule deer, waterfowl, and common loons. Basalt cliffs and bluffs provide nesting substrates for raptors and several nests of golden eagles, peregrine falcons, and prairie falcons have been documented.

The Hanford Reach supports the larger of the only two remaining healthy naturally spawning fall Chinook salmon populations in the Columbia River System (Nugent et al. 2002). Route Segment 3c parallels the Hanford Reach for approximately four miles. This route segment parallels and crosses the Columbia River at Vernita Bar. Gravel bars are critical to fall Chinook salmon spawning (Nugent et al. 2002). No structure or road construction work would occur directly within the Columbia River. For the Columbia River crossing the structures would be approximately 200 foot tall lattice steel structures for the up to 2,800 foot crossing. Impacts to Chinook salmon from the construction of Route Segment 3c could include increased erosion, sedimentation and elevated turbidity. The potential for impacts would be minimized by implementing RDFs that apply and maintain standard erosion and sediment control methods. Specific erosion and sediment control measures and locations would be specified in the SWPPP. These may include straw wattles, straw bale barriers, and silt fencing which would be placed at construction boundaries. The implementation of RDFs is anticipated to be effective at minimizing impacts. Impact levels are expected to be low for four miles, with no identifiable impacts for the remainder of the route segment.

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 3c 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). Aside from the Columbia River, 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 directly within the Columbia River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of RDFs 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.

Striped whipsnake, night snake, and sagebrush lizard have been documented within one mile of Route Segment 3c. An area north of Vantage Substation with rock outcrops and shallow soils is considered an overwintering area for striped whipsnakes and side-blotched lizards occur there as well. Striped whipsnakes have been documented in several other locations along Route Segment 3c. Striped whipsnake is rare and localized in Washington. According to WDFW, occupied habitat extends from Highway 26, located north of Vantage Substation, south to Lower Crab Creek. Potential impacts to these four 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 rare and localized, impacts to the species or habitat could occur. However, the implementation of RDFs are anticipated to be successful at minimizing impacts to striped whipsnake, night snake, side-blotched lizard, and sagebrush lizard, as described in Sections 4.3.3.1 and 4.3.3.2. For all four species, impact levels are expected to be moderate for 3.8 miles of the route segment.

Black-tailed jackrabbit has been documented within a half mile of Route Segment 3c. 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. RDFs 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 1.7 miles and low for 23.5 miles.

Route Segment 3c crosses two chukar Priority Species Regional Areas. Route Segment 3c crosses 0.3 mile of the chukar Regional Area south of the Columbia River. This area is a dry rocky slope comprised of sagebrush and perennial grasses. The second Regional Area crossed (2.4 miles) occurs just south of Lower Crab Creek. This area is a mixture of sagebrush and perennial and annual grasslands, with some emergent riparian vegetation present along Lower Crab Creek. 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 structures would serve as perch sites for raptor species, which could prey on chukar. The implementation of RDFs, as described in Sections 4.3.3.1 and 4.3.3.2, is anticipated to reduce impacts to chukar. Impact levels to chukar are anticipated to be moderate for the 2.7 miles of the route segment that cross the chukar concentration area.

A mule deer regular concentration area has been identified on Wanapum Bench within one mile of Route Segment 3c, 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 route segment, but does not intersect the route segment’s 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 Wanapum Pool fall and winter waterfowl area and common loon use area is located within 1.0 mile of Route Segment 3c 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. A waterfowl Priority Species Regional Area have been identified for Nunnally Lake. This lake has high numbers of waterfowl present during the fall and winter months. This route segment occurs approximately 0.1 mile west of Nunnally Lake There is another wetland pond area west of the route segment and approximately 0.5 miles from Nunnally Lake. Waterfowl may fly across the route traversing between Nunnally Lake and the smaller pond/wetlands and/or the Columbia River. Priest Rapids Reservoir, located several miles southwest of Nunnally Lake is another waterfowl concentration area. Agricultural areas, which may be used as foraging areas by waterfowl, occur along the Columbia River and also several miles northeast of Route Segment 3c. Waterfowl injury and mortality could occur through collision with the route segment. Available literature indicates that waterfowl, including ducks, geese, swans, cranes, and shorebirds appear to be most susceptible to collisions when transmission lines are located near wetlands (Erickson et al. 2005; Faanes 1987; Anderson 1978). Large, heavy-bodied birds with longer wings (i.e., herons, cranes, swans, and pelicans) tend to be less maneuverable than smaller birds and can be more susceptible to collision with overhead wires (CEC 2002; APLIC 1994). Bird movement patterns in the area are not known, however, migrating waterfowl arriving and departing from Nunnally Lake could collide with this route segment's transmission line and structures, including overhead grounding/shield wires. RDFs include installing bird flight diverters in locations with known avian mortality through collision with transmission line infrastructure. Route Segment 3a is expected to have no identifiable impacts to waterfowl or aquatic bird species. With the implementation of RDFs, impacts to waterfowl and other aquatic birds is anticipated to include 1.0 miles of moderate and 24.2 miles of low impacts.

An area of basalt cliffs and bluffs along the south edge of the Columbia River and another area of cliffs and bluffs on the north side of the Saddle Mountains provide nesting substrates for raptors. Several nests of prairie falcons have been documented at both locations. Within one mile of the route segment, a peregrine falcon nest has been documented on the cliffs along the Columbia River (approximately 300 feet from Route Segment 3c) and a golden eagle nest has been documented on the Saddle Mountains cliffs, approximately 0.8 mile from the route segment. Potential impacts to raptors would occur from biological disturbance during construction activities or from injury or mortality from vehicle strikes or interactions with other equipment used during construction. Noise from construction equipment and general construction activities could disturb and displace individuals during the sensitive nesting period. RDFs to minimize impact on raptors are described in Sections 4.3.3.1 and 4.3.3.2. RDFs include the stipulation that within the breeding season, construction would be avoided within species-specific raptor nest buffers to avoid disturbing nesting birds (1.0 mile for peregrine falcon, 0.5 mile for golden eagle, and 0.25 mile for prairie falcon; see RDFs in Chapter 2). Following implementation of RDFs, impact levels on peregrine falcons are anticipated to be moderate for 2.1 miles, impact levels on golden eagles are anticipated to be moderate for 1.3 miles, and impact levels on prairie falcons are expected to be moderate for 5.5 miles.

Habitat disturbance associated with Route Segment 3c would be located within the Occasionally Occupied Habitat MU for Sage-Grouse (58.9 acres), Expansion Habitat MU (17.9 acres), Regularly Occupied Habitat MU (10.5 acres), and land not designated as a Sage-Grouse management unit (34.5 acres). Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7). Anticipated ground disturbance includes 52.7 acres of suitable Sage-Grouse habitat, 28.8 acres of marginal habitat, and 40.3 acres of unsuitable habitat (Table 4.3-8). With the implementation of RDFs (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 14.8 miles and moderate for 10.4 miles.

Construction of Route Segment 3c would require an estimated 186 structures, of which 119 structures (64 percent) would be located greater than 0.25 mile of an existing transmission line (Table 4.3-5).

Approximately two percent (3,231 acres) of the JBLM YTC 95 percent population range is within four miles of Route Segment 3c (Figure 3.3-4). No active or inactive leks are known to occur within four miles of this proposed route segment (Table 4.3-6). Impacts to lekking Sage-Grouse associated with the construction of Route Segment 3c are anticipated to be low for the entire 25.2-mile route segment.

4.3.4.11 Route Segment NNR-2

Approximately 12.1 acres of long-term and 12.6 acres of short-term disturbance would occur through the construction of Route Segment NNR-2. All short-term disturbance and most of the long-term 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 long-term disturbance will include 4.4

acres of areas classified as sagebrush/perennial grassland, 2.4 acres of sagebrush/annual grassland, and 1.3 acres of tree habitat. RDFs 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 3.4 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 new transmission line 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 4.3-5).

Within one mile of Route Segment NNR-2, 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 RDFs 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 including golden eagles and prairie falcons, 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; documented nests include four prairie falcon nests (not a special status species, but sensitive to nest disturbance); and one golden eagle nest documented by PHS in 2013 just under one 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 raptor nest buffers to avoid disturbing nesting birds (0.5 mile for golden eagle and 0.25 mile for prairie falcon; see RDFs 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 not likely to have persisted to the present, 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 route segment's ROW corridor, a seasonal restriction on construction would be enacted from March to August within the 0.25-mile buffer. Additional RDFs 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—approximately 0.8 mile west 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 new transmission line, though it is not very likely because the route segment will not cross the wetlands or cross between the wetlands and likely feeding areas such as agricultural fields. RDFs include installing bird flight diverters in locations with known avian mortality through collision with transmission line infrastructure. Route Segment 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. RDFs 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 route segments' ROW corridor; though, the species commonly uses upland habitats like sagebrush-steppe, as well. The route segment will span the Selah Creek Canyon and avoid disturbing riparian vegetation. The RDFs to address habitat loss and degradation (Section 4.3.3.1) will reduce impacts to pallid bats. Route Segment 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 4.3-7). 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. Approximately 4.4 acres of disturbance is predicted to occur within suitable Sage-Grouse habitat, 11.5 acres of disturbance is anticipated to occur in marginal habitat, and 8.8 acres within unsuitable habitat (Table 4.3-8). But given the proximity of the route segment to surrounding disturbance and urban development, it is doubtful that the immediate area would be used by Sage-Grouse. With the implementation of RDFs (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 5.1 miles of the route segment.

Existing perching, roosting and nesting sites for avian predators are available along Route Segment NNR-2 from buildings, trees, and 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 4.3-5).

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-2 ROW (Figure 3.3-4). Approximately 1.2 miles of Route Segment NNR-2 is within four miles of an active lek. All 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 RDFs (refer to Sections 4.3.3.1 and 4.3.3.2). Lek impact levels are anticipated to be low for 3.9 miles and moderate for 1.2 miles.

4.3.4.12 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. RDFs 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 1.6 miles and moderate for 7.7 miles (sagebrush/perennial grassland for 7.0 miles and sagebrush/annual grassland for 0.7 miles).

The presence of new transmission line 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 4.3-5).

Within one mile of Route Segment NNR-3, potentially suitable habitat is present for 49 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 RDFs 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 bull trout critical habitat, 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, a pallid bat acoustical detection, 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 transmission line structure or road construction work would occur directly within the Yakima River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of RDFs 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 directly within the Yakima River, which is located greater than or equal to 0.75 mile from the route segment ROW corridor or Burbank Creek, which would be spanned by the route segment. 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 segment. 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 RDFs 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.

Two pallid bats were detected in 1994 approximately 0.7 miles east of Route Segment NNR-3 along Selah Creek. Although the detections were near the riparian vegetation in Selah Creek, the species commonly uses upland habitats like sagebrush-steppe, as well. The route segment would span the Selah

Creek Canyon and avoid disturbing riparian vegetation. The RDFs to address habitat loss and degradation (Section 4.3.3.1) will reduce impacts to pallid bats. Route Segment NNR-3 is expected to have no identifiable impacts to pallid bats.

Bighorn sheep winter range occurs within one mile of Route Segment NNR-3 and is crossed by the route segment's ROW corridor 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 RDFs to minimize disturbance impacts and collision risk are described in Section 4.3.3.2; RDFs 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 Wildlife Area, approximately 0.8 mile from the route segment's ROW corridor. 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 2.3). 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 MU for Sage-Grouse. Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7). Anticipated ground disturbance includes 41.4 acres of suitable Sage-Grouse habitat, 10.7 acres of marginal habitat, and 0.4 acres of unsuitable habitat (Table 4.3-8). RDFs 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 to be low for 1.9 miles and moderate for 7.4 miles.

Existing perching, roosting, and nesting sites for avian predators are available along Route Segment NNR-3 from buildings, trees, and 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 4.3-5).

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-3 ROW (Figure 3.3-4). 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 RDFs (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.

Route Segment NNR-3 would cross Reclamation's proposed Wymer Dam and Reservoir Project for approximately 0.2 mile. At this crossing, Route Segment NNR-3 is directly adjacent to Pacific Power's existing Pomona-Wanapum 230 kV Transmission Line. For the proposed Wymer Dam and Reservoir Project, mitigation land acquisition and habitat enhancement components are intended to result in a net improvement in conditions for Sage-Grouse. Approximately 2.3 miles of Route Segment NNR-3 crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project.

4.3.4.13 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 construction would create a larger area of ground disturbance than overhead construction 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 Design Option would result in approximately 21.4 acres of long-term and 1.5 acres of short-term disturbance, while the Underground Design Option would cause approximately 43.7 acres of long-term disturbance and 2.9 acres of short-term disturbance resulting in more than two times as much ground disturbance as the Overhead Design Option. For Route Segment NNR-4o, permanently disturbed areas would include 10.8 acres of sagebrush/perennial grassland and 9.2 acres of sagebrush/ annual grassland (Table 4.3-4). Undergrounding Route Segment NNR-4u would increase the permanently disturbed areas to 24.7 acres of sagebrush/perennial grassland and 17 acres of sagebrush/annual grassland. The remaining 1.4 acres of long-term disturbance for NNR-4o, 2.0 acres for NNR-4u, and all short-term disturbance (1.5 acres for NNR-4o and 2.9 acres for NNR-4u) consists of annual grassland and noxious weeds, other shrublands, and perennial grassland. RDFs would be implemented to minimize habitat loss and degradation, as described in Section 4.3.3.1. For either design 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 new transmission line 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 4.3-5). The Underground Design Option, NNR-4u, would need to be overhead for a short-stretch as it crosses I-82. This would require two transmission towers, all 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-4o/NNR-4u, potentially suitable habitat is present for 44 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 RDFs 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-4o/NNR-4u 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-4o/NNR-4u; 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 120 feet 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 RDFs 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 Route Segment NNR-4o/NNR-4u 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 RDFs to minimize disturbance impacts and collision risk are described in Section 4.3.3.2; RDFs 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 habitat disturbance associated with Route Segment NNR-4o/NNR-4u would be located within the Regularly Occupied Habitat MU for Sage-Grouse. For either design option, construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7).

For NNR-4o, anticipated disturbance includes 11.9 acres of suitable Sage-Grouse habitat, 11.1 acres of marginal habitat, and no unsuitable habitat. Undergrounding NNR-4u would increase the anticipated disturbance to 24.5 acres of suitable habitat and 22.3 acres of marginal habitat (Table 4.3-8). RDFs 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 0.5 miles and moderate for 4.0 miles.

Existing perching, roosting, and nesting sites for avian predators are available along Route Segment NNR-4o/NNR-4u from buildings, trees, and 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 4.3-5). The underground design option, NNR-4u would need to be overhead for a short-stretch as it crosses I-82. This would require two transmission structures, 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.

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-4o/NNR-4u ROW (Figure 3.3-4). No active leks are known to occur within four miles of Route Segment NNR-4o/NNR-4u (Table 4.3-6). With the implementation of RDFs (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-4o/NNR-4u, both the Overhead and Underground Design Option, is anticipated to be low for the entire route segment (4.5 miles).

Approximately 1.2 miles of Route Segment NNR-4o/NNR-4u crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project.

4.3.4.14 Route Segment NNR-5

Approximately 8.6 acres of long-term and 0.4 acres of short-term disturbance would occur with 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. RDFs 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 1.8 miles of the route segment (sagebrush/perennial grassland).

The presence of transmission line 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 new 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 4.3-5).

Within one mile of Route Segment NNR-5, potentially suitable habitat is present for 35 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 RDFs 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 not likely to have persisted to the present, 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 RDFs 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 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 (Table 4.3-7). Anticipated ground disturbance includes 9.1 acres of suitable Sage-Grouse habitat (Table 4.3-8). With the implementation of RDFs (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, and 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 4.3-5).

The estimated Sage-Grouse population range does not overlap Route Segment NNR-5 ROW corridor (Figure 3.3-4). No active leks are known to occur within four miles of Route Segment NNR-5 (Table 4.3-6). With the implementation of RDFs (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).

4.3.4.15 Route Segment NNR-6o/NNR-6u

Route Segment NNR-6 is being considered as either an underground segment (NNR-6u) or as an overhead 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 Design Option would result in approximately 27.3 acres of long-term and 3.3 acres of short-term disturbance, while the Underground Design Option would cause approximately 50.9 acres of long-term disturbance and 6.6 acres of short-term disturbance resulting in nearly two times as much ground disturbance as the Overhead Design Option. For Route Segment

NNR-6o, permanently disturbed areas would include 26.5 acres of sagebrush/perennial grassland; while for Route Segment NNR-6u, permanently disturbed areas would include 5 acres of sagebrush/perennial grassland (Table 4.3-4). RDFs would be implemented to minimize habitat loss and degradation, as described in Section 4.3.3.1. For either design option, impact levels to habitat are expected to be low for 2.3 mile and moderate for 4.1 miles (sagebrush/perennial grassland).

The presence of new 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 48 structures. None of the new structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5). Although the Underground Design 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-6o/NNR-6u, potentially suitable habitat is present for 36 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 RDFs 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-6o/NNR-6u include a burrowing owl nest, Merriam's shrew, and regular concentration areas of loggerhead shrikes and mule deer.

A historic burrowing owl nesting site (last documented occupancy prior to 2000) occurs approximately 0.7 mile from Route Segment NNR-6o/NNR-u. While this particular nest is not likely to have persisted to the present, it demonstrates potential for burrowing owls to nest within one mile of Route Segment NNR-6o/NNR-6u. 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 segment, a seasonal restriction on construction would be enacted from March to August, within the 0.25-mile buffer. Additional RDFs 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.

The McDonald Springs regular concentration of loggerhead shrikes is located approximately 0.9 mile from Route Segment NNR-6o/NNR-6u. 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 new structures, and disturbance or displacement from noise or visual disturbance, especially during construction. RDFs 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 segment, no identifiable impacts are anticipated.

A Merriam's shrew was documented within 1.0 mile of Route Segment NNR-6o/NNR-6u in 1954, demonstrating potential for Merriam's shrews to exist within one mile of Route Segment NNR-6o/NNR-6u. Potential impacts include habitat loss, habitat degradation, injury or mortality due to crushing by construction equipment or vehicles, and increased predation from avian predators. RDFs 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 route segment ROW corridor 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 and during parturition when fawns are relatively immobile and vulnerable. 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 habitat disturbance associated with Route Segment NNR-6o/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 4.3-7).

For Route Segment NNR-6o, anticipated disturbance includes 26.5 acres of suitable Sage-Grouse habitat and 4.1 acres of marginal habitat. Undergrounding Route Segment NNR-6u would increase the anticipated disturbance to 50.1 acres of suitable habitat and 7.3 acres of marginal habitat (Table 4.3-8). With the implementation of RDFs (Sections 4.3.3.1 and 4.3.3.2), habitat impact levels would be low for 2.3 miles and moderate for 4.1 miles.

Existing perching, roosting and nesting sites for avian predators are available along Route Segment NNR-6/NNR-6u from buildings, trees, and 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 4.3-5). 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.

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-6/NNR-6u ROW (Figure 3.3-4). Approximately 3.7 miles of Route Segment NNR-6/NNR-6U is within 4.0 miles of an active lek (Table 4.3-6). All new 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 RDFs (Sections 4.3.3.1 and 4.3.3.2), lek impact levels are anticipated to be low for 2.7 miles and moderate for 3.7 miles.

4.3.4.16 Route Segment NNR-7

All 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). In 2014, a 23,261-acre fire burned the majority of Route Segment NNR-7. Because perennial bunchgrasses typically recover quickly after a fire and sagebrush typically recovers much more slowly. Currently much of the route segment is probably perennial grassland rather than shrubland—though depending on burn severity, over the next several years to several decades the sagebrush cover will likely return. RDFs would be implemented to minimize habitat loss and degradation, as described in Section 4.3.3.1. Impact levels to special status species habitat are expected to be low for 7.1 miles and moderate for 1.1 miles.

The presence of new 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; however, none of the structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Within 1.0 mile of Route Segment NNR-7, potentially suitable habitat is present for 62 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 RDFs 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-7 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 directly within the Columbia River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of RDFs 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 2.3). 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. RDFs 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 structure would serve as perch sites for raptor species, which could prey on chukar. The implementation of RDFs, as described in Sections 4.3.3.1 and 4.3.3.2, is 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. RDFs 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 increased predation from avian predators. RDFs 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 route segment. 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 4.3-7). Anticipated ground disturbance includes 38.1 acres classified as suitable Sage-Grouse habitat (Table 4.3-8). In 2014, a 23,261-acre fire burned the majority of Route Segment NNR-7. Because perennial bunchgrasses typically recover quickly after a fire and sagebrush typically recovers much more slowly, currently much of the route segment is probably perennial grassland rather than shrubland—though depending on burn severity, over the next several years to several decades the sagebrush cover will likely return. Considering the recent burn and the implementation of RDFs (Sections 4.3.3.1 and 4.3.3.2), habitat impact levels are anticipated to be low for 7.1 miles and moderate for 1.1 miles.

Existing perching, roosting, and nesting sites for avian predators are available along Route Segment NNR-7 from buildings, trees, and 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 4.3-5).

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-7 ROW corridor (Figure 3.3-4). No active leks are known to occur within 4.0 miles of Route Segment NNR-7 (Table 4.3-6). With the implementation of RDFs (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).

4.3.4.17 Route Segment NNR-8

Approximately 10 acres of long-term and 3.2 acres of short-term disturbance would occur through the construction of Route Segment NNR-8. Permanently disturbed areas would include 8.9 acres of sagebrush/perennial grassland and 0.5 acre of sagebrush/annual grassland (Table 4.3-4). Annual grassland/noxious weeds and perennial grassland account for the remaining long-term (0.6 acre) and short-term (3.2 acres) disturbance. RDFs 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 1.1 miles and moderate for 1.6 miles (sagebrush/perennial grassland).

The presence of new transmission line 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, but none of the structures would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

Within 1.0 mile of Route Segment NNR-8, potentially suitable habitat is present for 62 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 RDFs 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-8 include critical habitat for bull trout, Chinook salmon, and steelhead; occurrences of 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 directly within the Columbia River. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. The implementation of RDFs 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.

Striped whipsnake, night snake, side-blotched lizard, and sagebrush lizard have been documented within one mile of Route Segment NNR-8. An area located north of Vantage Substation with rock outcrops and shallow soils is considered an overwintering area for striped whipsnakes, and side-blotched lizards occur there as well. Striped whipsnake is rare and localized in Washington. According to WDFW, occupied habitat extends from Highway 26, located north of Vantage Substation, south to Lower Crab Creek. Potential impacts to these four 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 RDFs 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 new transmission line. Where the proposed route segment ROW corridor crosses the Columbia River, the new transmission 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. RDFs 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. RDFs 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 1.5 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 route segment ROW corridor. 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 Occasionally Occupied Habitat MU for Sage-Grouse (10.6 acres), with the remainder of disturbance within Regularly Occupied Habitat MU (2.7 acres) Construction activities would disturb less than one percent of Regularly Occupied Habitat (Table 4.3-7). Anticipated ground disturbance includes 8.9 acres of suitable Sage-Grouse habitat, and 4.4 acres of marginal habitat (Table 4.3-8). With the implementation of RDFs (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 1.2 miles and moderate for 1.5 mile.

Existing perching, roosting, and nesting sites for avian predators are available along Route Segment NNR-8 from buildings, trees, and 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, but none of them would be located greater than 0.25 mile from an existing transmission line (Table 4.3-5).

The estimated Sage-Grouse population range does not overlap the Route Segment NNR-8 ROW (Figure 3.3-4). No active leks are known to occur within four miles of Route Segment NNR-8 (Table 4.3-6). With the implementation of RDFs (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).

4.3.4.18 Route Segment MR-1

Approximately 50.7 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. RDFs 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 new transmission line 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/NNR4u. Compared with Route Segment NNR-4o/NNR-4u, Route Segment MR-1 would require 55 more new structures (Table 4.3-5).

Within 1.0 mile of Route Segment MR-1 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 RDFs 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 (but sensitive to nest disturbance), 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 RDFs 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. RDFs 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 Route Segment 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 RDFs to minimize disturbance impacts and collision risk are described in Section 4.3.3.2; RDFs 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 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 4.3-7). Anticipated ground disturbance includes 29.3 acres of suitable Sage-Grouse habitat, 31.4 acres of marginal habitat, and 18.5 acres of unsuitable habitat (Table 4.3-8). With the implementation of RDFs (Sections 4.3.3.1 and 4.3.3.2), habitat impact levels would be low for 7.5 miles and moderate for 4.4 miles.

Existing perching, roosting, and nesting sites for avian predators are available along Route Segment MR-1 from buildings, trees, and 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 4.3-5).

The estimated Sage-Grouse population range does not overlap the Route Segment MR-1 ROW (Figure 3.3-4). No active leks are known to occur within four miles of Route Segment MR-1 (Table 4.3-6). With the implementation of RDFs (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).

Route Segment MR-1 would cross Reclamation’s proposed Wymer Dam and Reservoir Project for approximately 0.05 mile. For the proposed Wymer Dam and Reservoir Project, mitigation land acquisition and habitat enhancement components are intended to result in a net improvement in conditions for Sage-Grouse. Approximately 3.2 miles of Route Segment MR-1 crosses private land targeted for mitigation acquisition to offset impacts from the proposed Wymer Dam and Reservoir Project.

4.3.5 Mitigation Measures And Residual Impacts

The RDFs and environmental protection measures described in Section 2.3 - RDFs 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.

Agency objectives for Sage-Grouse conservation and mitigation are described in Appendix B-5—Sage-Grouse Analysis and Mitigation Report and Appendix B-7 - Compliance with Applicable Greater Sage-Grouse Policies, Plans, and Procedures. Residual impacts to Sage-Grouse and compensatory mitigation will be analyzed and quantified using methodology described in the Framework for Development of a Sage-Grouse Compensatory Mitigation Plan, which was created by the Sage-Grouse Subgroup comprised of representatives from BLM, JBLM YTC, USFWS, and WDFW (Appendix B-6). Pacific Power will work with stakeholding agencies to create and implement a Sage-Grouse Compensatory Mitigation Plan (CMP). The CMP mitigation will achieve a *net conservation gain* for the species, with compensatory mitigation designed to enhance and improve habitat. It is important to note that mitigation developed for this Project is project-specific and not intended for application to existing and ongoing military training.

Compensatory mitigation implemented to help Sage-Grouse, such as habitat acquisition, habitat restoration, and fire prevention, will also benefit other sagebrush-steppe and grassland species. At this time, for species other than Sage-Grouse no additional compensatory mitigation would be required. If desired biological objectives are not achieved with the existing RDFs, additional mitigation measures may be implemented.

4.3.6 Impact Summary By Alternative

4.3.6.1 No Action Alternative

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 military maneuvers and live fire training. Refer to Section 4.17 - Cumulative Effects for a discussion of potential future development.

4.3.6.2 Action Alternatives

Table 4.3-9 presents a summary of the impacts for the Action Alternatives on all wildlife and Table 4.3-10 presents a comparison of the impacts to Sage-Grouse. Each comparison includes nine Action Alternatives (Alternatives A-H and the NNR Alternative) and three design options under the NNR Alternative (NNR Alternative - Overhead Design Option, NNR Alternative - Underground Design Option, and NNR Alternative - MR Subroute). The NNR-Overhead Design Option is the 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 RDFs for all wildlife species (Table 4.3-9) and for Sage-Grouse (Table 4.3-10).

The NNR Alternative – Overhead Design Option and the NNR Alternative - Underground Design Option is the shortest Action Alternative (40.3 miles). Alternatives A-H are all longer than 60 miles, with Alternative H being the longest at 66.7 miles. As a result, the Agency Preferred Alternative (NNR Alternative - Overhead Design Option) would result in the least amount of direct disturbance to wildlife habitat (204 acres) and Sage-Grouse habitat (192 acres; suitable and marginal habitat) and the second fewest number of transmission line structures (328). While the NNR Alternative - Underground Design Option would require the fewest number of new structures (251), compared with the Agency Preferred Alternative, it would disturb more wildlife habitat (254 acres vs. 204 acres) and more Sage-Grouse habitat (243 acres vs. 192 acres) because it would require more vegetation removal through the excavation of a continuous trench for the underground portions and would require a permanent road to access the underground portions. Because the NNR Alternative – Overhead Design Option and the NNR Alternative - Underground Design Option closely parallel Pacific Power's existing Pomona-Wanapum 230 kV transmission line for the majority of its total length, utilizing nearby existing roads will greatly reduce the need for the construction of new access roads, decreasing the amount of direct habitat loss associated with the proposed Project. The NNR Alternative - MR Subroute is 47.7 miles long and would result in 260 acres of direct disturbance to wildlife habitat, 230 acres of direct disturbance to Sage-Grouse habitat, and 383 new structures. The much lengthier Alternatives A-H would each result in at least 317 acres of direct wildlife habitat loss, at least 477 new transmission line structures, and from 203 acres (Alternative C) to 296 acres (Alternative F) of direct Sage-Grouse habitat loss. For all Action Alternatives, disturbed areas would be restored following construction; however, because of the long recovery times for restoring sagebrush communities (30 to 120 years), any direct disturbance to sagebrush-steppe would be considered a long-term impact.

Indirect habitat loss through the spread of noxious weeds and invasive species and potential increased fire frequency would occur for all Action 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. The least ground disturbance would occur with the Agency Preferred Alternative (204 acres). The NNR Alternative - Underground Design Option would require greater ground disturbance (254 acres) in underground construction locations through trenching and new, permanent access road construction. 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, resulting in 260 acres of ground disturbance. Alternatives A-H would require much more ground disturbance (316 to 350 acres) due to their longer length.

The Agency Preferred Alternative and the NNR Alternative - Underground Design Option closely parallel Pacific Power’s 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 Agency Preferred Alternative or the NNR Alternative - Underground Design Option would require the fewest structures greater than 0.25 mile from an existing transmission line (50 structures). All other Action Alternatives and the NNR Alternative - MR Subroute are longer and follow existing transmission lines for lesser proportions of their lengths, necessitating more structures greater than 0.25 mile from an existing transmission line—135 structures for NNR Alternative – MR Subroute, and 338 to 432 for each of the Alternatives A-H. 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 Pacific Power’s 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.

Wildlife habitat that is sensitive to disturbance includes sagebrush-steppe, riparian areas, intermittent streams/dry gullies, wetlands, and trees. The proposed Project traverses through sensitive habitats ranges from as low as 21.8 miles for Alternative G to as high as 35.1 miles for Alternative A. The Agency Preferred Alternative would cross 31.1 miles of sensitive habitat—primarily sagebrush-steppe.

The NNR Alternative – MR Subroute would have the least amount of centerline within one mile of documented special status species raptor nests (9.1 miles), followed by Alternative A (10 miles), and then the Agency Preferred Alternative, and NNR Alternative – Overhead Design Option (10.5 miles). Alternative C would have the greatest length within one mile of special status raptor nests—19.6 miles. Spatial and temporal buffers would minimize disturbance of nesting raptors during construction and maintenance activities.

Special status species occurrence points within 0.5 mile of the Action Alternatives include striped whipsnake, night snake, loggerhead shrike, American white pelican, pallid bat, black-tailed jackrabbit, and white-tailed jackrabbit. The Agency Preferred Alternative, NNR Alternative - Underground Design Option, and NNR Alternative - MR Subroute had the shortest length of centerline within 0.5 mile of special status species occurrences (8.6 miles), with the next smallest amount associated with Alternative H (10.4 miles) and the greatest amount associated with Alternative B (19.4 mile).

Priority Species Regional Areas crossed by the Action Alternatives include concentration areas for waterfowl, common loon, long-billed curlew, chukar, bighorn sheep, elk, and mule deer, and cliff areas that provide nesting substrates for raptors. The Agency Preferred Alternative and NNR Alternative -

Underground Design Option would cross 5.0 miles of Priority Species Regional Areas—the least amount. NNR Alternative – MR Subroute would cross slightly more Priority Species Regional Areas (5.5 miles), but Alternatives A-H would cross between 28.2 and 50.2 miles of Priority Species Regional Areas, depending on the Action Alternative.

Overall impact levels for special status wildlife 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 route segment ROW corridors, documented special status species occurrence points within 0.5 mile of the route segment ROW corridors, and Priority Species Regional Area crossings. None of the Action Alternatives had any miles of overall high impact levels or of no identifiable impact levels. The Agency Preferred and the NNR Alternative - Underground Design Option had the shortest distance classified as moderate impact (29.8 miles), followed closely by NNR Alternative - MR Subroute (30.8 miles), then by Alternative H (34.6 miles), and then Alternative D (38.4 miles). The greatest length of moderate impact levels is associated with Alternative B (51.1 miles). While the NNR Alternative - MR Subroute would impact more miles than the NNR Alternative - Overhead Design Option or the 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 route segments. While the NNR Alternative - Underground Design Option would result in slightly fewer transmission line structures than the Agency Preferred Alternative, the number of structures greater than 0.25 mile from an existing transmission line would be the same and the acres of direct habitat disturbance would be slightly higher. Thus, the NNR Alternative - Underground Design Option did not have different overall impact levels than the Agency Preferred Alternative.

A portion of each of the Action Alternatives would be located within the YTC Priority Area of Conservation (PAC). The Agency Preferred Alternative and the NNR Alternative - Underground Design Option cross the shortest distance of PAC (38.7 miles), followed by Alternative A (41.5 miles). The longest distance of PAC crossing by any Alternative is 58.9 miles by Alternative G.

The ROW corridor for the three NNR Alternative design options, including the Agency Preferred Alternative, would be located entirely outside of the estimated 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 analysis area for the three NNR Alternative design options overlaps approximately eight percent of the total estimated 95 percent population range (15,264 to 15,424 acres, depending on NNR Alternative design option). The NNR Alternative design options do not overlap the core range, where 80 percent of Sage-Grouse use is estimated to occur. Recent Sage-Grouse use has been documented near the NNR Alternative (all design options) indicating that these areas are used by Sage-Grouse occasionally, but telemetry data indicate that use near the NNR Alternative is much lighter than areas within the population range. Each of the Alternatives A-H, cross through the estimated Sage-Grouse population range for a substantial distance, (22.1 miles to 25.4 miles, depending on Action Alternative). Alternatives A-H pass through the 80 percent core Sage-Grouse area for distances ranging from 7.4 miles for Alternatives G and H to 10.2 miles for Alternatives A and B. The eight-mile wide Sage-Grouse analysis area for each of Alternatives A-H overlaps approximately half (44 to 56 percent, depending on Action Alternative) of the total estimated 95 percent population range for the YTC Sage-Grouse population.

There are four active leks and two inactive leks within four miles of the Action Alternatives. None of the Action Alternatives would be located within 0.6 mile of an active or inactive lek, but each Action Alternative would be within four miles of active leks. The three NNR Alternative design options each have two active leks located between three and four miles away. Alternatives A-H each have four or five active or inactive leks within four miles and one or two of the leks are within two miles of the Action Alternatives. Historic leks (i.e., leks that have not been occupied for at least the past ten years) occur near each of the Action Alternatives, as well. The number of historic leks within four miles ranges from 10 historic leks near the three NNR Alternative design options, to 21 historic leks near Alternatives B, C, E, and G.

Among the Action Alternatives, habitat connectivity between the YTC Sage-Grouse population and the Mansfield Plateau/Moses Coulee Sage-Grouse population appears to have the greatest potential where the NNR Alternative would be located—specifically where Route Segments NNR-6o/NNR-6u and NNR-7 are located. Local patterns of Sage-Grouse distribution suggest that Route Segment NNR-6o/NNR-6u is likely to be the most important connectivity zone, but the presence of two wind developments north of I-90 reduces the connectivity value, according to the WHCWG model. In addition, the kernel density analysis shows a southeastward shift in the YTC Sage-Grouse population range and core population range since 1989. This shift in use could be associated with increased military training at 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 connectivity habitat. Because the proposed NNR Alternative closely parallels Pacific Power's existing 230 kV transmission line as it crosses the identified connectivity area, the magnitude of its effect on Sage-Grouse movement would depend on a number of unknown variables, including the perception of the vertical transmission line structures by Sage-Grouse, and the potential for the structures to attract avian predators. The NNR Alternative 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 a new transmission line at Route Segment NNR-6o/NNR-6u; 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 YTC population was higher (over 400 birds). Of the three main Sage-Grouse connectivity zones identified by WHCWG, the one linking the YTC population with the reintroduced Yakama Indian Reservation population was the weakest. That connectivity zone would cross Alternatives A-H, with the most valuable zone crossing Route Segments 2b and 2c, before detouring around far to the west (or to the east) in order to connect with the habitat on the Yakama Indian Reservation. However, according to Robb and Schroeder (2012), development along the I-82 corridor "essentially isolates" habitat on the Yakama Indian Reservation from the YTC population and potential for movement between the two areas "looks dismal." None of the proposed Action Alternatives are likely to impact Sage-Grouse connectivity to the south; given the existing barriers, it is unlikely that movement would occur between the YTC and Yakama Indian Reservation populations with or without any of the Action Alternatives.

Overall impact levels for Sage-Grouse were estimated taking into account sagebrush-steppe habitat, crossings of Sage-Grouse population range, and proximity to active and inactive leks. None of the Action Alternatives had any miles of overall high impact levels or of no identifiable impact levels. The Agency Preferred Alternative and the NNR Alternative - Underground Design Option had the shortest distance classified as moderate impact (23.9 miles), followed by NNR Alternative - MR Subroute (24.3 miles). Miles of moderate impact for each of Alternatives A-H ranged from 35.1 miles for Alternative G to 45.9 miles for Alternative A. Even though Alternatives A-H passed through more degraded habitat than the three NNR Alternative design options, their much longer length, much greater overlap with occupied Sage-Grouse range, and closer proximity to more leks, indicate a greater overall impact on Sage-Grouse for Alternatives A-H. Among Alternatives A-H, Alternative A would have the greatest impact on Sage-Grouse, and Alternative G would have the least impact, though still larger than for any of the three NNR Alternative design options. 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 length is in a landscape that would yield a low level of impact on Sage-Grouse, resulting in modestly greater impact on Sage-Grouse than for the Agency Preferred Alternative. While the NNR

Alternative - Underground Design Option would result in slightly fewer transmission line structures than the Agency Preferred Alternative, 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. Thus, the NNR Alternative - Underground Design Option did not have different overall impact levels for Sage-Grouse than the Agency Preferred Alternative.

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Table 4.3-9 Impacts to Special Status Wildlife and Impact Summary of Action Alternatives

ACTION 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]	Miles of Centerline With Documented Special Status Species Raptor Nest within 1 Mile	Miles of Centerline with Documented Special Status Species Point within 0.5 Mile	Miles of Priority Species Regional Areas Crossed	High	Moderate	Low	No Identifiable
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.7 miles	482	391	337	35.1	10	12.5	29.6	0.0	43.4	21.3	0.0
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.2 miles	477	432	323	31.8	14.3	19.4	48.4	0.0	51.1	10.1	0.0
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 63.0 miles	485	376	316	25.0	19.6	17.5	50.2	0.0	46.1	16.9	0.0
Alternative D 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.5 miles	490	335	330	28.3	15.3	10.6	31.4	0.0	38.4	28.1	0.0
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.6 miles	480	435	336	28.6	14	19.2	45.2	0.0	47.3	14.3	0.0
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 65.1 miles	485	394	350	31.9	9.7	12.3	26.4	0.0	39.6	25.5	0.0
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.4 miles	488	379	329	21.8	19.3	17.3	47	0.0	42.3	21.1	0.0
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.8 miles	493	338	343	25.1	15	10.4	28.2	0.0	34.6	32.2	0.0
NNR Alternative – Overhead Design Option* NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.5 miles	328	50	204	31.1	10.5	8.6	5.0	0.0	29.8	10.7	0.0
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.5 miles	251	50	254	31.1	10.5	8.6	5.0	0.0	29.8	10.7	0.0
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.8 miles	383	135	260	31.5	9.1	8.6	5.5	0.0	30.8	17	0.0

Notes: [1] High sensitivity habitat included riparian; intermittent stream/dry gully; sagebrush/perennial grassland; sagebrush/annual grassland; and trees (aspen and poplar)
* Agency Preferred Alternative.

TABLE 4.3-10 SUMMARY OF IMPACTS TO SAGE-GROUSE BY ACTION ALTERNATIVE

ACTION 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)				OVERALL IMPACT LEVELS (MILES)[2]		
									Miles of Centerline Within Sage-Grouse Population Range		Acres of Population Range Within 4 Miles												
		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	80% Core Population Range	95% Population Range	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)	Wi Thin 0-0.6 Mile	Within 0-2 Miles	Within 0-3 Miles	Within 0-4 Miles (SDEIS Only)	High	Moderate	Low
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.7 miles	41.5	187.7	94.7	54.5	336.9	225.0	482	391	10.2	25.1	51,534	100,284	0	2	3	4	0	8	9	15	0	45.9	18.8
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.2 miles	56.7	162.0	74.0	87.0	323.0	299.0	477	432	10.2	25.1	56,807	109,563	0	2	3	5	0	10	13	21	0	39.4	21.8
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 63.0 miles	58.5	119.2	84.0	113.2	316.4	292.4	485	376	7.9	22.1	44,737	95,824	0	1	3	5	0	7	12	21	0	36.1	26.9
Alternative D 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.5 miles	43.3	144.9	104.8	80.7	330.3	218.4	490	335	7.9	22.1	39,304	86,385	0	1	3	4	0	5	8	15	0	42.6	23.9
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.6 miles	57.1	151.2	97.9	86.9	336.0	311.9	480	435	9.7	25.4	56,386	108,886	0	2	2	5	0	10	13	21	0	38.4	23.2
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 65.1 miles	41.9	176.9	118.6	54.3	349.9	238.0	485	394	9.7	25.4	51,113	99,607	0	2	2	4	0	8	9	15	0	44.9	20.2
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.4 miles	58.9	108.4	107.9	113.1	329.4	305.4	488	379	7.4	22.4	44,286	95,117	0	1	2	5	0	7	12	21	0	35.1	28.3
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.8 miles	43.7	134.2	128.7	80.5	343.3	231.4	493	338	7.4	22.4	38,852	85,677	0	1	2	4	0	5	8	15	0	41.6	25.2
NNR Alternative - Overhead Design Option* NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.5 miles	38.7	144.0	48.1	11.8	204.0	193.3	328	50	0	0	0	15,424	0	0	0	2	2	5	7	10	0	23.9	16.6
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.5 miles	38.7	180.2	62.5	11.8	254.5	243.9	383	50	0	0	0	15,424	0	0	0	2	2	5	7	10	0	23.9	16.6
NNR Alternative MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.8 miles	46	161.3	68.5	30.3	260.2	249.5	383	135	0	0	0	15,264	0	0	0	2	1	4	7	10	0	24.3	23.5

[1] Habitat Suitability 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, trees, and other (includes agriculture, developed/residential areas and open water).
[2] Impact levels are presented in linear miles. Impacts may be reduced further through site specific engineering and design in conjunction with mitigation.
* Agency Preferred Alternative

4.4 LAND USE

Land use impacts would occur as a result of the construction, operation, and maintenance of the proposed 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 proposed Project effects on land uses;
- Evaluating the sensitivity of specific land uses to change;
- Developing criteria for assessing impact intensity;
- Assessing impacts based on required design features (RDFs);
- Introducing specific mitigation measures in specific locations to reduce impacts;
- Evaluating residual impacts; and
- Comparing Action 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 develop the proposed Project;
- Construction of the Project;
- The physical presence and operation of the Project; and
- Managing the right-of-way (ROW) corridor and maintaining the Project.

The potential for change from introducing the proposed 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 RDFs.

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 Action 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 proposed 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 Action Alternatives and their 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 and/or Conservation-Existing	High
Recreation and/or Conservation-Planned (Wanapum Natural Area Preserve, Yakima River Basin Integrated Plan [Integrated Plan] potential conservation easement/property purchase parcels)	Moderate
Military (Joint Base Lewis-McChord Yakima Training Center; JBLM YTC)	Moderate
Important Farmland – Prime Farmland (non-Agriculture)	Moderate
Important Farmland – Unique Farmland (non-Agriculture)	Moderate
Important Farmland – Farmland of 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 Trust Lease Lands [DNR], Bureau of Reclamation)	Low
Undeveloped/Grazing/Vacant	Low

4.4.2 Impact Levels

Potential impacts to land use resources were assessed along the assumed centerlines of the Action Alternatives including access roads. The assumed centerline of the Action Alternative route segments for land use impact assessment is 125 feet wide (i.e., the proposed route segment ROW corridor width).

High - Impacts would be considered high where the proposed 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 proposed Project would:

- Adversely affect properties by eliminating or limiting the potential for development to occur in the long-term around or underneath the transmission line and/or transmission line 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 Public Land Survey System sections containing Conservation Reserve Program (CRP) lands;
- 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 proposed 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 proposed 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 Action Alternative route segments would be temporarily disrupted by construction activities such as noise, dust, and traffic. Construction of the proposed Project would temporarily disturb these areas as a result of heavy construction equipment on access roads while moving building materials to transmission line structure sites and returning to construction staging areas.

Construction of the proposed Project would involve installation of new transmission line structures. Installation of the new transmission line structures would temporarily disturb land use and landcover 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 proposed route segment ROW corridors (includes residences within 500 feet of a route segment).

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

Land uses that comply with local regulations would generally be permitted adjacent to the proposed Project’s ROW corridor. Compatible uses of the proposed Project’s ROW corridor on either federal or state lands would have to be approved by the applicable federal and/or state land management agency. Permission to use the proposed Project’s ROW corridor on private lands would be determined by Pacific Power in consultation with the landowner.

The proposed Project’s 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 proposed 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 proposed 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 and State Route (SR) 243.

4.4.4 Impacts Specific to Route Segments and Design Options

Long- 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
1a/NNR-1 2.4 miles	0	0	2.4	0
1b 12.5 miles	0	0	12.6	0
1c 12.9 miles	1.1	9.7	2.1	0.1
2a 1.0 mile	0	1.0	0	0
2b 16.4 miles	0	16.4	0	0
2c 18.1 miles	0	15.2	2.5	0.5
2d 7.0 miles	0.3	6.8	0	0
3a 0.1 mile	0	0	0.2	0
3b 21.7 miles	0.5	17.8	3.4	0
3c 25.4 miles	2.7	15.9	6.3	0.4
NNR-2 5.0 miles	0	1.5	3.5	0
NNR-3 9.3 miles	0	6.7	2.6	0
NNR-4o/4u 4.5 mile	0	0	4.5	0
NNR-5 1.8 miles	0	0	1.8	0

ROUTE SEGMENT	IMPACT LEVEL			
	NO IMPACT	LOW	MODERATE	HIGH
NNR-6o/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	0.4	1.9	0
MR-1 11.9 mile	0	0.4	11.5	0

4.4.4.1 Route Segment 1a/NNR-1

No direct or high impacts are anticipated in this route segment. During ROW acquisition and detailed design (by Pacific Power), the centerline of this route segment would be adjusted to avoid the need for removal of residential dwellings or related structures from the route segment's ROW corridor. Therefore, with prudent adjustments to the location of the route segment, ROW corridor, and structure placement, no direct impacts to existing residential dwellings or related structures are foreseen. Moderate impacts within a residential area would result from long-term elimination or limitation of any structure placement or development under the proposed transmission line or within its ROW corridor.

Overall impacts would be moderate because the Project would eliminate the potential for further development (see Table 4.4-2) because the establishment of the ROW would substantially restrict the types of development that are allowed. Much of this route segment is located within or adjacent to Sage Trail Road's ROW and single pole structures would be used along this route segment. Higher impacts would occur where the route segment ROW corridor would traverse residential land parcels and heavy angle transmission line 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 1.7 acres of long-term disturbance and crosses Prime Farmland causing less than 0.1 acres of long-term disturbance and moderate impacts 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 route segment would cross private land in Yakima County, and would be consistent with the Yakima County Comprehensive Plan (2007). Route Segment NNR-1a/NNR-1 would be subject to the Yakima County Code (YCC) 19.18.260(4) – Linear Transmission Facilities, and would require a Type II review.

Moderate impacts would occur for 2.4 miles of this route segment.

4.4.4.2 Route Segment 1b

Route Segment 1b would cause approximately 11.2 acres of long-term impacts on military land use on the perimeter of the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) in Training Areas 11, 13, and 10. Military operations in this area would be minimally affected; however, because the route segment would be on the perimeter of training activity areas and new transmission line structures would be located adjacent to an existing fire break road. Impacts would be moderate, because military activities could continue to occur. Short-term impacts would total 46.3 acres on military land use areas.

This route segment also crosses land classified as Farmland of Statewide Importance and Prime Farmland if Irrigated causing 1.8 acres of long-term disturbance and 4.6 acres of long-term disturbance, respectively. However, this is non-agricultural land.

The route segment would cross private land in Yakima County, and would be consistent with the Yakima County Comprehensive Plan (2007). Route Segment 1b would be subject to YCC 19.18.260(4) – Linear Transmission Facilities, and would require a Type II review.

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 12.6 miles of this route segment.

4.4.4.3 Route Segment 1c

Route Segment 1c is similar to Route Segment 1b except that is located outside of the JBLM YTC boundary. The land use for a good portion of the route segment is undeveloped rangeland, while agricultural land uses are located in the southern portion of this route segment between milepost (MP) 9.5 and MP 10.5.

Active agricultural operations would be temporarily impacted by construction activities associated with the construction and/or expansion of access roads, both temporary and permanent; pulling sites and construction equipment and vehicle staging areas; and the installation of H-frame or single pole transmission line structures and wires. These construction activities could temporarily interfere with active agricultural operations by damaging or removing crops, impeding access to certain fields or plots of land, obstructing farm vehicles and equipment, disrupting drainage and irrigation systems, and disrupting grazing activities, all of which could result in the temporary reduction of agricultural productivity.

Depending upon the extent of construction required for certain aspects of the proposed route segment, soils, including those designated as Important Farmland, would be compacted as a result of construction activities, (i.e., the use of heavy construction equipment). This would create a short-term disturbance to agricultural soils that would impact active agricultural operations, such as the planting of crops. Short-term impacts would occur on 2.2 acres of irrigated cropland and 36.5 acres of low density residential areas.

Impacts to agricultural land would occur where the location of route segment facilities, such as access roads and H-frame or single pole structures, would permanently convert the land upon which they are situated to non-agricultural use. This also includes soils designated as Important Farmland.

Loss of agricultural land would result in initial high and moderate impacts while grazing impacts would be low. Areas disturbed by construction would be minimal. Following rehabilitation, areas removed from use for the life of the proposed Project would include the small areas at the structure footings and/or guy anchors, as well as new access roads.

Once construction is complete and the H-frame or single pole structures are in place, agricultural uses (e.g., crops, grazing) may be re-established/continued within the route segment ROW corridor. The loss of productive farmland will result in financial impacts to farmers. The amount of financial impact would depend on the type of crop since crop values fluctuate from year to year.

In addition to the long-term loss of land under active agricultural operations, the construction of the route segment would result in other agricultural impacts in the vicinity of the proposed Project. These include: disrupting farming facilities or operations and disrupting or altering aerial spraying practices.

The presence of new transmission line components in this route segment would permanently disrupt active farming operations in nearby areas, by dividing or fragmenting agricultural fields, and disrupting the operation of farm equipment.

In some instances, maneuvering harvesting equipment around H-frame or single pole structures may be difficult. The level of difficulty would depend on the type of crop. Row crops that are perpendicular or diagonal to the new transmission line structures, rather than parallel, would be more difficult for large equipment maneuvering, such as field cultivators, combines, or other wide equipment. Equipment operators may have to make additional passes, additional maneuvers or otherwise modify seeding, irrigation or harvesting practices because of structure obstruction. Potential secondary effects include restrictions on nighttime operations (due to the potential for accidents), restrictions on normal crop rotations because of operational considerations, and increased difficulty in leasing fields with new transmission line structures. New transmission line structures would also increase the need for weed and pest control activities around H-frame or single pole structure foundations. Agricultural lands that utilize certain types of irrigation systems may also be impacted by the placement of H-frame or single pole structures on cropland.

Aerial spraying (e.g., crop dusting) is used to fertilize crops and control insects, weeds, and diseases that may affect crops in the Study area. Aerial spraying occurs in those areas actively cultivated with field crops. Transmission lines and H-frame or single pole structures present a substantial obstacle to be avoided, and require additional attention from the pilots. In addition, the presence of a new 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 new transmission structures could receive less spray than desired. Section 4.16.9 discusses aerial spraying in more detail.

Global Positioning Systems (GPS) are used in a wide range of activities including several important agricultural activities such as monitoring pivot irrigation, tracking wheeled and equipment movements during farming operations, and checking the orientation of aerial spraying aircraft. Concerns have been expressed about the potential for interference to GPS systems from electrical fields from the new transmission line. Due to the frequencies used by these devices and the modulation and processing techniques used, interference effects with GPS units are unlikely (Silva and Olsen 2002). Section 4.16.8 discusses GPS systems and studies that have been conducted to address whether transmission lines affect GPS systems operation and accuracy.

This route segment would potentially disturb 0.3 acre of irrigated agricultural land located north of and along Mieras Road. The wheel line operations in 0.1 acre of irrigated pasture land and 0.2 acre of apple crop operations will be affected in the long-term between MP 9.5 and MP 10.5, causing high impacts for 0.9 mile. A wheel line irrigation system located between MP 9.9 and MP 10.1 would be adversely affected because the route segment runs diagonally across the field, potentially creating impacts if the wheel line needs to be separated and moved around the structures when the irrigation system traverses the field. This would cause additional costs to the land owner. Long-term impacts would occur to 0.2 acre of sprinkler irrigation areas and 0.2 acre of wheel line irrigation. Short-term impacts would total 1.0 acre and 1.1 acre, respectively. Agricultural land along this route segment is not Prime Farmland.

Non-irrigated pasture and fallow land would also be affected by this route segment between MP 9.5 and MP 10.2. Long-term dryland agriculture impacts total 1.5 acres and short-term impacts total 0.4 acre for this route segment.

This route segment also crosses a short segment of land classified as Farmland of Unique Importance, causing 0.1 acre of long-term disturbance. However, this is non-agricultural land and no farmland conversion would occur.

Route Segment 1c would cause approximately 19.0 acres of long-term impacts on residential land use, but overall impacts would be moderate because the route segment would eliminate the potential for further development. At MP 5.9, the route segment ROW corridor would potentially bisect an existing residence and associated buildings located on Summerset Drive, causing high impacts for a short distance (MP 5.9-6.0). Other residential areas would also be affected by the presence of the new transmission line and structures. The route segment would impact residential property at MP 10.1, by eliminating or limiting the potential for future development to occur on the property, causing moderate impacts. Between MP 10.5 and 11.4, residential land use will be adversely affected in isolated areas because the route segment would limit future residential activities. Short-term impacts in low density residential areas would total 36.5 acres for this route segment.

The route segment would cross private land in Yakima County, and would be consistent with the Yakima County Comprehensive Plan (2007). The Project would be subject to YCC 19.18.260(4) – Linear Transmission Facilities, and would require a Type II review.

Overall, this route segment would create 1.0 mile of high impact and 1.2 miles of moderate impact.

4.4.4.4 Route Segment 2a

This route segment would cause 2.1 acres of long-term impacts on undeveloped/grazing land. Short-term impacts on undeveloped/grazing land would total 4.0 acre.

This route segment would create long-term impacts on Farmland of Statewide Importance and Farmland of Unique Importance totaling 0.4 acre and 0.9 acre, respectively, and short-term impacts would total 0.8 and 1.6 acre, respectively. However, moderate impacts would result because no farmland would be converted to non-agricultural use. Private grazing land may be affected by the construction of this route segment, but impacts would be low. Long-term impacts on undeveloped land would total 2.1 acres and short-term impacts would total 4.0 acres.

The route segment would cross private land in Yakima County, and would be consistent with the Yakima County Comprehensive Plan (2007). The route segment would be in compliance with the Yakima County Comprehensive Plan and all applicable development regulations. The Project would be subject to YCC 19.18.260(4) – Linear Transmission Facilities, and would require a Type II review.

Moderate impacts would occur for 1.0 mile of this route segment.

4.4.4.5 Route Segment 2b

Long-term impacts would be created in undeveloped/grazing land use areas. A total of 35.7 acres of long-term impact and 59.6 acres of short-term impact would be created as a result of Route Segment 2b.

The route segment also crosses U.S. Bureau of Land Management (BLM) grazing allotments, where long-term impacts would total 1.6 acres of leased land. Short-term lease land impacts would total 2.5 acres.

This route segment crosses Farmland of Statewide Importance, Farmland of Unique Importance, and Prime Farmland if Irrigated land causing 10.2 acres of long-term disturbance. However, this is non-agricultural land, so impacts would be low.

CRP lands would also be affected by this route segment. In the Public Land Survey System (PLSS) sections crossed known to have CRP designated lands, long-term impacts totaling 4.8 acres could potentially occur. However, the location of these lands within the section crossed is unknown. CRP lands to be crossed by the new transmission line would need a Farm Service Agency (FSA) assessment of the adverse effects on the participants of CRP acreage. As stated in Section 3.4, the exact parcels of CRP lands are not known. Pacific Power would consult with the FSA and landowners to determine if the construction of the route segment would affect the CRP status of the land or if special construction or re-vegetation would be necessary. Pacific Power would provide landowners with information, including estimated land disturbance to ground cover and length of use, if required to obtain prior approval from the FSA for ground disturbance prior to ground disturbance on CRP lands.

If the FSA determines that the use would have an adverse effect on CRP acreage, the affected acreage would be terminated and refunds assessed. Annual lease payments to CRP enrollees, however, are not likely to be reduced, despite the potential for long-term disturbance and reduction of CRP acres due to the presence of new transmission line structure footprints and access roads. Therefore, moderate impacts on CRP lands are expected. The FSA Handbook Agricultural Resource Conservation Program for State and County Offices (U.S. Department of Agriculture 2008) states:

> *"The following is the procedure for continuing CRP-1 on land being used by public utilities for installing gas lines, pipes, cable, telephone poles, etc., materials used by an entity of the State for building or Federally funded pipeline projects.*
>
> *CRP-1's may be continued without reduction in payment if:*
>
> - *the participant gives COC details of the proposed use, including length of use*
> - *COC authorizes use*
>
>   *Note: Use is not authorized during primary nesting season.*
> - *Natural Resource Conservation Service (NRCS) or Technical Service Provider (TSP)certifies usage will have a minimal effect, such as:*
>   - *Erosion is kept to minimum*
>   - *Minimum effect on wildlife and wildlife habitat*
>   - *Minimum effect on water and air quality*
> - *the participant restores cover, at the participant's expense, to disturbed land in timeframe set by COC.*
>
>   *Note: No payment reduction will be made for compensation received by the participant from the public agency.*
>
> *NRCS or TSP will determine whether the disturbance will have an adverse effect on the land. If the NRCS or TSP determines that public use will have an adverse effect on CRP acreage, affected acreages shall be terminated and refunds assessed."*

The route segment would cross private land in Yakima County, and would be consistent with the Yakima County Comprehensive Plan (2007). The Route Segment 2b would be subject to YCC 19.18.260(4) – Linear Transmission Facilities, and would require a Type II review. Route Segment 2b would also cross BLM land, and would be consistent with the BLM Spokane District 1985/1987 Resource Management Plan (RMP) and 1992 RMP Amendment/Record of Decision (ROD).

Moderate impacts would occur for 6.7 miles of this route segment.

4.4.4.6 Route Segment 2c

See discussion regarding short-term construction impacts, Prime Farmlands, loss of agricultural and grazing land due to new transmission line structure footprints, potential financial impacts, impacts on aerial spraying, GPS operation, and other general short-term and long-term impacts on agricultural and grazing lands as described in Section 4.4.4.3 - Route Segment 1c. Short-term impacts would occur on 13.1 acres of irrigated cropland for this route segment.

A portion (8.6 miles of 18.1 miles) of this route segment parallels an existing utility ROW corridor located on private lands. A portion of the route segment that parallels the exiting utility corridor would also be located in irrigated agricultural land and, potentially, CRP lands. Approximately 2.5 acres of long-term disturbance would occur in irrigated agricultural land and 3.5 acres of long-term disturbance would occur in CRP Land. Long-term disturbance would occur to cropland under cultivation as wheat, Timothy, apple, alfalfa hay and wildlife feed. Most of this agricultural land (80 percent) is Farmland of Statewide Importance, Farmland of Unique Importance, and/or Prime Farmland if Irrigated and these lands would be converted to non-agricultural uses. Other non-agricultural land is designated as Prime and Unique Farmland or Farmland of Statewide importance, also. Conversion of Prime Farmlands to non-agricultural uses would require a Farmland Conversion Impact Rating from the U.S. Department of Agriculture. Long-term impacts totaling 2.5 acres on Farmland of Statewide importance, 6.5 acres on Unique Farmland, and 0.8 acres on Prime Farmland would occur.

The operation of five center pivot irrigation systems would be impacted as a result of the presence of this route segment. The route segment would cause long-term impacts on 1.0 acre of center pivot agricultural areas and less than 0.1 acre of sprinkler irrigated land. Conflicts with agricultural operations associated with the new transmission line structures located at MP 11.0 will cause high impacts.

CRP lands would also be affected by this route segment. Long-term impacts totaling 0.4 acre would occur to known CRP lands. In PLSS sections crossed known to have CRP designated lands, long-term impacts totaling 3.5 acres could potentially occur. However, the location of these lands within the section crossed is unknown. CRP lands will be crossed by the new transmission line would need an FSA assessment of the adverse effects on the participants CRP acreage. If the FSA determines that the use will have an adverse effect on CRP acreage, the affected acreage will be terminated and refunds assessed. See other CRP land impact discussion in Section 4.4.4.5 - Route Segment 2b. As stated in Section 3.4, the exact parcels of CRP lands are not known. Pacific Power would consult with the FSA and landowners to determine if the construction of the route segment would affect the CRP status of the land or if special construction or revegetation would be necessary. Pacific Power would provide landowners with information, including estimated land disturbance to ground cover and length of use, if required to obtain prior approval from the FSA for ground disturbance prior to ground disturbance on CRP lands. Annual lease payments to CRP enrollees are not likely to be reduced, despite the potential for long-term disturbance and reduction of CRP acres due to the presence of structure footprints and access roads and, therefore, moderate impacts are assumed.

Washington State Department of Natural Resources (DNR) state trust land grazing lease lands would also be affected by the construction of this route segment. Long-term impacts would occur on 0.7 acre of state trust grazing lease lands. Long-term impacts totaling 1.4 acres of BLM grazing lease allotments would also occur along this route segment.

Non-irrigated fallow wheat agricultural land would also be affected by this route segment between MP 9.5 and 9.6 and wildlife feed crops between MP 13.1 and 13.7. Long-term dryland impacts total 4.2 acres and short-term impacts total 0.8 acres for this route segment.

The route segment would cross private land in Yakima County, and would be consistent with the Yakima County Comprehensive Plan (2007). The route segment would be subject to YCC 19.18.260(4) – Linear Transmission Facilities, and would require a Type II review.

High impacts would occur for 2.9 miles and moderate impacts would occur for 12.7 miles of this route segment.

4.4.4.7 Route Segment 2d

Long-term land use impacts occurring as a result of the construction or Route Segment 2d will primarily be to BLM grazing lease lands. A total of 1.4 acres of long-term impacts and 2.6 acres of short-term impacts will occur for this route segment.

Prime Farmland impacts will also occur in non-agricultural areas. Long-term impacts will occur on 4.5 acres of Farmland of Unique Importance and 8.2 acres of short-term impacts will occur.

CRP lands would also be affected by this route segment. In crossing PLSS sections known to have CRP designated lands, long-term impacts totaling 0.3 acre could potentially occur. However, the location of these lands within the section crossed is unknown. CRP lands crossed by the route segment would need an FSA assessment of the adverse effects on the participants CRP acreage. See other CRP land impact discussion in Section 4.4.4.5 - Route Segment 2b. As stated in Section 3.4, the exact parcels of CRP lands are not known. Pacific Power would consult with the FSA and landowners to determine if the construction of the route segment would affect the CRP status of the land or if special construction or revegetation would be necessary. Pacific Power would provide landowners with information, including estimated land disturbance to ground cover and length of use, if required to obtain prior approval from the FSA for ground disturbance prior to ground disturbance on CRP lands.

The route segment would be consistent with the Yakima County Comprehensive Plan (2007), Benton County Comprehensive Plan (2006), and the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD. The route segment would be subject to YCC 19.18.260(4) – Linear Transmission Facilities, and would require a Type II review.

Moderate impacts would occur for 4.3 miles and low impacts would occur for 2.4 miles of this route segment.

4.4.4.8 Route Segment 3a

This route segment is located adjacent to the Vantage Substation along the existing utility corridors. Land use impacts would be moderate for this route segment due to the route segment crossing the proposed Wanapum Natural Area Preserve (NAP).

4.4.4.9 Route Segment 3b

See discussion regarding short-term construction impacts, Prime Farmlands, loss of agricultural and grazing land due to structure footprints, potential financial impact, impacts on aerial spraying, GPS operation, and other general short-term and long-term impacts on agricultural and grazing lands as described in Section 4.4.4.3 - Route Segment 1c. Short-term impacts would total 49.0 acres on military lands for this segment.

No direct or high impacts are anticipated in this route segment. During route segment ROW corridor acquisition and detailed design (by Pacific Power), the assumed centerline of this route segment would be adjusted to avoid the need for removal of dwellings or related structures. Therefore, with prudent adjustments to the location of the route segment's ROW corridor and transmission line 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 new transmission line within the route segment ROW corridor.

Route Segment 3b would cause approximately 20.1 acres of long-term impacts on military land use on the perimeter of the JBLM YTC in Training Areas 5 and 6. Military operations in this area would be minimally affected; however, because the route segment would be on the perimeter of training activity areas and new transmission line structures would be located adjacent to an existing fire break road, impacts would be moderate because activities could continue to occur.

Non-agricultural Prime Farmland would be affected by this route segment. Long-term impacts would occur to Farmland of Unique Importance, Farmland of Statewide Importance, and Prime Farmland if Irrigated totaling 7.6, 1.1 and 0.6 acre, respectively, causing moderate impacts.

Potential impacts would also occur where the route segment parallels and crosses the John Wayne Pioneer Trail between MP 17.3 and 19.0, where the route segment would potentially conflict with the use of the trail. The existing ROW corridor for the trail (railroad corridor), where the route segment would be located within this corridor, is 200 feet. High impact would occur as a result of potential conversion of recreational land to non-recreational uses (new transmission line structures) (also see Section 4.5 - Recreation). Also, the proposed Wanapum NAP is crossed along this segment, causing moderate impacts.

Short-term impacts would occur on Huntzinger Road and SR-243, where road users would be affected by disruption of traffic flow during construction (see Section 4.7 - Transportation).

Route Segment 3b would be in compliance with the Yakima County Comprehensive Plan (2007) and all applicable development regulations, the Benton County Comprehensive Land Use Plan, and the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD.

Overall, high impacts would total 1.7 miles and moderate impacts would total 8.9 miles for this route segment.

4.4.4.10 Route Segment 3c

See discussion regarding short-term construction impacts, Prime Farmlands, loss of agricultural and grazing land due to new transmission line structure footprints, potential financial impacts, impacts on aerial spraying, GPS operation, and other general short-term and long-term impacts on agricultural and grazing lands as described in Section 4.4.4.3 - Route Segment 1c. Short term impacts would occur on 60.1 acres of undeveloped/grazing lands and 33.5 acres of irrigated cropland.

A portion (4.0 miles of 25.0 miles) of this route segment parallels the Hanford-Vantage No. 1 500 kV transmission line corridor with 3.4 miles being in a BLM designated utility corridor located within the Saddle Mountains Management Area (MA). A portion of the route segment that parallels the existing BLM utility corridor is located in an open road designation within the Saddle Mountains MA (1.8 miles, see Section 4.7 - Transportation). Approximately 1.6 miles located within the BLM Saddle Mountains MA and utility corridor is located in a road restricted area. Most of the BLM land in the Saddle Mountains MA is under grazing leases, and long-term impacts on these lands would total 5.7 acres. BLM oil and gas lease land would also be affected by the route segment, with 0.6 acres of long-term disturbance occurring as a result of this route segment. Rangeland and recreational use impacts would be low because the grazing would continue on these lands and off-road vehicles would be able to move under and around the new transmission line structures. Moderate impacts to land used for residential purposes would occur at MP 10.3-10.4, MP 23.6-23.7, MP 22.5-22.5, and MP 23.7-23.8.

EDP Renewables has secured a wind testing and monitoring ROW in the Saddle Mountains as part of the proposed Saddle Mountains West Wind Farm in the Project study area. Route Segment 3c would cross a portion of these BLM lease lands in the Saddle Mountains MA and the entire length of the route segment in the Saddle Mountains MA would be in the wind testing and monitoring ROW. Moderate impacts could result from the route segment by limiting the potential placement of wind turbines in two areas on the north end and south end of the Saddle Mountains MA where the route segment diverges from the Hanford-Vantage No. 1 line and because the route segment could potentially affect interconnection of the wind farm collector to the existing Hanford-Vantage No. 1 transmission line (also see Section 4.17: Cumulative Impacts).

Approximately 6.2 acres of long-term impacts would occur to irrigated agricultural lands almost entirely in the Wahluke Slope area. A small area of irrigated agricultural land would be affected by the route segment north of the Saddle Mountains. Long-term disturbance would occur to cropland cultivated as alfalfa hay, blueberry, cherry, field corn, wine grape, grass hay, green pea, potato, timothy, and wheat. All of these crops are irrigated and are Prime Farmland and/or Statewide Important agricultural areas. Prime Farmland makes up 100 percent of the total farmland crossed by this route segment.

Short-term impacts totaling 33.5 acres would occur to these irrigated crop lands. Long-term impacts would occur to cherry orchards totaling 0.4 acre along 0.3 mile of line route. Growers occasionally utilize helicopters to dry the orchards when precipitation and low temperature endanger crops due to potential freezing. The presence of the route segment in the area of cherry orchards (MP 6.7, 10.3, 10.7, and 12.3) could affect the operations of cherry growers and create air-space obstructions where none currently occur.

The operation of nine center pivot irrigation systems would be affected along this route segment for a distance of 0.9 mile; however, all utilize articulated pivot systems. In these areas, the irrigation system would not need to be modified to accommodate structures should they be necessary within pivot irrigated field. Other long-term impacts would occur in areas where hand-movable sprinkler and other (unknown) systems are utilized, potentially creating higher operating costs as a result of system re-configuration.

This route segment would also potentially conflict with the operation of irrigation canals operated by the U.S. Bureau of Reclamation (Reclamation). The route segment would need to be located on the west side of Road N SW to allow for the maintenance and access of the open ditch canals from the road. Buried canals would need to be located during detailed engineering and planning to ensure that the buried canals and lines are not affected during auguring for foundation construction or direct imbedding of structures. Wasteway lines, lateral lines and waterway lines are located between MP 5.8-6.3, MP 6.8-7.8, MP 11.2-11.7, and MP 11.4-11.5 and are crossed at MP 10.3, 10.8, 12.3, and 12.6 (see Appendix A: Existing Agriculture and Irrigation Map).

BLM grazing lease lands would also be affected by the construction of this route segment. Long-term impacts would occur on 5.7 acres of BLM leased lands located in the Saddle Mountains MA.

Potential impacts on open off-highway vehicle (OHV) areas of the Saddle Mountains MA, Beverly Sand Dunes OHV Area, and Burkett Lake Recreation Area would occur. See Section 4.5 - Recreation for a detailed discussion of impacts.

Low impacts would also occur on the private air strip and associated aircraft operations. The route segment would not penetrate the approach zone of the airport. The addition of a new transmission line in the vicinity will not affect normal air strip operations.

The route segment would be in compliance with the Benton County Comprehensive Land Use Plan, the Grant County Comprehensive Plan, and the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD. The Saddle Mountains MA is managed for multiple uses such as mineral extraction, rangeland, recreation, wildlife habitat, and energy ROWs.

Overall, high impacts would total 4.6 miles and moderate impacts would total 13.4 miles for Route Segment 3c.

4.4.4.11 Route Segment NNR-2

Route Segment New Northern Route (NNR) 2 would cross approximately 5.0 miles of the perimeter of the 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 route segment would be on the perimeter of training activity areas and the new 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 route segment would be in compliance with the Final Cultural and Natural Resources Management Plan for the JBLM YTC.

Overall, moderate impacts would occur for 2 miles and low impacts would occur for 2.4 miles of this route segment.

4.4.4.12 Route Segment NNR-3

Route Segment NNR-3 crosses BLM, private, and WSDOT owned and managed 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 is adjacent to Selah Creek Rest Area. Special management and recreation areas are managed by the BLM and DNR, and include Selah Cliffs NAP, Yakima Cliffs/Umtanum Ridge Area of Critical Environmental Concern (ACEC) located between MP 3.3 and 4.3, Yakima Cliffs/Umtanum Ridge ACEC proposed expansion located between MP 1.5 and 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 leases. There are two Washington State Recreation and Conservation Office (RCO) funded projects within the Project study 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 route segment. The Selah Cliffs NAP is not crossed by the assumed centerline of this route segment and no land use impacts would occur on the NAP. It is assumed there will be no aerial easement across the NAP; however, final engineering in coordination with the affected landowner/land managing agency will determine the location and extent of the ROW. This route segment would also cross Reclamation's proposed Wymer Dam Reservoir (MPs 8.3-8.6 and 9.1-9.2) and the private lands targeted for acquisition or conservation easement as part of the Yakima River Basin Integrated Water Resource Management Plan (Integrated Plan). These potential acquisition/conservation easement lands are located between MP 6.9 and 9.3. A total of 9.0 acres of short-term impacts and 4.8 acres of long-term impacts on acquisition/conservation easement lands would occur.

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 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 route segment would cross private land in Yakima and Kittitas counties. The route segment would be in compliance with the Yakima County Comprehensive Plan (2007) and all applicable development regulations, the Kittitas County Comprehensive Plan (2014), and the BLM Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD. The route segment would be subject to the YCC 19.18.260 – Linear Transmission Facilities, and would require a Type II review. In Kittitas County, a Conditional Use Permit would be necessary.

Overall, this route segment would create 2.6 miles of moderate impact and 6.7 miles of low impact.

4.4.4.13 Route Segment NNR-4o/4u

Overhead Design Option

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 route segment 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 route segment 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 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 route segment would be in compliance with the Kittitas County Comprehensive Plan (2014). In Kittitas County, a Conditional Use Permit would be necessary.

This route segment would also cross private lands targeted for acquisition or conservation easement as part of the Integrated Plan. These potential acquisition/conservation easement lands are located between MP 0.0-1.2. Overall, moderate impacts would occur for 4.5 miles and low impacts would occur for 0 miles of this route segment. A total of 4.6 acres of short-term impacts and 2.3 acres of long-term impacts on acquisition/conservation easement lands would occur.

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 route segment 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 corridor would be kept clear of any structures and the only compatible use would consist of grazing activities. The cleared ROW corridor is to ensure that the underground duct bank and splice vaults are accessible for maintenance and transmission cable repairs for the life of the proposed 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 (2014). In Kittitas County, a Conditional Use Permit would be necessary.

This route segment would also cross private lands targeted for acquisition or conservation easement as part of the Integrated Plan. These potential acquisition/conservation easement lands are located between MP 0.0-1.2. Overall, moderate impacts would occur for 4.5 miles and low impacts would occur for 0 miles of this route segment. A total of 8.7 acres of short-term impacts and 6.3 acres of long-term impacts on acquisition/conservation easement lands would occur.

4.4.4.14 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 and 1.8. Military operations in this area would be minimally affected because the route segment would be on the perimeter of training activity areas and new 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 route segment 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.

4.4.4.15 Route Segment NNR-6o/6u

<u>Overhead Design Option</u>

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 route segment 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 route segment 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 Pacific Power's 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 route segment 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.

4.4.4.16 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 route segment would be on the perimeter of training activity areas and new 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 route segment 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.

4.4.4.17 Route Segment NNR-8

Jurisdictions crossed by this route segment are private lands in Grant County, BLM, Grant County Public Utility District, and Reclamation. Route Segment NNR-8 is located in Kittitas County and Grant County (south of Wanapum Dam on the east side of the Columbia River). The route segment parallels the existing Bonneville Power Administration-PacifiCorp utility corridor across the Columbia River south of the Wanapum Dam. The new 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 study area of this route segment: Wanapum State Park Boat Launch Replacement Grant #00-1519 and Wanapum NAP 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 SR-243. Refer to Section 4-7 for impacts and necessary WSDOT approvals to cross SR-243.

Potential impacts would also occur where the route segment parallels and crosses the John Wayne Pioneer Trail thereby presenting a potential conflict. The existing ROW corridor for the trail (railroad corridor) where the route segment 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. Also, the proposed Wanapum NAP is crossed along this segment, causing moderate impacts.

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 route segment would cause no land use impacts over the Columbia River. In addition, DNR's aquatic use authorization for the crossing of state-owned aquatic land would be required.

Livestock grazing occurs on both federal and private lands with the route segment causing low impacts in these areas.

Overall, moderate impacts would occur for 1.9 miles, low impacts would occur for 0.4 miles, and no impacts would occur for 0.4 mile of this route segment.

4.4.4.18 Route Segment MR-1

Route Segment Manastash Ridge (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 route segment 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 route segment would be in compliance with the Kittitas County Comprehensive Plan (2014). The route segment 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.

This route segment would also cross private lands targeted for acquisition or conservation easement as part of the Integrated Plan. These potential acquisition/conservation easement lands are located between MPs 0.0-0.4, and MPs 2.7-5.0. A total of 12.5 acres of short-term impacts and 9.3 acres of long-term impacts on acquisition/conservation easement lands would occur.

Route Segment MR-1 also crosses DNR grazing leases between MPs 0.3-1.8 and 2.4-2.8 which would result in moderate impacts.

Overall, moderate impacts would total 11.5 miles and low impacts would total 0.4 miles for this route segment.

4.4.5 Mitigation Measures

The following mitigation measures have been identified to reduce, avoid, minimize, or rectify adverse impacts to land use resources, specifically to agricultural resources. These mitigation measures would be implemented where warranted and are anticipated to be effective. They are summarized in Table 4.4-3 below.

Table 4.4-3 Vantage-Pomona Heights Transmission Project Mitigation Measures

MITIGATION MEASURE	DESCRIPTION
LU-1: Modify Structure/ROW Location	Within the standard limits of structure design, single pole and H-frame structures will be located so as to allow adequate clearance for agricultural operations and irrigation canal maintenance or to span or avoid sensitive land use features. Avoidance measures may include structure micro-siting, placing access roads and structures at the edge of fields, spanning features, taller structures, or the realigning of access roads and ROW centerline.
LU-2: Modify Structure Type	To the extent practical, within standard structure design, and where not identified as a required design feature, single-pole structures will be utilized to minimize ground disturbance and operational conflicts and address site-specific constraints
LU-3: Stockpile Soils in Prime Farmland	Any topsoil removed from areas designated as prime farmland or Farmland of Statewide Importance will be scraped and stockpiled rather than covered over or removed. The topsoil will then be used for erosion control and in areas of planting for best management practices.

To minimize the effects of Project construction and operation conflicts with sensitive land uses, mitigation measure LU-1: Modify Structure/ROW Location will be implemented in specific locations as necessary. Mitigation measure LU-1 will be effective at reducing impacts by reducing the potential operational and maintenance interference and other conflicts. This mitigation measure will be implemented in the following locations:

- Route Segment 1c: MP 5.9-6.0, 9.5-10.5, and 11.3-11.4
- Route Segment 2c: MP 9.5-11.2 and 13.1-14.7
- Route Segment 3b: MP 14.7-15.1 and 17.3-19.0
- Route Segment 3c: MP 5.3-14.3

To minimize the effects of structure impedance on irrigation facilities and cropland, Mitigation Measure LU-2: Modify Structure Type will be implemented in specific locations as necessary. Mitigation Measure LU-2 will be effective at reducing impacts by reducing the structure footprint area and increasing compatibility with agricultural operations. This mitigation measure will be implemented in the following locations:

- Route Segment 2c: MP 13.1-14.7

To minimize the effects farmland conversion and impacts on Prime Farmland, mitigation measure LU-3: Stockpile Soils in Prime Farmland will be implemented in specific locations as necessary. Mitigation Measure LU-3 will be effective at reducing impacts by preserving soil resources and minimizing the effects of reduced Prime Farmland area. This mitigation measure would reduce impacts from moderate to low in non-agricultural land. This mitigation measure will be implemented in the following locations:

- Route Segment 1a/NNR-1: MP 0.0-0.2 and 0.7-2.4
- Route Segment 1b: MP 0.0-0.2, 5.4-5.8, 6.4-6.8, 9.3-9.5, 10.0-10.2, and 10.6-11.2
- Route Segment 1c: MP 0.0-0.1 and 10.5-10.7

- Route Segment 2a: MP 0.0-1.0
- Route Segment 2b: MP 0.0-2.2, 2.4-2.5, 4.9-5.0, 5.9-6.1, 6.5-6.8, 7.0-7.6, 11.1-11.7, and 15.0-16.4
- Route Segment 2c: MP 0.0-0.1, 0.3-2.9, 3.3-3.7, 5.2-6.1, 6.3-7.2, 7.5-7.9, 8.0-9.5, 10.2-10.4, 11.1-12.9, 13.2-14.0, 14.4-17.1, and 17.7-18.2
- Route Segment 2d: MP 0.0-0.3, 0.6-1.0, 1.7-2.0, 2.3-5.1, 5.6-6.0, and 6.4-7.0
- Route Segment 3b: MP 3.0-3.7, 5.2-8.4, 10.6-10.8, 15.7-15.8, and 18.1-19.6
- Route Segment 3c: MP 0.0-2.4, 2.9-3.4, 3.8-3.9, 4.8-10.4, 10.6-11.6, 11.9-12.5, 12.7-13.0, 13.8-15.1, 15.4-15.5, 16.7-16.9, 17.4-17.5, 18.0-18.3, 18.5-18.7, 20.5-21.1, 21.7-22.5, and 22.8-24.1
- Route Segment MR-1: MP 1.5-1.7, 3.4-3.7, 4.7-4.8, 5.7-7.8, and 8.0-11.8
- Route Segment NNR-2: MP 0.1-0.4, 0.7-1.7, 2.4-2.5, and 4.3-4.9
- Route Segment NNR-3: MP 0.4-0.5, 4.1-4.2, 4.7-4.9, 5.2-5.4, and 6.1-6.4
- Route Segment NNR-4o/4u: MP 1.1-2.0 and 4.3-4.5
- Route Segment NNR-5: MP 0.2-1.0
- Route Segment NNR-6o/6u: MP 0.4-0.5, 1.9-2.0, and 5.9-6.0
- Route Segment NNR-7: MP 0.9-1.1, 1.3-1.4, 1.8-2.2, 2.8-2.9, 4.0-4.1, 6.5-7.2, and 7.8-7.8

4.4.6 Impact Summary by Alternative

4.4.6.1 No Action Alternative

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 Action Alternatives

Table 4.4-4 presents a summary of the long-term impacts and residual impact levels for Project Action Alternatives.

Alternatives E, F, G, and H would have the greatest impacts on residential land use. Alternative H would have the greatest impacts on irrigated agriculture. The NNR Alternative - MR Subroute would have the highest impacts on JBLM YTC land uses. The most disturbance on state grazing or agricultural leased land would occur for the NNR Alternative - MR Subroute. Alternatives A and F would have the greatest impacts on BLM grazing leases. Overall, the greatest distance of high impacts on land use would occur for Alternative H.

Table 4.4-4 Long-Term Land Use Disturbance and Action Alternative Residual Impact Summary

ACTION 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	Integrated Plan Potential Acquisition/ Conservation Land	High	Moderate	Low	No Identifiable
ALTERNATIVE A 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3c 64.7 miles	2.3	6.2	8.4	11.2	0	8.7	0	0.4	21.1	39.9	3.3
ALTERNATIVE B 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3b 61.2 miles	2.3	0	8.4	31.2	0	3.0	0	0	18.9	41.8	1.5
ALTERNATIVE C 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3b 63.0 miles	2.3	2.5	15.2	31.2	0.9	1.4	0	0.5	20.8	40.6	1.5
ALTERNATIVE D 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3c 66.5 miles	2.3	8.7	15.2	11.2	0.9	7.1	0	0.9	23.6	38.7	3.3
ALTERNATIVE E 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3b 61.6 miles	21.2	0.3	9.9	20.1	0	3.0	0	0.1	7.8	51.5	2.2
ALTERNATIVE F 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3c 65.1 miles	21.2	6.6	9.9	0	0	8.7	0	0.5	10.6	49.6	4.4
ALTERNATIVE G 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3b 63.4 miles	21.2	2.8	16.7	20.1	0.9	1.4	0	0.6	10.3	50.3	2.2

ACTION 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	Integrated Plan Potential Acquisition/ Conservation Land	High	Moderate	Low	No Identifiable
ALTERNATIVE H 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3c 66.8 miles	21.2	9.1	16.7	0	0.9	7.1	0	1.0	13.0	48.4	4.4
NNR Alternative - Overhead Design Option* 1a/NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.5 miles	2.8	0	0	22.3	0	7.6	7.1	0	27.8	12.6	0.4
NNR Alternative - Underground Design Option 1a/NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.5 miles	2.8	0	0	29.8	0	7.6	11.1	0	27.8	12.6	0.4
NNR Alternative - MR Subroute 1a/NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.8 miles	2.8	0	0	39.7	4.2	7.6	14.2	0	34.7	13.0	0.4

*Agency Preferred Alternative

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 Required Design Features (RDFs);
- 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 RDFs.

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 Action 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 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. Impacts for each route segment are discussed in detail in the following sections.

4.5.4.1 Route Segment 1a/NNR-1

There are no recreation areas or significant recreational activities occurring along Route Segment 1a/New Northern Route (NNR) 1, therefore no short-term or long-term impacts will occur as a result of the Project construction, operation, or maintenance. No impacts on recreation resources are expected.

4.5.4.2 Route Segment 1b

Route Segment 1b 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 impacts on recreation resources are expected.

4.5.4.3 Route Segment 1c

The primary recreation activity occurring in this area is private land hunting. State lands are crossed for one mile on the west end of the route in the Blackrock designated elk hunting area (Washington Department of Fish and Wildlife 2015). Refer to impacts common to all route segments above (Section 4.5.3) for potential recreation impacts on Route Segment 1c. Other areas of agriculture and residential land use will not impact recreational resources. Low impacts are expected for 11.0 miles of this route segment and no impacts for 1.8 miles.

4.5.4.4 Route Segment 2a

Route 2a crosses private lands potentially open for dispersed hunting activities. Refer to impacts common to all route segments above (Section 4.5.3) for potential recreation impacts on Route Segment 2a. Low impacts are expected for this route segment.

4.5.4.5 Route Segment 2b

Private and U.S. Bureau of Land Management (BLM) land potentially open for hunting may be affected by the Project. Refer to impacts common to all route segments above (Section 4.5.3) for potential recreation impacts on Route Segment 2b. Low impacts are expected for this route segment.

4.5.4.6 Route Segment 2c

Private and BLM land potentially open for hunting may be affected by the Project. However, much of this route segment is located adjacent to an existing transmission line and agricultural land, limiting hunting opportunities and potential impacts. Refer to impacts common to all route segments above (Section 4.5.3) for potential recreation impacts on Route Segment 2c. Low impacts 11.6 miles and no impacts for 6.5 miles are expected for this route segment.

4.5.4.7 Route Segment 2d

BLM-managed land potentially open for hunting may be affected by the Project. However, limited access to these lands would reduce the potential for Project impacts. Refer to impacts common to all route segments above (Section 4.5.3) for potential recreation impacts on Route Segment 2d. Low impacts are expected for this route segment.

4.5.4.8 Route Segment 3a

No impacts on recreational resources would occur for Route Segment 3a because this short segment is located in a utility corridor not used for recreation.

4.5.4.9 Route Segment 3b

Impacts would potentially occur to recreation resources as a result of constructing, operating, and maintaining the Project. These impacts would occur on recreationists using the Columbia River corridor, Priest Rapids Reservoir, and the John Wayne Pioneer Trail. The highest impacts would be related to the visual experience of users and are covered in Section 4.8 Visual Resources. 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 parallels and crosses the John Wayne Pioneer Trail between mile posts (MP) 17.3 and 19.0, where the Project would potentially conflict with the use of the trail. Short-term impacts related to the closure of the trail during construction may potentially affect trail users. Overall, high impacts would result from trail conversion to non-recreational uses. The existing ROW for the trail (railroad corridor), where the Project would be located within this corridor, is 200 feet. High impacts are expected for 1.7 mile, low impacts for 0.6 mile, and no impacts are expected for 19.4 miles of this route segment.

4.5.4.10 Route Segment 3c

Potential impacts on open off-highway vehicles (OHV) areas of the Saddle Mountains Management Area (MA), the Saddle Mountains Private Hang Gliding Area, Beverly Sand Dunes OHV Area, and Burkett Lake Recreation Area would occur. Indirect impacts related to the road closures, restricted access and the visual effects of the transmission line (see Section 4.8 Visual Resources) would potentially occur.

Impacts on OHV users in the Saddle Mountains MA would be low because riding areas are abundant and would remain. OHV users would be able to easily avoid the transmission line structures. Use may increase in these areas due to access established as a result of transmission line access road construction and areas that might otherwise be difficult to traverse would be accessible. Other activities occurring in the Saddle Mountains MA, such as petrified wood collecting, hunting, horseback riding, and mountain bike riding would be impacted at a low level and could continue as they currently occur.

Access to the Saddle Mountains Private Hang Gliding Area may be restricted during construction, causing short-term impacts on the site. Long-term impacts related to the alteration of gliding and landing patterns would also potentially occur. Gliders land in the Beverly Sand Dunes area in the Lower Crab Creek Valley below and would likely alter their gliding and landing location due to the presence of the transmission line, causing low impacts due to minor dispersed activity displacement.

As described in Section 4.3, waterfowl injury and mortality could occur as a result of the Project, which may disrupt hunting activities if the Project affects waterfowl use and potential hunting activities of the Lower Crab Creek area. However, there is very limited open water along Lower Crab Creek in the Project area and hunting generally is prohibited or would conflict with the other recreational activities occurring in the area (Beverly Sand Dunes OHV Park, Burkett Lake Recreation Area, John Wayne/Milwaukee Road Trail, etc.). In addition, there are four existing transmission lines traversing the Lower Crab Creek area between the proposed Project and Priest Rapids Lake, where most of the wetlands and open water used by waterfowl occurs. Therefore, the Project is not expected to reduce waterfowl use of the area.

Crab Creek Corridor/Burkett Lake Recreation Area and Beverly Sand Dunes OHV Park impacts would be related to ground disturbing activities occurring in close proximity to the recreation areas. This route segment avoids crossing the planned expansion area of the Burkett Lake Recreation Area, but the proximity of the transmission line may impact the experience of some recreation users.

The Milwaukee Corridor impacts would be limited to visual effects because the trail is perpendicular to the transmission line and would be spanned, potentially causing only short-term impacts during construction.

Route Segment 3c also crosses the Columbia River recreational corridor utilized for rafting, fishing, boating, and sight-seeing. Impacts on recreational activities and uses in this area would be related to visual experiences (see Section 4.8 Visual Resources).

Low impacts for 8.8 miles and no impacts for 16.6 miles of this route segment.

4.5.4.11 Route Segment NNR-2

Route Segment NNR-2 is located in a restricted area of 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.

4.5.4.12 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.

4.5.4.13 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.

4.5.4.14 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.

4.5.4.15 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.

4.5.4.16 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.

4.5.4.17 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.

4.5.4.18 Route Segment MR-1

Route Segment Manastash Ridge (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 3b: MP 17.3-19.0
- Route Segment 3c: MP 19.3-19.4, 20.6-21.4
- Route Segment NNR-7: 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
1a/NNR-1 2.4 miles	2.4	0	0	0
1b 12.5 miles	12.5	0	0	0
1c 12.9 miles	1.8	11.1	0	0
2a 1.0 mile	0	1.0	0	0
2b 16.4 miles	0	16.4	0	0
2c 18.1 miles	6.5	11.6	0	0
2d 7.0 miles	0	7.0	0	0

ROUTE SEGMENT	RESIDUAL IMPACTS (MILES)			
	NO IDENTIFIABLE	LOW	MODERATE	HIGH
3a 0.1 mile	0.1	0	0	0
3b 21.7 miles	19.4	0.6	1.7	0
3c 25.4 miles	16.6	8.8	0	0
NNR-1 2.4 miles	2.4	0	0	0
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 Alternative

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 Action Alternatives

Table 4.5-4 presents a summary of residual impacts for each of the end-to-end Action Alternatives following the implementation of the mitigation measures.

No Action Alternatives would have any high residual impacts. Alternative B, C, E, and G would each have 1.7 miles of moderate residual impacts. The mileage of low residual impacts on recreation resources would be highest for Alternative F and lowest for Alternative C. Combined no identifiable and low impacts would be lowest and no moderate or high impacts would occur for the NNR Alternative Overhead and Underground Design Options.

Table 4.5-4 Recreation Resources Residual Impact Summary by Action Alternative

ACTION ALTERNATIVE	RESIDUAL IMPACTS (MILES)			
	NO IDENTIFIABLE	LOW	MODERATE	HIGH
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.7 miles	31.8	32.9	0	0
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.2 miles	34.8	24.7	1.7	0

ACTION ALTERNATIVE	RESIDUAL IMPACTS (MILES)			
	NO IDENTIFIABLE	LOW	MODERATE	HIGH
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 63.0 miles	41.4	19.9	1.7	0
Alternative D 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.5 miles	38.4	28.1	0	0
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.6 miles	24.1	35.8	1.7	0
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 65.1 miles	17.1	44.0	0	0
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.4 miles	30.7	31.0	1.7	0
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3b 66.8 miles	27.6	39.2	0	0
NNR Alternative - Overhead Design Option* NNR-1, NNR-2, NNR-3, NNR-4 NNR-5, NNR-6, NNR-7, NNR-8 40.5 miles	11.0	29.5	0	0
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.5 miles	11.0	29.5	0	0
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6, NNR-7, NNR-8 47.8 miles	10.9	36.9	0	0

*Agency Preferred Alternative

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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 Required Design Features (RDFs);
- 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 of the management documents or agencies. 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 RDFs.

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 SMAs. The impact types identified along the centerlines of Action 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 SMAs; 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 - 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

There are no impacts common to all route segments pertaining to SMAs.

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. Impacts for each route segment are discussed in detail in the following sections.

4.6.4.1 Route Segment 1a/NNR-1

There are no SMAs associated with Route Segment 1a/New Northern Route (NNR) 1 and no impacts would occur.

4.6.4.2 Route Segment 1b

Low impacts for 12.6 miles on the Yakima Hills Important Bird Area (IBA) will occur as a result of the Project, because there are no specific management requirements in place as part of the IBA status. 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 to work with land owners and managers to conserve these areas for long-term protection. The Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) is recognized as an IBA based on the presence of Greater Sage-Grouse (*Centrocercus urophasianus*) habitat. Sage-Grouse resources would be affected at a moderate to low level, but the status and management of the IBA will remain intact. 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 1c

There are no SMAs associated with Route Segment 1c and no impacts would occur.

4.6.4.4 Route Segment 2a

There are no SMAs associated with Route Segment 2a and no impacts would occur.

4.6.4.5 Route Segment 2b

There are no SMAs associated with Route Segment 2b and no impacts would occur.

4.6.4.6 Route Segment 2c

There are no SMAs associated with Route Segment 2c and no impacts would occur.

4.6.4.7 Route Segment 2d

No direct or indirect impacts would occur to the U.S. Bureau of Land Management (BLM) McCoy Canyon Area of Critical Environmental Concern (ACEC). The McCoy Canyon ACEC is not crossed by the Project and is located 0.4 mile to the east of Route Segment 2d (refer to Appendix A: Jurisdiction, Recreation, and Special Management Areas).

4.6.4.8 Route Segment 3a

There are no SMAs associated with Route Segment 3a and no impacts would occur.

4.6.4.9 Route Segment 3b

The Hanford Reach of the Columbia River and public lands within 0.25 mile was recommended for inclusion (eligible) in the National Wild and Scenic Rivers (WSR) system as a “Recreational River” as a result of a study conducted by the National Park Service. The eligible section begins one mile downstream from the outflow of the Priest Rapids Dam (free flowing river section) near the Yakima-Grant-Benton County line and includes approximately 0.25 mile on each side of the river. The U.S. Fish and Wildlife Service, who has oversight responsibility and manages the proposed “Recreational River" in such a manner as to protect and enhance the values which caused it to be recommended for inclusion in the National WSR system. No public lands are crossed within 0.25 mile of the Columbia River Eligible WSR and no impacts would occur.

4.6.4.10 Route Segment 3c

No impacts would occur to the McCoy Canyon ACEC, Hanford Reach National Monument (HRNM), Columbia National Wildlife Refuge, or Lower Crab Creek Unit of the Columbia Basin Wildlife Area. Impacts in the Eligible Columbia River WSR would be low for 0.2 mile (on U.S. Bureau of Reclamation lands) because the Project would not adversely affect any of the seven outstandingly remarkable resources, as defined in Section 3.6 - Special Management Areas. The resources would be protected by RDFs implemented as part of the Project. Impacts to Chinook salmon (*Oncorhynchus tshawytscha*), federally recognized rare plant and animal species, and the intact ecosystem of the river and adjacent Wahluke Slope within 0.25 mile of the eligible portion of the river on public lands are expected to be low or none (see Section 4.2 - Vegetation and Special Status Plant Species and Section 4.3 - Wildlife and Special Status Wildlife Species). Physical impacts on Native American cultural resources and archeological artifacts and sites within 0.25 mile of the river on public land adjacent to the eligible WSR are not expected (see Section 4.11 - Cultural Resources). Hydrology and geological impacts will be low in this area of the route segment.

4.6.4.11 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 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.

4.6.4.12 Route Segment NNR-3

This Route Segment crosses the established and proposed expansion area of the Yakima River Cliffs and Umtanum Ridge ACECs. 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 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 RDFs 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.

Approximately 0.7 mile of this route segment crosses lands recognized by Washington State Department of Transportation (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 RDFs will be implemented as part of the Project. These RDFs 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 2.3 for a complete list and description of RDFs. Because of the implementation of these RDFs and because the environmental management buffer is a non-regulatory designation with no specific management policies, impacts on the area will be low.

4.6.4.13 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.

4.6.4.14 Route Segment NNR-5

There are no SMAs associated with Route Segment NNR-5 and no impacts would occur.

4.6.4.15 Route Segment NNR-6o/6u
There are no SMAs associated with Route Segment NNR-6 and no impacts would occur.

4.6.4.16 Route Segment NNR-7
There are no SMAs associated with Route Segment NNR-7 and no impacts would occur.

4.6.4.17 Route Segment NNR-8
This route segment crosses the proposed expansion area of the Yakima River Cliffs and Umtanum Ridge ACEC, the Huntzinger Road ACEC, and the planned Wanapum Natural Area Preserve (NAP). 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 RDFs 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 and the Wanapum NAP, causing moderate or low impacts, respectively.

4.6.4.18 Route Segment MR-1
There are no SMAs associated with Route Segment Manastash Ridge (MR) 1 and no impacts would occur.

4.6.5 Mitigation Measures

The RDFs 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 Alternative
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 Action Alternatives
Low impacts would occur for 0.2 mile for Alternatives F and H, for 12.8 miles for Alternatives A and D, and for 12.6 miles of Alternatives B and C. Moderate impacts would also occur along 1.8 miles of Alternatives B, C, E, and G. Impacts would be identical for both NNR Alternative Design Options and the MR Subroute, with low impacts occurring for 6.9 miles and moderate impacts for 3.1 miles.

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4.7 TRANSPORTATION

Transportation impacts could be created as a result of the construction, operation, and maintenance of the proposed 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 existing transportation 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 proposed 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 study 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 proposed Project. The determinations of sensitivity levels included consideration of:

- Roadway Classification
- Closures/blockages
- 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 study area.

Table 4.7-1 Transportation Resource Sensitivity Classification

TRANSPORTATION RESOURCE	SENSITIVITY
Interstate and state highways	High
Private air strips	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 proposed 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 proposed 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. Construction of the proposed transmission line would require temporary closure of the main highways (Interstate [I] 82, State Route [SR] 243, and SR-24) for safety. 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 2.2.5.1) on either side of the highway. Transportation within Joint Base Lewis-McChord Yakima Training Center (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 new 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

The 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 2.2.3.14.

Proposed Project construction activities may require road closures at I-82 or SR-243 during construction, such as at the I-82 or SR-243 route segment crossings. Other lane closures may also 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. A Traffic Management Plan would be developed which 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, SR-24, and SR-243) would be used for the duration of the construction phase of the proposed 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 proposed Project right-of-way (ROW) corridor. 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 2.3.4), Required Design Features (RDFs) would be implemented to reduce impacts on transportation resources, including the development of a Traffic Management Plan which would be submitted to and approved by Washington State Department of Transportation (WSDOT) and/or local agencies with jurisdiction. Therefore, construction related impacts to traffic would be moderate to low.

The New Northern Route (NNR) Alternative, including the Manastash Ridge (MR) Subroute, and the Underground Design Option each would require the crossing of I-82 and SR-243 and all other Action Alternatives would require the crossing of SR-243; therefore, a Traffic Management Plan would be required by WSDOT. Depending on which Action Alternative is selected, SR-243 would be crossed in one of two potential locations. One potential crossing location is approximately 0.3 miles north of Wanapum Village with the other potential crossing located 3.3 miles west of the Vernita Bridge.

A 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 on the ground. Rolling slowdown and flagging procedures, signage and illumination requirements, and locations of approved access point from 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 corridor 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 maintenance purposes and a temporary access break would be required for construction. The Traffic Management Plan would be submitted to WSDOT, JBLM YTC Public Works Department, Grant County, Kittitas County and/or Yakima County, as applicable, for review and approval prior to any construction activities taking place. Along with the RDFs detailed in Section 2.3.4, the Traffic Management Plan would reduce impacts on transportation resources in the Project area. RDFs 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-11. Refer to Chapter 2, Section 2.3 for a complete list and description of RDFs.

Surface access to the Project's proposed overhead and/or underground structures and work areas would be required during construction and operation. Disturbance calculations for the NNR Alternative Overhead and Underground Design Options were based on the presence of existing roads (see Section 2.2.3.2, Table 2-4, and Appendix A-Construction Access Levels). For the NNR Alternative - Underground Design Option, direct continuous access adjacent to the duct bank would be required, unlike the NNR Alternative - Overhead Design Option which would require direct access only to each overhead transmission line structure.

In most cases, existing public roads would be used to transport construction equipment to the approved access roads, construction staging areas, 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 private landowners and other state and federal agencies. This permission would be secured prior to applying for a permanent or temporary break in access permit.

The proposed Project would cross or run parallel to transportation ROW corridors. Along county roads, structures may be located within the county road ROW. Transmission line/conductor stringing activities over state highways and county roads will require the temporary closure of traffic lanes for safety, 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/conductors across highways.

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 (RDF 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 (RDF 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.

FIGURE 4.7-1 HIGHWAY CONSTRUCTION STRINGING ACTIVITIES

Improvements to local roads (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 2.2.3.2.

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 Final Environmental Impact Statement. 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 corridor, 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 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 ROW corridors 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 proposed Project. Maintenance traffic would normally be a few maintenance vehicles along the ROW corridor several times a year and helicopters flying transmission line inspections twice a year. Except in isolated locations, vegetation maintenance requirements would be minimal because the proposed 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 proposed 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 corridor periodically and would not affect local traffic conditions.

Even with the implementation of RDFs 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 of the proposed Project. 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 with the implementation of RDF LU-4 and LU-14. There currently are multiple high voltage transmission lines throughout the Project study area. The proposed Project Columbia River crossing structures would be in the same areas as existing transmission line 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 proposed Project.

4.7.4 Impacts Specific to Route Segments and Design Options

4.7.4.1 Route Segment 1a/NNR-1

The primary access to this route segment would occur from I-82 (Exits 26 or 29 only) and East Selah Road from the west. The highest impacts on transportation for Route Segment 1a/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 this route segment. Local road closure and the rerouting of traffic may be necessary. The opportunity to reroute traffic is limited along this route segment due to the configuration and scarcity of roads in the area. Construction activities along this route segment would be fairly brief in relation to overall proposed 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 route segment as detailed in RDF TR-11. Moderate impacts on transportation would result from the construction of Route Segment 1a/NNR-1.

Access Levels for Route Segment 1a/NNR-1 are assumed as Level 2 for the entire route segment. This route 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 1b

Route Segment 1b would be located in the JBLM YTC and accessed from Sage Trail Road. The fire break perimeter road would serve as the primary access road to the route segment. Some new road construction would be required where the route segment diverges from the perimeter of the JBLM YTC. Resulting impacts on the existing roads would be low.

Route Segment 1b would require the construction of approximately 4.5 miles of spur roads and approximately 1.3 miles of access roads for a total of 5.8 miles of new roads. Low impacts are expected as a result of the construction of Route Segment 1b.

4.7.4.3 Route Segment 1c

This route segment would also be accessed from Sage Trail Road as well as Arthur Boulevard, John Street, William Court, and various 2-track roads northwest of Kittitas Canyon. Sumerset Drive and Chapman Road would provide adjacent access through Kittitas Canyon north of Mieras Road and minimal improvements would be necessary for these roads. The route segment would be accessed by Coombs Road and would follow Mieras Road on the south end of the route segment. Mieras Road is a gravel road from the Coombs Road intersection east, and Coombs Road is a gravel road from Mieras Road south. These roads would not require improvements. East of a residential area generally east of the Mieras Road-Prairie Road intersection, new road construction would be necessary along the southern border of JBLM YTC. New road construction accounts for the majority of road building for this route segment.

Route Segment 1c would require the construction of approximately 3.9 miles of spur roads and approximately 4.4 miles of access roads for a total of 8.3 miles of new roads. If the route segment used JBLM YTC roads, Route Segment 1c would require the construction of approximately 5.1 miles of spur road and no new access road, a difference of 3.2 miles. Moderate to low impacts will result from the construction of Route Segment 1c.

4.7.4.4 Route Segment 2a

Access to Route Segment 2a would be from the east end of Postma Road and new road construction would be required. Improvements to a two-track road would be required. Resulting impacts on the existing roads would be low. Route Segment 2a would require the construction of approximately 1,050 feet of new spur road and 0.6 mile of new access road for a total of 0.8 mile of new road.

4.7.4.5 Route Segment 2b

Route Segment 2b generally crosses rangeland with limited two-track road development. These two-track roads would require improvement to varying degrees. New road construction would account for most of the roads along this route segment. Route Segment 2b would require the construction of approximately 1.9 miles of new spur roads and approximately 15.2 miles of access roads for a total of 17.1 miles of new roads. Existing roads located within the JBLM YTC may be utilized where the Project follows the southern boundary of the base. If the Project used JBLM YTC roads for access, Route Segment 2b would require the construction of approximately 4.6 miles of spur road and 6.1 miles of new access road for a total of 10.7 miles of new roads, a difference of 6.4 miles of new road construction. Resulting impacts would be low.

4.7.4.6 Route Segment 2c

Much of this route segment would be accessed along the existing Union Gap-Midway 230 kilovolt (kV) and Midway-Moxee 115 kV corridor access roads. However, this route segment also crosses undeveloped land with limited, two-track road access that would require some improvements. Route Segment 2c would require the construction of approximately 5.0 miles of spur roads and approximately 6.2 miles of access roads for a total of 11.3 miles of new roads.

The construction and operation of this route segment could affect local air traffic, which may consist of aerial spray applicators servicing the agricultural fields located adjacent to the existing Midway-Moxee 115 kV corridor. However, because there are already multiple existing transmission lines in the area and notification of the aerial applicators would occur, low impacts are expected.

4.7.4.7 Route Segment 2d

Route Segment 2d generally crosses rangeland with limited 2-track road development. These two-track roads would require improvements to varying degrees. New road construction would account for more than half of the new roads constructed along this route segment. Route Segment 2d would require the construction of approximately 1.5 miles of new spur roads and approximately 4.7 miles of access roads for a total of 6.2 miles of new roads. Resulting impacts would be low.

4.7.4.8 Route Segment 3a

Route Segment 3a is located adjacent to existing transmission lines interconnecting with the Vantage Substation and the existing road access for these transmission lines would be utilized for this route segment. Minimal spur road construction would be necessary for this route segment, and impacts would be low. Route Segment 3a would require the construction of approximately 420 feet of new spur roads off of existing roads. No new access road construction (Level 4+ as described in Table 2-4) would be necessary for this route segment. Resulting impacts would be low.

4.7.4.9 Route Segment 3b

This route segment follows the abandoned Chicago, Milwaukee, St. Paul & Pacific Railroad Corridor, and access along the route segment would be provided utilizing this abandoned corridor. Access to the route segment from the south would be via the Midway Substation Road located directly off of SR-24 or from Huntzinger Road from the north. The Midway Substation Road is paved to the vicinity of the substation. Huntzinger Road is paved for 10.8 miles from I-90 to the Auvil Fruit Company entry area. Improvements would not typically be necessary along these access routes, but may be necessary where the route segment follows the railroad corridor because widening or other improvements to the railroad bed may be necessary. The highest impacts on transportation for Route Segment 3b would be as a result of traffic delays during construction along Huntzinger Road, and road closure for a short period of time may be necessary. 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, and the route segment would cross SR-243, requiring consultation with WSDOT. Authorization to span the Columbia River for Route Segment 3b would be required from the U.S. Army Corp of Engineers (USACE) through the Section 10 Rivers and Harbors Act permitting process. In addition, Washington State Department of Natural Resources' (DNR's) aquatic use authorization for the crossing of state-owned aquatic land would be required. 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 devises required for aviation safety. Resulting impacts would be low.

Route Segment 3b would require the construction of approximately 8.5 miles of spur roads off the existing railroad corridor. No new access road construction would be necessary for this route segment (Level 4+ as described in Table 2-4). Spur road construction would be minimal where the route segment is adjacent to the railroad corridor and would be located primarily where the route segment deviates somewhat from the centerline/offset of the railroad corridor. These areas include locations where multiple angle structures would be constructed in highly curving areas of the ROW (requiring additional spur road), north of the agricultural area along the west side of the Columbia River and near the north Columbia River crossing.

The construction and operation of this route segment could affect local air traffic, which may consist of aerial spray applicators potentially servicing the Auvil Fruit Company agricultural fields. However, because notification to spray applicators would occur, low impacts are expected.

4.7.4.10 Route Segment 3c

This route segment follows the railroad corridor on the south side of the Columbia River and crosses the river south of SR-243, crossing SR-243 to the northeast. Temporary road closure of the highway is possible for a brief period during construction, causing moderate impacts. It also follows Road N SW, which is posted for agricultural operational use only. A portion of the line would follow the existing Hanford-Vantage No. 1 500 kV corridor and access would be from the existing road servicing that transmission line. This route segment would also cross the Lower Crab Creek Road and the Milwaukee Trail Corridor, spanning the trail and allow current recreational use and potential future transportation uses to occur unaffected. Short-term impacts to agricultural operations would occur due route segment construction along Road N SW because this road is used for field and irrigation infrastructure access. Resulting impacts would be low.

The construction and operation of this route segment could affect local air traffic, which may consist of aerial spray applicators potentially servicing the agricultural fields located adjacent to the existing transmission line corridors. However, because there are already existing transmission lines in the area and notification of spray applicators would occur, low impacts are expected. This route segment also would potentially affect the operations of the private air strip located northeast of Beverly, but impacts would be low because the route segment would not break the approach angles and existing transmission lines are currently located in the area (Hanford-Vantage No. 1 500 kV transmission line). Resulting impacts would be low.

This route segment crosses public lands in BLM’s Saddle Mountains Management Area that are either open to off-highway vehicle (OHV) use or where OHV use is restricted to designated roads and trails. Impacts from increased OHV use on the limited use area would be low if control measures, such as barriers or gates, are put in place on newly constructed transmission line roads in the open areas. Therefore impacts here would be low to moderate.

Authorization to span the Columbia River for Route Segment 3c would be required from USACE through the Section 10 Rivers and Harbors Act permitting process. In addition, DNR’s aquatic use authorization for the crossing of state-owned aquatic land would be required. Flashing lights or spherical balls on the transmission line 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 devises required for aviation safety. Resulting impacts would be low.

Route Segment 3c would require the construction of approximately 8.6 miles of spur roads and approximately 3.3 miles of new access roads for a total of 11.9 miles of new roads.

4.7.4.11 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 route segment. A section of Pacific Power distribution line located along the south side of Firing Center Road would require reconstruction for this route segment. This added construction requirement would increase the overall total construction 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 route segment may also be necessary, but alternative traffic routes are typically available within the JBLM YTC cantonment area of the route segment. The route segment 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. RDFs, such as the development of a Traffic Management Plan, would be implemented to reduce impacts on traffic within JBLM YTC and on county and private roads. Damage to roads will be repaired as directed by the private road owners, Yakima County, and JBLM YTC based on ownership and jurisdiction.

Access Levels for Route Segment NNR-2 are assumed as Level 2 for the entire route segment. This route 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.

4.7.4.12 Route Segment NNR-3

This route 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 route segment parallels Pacific Power’s existing Pomona-Wanapum 230 kV transmission line (Figure 4.7-2).

Route Segment NNR-3 would also cross I-82 at transmission line MP 0.0-0.1 just south of the Selah Creek Rest Area. The Selah Creek Rest Area is located at highway MP 24.5, approximately. 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 corridor or the rest area. Access on either side of the interstate would occur from JBLM YTC on the southeast or from the private parcel on the northwest. 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. A 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 corridor 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. Temporary road closure of I-82 during conductor stringing activities would occur to maintain safety.

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 route segment line 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.

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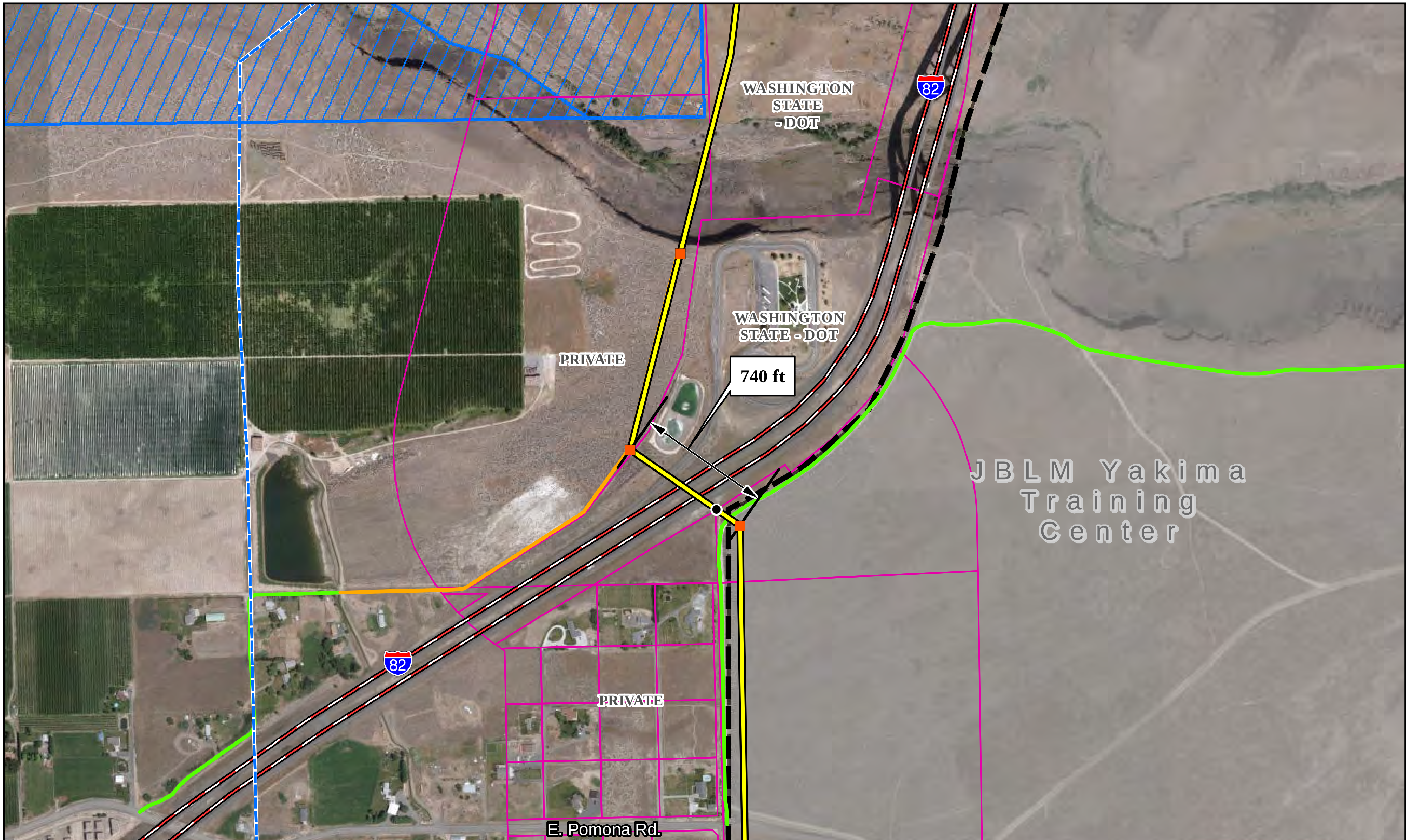

Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 4.7-2
NNR Alternative I-82 Crossing #1: Selah Creek Rest Area

Project Features
- Conceptual Structures
- Agency Preferred Alternative
- Existing Access Road
- New Access Road

Existing Utility Features
- Pomona - Wanapum 230 kV Transmission Line

Transportation
- Interstate Highway

Jurisdiction
- Parcel

- Washington Department of Natural Resources: Natural Area Preserve
- JBLM Yakima Training Center

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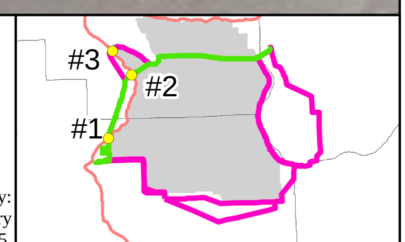

Aerial Photography:
Esri Basemap Imagery
Service as of 12/29/2015.

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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.

4.7.4.13 Route Segment NNR-4o/4u

Overhead Design Option

This route 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. Use of Exist 11 will require FHWA and WSDOT approval. 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 Pacific Power's existing 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 Pacific Power's 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 corridor. 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. A permanent access break, authorizing the use of Exit 11, would be required for maintenance purposes and a temporary access break would be required for construction. Temporary road closure of I-82 during conductor stringing activities would occur to maintain safety. 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 segment as it follows Pacific Power's existing Pomona-Wanapum 230 kV transmission line. This route 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 transmission line overhead to underground 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 training center. RDFs would reduce traffic impacts to the JBLM YTC road. Low to moderate impacts would result from the construction of Route Segment NNR-4u.

4.7.4.14 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 route segment. 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.

4.7.4.15 Route Segment NNR-6o/6u

Overhead Design Option

This route segment would be accessed from within JBLM YTC, typically along Pacific Power's 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 route segment. 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 Route Segment NNR-6u 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.

4.7.4.16 Route Segment NNR-7

This route segment would be accessed from within JBLM YTC, typically along Pacific Power's 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 route segment 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.

4.7.4.17 Route Segment NNR-8

This route segment parallels Pacific Power's 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 Columbia 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 route segment 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.

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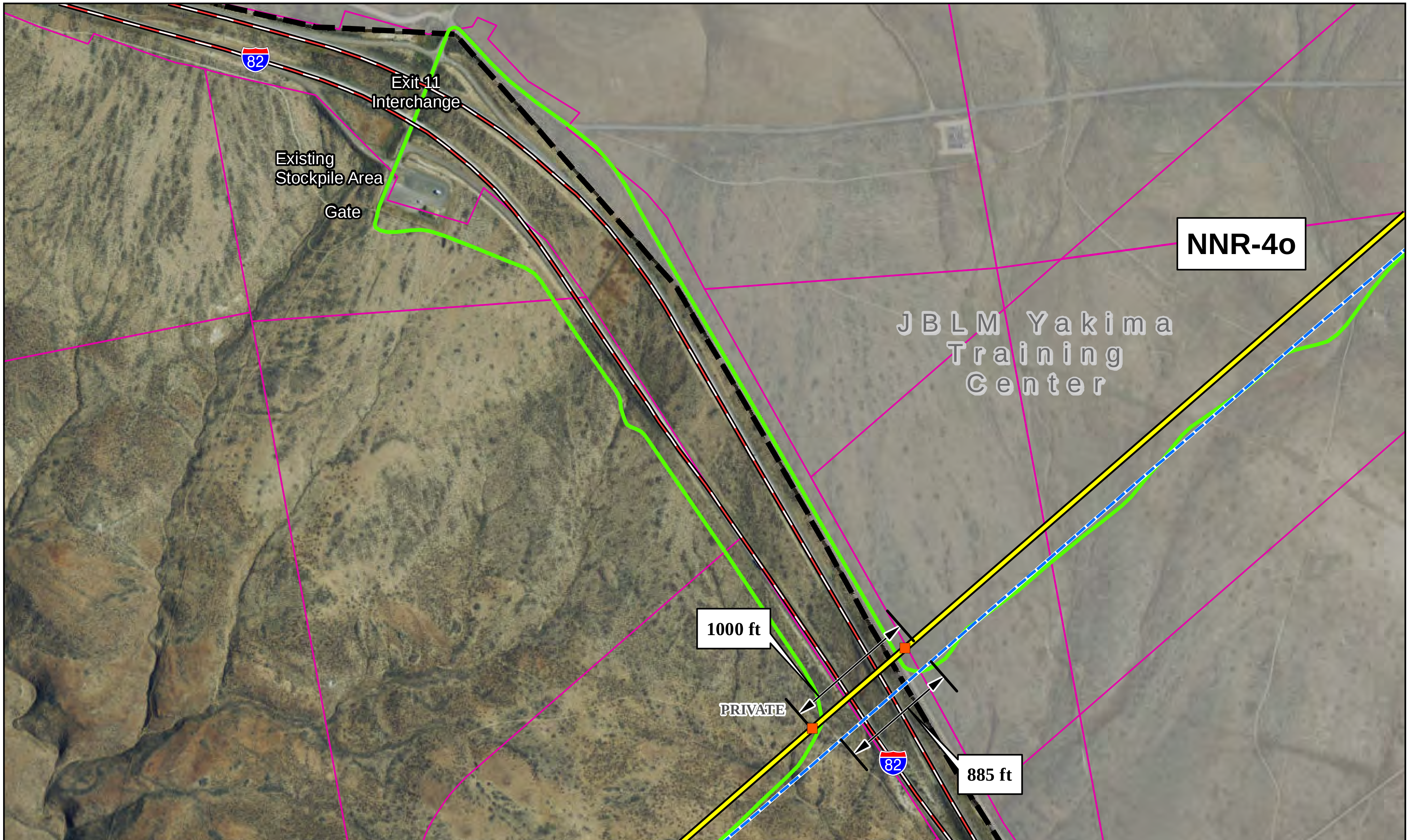

Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 4.7-3
NNR Alternative I-82 Crossing #2: Exit 11

Project Features
- Conceptual Structures
- Agency Preferred Alternative
- Existing Access Road

Existing Utility Features
- Pomona - Wanapum 230 kV Transmission Line

Transportation
- Interstate Highway

Jurisdiction
- Parcel

- JBLM Yakima Training Center

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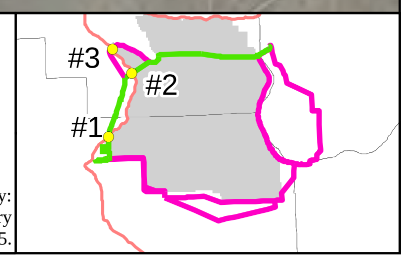

Aerial Photography: Esri Basemap Imagery Service as of 12/29/2015.

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On the east side of the Columbia River, existing roads would require minimal improvements. The route segment 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 corridor or WSDOT's Control Zone. Authorization to span the Columbia River for Route Segment NNR-8 would be required from USACE through the Section 10 Rivers and Harbors Act permitting process. In addition, DNR's aquatic use authorization for the crossing of state-owned aquatic land would be required. 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.

4.7.4.18 Route Segment MR-1

Access to route segment MR-1 would be from minor two-track roads crossing rangeland on private and DNR state trust land west of I-82 and from Silk Road, Boland Road, Vanderbilt 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 segment 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 interstate crossing would be a minimum of 34 feet according to WSDOT. No structures would be placed within the interstate ROW corridor. Temporary road closure of I-82 during conductor stringing activities would occur to maintain safety. A Utility Permit would be required from WSDOT. Impacts on I-82 traffic are discussed in Section 4.7.3 (Impacts Common to All Alternatives) and would be low.

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
1a/NNR-1 2.4 miles	0.95	0.00	0.95
1b 12.5 miles	4.52	1.32	5.84
1c 12.9 miles	3.88	4.43	8.31
2a 1.0 mile	0.2	0.64	0.84
2b 16.4 miles	1.88	15.23	17.11
2c 18.1 miles	5.04	6.23	11.27
2d 7.0 miles	1.48	4.67	6.15
3a 0.1 mile	0.08	0	0.08
3b 21.7 miles	8.52	0	8.52
3c 25.4 miles	8.64	3.28	11.92

ROUTE SEGMENT	MILES OF NEW SPUR ROAD	MILES OF NEW ACCESS ROAD	TOTAL MILES OF NEW ROAD
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[1] 4.5 mile	1.79	0.99	2.78
NNR-5 1.8 miles	0.68	0.13	0.81
NNR-6o/6u[1] 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

[1] Disturbance area calculations for Underground Design Option and Overhead Design Option are identical regarding access road construction.

4.7.5 Mitigation Measures

RDFs described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required. Along with the RDFs detailed in Section 2.3, the Traffic Management Plan would reduce impacts on transportation resources in the Project area. RDFs 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-11. Refer to Chapter 2, Section 2.3 for a complete list and description of RDFs.

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 Alternative

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 Action Alternatives

Alternative F would require the most new and spur road construction, but would not require the crossing of I-82. All Action Alternatives cross SR-243 in one of two locations. One potential crossing location is approximately 0.3 miles north of Wanapum Village with the other potential crossing located 3.3 miles west of the Vernita Bridge. The NNR Alternative - Overhead Design Option and NNR Alternative - Underground Design Option would require the least amount of new road construction. Although the disturbance calculations used the same access road assumptions as the NNR Alternative - Overhead Design Option, the NNR Alternative - Underground Design Option would also 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.

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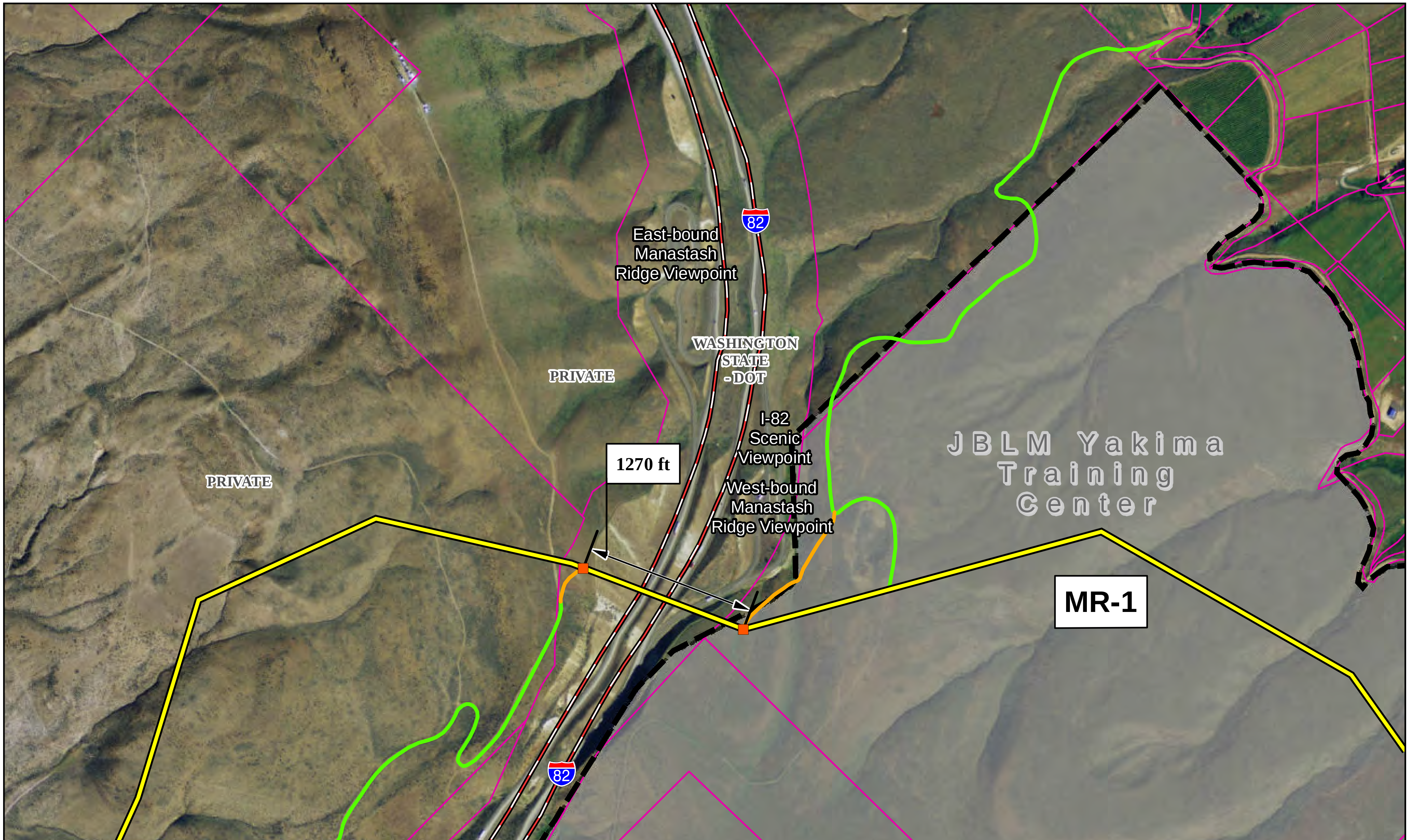

Vantage - Pomona Heights 230 kV Transmission Line Project

Figure 4.7-4 Manastash Ridge Subroute Crossing #3: Manastash Ridge Viewpoint

Project Features
- Conceptual Structures
- Agency Preferred Alternative
- Existing Access Road
- New Access Road

Transportation
- Interstate Highway

Jurisdiction
- Parcel
- JBLM Yakima Training Center

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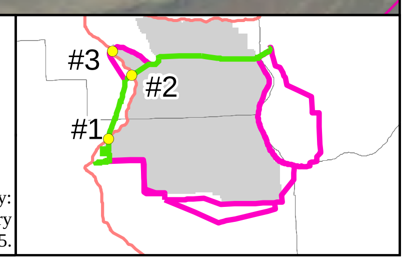

Aerial Photography: Esri Basemap Imagery Service as of 12/29/2015.

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Table 4.7-3 New Road Construction Summary by Action Alternative

ACTION ALTERNATIVE	MILES OF NEW SPUR ROAD	MILES OF NEW ACCESS ROAD	TOTAL MILES OF NEW ROAD
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.7 miles	17.8	25.1	42.9
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.2 miles	17.6	21.9	39.5
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 63.0 miles	20.8	12.9	33.6
Alternative D 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.5 miles	20.9	16.1	37.0
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.6 miles	17.0	25.0	41.9
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 65.1 miles	17.1	28.2	45.3
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.4 miles	20.2	16.0	36.1
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.8 miles	20.3	19.2	39.5
NNR Alternative - Overhead Design Option* NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.4 miles	15.8	7.7	23.5
NNR Alternative – Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.4 miles	15.8	7.7	23.5
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6, NNR-7, NNR-8 47.7 miles	15.9	23.4	39.4

*Agency Preferred Alternative

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4.8 VISUAL RESOURCES

Visual resource impacts would be created as result of the construction, operation, and maintenance of the proposed Project and would be caused by proposed Project components (e.g., structures, lines, roads, equipment) being seen from sensitive viewpoints; the effects of proposed 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 proposed 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 the Project's 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 Action Alternative route 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 line configuration data.

The effects analysis utilized a combination of GIS modeling, primary observation, and visual simulation development to evaluate the effects of the proposed Project on visual resources. Viewshed modeling in combination with contrast analysis was used to assess viewer impacts, an assessment from identified Key Observation Points (KOPs) 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 and the sensitive viewpoints mapped. Because the proposed Project structures have not been sited and engineered for each Action Alternative, 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 line structures photo matching, lighting, materials, and rendering simulations.
- *Bentley Inroads v8.5* – Used for Digital Terrain Mapping and modeling.
- *ArcView* – Used for geographic information proposed 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 area 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 zoom lens or a Ricoh 500SE GPS-ready digital camera. The camera was hand held at eye-level (approximately five feet and six inches above the ground). The date, time of day, GPS coordinates (latitude/longitude), and weather conditions were documented.

The proposed Project 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 proposed transmission line would occur after the environmental analysis phase of the Project is complete 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 proposed 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 proposed Project. The impact analysis for the proposed Project was based on contrast and visibility modeling and the Contrast Rating Worksheets (Form 8400-4) from representative sensitive viewpoints (e.g., KOPs). A contrast model was also used as a basis to assess impacts along the Action 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 segments. A database of Project contrast was mapped and entered into the GIS for the impact analysis. Project contrast was then compared with proposed 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, Fire Break, 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 proposed 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 proposed 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 (New Northern Route [NNR] 4u and NNR-6u), increased landform and vegetation and, therefore, landscape contrasts would result from the proposed 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 corridor.

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 proposed Project. The proposed 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 corridor, and Project parallels two 230 kV and two 500 kV corridors). 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.

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.

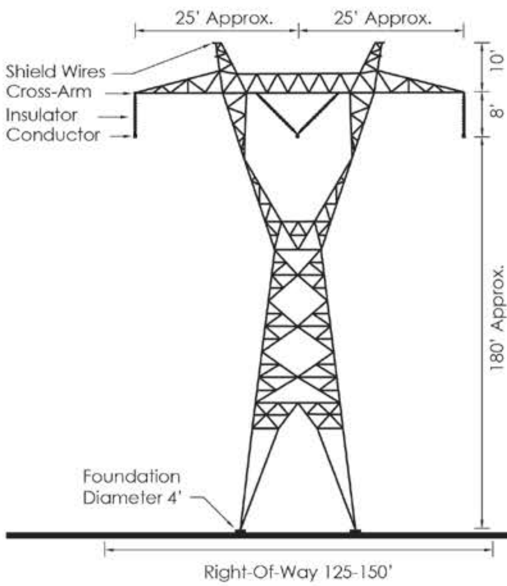
4.8.2.2 Impact Types

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.

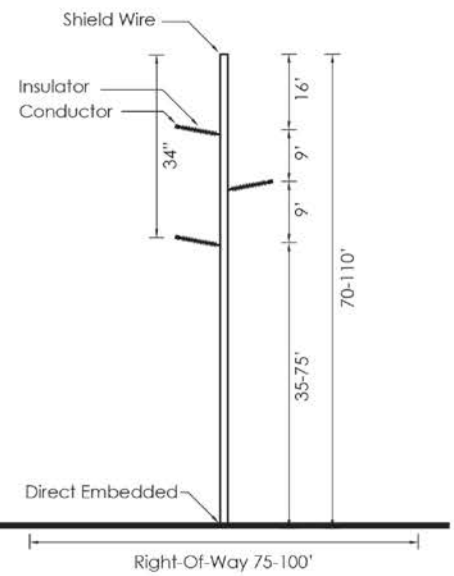
The development of the proposed Project has the potential to result in three basic types of impacts to visual resources. Construction impacts would be considered temporary that result from the presence of construction vehicles and equipment that cause ground disturbance, equipment structure contrasts, and air emissions. Operations and maintenance impacts may be short-term or long-term. Maintenance activities would also be 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 would be primarily associated with the long-term use and presence of the proposed 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, would be produced during construction, operations, and maintenance of the proposed Project.

The general types of impacts caused by the construction, operations, and maintenance of the proposed Project include:

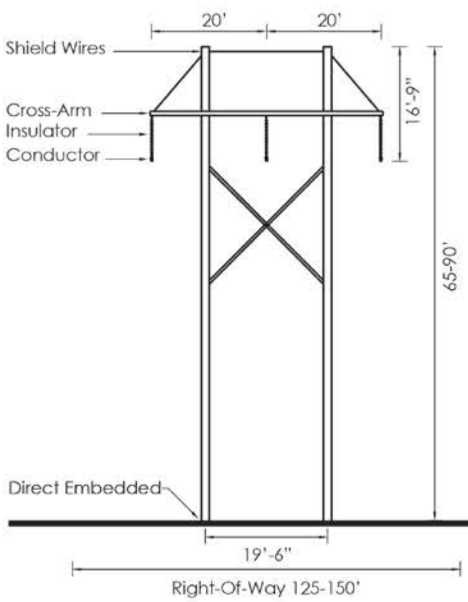
FIGURE 4.8-1 VISUAL CHARACTERISTICS OF STRUCTURE TYPES



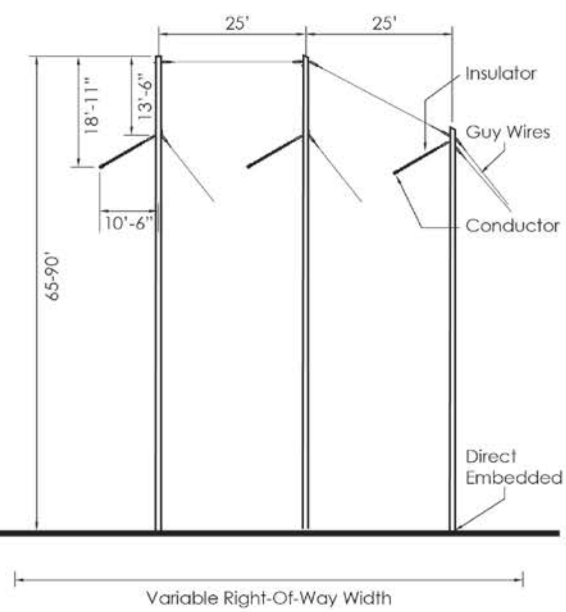
Single-Circuit 230 kV Steel Lattice Structure (Columbia River Crossing)



Single-Circuit 230 kV Single Pole Tangent Structure



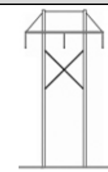
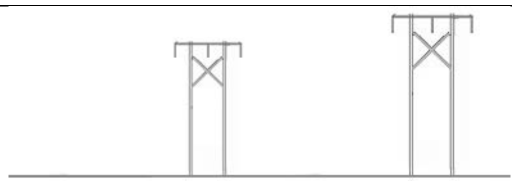
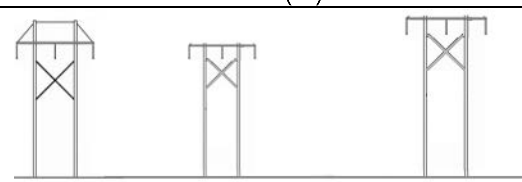
Single-Circuit 230 kV H-Frame Tangent Structure

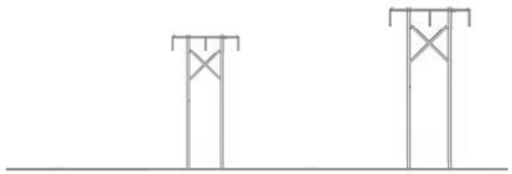
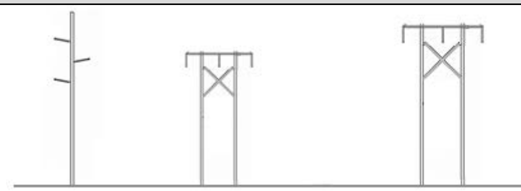
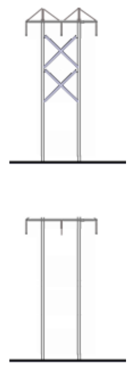
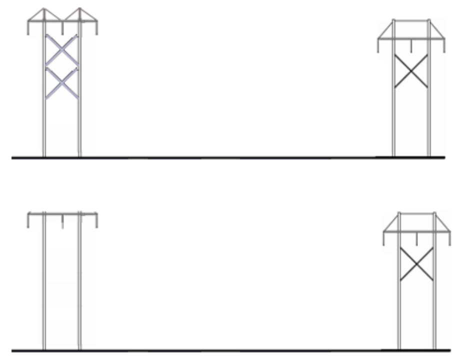
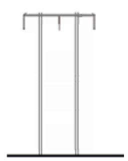
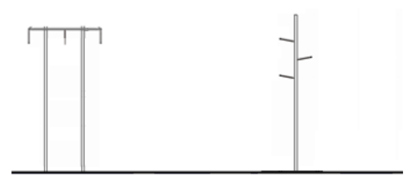


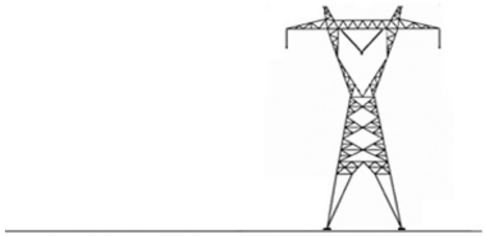
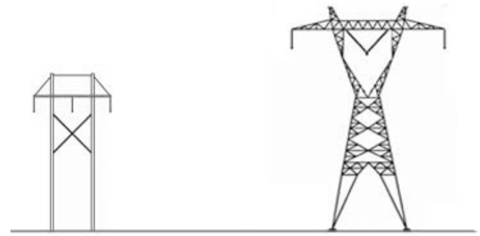
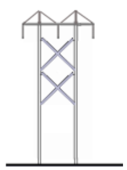
Single-Circuit 230 kV 3 Pole Angle-Guyed Structure

IMAGES NOT TO SCALE

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	*Strong*
No Structures	 New Single Pole: 230 kV: Route NNR-1, Portion of Route NNR-2 (#2)	Yakima Ridge, Black Rock Valley; Columbia River; JBLM YTC Residential and Agricultural Land Use	*Strong*
 Existing Distribution	 New Single Pole 230 kV with Distribution Under-build: Portion of NNR-1, Portion of NNR-2 (#3)	Yakima Ridge, JBLM YTC Cantonment Area; Residential Land Use	*Strong / Moderate*
 Existing 115 kV & 230 kV H-Frame Wood Pole (Midway-Moxie 115 kV & Union Gap-Midway 230 kV)	 New H-Frame Wood Pole 230 kV/ Existing 115 kV & 230 kV H-Frame Wood Pole (#4)	Black Rock Valley; Grazing and Undeveloped Land Use	*Weak*

EXISTING CORRIDOR	PROPOSED CORRIDOR (CONFIGURATION #)	VIEWING CONTEXT	STRUCTURE CONTRAST
 Existing 115 kV & 230 kV H-Frame Wood Pole (Midway-Moxie 115 kV & Union Gap-Midway 230 kV)	 New Single Wood Pole 230 kV/ Existing 115 kV & 230 kV H-Frame Wood Pole (#5)	Black Rock Valley; Grazing and Agricultural Land Use	*Moderate / Weak*
 Existing 230 kV H-Frame Wood Pole (e.g., Pomona-Wanapum 230 kV)	 New H-Frame 230 kV/ 230 kV H-Frame Wood Pole (#6)	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	*Weak*
 Existing 230 kV H-Frame Wood Pole (Pomona-Wanapum 230 kV)	 New Single Pole 230 kV/ 230 kV H-Frame Wood Pole (#7)	JBLM YTC Cantonment Area / Shotgun Lane residential	*Moderate / Weak*

EXISTING CORRIDOR	PROPOSED CORRIDOR (CONFIGURATION #)	VIEWING CONTEXT	STRUCTURE CONTRAST
 Existing Steel 500 kV (Hanford-Vantage No. 1)	 New H-Frame Wood Pole / Existing Steel 500 kV (#8)	Saddle Mountains, Crab Creek Valley; Recreational / Multi-Use Land Use; Residential / Agricultural Land Use	*Moderate*
(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 (#9)	Northeastern JBLM YTC, Columbia River Crossing / Wanapum Dam/Vantage Substation Industrial Area	*Weak*
No Structures	(Underground Design Option Duct Bank Corridor ROW) (#10)	Grazing and Undeveloped Land Use; JBLM YTC Training Areas	*None- See Table 4.8-1 for Landscape Contrast*
 Existing 230 kV H-Frame Wood Pole (e.g., Pomona-Wanapum 230 kV)	Transition Stations (#11)	Interstate 82 Travel Corridor, Existing Pomona-Wanapum 230 kV transmission line, sage-brush dominated landscape, JBLM YTC training areas	*Strong-Moderate*

- 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 Option 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 proposed Project affect scenic quality and sensitive viewers. These impacts also relate to whether or not the proposed 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 Action Alternatives. At the Interstate (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 proposed 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 proposed 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 proposed Project if that character is not compatible with the industrial, linear, and vertical visual character of the proposed 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 proposed Project even if the form, line, color, or texture of the proposed 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 proposed 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 route segment of the proposed 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 study area from specific viewpoints. Viewing variables such as direction of view, landform, vegetation, or architectural screening influence how sensitive viewers are impacted by the proposed Project and how contrasts are seen in the landscape. Impacts are highest on sensitive viewers where static (stationary), direct, unimpeded views of the proposed Project would occur at close viewing distance and where the proposed 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 proposed 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 Action Alternatives' route segments based on contrast and visibility/scenic quality. Potential impacts were also recorded in data tables for each impact level change along each Action Alternatives' route segments. Each potential impact was documented considering the implementation of Required Design Features (RDFs) and additional specific mitigation measures were recommended where effective to reduce visual impacts. Refer to Chapter 2, Section 2.3 for a complete list and description of RDFs. 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:

30) The visual influence of an industrial or developed setting on the landscapes and views that reduces impacts;
31) Focal points in the landscape or orientation of dominant views are directed away from the proposed Project;
32) Viewer and proposed Project position in the landscape (viewing the Project from below);
33) Views that are brief and/or intermittent; and
34) 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 through 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 Action Alternatives' route segments. 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 route segments. 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 corridor maintenance and vegetation management, and associated fugitive dust potentially impacting views would create low impacts common to all route segments. 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 Tables 4.8-8A and 4.8-8B.

4.8.5 Impacts Specific to Route Segments and Design Options

4.8.5.1 Route Segment 1a/NNR-1

Visual Contrasts

Along this route segment, visual contrasts are primarily dependent on the extent to which the proposed Project would parallel existing transmission lines, incorporate existing distribution lines, or would introduce a new structure in the landscape where no infrastructure currently exists. Pacific Power's existing Pomona-Wanapum Transmission Line is paralleled between milepost (MP) 0.0 and 0.7 (see configuration #7 in Table 4.8-3). No existing transmission or distribution structures exist between MP 0.7 and 0.8 and between MP 1.9 and 2.4 (see configuration #2 in Table 4.8-3 and KOP 1 in Appendix C-4). 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) between MP 0.8 and 2.0. Landscape contrast would be none to weak because existing roads along the Pomona-Wanapum transmission line and Sage Trail 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 conductor wire 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. Project contrast would typically be weak near the Pomona Heights Substation and where the line would parallel Pacific Power's existing Pomona-Wanapum 230 kV transmission line, but otherwise moderate to strong.

Scenic Quality Impacts and Development Character

The landscape of Route Segment 1a/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, Mount Rainier). This residential character is affected along the route segment 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 proposed Project and visual separation of the existing line from the route segment, 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 in areas where the route segment deviates from paralleling the existing Pomona-Wanapum 230 kV Transmission line.

Sensitive Viewer Impacts

Several residences located along Sage Trail Road and adjacent roads would have new transmission line structures and conductors in the line of sight of Mount Rainier and the route segment structures may impede views, depending on final placement. This would occur on the middle and eastern section of the route segment where it would intersect with Sage Trail Road and generally parallel it. Therefore, the new pole structures would create high impacts on residential viewers along this portion of the route segment. Impacts are the result of generally strong to strong/moderate structure contrasts seen in the immediate foreground. Structures could potentially obstruct views of Mount 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 1, 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 1.

Views of the route segment from residences located in the County Squires Mobile Manor are generally screened by vegetation, but some would view the route segment against the Yakima Ridge. From this location, the Pomona-Wanapum 230 kV transmission line is also within the foreground viewshed and low impacts on these residences are anticipated.

Viewers using East Selah Road would have very brief views of the route segment in the immediate foreground. Views from both travelling directions are generally screened by buildings, vegetation, and topography. Route Segment 1a/NNR-1 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 route segment would comply with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.2 Route Segment 1b

Visual Contrasts
Structure contrast would be strong along this entire route segment; no existing transmission line infrastructure or other substantial development, other than adjacent residential development, is located within this corridor. Route Segment 1b would generally follow the southern boundary of the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) on federal land, and would utilize the existing fire break road following the property line. Because access for the route segment would be “Level 2” (use existing roads), typically, along most of the route segment and because the existing vegetation is Group 2 or 3 (shrubs and/or grassland), landscape contrast would be weak. Short portions of this route segment would deviate from the fire break road, and new access may be required (see MP 9.6-10.9) in an area of Group 3 or 4 vegetation (sagebrush/rabbitbrush/overstory trees), causing strong landscape contrasts. The strongest visual contrasts would occur in these areas where new road and structure installation would occur in steeper areas of Group 2 or 3 vegetation. Typically, Project contrasts would be strong-moderate, with some isolated areas of strong or moderate where vegetation, slope and road construction variables reduce or increase overall visual contrast.

Scenic Quality Impacts and Development Character
Scenic quality impacts would be moderate to low in the Class C Yakima Ridge landscape setting along this route segment. The route segment would be compatible with the existing development character where it crosses in the vicinity of the Ellensburg-Moxee #1 115 kV transmission line corridor (MP 0.2-0.3). However, the vertical H-frame structures and linear features of the conductors (wires) would contrast with the simple rolling, undulating, and horizontally flowing lines of the landforms of Yakima Ridge. Moderate scenic quality impacts would occur along a portion of Route Segment 1b, but would otherwise be low. No high scenic quality impacts are expected as a result of Route Segment 1b.

Sensitive Viewer Impacts
Residences would be affected by the construction and operation of the route segment, because the H-frame structures and conductor wires would be seen in the immediate foreground and foreground of residences located on Sage Trail Road, Summerset Drive, and Bohoskey Drive (MP 0.0-0.2 and 5.8-6.2). Strong contrast would be seen in the middleground from residences located north of Mieras Road and along St. Hilaire Road (see KOP 2, Appendix C-3) where the route segment would be skylined (MP 6.5-6.7) causing moderate residual impacts at this distance. Strong to strong-moderate Project contrasts would

also be seen by residences viewing the line in the foreground from Mieras Road against Yakima Ridge in the background (MP 5.8-6.2). One residence located on Summerset Drive in Kittitas Canyon adjacent to JBLM YTC would view strong to strong-moderate contrasts in the immediate foreground (MP 5.8-6.2) and route segment skylining in the middleground (MP 6.5-6.7) resulting in high to moderate impacts. Residences located on the east end of Postma Road would view strong Project contrasts generally in the background and middleground.

Agency Management Compliance

Federal land crossed is administered by the JBLM YTC, which does not have any identified goals, policies, and standards regarding the management of visual resources.

4.8.5.3 Route Segment 1c

Visual Contrasts

Structure contrast would be strong along this entire route segment; no existing transmission line infrastructure or other substantial development, other than adjacent residential development, is located within this corridor. Route Segment 1c would generally follow the southern boundary of the JBLM YTC, but on private land, and would require new access in some areas where no roads are currently constructed. Significant road construction would be required for a portion of this route segment, modifying the vegetation and landform and creating moderate to strong landscape contrasts along route segment. Much of the route segment would require clearing of sagebrush or other shrub vegetation for road construction. Project contrasts would typically be strong to strong-moderate along this route segment, with some isolated areas of moderate Project contrast in areas of Group 1 or 2 vegetation and Level 2 or lower road construction (MP 9.9-11.4). Project contrasts would be slightly reduced (e.g., from strong to strong/moderate, strong/moderate to moderate) if the JBLM YTC access road was used for construction and maintenance of this route segment. This would reduce landscape contrasts because new roads would not be bladed and the existing fire break road would require minimal improvements compared to private two-track roads. Landscape contrasts created as a result of work pad construction and structure installation and presence, however, would remain. Overall, the effects of reduced Project contrasts would only affect impacts on middleground, high sensitivity views, and foreground moderate sensitivity views reducing impacts from high to moderate. Impacts would be reduced from high to moderate along 2.5 miles due to reduced contrasts (see sensitive viewer impact discussion below).

Scenic Quality Impacts and Development Character

In areas of strong and strong-moderate contrast in Class C landscapes, scenic quality impacts would typically be moderate. Impacts would be low in isolated areas of moderate Project contrast. Scenic quality impacts would not be substantially reduced by using the JBLM YTC fire break road (Access Model B). For a short distance, the dominant development character is influenced by the Ellensburg-Moxee #1 115 kV transmission line corridor and the route segment would be compatible in this setting (MP 0.2-0.3).

Sensitive Viewer Impact

Impacts on sensitive viewers would be similar to Route Segment 1b, but this route segment would be closer to residences located on Sage Trail Road, Summerset Drive, and Bohoskey Drive where strong to strong/moderate contrasts would be seen in the immediate foreground, foreground, and middleground. Strong contrast would be seen in the middleground from residences located north of Mieras Road and along St. Hilaire Road (see KOP 2, Appendix C-3) where the route segment would be skylined (MP 6.4-6.6), causing moderate impacts at this distance. One residence located on Summerset Drive in Kittitas Canyon adjacent to JBLM YTC would view strong to strong-moderate contrasts in the immediate foreground (MP 5.7-6.2) and route segment skylining in the middleground (MP 6.4-6.6) resulting in high to moderate impacts. Residences located at the north end of Coombs Road and along Mieras Road would view the route segment in the immediate foreground and foreground where Project contrasts would be strong/moderate to moderate, creating high impacts. Some of these residences have views of the Moxee Valley and Mount Adams, which would be affected by the presence of the route segment (see Appendix C-3: KOP 3). The Project may obstruct the line of sight to Mount Adams (MP 10.2-10.7).

High visual impacts on residences would be reduced to moderate impacts in the middleground for approximately 2.5 miles if the existing fire break road was utilized for route segment access and construction because new road grading and clearing would not be necessary, resulting in reduced landscape contrasts.

Agency Management Compliance

There is no federal land crossed by this route segment. The route segment would comply with the visual standards identified in the Yakima County Comprehensive Plan. The route segment crosses one mile of DNR state trust land. The DNR does not have goals, policies, or standards regarding the management of visual resources.

4.8.5.4 Route Segment 2a

Visual Contrasts

Structure contrast would be strong along this entire route segment as no existing transmission line infrastructure or other substantial development is located within this corridor. Some new road construction would be necessary along this route segment resulting in the removal of grassland or other herbaceous ground cover; therefore, landscape contrasts would be moderate to weak, depending on the slope. Overall, Project contrasts would be strong/moderate and in limited areas, strong.

Scenic Quality Impacts and Development Character

Scenic quality impacts would be moderate for this route segment, with the vertical H-frame structures and linear features of the conductors would contrast with the simple rolling, undulating, and horizontally flowing lines of the landforms of the Yakima Ridge.

Sensitive Viewer Impacts

The nearest sensitive viewers are residences located at the east end of Postma Road, who would have middleground views of typically strong-moderate Project contrasts. Residual impacts on viewers would be low. Impacts on residences would typically be moderate and high in a limited area (MP 0.7-0.8) where strong contrasts occur.

Agency Management Compliance

There are no federal or state lands crossed by this route segment. The route segment would comply with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.5 Route Segment 2b

Visual Contrasts

Structure contrast would also be strong along this entire route segment because no existing or related transmission lines currently exist in this corridor. Landscape contrast varies due to the presence of intermittent two-track roads and variable vegetation. New road construction would create visual contrasts in slopes of up to 30 percent and work pad construction would require grading and vegetation removal. Most of this route segment would create strong to strong-moderate visual contrasts. The use of JBLM YTC fire access roads would somewhat reduce visual contrasts by reducing the extent of necessary road construction where the route segment is located adjacent to the base, but on private or BLM-owned land. However, because this route segment is located in the background or seldom seen distance zone for high and moderate sensitivity viewers because the route is located in a Class C landscape and because Project contrasts would remain strong/moderate to moderate, visual impacts would not substantially differ should the route segment utilize JBLM YTC access roads.

Scenic Quality Impacts and Development Character

Scenic quality impacts would be moderate to low in the undeveloped Class C landscape that is similar to the other routes located in the undeveloped Yakima Ridge area.

Sensitive Viewer Impacts

Sensitive viewers, which include residences and State Route (SR) 24 travelers (see Appendix C-3: KOP 4) would view moderate to strong Project contrasts in the background or seldom seen distance zone except on the far western end of the route segment, where high impacts on residences located at the east end of Postma Road and Deeringhoff Road would occur for a short distance. The implementation of mitigation measure VIS-2 between MP 0.0 and MP 0.4 would reduce the contrast created by the conductor wires and reduce high impacts to moderate and moderate impacts to low. Moderate impacts created as a result of strong or moderate/strong impacts seen in the background from residential viewers and SR-24 motorists would also occur from MP 11.5 to the east end of the route. Implementation of mitigation measure VIS-2 (non-specular conductors) would reduce these impacts to a low level.

Agency Management Compliance

BLM Interim VRM Class III lands are crossed at MP 4.0-4.2 and MP 12.4-12.9. Project contrasts would be strong because of structures contrasts and access road construction in 0 to 15 percent slope areas with Group 3 vegetation cover. The route segment would be compliant with the Interim Class III from residences north of SR-24, the nearest viewpoint, because strong to strong-moderate contrasts are seen in the background or seldom-seen distance zone. The route segment is in the seldom seen and background distance zone from the nearest KOP (KOP 4) causing low impacts.

The route segment would also comply with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.6 Route Segment 2c

Visual Contrasts

Structure contrasts for Route Segment 2c would vary depending on whether or not the route segment is paralleling the Union Gap-Midway 230 kV and Midway-Moxee 115 kV corridor or not and which structure type (single pole or H-frame) is proposed. Where the route segment parallels the existing transmission line corridor, structure contrasts would be either moderate/weak or weak (see Table 4.8-2 Structure Contrast: Configuration 4 or 5). This route segment crosses grassland/herbaceous vegetation and the clearing and grading associated with access road construction, work pad installation, and other construction activities would cause moderate to weak landscape contrasts.

Scenic Quality Impacts and Development Character

Scenic quality impacts would be moderate to low in the undeveloped Class C landscape that is similar to the other route segments located in the undeveloped Yakima Ridge area. As the route segment enters the Moxee Valley Agricultural Development Character Area (as described in Section 3.8.2.3), it would also follow the existing Union Gap-Midway 230 kV and Midway-Moxee 115 kV transmission line corridor. The route segment would be compatible with the existing character as it parallels these existing transmission lines.

Sensitive Viewer Impacts

Moderate impacts would occur on residences located north of SR-24 in the Moxee Valley viewing moderate Project contrasts in the immediate foreground for a short distance (0.4 mile). Background views of strong contrasts would also occur, also cause moderate impacts. High impacts on residences would occur where strong contrasts are seen in the middleground. Impacts would otherwise typically be low on residences.

Motorists using SR-24 would view the route segment in the foreground where weak Project contrasts would occur causing low impacts. Some of this route segment also would cause moderate impacts on motorists where they would view strong and strong-moderate contrasts in the background.

Agency Management Compliance

There are no federal or state lands crossed by this route segment. The route segment would comply with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.7 Route Segment 2d

Visual Contrasts

Structure contrast would be strong along this entire route segment. Landscape contrast is generally strong to moderate due to the extent of access road construction and necessary sagebrush/rabbitbrush vegetation removal. Some areas would be accessible via overland travel and, therefore, no landscape contrasts would occur. Structure contrasts would remain, however. Typically, Project contrasts would be strong or strong-moderate. Helicopter placement of transmission line structures between MP 6.6 and 7.0 would reduce landscape contrasts by eliminating need for road construction and associated clearing and grading activities.

Scenic Quality Impacts and Development Character

Scenic quality impacts would be moderate to high. High impacts would occur in areas of Class B scenery and strong Project impacts, consisting of most of the route segment from MP 2.9 to 7.0. Moderate to low scenic quality impacts would occur from MP 0.0 to 2.9 in a Class C landscape.

Sensitive Viewer Impacts

Visibility of the route segment from the moderate sensitivity SR-24 corridor and high sensitivity residential viewpoints would be in the background or seldom seen distance zones, where strong contrasts would cause moderate and low impacts.

As seen from the Columbia River recreation corridor and SR-243, the route segment would be skylined as it descends from the Umtanum Ridge (MP 6.14-6.2). The route segment would result in moderate impacts in this area.

Agency Management Compliance

BLM Interim VRM Class III lands are crossed between MP 1.0 and MP 2.0. Project contrasts would be strong to strong-moderate because of structures contrasts and access road improvements (Access Level 2) in areas with Group 3 vegetation cover. The route segment would be compliant with the Interim Class III from residences north of SR-24, the nearest viewpoint, because strong to strong-moderate contrasts are seen in the background or seldom-seen distance zone. The route segment is in the seldom seen and background distance zone from the nearest KOP (KOP 6) causing low impacts.

The route segment would comply with the visual standards identified in the Yakima County Comprehensive Plan and Benton County Comprehensive Land Use Plan.

4.8.5.8 Route Segment 3a

Visual Contrasts
Structure contrast would be weak near the existing Vantage Substation, where multiple transmission lines converge. There would be minimal or no access road improvements necessary due to the existing road network servicing the substation facility and transmission lines and, therefore, weak landscape contrasts. Overall, weak Project contrasts would occur as a result of this route segment.

Scenic Quality Impacts and Development Character
This route segment is in a highly visually modified corridor, and the Industrial Development Character (see Section 3.8.2.3) and visual influence of the Wanapum Dam and associated substation and transmission infrastructure is compatible with this route segment.

Sensitive Viewer Impacts
Residences located to the south would view weak Project contrasts in the background and low impacts would result. Middleground views would occur from SR-243 and Beverly-Berke Road and would also be seen through the existing transmission infrastructure creating low impacts.

Agency Management Compliance
There are no BLM or state lands crossed by this route segment and the Bureau of Reclamation does not have standards regarding the management of visual resources.

4.8.5.9 Route Segment 3b

Visual Contrasts
Structure contrast would be strong along most of this route segment except where the route segment meets the Shultz-Wautoma 500 kV corridor and Columbia River crossing. From the west side of the Columbia River crossing to the Vantage Substation and Route Segment 3a intersection structure contrasts would be weak. Landscape contrasts would typically be weak because most of the route segment follows the abandoned railroad ROW corridor that would require minimal improvements and vegetation is frequently low growing and herbaceous. Where the route segment would require the removal of shrubby vegetation or trees in selected areas (MP 12.9-17.0), weak or strong landscape contrast would occur. Overall, Project contrasts would typically be moderate from MP 0.0 to 12.3 and be strong or strong moderate from MP 12.3 to 19.3, where the route segment joins the existing Pomona-Wanapum 230 kV/ Wanapum-Wind Ridge 230 kV/Schultz-Vantage 500 kV/Schultz-Wanapum 500 kV corridor and crosses the Columbia River.

Scenic Quality Impacts and Development Character
Scenic quality impacts along this route segment would typically be moderate in a Class B landscape, except in those areas where more visually prominent vegetation would be removed as a result of access improvements. The route segment would impact scenic quality by contrasting with the dominating river and lake shorelines, rocky talus slope toes, and basalt cliffs. The route segment would not traverse Agricultural Development Character Areas, but would be directly adjacent to them. For a short distance, the route segment would cross Residential Development Character Areas, also (MP 14.7-15.1). In those areas, the route segment would not be compatible the existing landscape character.

Sensitive Viewer Impacts
Residences would view moderate to strong Project contrasts in the immediate foreground in two areas along this route segment causing high impacts: the Priest Rapids residential area located on the southwest side of the Priest Rapids Dam and an agricultural residential area located on the south end of Huntzinger Road.

Moderate and high sensitivity recreationists using the Columbia River corridor below Priest Rapids Dam, Priest Rapids Reservoir recreationists and John Wayne Pioneer Trail users would also view moderate to strong Project contrasts in the immediate foreground causing moderate to high visual impacts. The route segment would be viewed longitudinally as it follows the John Wayne Trail and would dominate the viewshed. The route segment would affect views from the John Wayne Trail Trailhead (see Appendix C-3: KOP 12), dominating scenic views of the Columbia River corridor to the south.

Motorists and recreationists using Huntzinger Road would also view the route segment in the immediate foreground along the road for about five miles (approximately MP 13.6-18.7), causing high or moderate impacts.

Agency Management Compliance

BLM Interim VRM Class III lands are crossed between MP 19.1 and MP 19.6. Project contrasts would be strong for a short distance (MP 19.1-19.3). The route segment would be in compliance with Interim VRM Class III from KOP 12 (John Wayne Pioneer Trail) because moderate-weak contrasts are seen in the immediate foreground to background distance zone and because the route segment would be seen in the middleground distance zone set against the existing Pomona-Wanapum 230 kV/Wanapum-Wind Ridge 230 kV/Schultz-Vantage 500 kV/Schultz Wautoma 500 kV transmission line corridor.

The route segment would also comply with the visual standards identified in the Yakima County Comprehensive Plan and all applicable development regulations, the Kittitas County Comprehensive Plan, and the Benton County Comprehensive Land Use Plan.

4.8.5.10 Route Segment 3c

Visual Contrasts

Structure contrast would typically be strong along this route segment. Where the route segment crosses the Midway-Vantage 230 kV/Shultz-Wautoma 500 kV corridor and parallels the Hanford-Vantage No. 1 500 kV corridor, structure contrasts would be moderate (see Table 4.8-2, Structure Configuration #8). Much of this route segment follows existing roads and portions of agricultural areas; therefore, landscape contrasts would be weak or none. Moderate and strong landscape contrasts occur in the Saddle Mountains Management Area and other areas where no roads occur, typically where the route segment does not follow existing transmission lines. Helicopter placement of transmission line structures between MP 20.0 and 20.6 would reduce landscape contrasts by eliminating the need for road construction and associated clearing and grading activities. Structure contrasts would be strongest where at the Columbia River crossing, 195-foot tall steel lattice structures would be constructed on the north and south sides of the river. The visual influence of the crossing structures would extend further than the typical single pole or H-frame Project wood structures, with immediate foreground views occurring within 0.75 mile of the structures (see distance zone discussion, Section 3.8.2.5).

Scenic Quality Impacts and Development Character

Scenic quality impacts along this route segment would be moderate to high in Class B landscapes along the Columbia River and high in Class A landscapes of the Saddle Mountains and Crab Creek area. The route segment would impact the scenic quality of the landscape by contrasting with the dominating river and lake shorelines, rocky talus slope toes and basalt cliffs of the Columbia River, and the rocky outcrops, erosional plumes, and rock formations of the Saddle Mountains. The route segment would traverse Agricultural Development Character Areas of the Wahluke Slope and would not be compatible in this landscape. The route segment would cross mixed Agricultural/Residential Development Character Areas and also would not be compatible with this existing character.

Sensitive Viewer Impacts

Residences would view strong-moderate and moderate Project contrasts in the immediate foreground along the Wahluke slope agricultural area, typically causing high impacts (MP 5.6-6.0, 10.0-10.6, and 12.6-13.5). Some views of the route segment would be seen in the context of the existing Midway-Vantage/Shultz-Wautoma transmission line corridor in the middleground, and impacts would be low. Immediate foreground views would also occur northeast of Beverly (MP 22.4-22.9 and 23.3-24.0) causing high impacts.

Immediate foreground and foreground views of strong contrasts would also occur from recreationists using the Columbia River corridor, causing high impacts. Motorists using SR-243 would also view the route segment for a short duration as it parallels and crosses the highway at MP 3.9. Impacts of the line on these viewers would be moderate to low to the north of the highway because the route segment would be viewed in the context of the Priest Rapids-Midway transmission line corridor. High impacts would occur south of the highway because the route segment, including the steel lattice river crossing structures, would be viewed against the Columbia River and Umtanum Ridge basalt cliffs (see Appendix C-4, KOP 5).

The route segment crosses the Milwaukee Road Corridor (see Appendix C-3: KOP 9) at MP 21.3-21.4 causing high impacts. The route segment would also be in the middleground of recreationists using the Burkett Lake Recreation Area (see Appendix C-3: KOP 8), causing high impacts. The route segment would also be in the middleground view of the Saddle Mountains Hang Gliding Launch Area, where the route segment would be seen in the valley over 1,800 feet below causing moderate impacts.

The route segment would also parallel and cross 24 SW Road west of Mattawa, causing high impacts for 0.9 mile (MP 11.1-12.0) and cross Lower Crab Creek Road at MP 21.1-21.2 causing high impacts. Moderate impacts would occur where the route segment crosses Beverly-Burke Road as it parallels the Hanford-Vantage No. 1 corridor.

Moderate impacts would occur for a short distance where the route segment would be viewed from the Saddle Mountains Recreation Destination Route (R Road Extension), but typically would be low. Views from this road are typically from the inferior position and the route segment would be seen in the context of the existing Hanford-Vantage No. 1 500 kV corridor. On the north end of this road, views are more sensitive as it enters the high elevations of the Saddle Mountains Management Area. Impacts would be high for a short distance where the route segment is skylined and also crosses the road. Contrasts as seen from KOP 7, however, would generally be moderate because of the context of the existing transmission line and distribution infrastructure as seen from this vantage point (see Appendix C-4, KOP 7).

Agency Management Compliance

BLM Interim VRM Class III lands are crossed between MP 14.3 and MP 16.2, and MP 17.0-19.6. Project contrasts would be strong and strong-moderate for 1.4 miles of the 4.5 mile Interim VRM Class III crossing (MP 14.3-14.5, 16.0-16.1, 17.7-17.9, and 18.7-19.6). As seen from KOP 7, the route segment would be in compliance with the Interim VRM Class III designation because strong to strong-moderate contrasts are seen in the immediate foreground to background distance zone would be mitigated (see below) and because the route segment would be seen in the context of the existing Hanford-Vantage No. 1 500 kV transmission line and distribution transmission facilities servicing the communication infrastructure located on the Saddle Mountains.

The route segment would also comply with the visual standards identified in the Grant County Comprehensive Plan, Grant County Public Utility District (PUD) 2010 Final Shoreline Management Plan and Benton County Comprehensive Land Use Plan.

4.8.5.11 Route Segment NNR-2

Visual Contrasts

On the south end 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 route segment crosses the Ellensburg-Moxee No.1 115 kV transmission line. The Ellensburg-Moxee No. 1 115 kV transmission line and the route segment also follows the JBLM YTC fire break road in this area. The fire break would be utilized for the route segment; therefore, weak landscape contrasts would result. Overall, strong Project contrasts would be created on the south end of the route segment. As the Ellensburg-Moxee No. 1 115 kV transmission line turns to the west near the water tower on JBLM YTC, the route segment would parallel this existing 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 route segment would utilize 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 route segment 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 route 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 15.

Pulling and tensioning sites would also cause short-term landscape and structure contrasts. The presence of a helicopter during the stringing of the conductor wires 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 non-military residential and JBLM YTC residential and industrial character area and scenery impacts on the undeveloped JBLM YTC areas crossed by the route segment. 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 this existing transmission line that is less developed. The route segment would generally be in character with most of the JBLM YTC cantonment area because the route segment would parallel existing transmission lines or would be in intensive use areas of the military training center (Appendix C-4: KOP 15 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 route segment 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. 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 RDF VR-7, span matching with existing structures would reduce the impacts of the route segment in this location. Residences along Sage Trail Road would be impacted by the presence of the new transmission line/route segment 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 15). From residences located along and near E. Pomona Road, impacts on views of the undeveloped area of JBLM YTC in the direction of the route segment would be high due to the lack of existing transmission lines in the viewshed. Impacts along this portion of the route segment would be high.

Travelers using I-82 would also view the route segment in the immediate foreground briefly, primarily from the eastbound direction. Westbound I-82 travelers would have a very brief view of Route Segment 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 lines 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 route segment would be consistent with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.12 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 17 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 route segment is this area.

As the route segment joins Pacific Power’s existing Pomona-Wanapum 230 kV transmission line, contrasts would be reduced because the new transmission line/route segment would be adjacent to the existing transmission line (Configuration #6, 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 conductor wires 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 (RDF 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 Route Segment NNR-3 would generally be compatible with the development character of the area. This route 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 existing 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 in those locations. Overall, there would be some degradation of scenery along the route 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 17 based on the FHWA's Visual Impact Assessment for Highways methodology. At the highway crossing, existing visual quality, rated on a scale of 1 to 7, was rated as 4.08 (moderately high). With the implementation of the route segment at this location, the visual quality of the highway in the area of the highway would drop to 3.50 (average). At KOP 17, existing visual quality was rated 4.42 (moderately high). With the implementation of the route segment, visual quality from KOP 17 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 Route Segment NNR-3 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 17 (Appendix C-4) show that the transmission line conductor wires would be lower than the line of sight. 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 new transmission line conductor wires and structures would moderately degrade views of the canyon area. The implementation of RDF VIS-7, span matching with existing structures, would reduce the impacts of the line in this location.

From DNR's Selah Cliffs Natural Area Preserve (NAP) trail at the base of the canyon, views of the route segment would be from the inferior position. As described in Chapter 2, 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 17-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 visual impacts. Placing a structure in this location would require access from BLM- and WSDOT-managed lands on the north side of the canyon or from the NAP on the west.

A Design Option for the route segment completely spanning the canyon was analyzed for visual resources. Completely spanning the canyon would eliminate the need for the transition structure located near the bottom of the canyon and the need for access from the west through the NAP or from the north through WSDOT and BLM land. This Design Option is shown in an alternative photo simulation for KOP 17 located in Appendix C4. As shown in the photo simulation, this would bring the transmission line conductor wires higher in the viewshed from the WSDOT Selah Cliffs Eastbound Rest Area Overlook and more in line with the direct line of sight through the canyon, causing slightly higher visual impacts.

However, impacts for this Design Option would remain high for WSDOT Selah Cliffs Eastbound Rest Area Overlook viewers, however, as compared to the Project as described in Chapter 2. Impacts on views from the NAP trail located at the bottom of the canyon, however, would be lower because the conductors would be elevated above the general viewing plane. The structure at the north rim of the canyon would still be visible and would be skylined from some positions within the canyon, but would be less dominant than if there was a structure in the bottom of the canyon. The Selah Cliffs NAP is not crossed by the assumed centerline of this route segment for either Design Option. It is assumed there will be no aerial easement across the NAP; however, final engineering in coordination with the affected landowner/land managing agency will determine the location and extent of the ROW.

Impacts for this route segment would also occur on views from the Selah Butte Recreation Destination Route and adjacent residences. Impacts on residents would be low because the route segment 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 route segment except in the area of the Selah Cliffs crossing. Therefore, impacts on residences viewing the route segment 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 route segment adjacent to the existing transmission 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. However, the viewing orientation is generally toward Yakima Canyon and topography typically screens views of the route segment. Because this is a dispersed recreation use area, views of the route segment 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 study area, but views are screened by topography. Therefore, low or no impacts are anticipated on these NNLs and the byway from Route Segment NNR-3.

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. Route Segment NNR-3 would be compliant with the Interim VRM Class III from KOP 18 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 17 (Selah Creek Rest Area), moderate-weak and weak contrasts would be seen in the middleground or background, respectively, and the route segment would be compliant with the Interim VRM Class III from both KOPs.

The route segment would also be consistent with the visual standards identified in the Yakima County Comprehensive Plan and Kittitas County Comprehensive Plan.

4.8.5.13 Route Segment NNR-4o/4u

Visual Contrasts

Overhead Design Option

Structure contrasts would be weak for Route Segment NNR-4o because the line follows Pacific Power's existing Pomona-Wanapum 230 kV transmission line (see Configuration #6, 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, Route Segment 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 conductor wires 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 (RDF VIS-6).

Underground Design Option
Structure contrasts created as a result of Route Segment 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 Route Segment NNR-4o 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 route segment at this location, 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 Route Segment NNR-4u is influenced by the presence of the existing Pomona-Wanapum 230 kV transmission line. However, because of the presence of the overhead to underground transition stations and potentially large areas of cut and fill, moderate to low scenic quality impacts would also result from the route segment.

Sensitive Viewer Impacts

Overhead Design Option
The primary viewers of Route Segment NNR-4o would be travelers using I-82 who would briefly view the route segment as it crosses the interstate 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 interstate and they would be less apparent and blend in with the existing structures. The implementation of mitigation measures VR-2 and RDF VIS-7 would reduce the visual impact on the residences and

inhabitants in this location. The implementation of RDFs, such as the rehabilitation of vegetation following construction would minimize the visual impacts on I-82 travelers at this crossing.

The route segment would also be viewed from residence located within Badger Pocket on the east end of the route segment (Appendix C-3: KOP 19). Weak and moderate Project contrasts would be viewed from this area as the route segment 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 that Route Segment NNR-4u would require the installation of two 5-acre overhead to underground 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 (greater than 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 overhead to underground transition stations, impacts would be lower compared to the Overhead Design Option for this route segment.

From the Badger Pocket residential area, the overhead to underground 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 for the route segment in this location.

Agency Management Compliance

Overhead Design Option
Route Segment NNR-4o would be consistent with the visual standards identified in the Kittitas County Comprehensive Plan.

Underground Design Option
The Route Segment NNR-4u would be consistent with the visual standards identified in the Kittitas County Comprehensive Plan.

4.8.5.14 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 transmission 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 conductor wires 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 (RDF 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 route segment where it crosses the existing transmission line, the route segment 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 route segment is in a slightly superior position relative to the closest residences and strong-moderate Project contrasts would be seen in the middleground. Therefore, moderate impacts on residences would result from the route segment.

Agency Management Compliance

This route segment crosses land managed by JBLM YTC, who has no policies related to the management of visual resources.

4.8.5.15 Route Segment NNR-6o/6u

Visual Contrasts

Overhead Design Option

As with NNR-4o and NNR-3, where Route Segment NNR-6o parallels the existing Pomona-Wanapum 230 kV transmission line, structure contrast for the route segment would be weak (Configuration #6, 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 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 conductor wires 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 (RDF VIS-6).

Underground Design Option

Structure contrasts created as a result of Route Segment NNR-6u would be limited to the presence of the overhead to underground transition stations located at the beginning and end of the route segment. 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 route segment would increase moderate-weak as compared to the Overhead Design Option. 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 Route Segment NNR-6o 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 Route Segment NNR-6u is influenced by the presence of the existing Pomona-Wanapum 230 kV transmission line. However, because of the presence of the overhead to underground transition stations and potentially large areas of cut and fill, low to moderate scenic quality impacts would result from the route segment.

Sensitive Viewer Impacts

Overhead Design Option
Sensitive viewers, residences and John Wayne Pioneer Trail users, would typically see Project contrasts in the seldom seen or background distance zone. On the west end of the route segment, the route segment would be seen in the middleground by residences and on the east end in the middleground by John Wayne Pioneer Trail users. Therefore, route segment 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 (Route Segment NNR-6u) 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 John Wayne Pioneer Trail users in the area of the overhead to underground transition station would occur.

Agency Management Compliance

Overhead Design Option
Route Segment NNR-6o crosses land managed by JBLM YTC, who has no policies related to the management of visual resources.

Underground Design Option
Route Segment NNR-6u crosses land managed by JBLM YTC, who has no policies related to the management of visual resources.

4.8.5.16 Route Segment NNR-7

Visual Contrasts
The western portion of Route Segment NNR-7 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 Route Segment 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 conductor wires 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 (RDF VIS-6).

Scenic Quality Impacts and Development Character

Scenic quality in the area of the Route Segment NNR-6u is influenced by the presence of the existing Pomona-Wanapum 230 kV transmission line and other existing 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 John Wayne Pioneer Trail users would view weak Project contrasts in the immediate foreground and foreground. From the north, the route segment 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 John Wayne Pioneer Trail where the trail generally parallels the route segment. At the John Wayne Pioneer Trail crossing of Route Segment NNR-6u (Appendix C-3: KOP 21), low impacts are expected due to the existing transmission lines visual influence and weak contrasts. Ginkgo Petrified Forest NNL (Wanapum Recreation Area boat launch) is located in the in the seldom seen distance zone within the Project study area and views are typically screened by topography. Therefore low or no impacts on the NNL is expected from Route Segment 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.

4.8.5.17 Route Segment NNR-8

Visual Contrasts

Structure contrasts are also weak for Route Segment NNR-8 because this route segment would parallel 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. Landscape contrasts are highest in areas of sagebrush and rabbitbrush where the existing road would require improvements. Also, the lattice structures needed to cross the Columbia River 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 route segment 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 Route Segment NNR-8 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 route segment in this location, 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 conductor wires 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 (RDF VIS-6).

Sensitive Viewer Impacts

Huntzinger Road travelers, recreationists using the Columbia River corridor below Priest Rapids Dam, and John Wayne Pioneer Trail users would view weak Project contrasts in the immediate foreground and foreground. From the north, the route segment 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 John Wayne Pioneer Trail where the route segment and existing lines cross the trail. Low impacts are expected due to the existing transmission lines visual influence and weak contrasts.

On the east side of the Columbia River, impacts would result from SR-243 travelers viewing the route segment briefly as it crosses the highway and residences viewing the route segment from Wanapum Village. Both sensitive viewers would see the route segment in the context of the Priest Rapids Dam and existing transmission line corridor with an industrial development character. Low impacts would result on these viewers. Ginkgo Petrified Forest NNL's Wanapum Recreation Area boat launch is located in the in the seldom seen distance zone within the Project study area and views are typically screened by topography. Therefore low or no impacts on the NNL are expected from Route Segment NNR-8.

Agency Management Compliance

BLM Interim VRM Class III lands are crossed between MP 0.0 and MP 0.4. Route Segment NNR-8 would be compliant with the Interim VRM Class III from KOP 21 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 route segment would be compliant with the Interim VRM Class III.

Route Segment NNR-8 would be consistent with the Kittitas County Comprehensive Plan and Grant County PUD 2010 Final Shoreline Management Plan.

4.8.5.18 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 Route Segment MR-1. 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 conductor wires 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 (RDF 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 route segment 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 route segment at this location, 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 structures, 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 route segment. I-82 travelers would have very brief and limited views of the route segment 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 route segment 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, Route Segment MR-1 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 route segment would cross the highway at the entrance to the rest area, away from the primary viewing orientation, with several structures being visible from the Manastash Ridge Viewpoint. The route segment 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 route segment in this location.

From the I-82 eastbound viewpoint, Route Segment MR-1 would be seen from a superior position and at a greater distance. More of the route segment 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 route segment and impacts would be moderate to low.

From the Badger Pocket residential and agricultural area, the route segment would be skylined and viewed against Manastash Ridge in an area that is undeveloped on JBLM. 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 4.8-8a Residual Visual Impact Summaries by Route Segment and Design Option

VISUAL IMPACT	ROUTE SEGMENT (MILES OF IMPACT)									
	1a/NNR-1	1b	1c	2a	2b	2c	2d	3a	3b	3c
Impacts on Viewers										
Residential (High Sensitivity)										
High	1.8	1.3	0.5	0	0.2	0	0	0	0	0
Moderate	0	2.0	0.4	0.2	0.1	1.7	0	0.2	0	0
Low	0.8	1.7	8.4	4.4	4.3	0.1	6.4	6.2	8.2	2.7
Recreational and Travelers (High Sensitivity)										
High	0	0	0.5	0	0	0	0	0.2	0	0
Moderate	0	2.9	0.4	0	0	0	0	0.1	0	0
Low	2.4	2.1	8.4	4.6	4.6	1.8	6.4	6.1	8.2	2.7
Recreational and Travelers (Moderate Sensitivity)										
High	0.6	1.0	0.4	0	0.2	0	0	0	0	0
Moderate	1.0	1.2	0.6	0	0.5	0	0	0	0	0
Low	0.8	2.8	8.3	4.6	3.9	1.8	6.4	6.4	8.2	2.7
Impacts on Scenic Quality										
High	-	0	0	-	-	0	-	-	-	-
Moderate	-	0.1	0.6	-	-	1.4	-	-	-	-
Low	-	0.1	0.2	-	-	0	-	-	-	-
Interim VRM Class III Compliance										
Compliant	-	-	3.9	-	-	-	-	-	-	0.4
Non-Compliant	-	-	0	-	-	-	-	-	-	

Table 4.8-8b Residual Visual Impact Summaries by Route Segment and Design Option

VISUAL IMPACT	ROUTE SEGMENT (MILES OF IMPACT)									
	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	1.3	0.5	0	0.2	0	0	0	0	0	4.2
Moderate	2.0	0.4	0.2	0.1	1.7	0	0.2	0	0	2.6
Low	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	0.5	0	0	0	0	0.2	0	0	1.2
Moderate	2.9	0.4	0	0	0	0	0.1	0	0	0.4
Low	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	1.0	0.4	0	0.2	0	0	0	0	0	0.7
Moderate	1.2	0.6	0	0.5	0	0	0	0	0	4.0
Low	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	-	-	-	-	-	-	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 line 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.
VIS – 3: Span Matching of Existing Structures	To the extent practicable and within the limits of standard structure design, Pacific Power shall match existing structure spacing, spans and heights as closely as possible to reduce visual complexity as seen from high concern viewpoints.
VIS – 4: Avoid Skylining of Structures	To the extent practical, Pacific Power shall design and locate transmission structures so that they do not break the skyline or are directly on the skyline when viewed from sensitive viewpoints.

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 1a/NNR-1: MP 0.8-2.3
- Route Segment 1c: MP 10.2-10.7
- Route Segment 3b: MP 19.1-19.3 (Interim VRM Class III mitigation)
- Route Segment 1a/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 3b: MP 15.7-15.8, 17.3-17.4, 17.8-17.9, 18.2-18.3, 18.9-19.0, and 20.3-20.4
- Route Segment 3c: MP 3.9-4.0, 19.2-19.3 (Interim VRM Class III mitigation), 21.1-21.2, 21.3-21.4, and 24.1-24.2
- 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

To minimize the effects of structure contrast, mitigation measure *VIS-3: Span Matching of Existing Structures* would be implemented in specific locations as necessary. Mitigation measure VIS-5 would be effective at reducing impacts by grouping transmission structures, reducing impact from high to moderate, or moderate to low. Matching existing spans of transmission line structures would help to consolidate structure contrasts and minimize the proliferation of vertical elements that may be perceived of as introducing a visual "barrier' in the landscape if they were offset. This mitigation measure would be implemented in the following locations:

- Route Segment 1a/NNR-1: MP 0.0-0.8
- Route Segment 2c: MP 12.6-13.0
- Route Segment 3c: MP16.0-16.2 and 17.0-17.9 (Interim VRM Class III mitigation)

To minimize the effects of structure contrast, mitigation measure *VIS-4: Avoid Skylining of Structures* would be implemented in specific locations as necessary. Mitigation measure VIS-6 would be effective at reducing impacts by increasing the landscape "backdropping" that typically reduces the visibility of structures and conductors. This mitigation measure would be implemented in the following locations:

- Route Segment 1b: MP 6.5-6.7
- Route Segment 1c: MP 6.4-6.6
- Route Segment 2d: MP 6.1-6.2
- Route Segment 3c: MP 18.9-19.0 and 19.4-19.5 (Interim VRM Class III mitigation)

Table 4.8-10 Project Residual Impacts by Route Segment and Design Option

ROUTE SEGMENT	RESIDUAL IMPACTS (MILES)		
	Low	Moderate	High
1a/NNR-1 2.4 miles	0.8	0	1.8
1b 12.5 miles	1.0	8.8	2.8
1c 12.9 miles	0.3	6.5	6.2
2a 1.0 mile	0	0.9	0.1
2b 16.4 miles	1.8	14.5	0.1
2c 18.1 miles	9.2	8.3	0.7
2d 7.0 miles	0.3	3.6	3.1
3a 0.1 mile	0.1	0	0
3b 21.7 miles	2.3	11.8	7.7
3c 25.4 miles	7.3	10.4	7.5

ROUTE SEGMENT	RESIDUAL IMPACTS (MILES)		
	Low	Moderate	High
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 proposed 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 Action Alternatives

Table 4.8-11 presents a summary of the residual impact levels for each Action Alternative following the implementation of mitigation measures.

Alternative H would have the highest total mileage of high impacts on visual resources while the NNR Alternative - Overhead Design Option would have the lowest total mileage of high impacts on visual resources. Alternative B would have the highest mileage of moderate visual impacts and while the NNR Alternative - Overhead Design Option would have the lowest total mileage of moderate impacts on visual resources. Alternatives E, F G, and H would cause higher impacts on residences in the Moxee Valley. Alternatives A, C, D, and H would cause higher visual impacts recreational viewers in the Saddle Mountains, Milwaukee corridor, and residences located in the vicinity of Beverly. Alternatives B, C, E, and G would have higher impacts on residences viewing from Desert Aire and recreationists using Priest Rapids Reservoir. All Action Alternatives would be compliant with Interim VRM Class III designation.

Table 4.8-11 Visual Resource Residual Impact Summary by Action Alternative After Mitigation

ACTION ALTERNATIVE	RESIDUAL IMPACTS (MILES)		
	Low	Moderate	High
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.7 miles	16.5	37.9	10.3
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.2 miles	16.7	39.3	5.2

ACTION ALTERNATIVE	RESIDUAL IMPACTS (MILES)		
	Low	Moderate	High
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 63.0 miles	17.3	33.1	12.6
Alternative D 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.5 miles	18.7	31.7	16.1
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.6 miles	20.1	37.0	4.5
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 65.1 miles	20.1	35.4	9.6
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.4 miles	22.1	30.8	11.9
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.8 miles	20.4	29.4	17.0
NNR Alternative - Overhead Design Option* NNR-1, NNR-2, NNR-3, NNR-4 NNR-5, NNR-6, NNR-7, NNR-8 40.5 miles	32.6	3.5	4.4
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u NNR-5, NNR-6u, NNR-7, NNR-8 40.5 miles	31.5	4.1	4.9
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6, NNR-7, NNR-8 47.8 miles	28.5	5.6	13.7

*Agency Preferred Alternative

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 Grant, Kittitas, and Yakima counties). Benton County is included when being considered for total costs or taxes. 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 Action 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 expenditure. Operation and maintenance would largely consist of visual inspection via helicopter and road vehicles and periodic repair and/or replacement of worn components. The miles of new transmission line would be a small proportion of the Proponent's total transmission line mileage and, thus, operation and maintenance would likely be performed by existing crews with any apportionment of cost to the Action 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.

Because the Action Alternatives presented in the Draft Environmental Impact Statement (DEIS; Alternatives A-H) are so close to one another in terms of total investment and work forces, the socioeconomic impact analysis used a “prototype” project, rather than specifically analyzing each of these Action Alternatives. The “prototype” project was Alternative F as it presented the midrange in terms of labor costs. Since the DEIS Action Alternatives are being analyzed together, they will be referred to as “Alternatives A-H.” The New Northern Route (NNR) Alternative and NNR Alternative – Manastash Ridge (MR) Subroute were analyzed independently and are presented as such.

The primary distinction among the Action Alternatives in terms of their impacts on employment and income would arise from their locations. The Action Alternatives with activities on the east side of the Columbia River, in Grant County, would create some of their impacts in Grant County while the other Action Alternatives would create impacts in Yakima and Kittitas counties with very little effect in Grant County. To facilitate a comparison of impacts among all Action Alternatives, differences were qualitatively assessed, based on the impacts of the “prototype” project.

4.9.2 Estimated Construction Cost (by Action Alternative)

Estimated construction costs vary slightly among Action Alternatives due to their different lengths, configuration of poles and roads, and terrain. Estimates of the total cost of construction by Action Alternative indicate a range of $17.3 million (NNR Alternative – Overhead Design Option) and $31.3 million (Alternative G). Construction costs are summarized in Table 4.9-1. These estimates show that approximately $17.3 to $31.3 million of the total cost would be for the purchases of goods and services.

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 2-4) 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 mid-2017-2018. During that year, the average number of on-site workers would be 41 construction workers for Alternatives A-H and 26 construction workers for the NNR Alternative and NNR Alternative - MR Subroute, plus approximately five visiting personnel for all Action 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 Action Alternative, 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. This creates “ripple” or “multiplier” effects whereby the total impact is a multiple of the original economic stimulus. 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 $17.3 to $31.3 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 1.8 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 4.9-1 Summary of Mileage by County, Construction Costs, and Labor Force by Action Alternative

ACTION ALTERNATIVE	TOTAL MILES	MILES IN BENTON COUNTY	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 (10%)
Alternative A	64.7	3.1	22.8	0	38.8	$28,605,725	$443,500	$13,762,651	$1,871,403	$12,971,672	40.9	$3,574,714	$357,417
Alternative B	61.2	0.7	2.2	9.5	48.8	$30,780,488	$504,598	$13,826,028	$2,013,677	$14,940,783	41.1	$3,591,176	$359,118
Alternative C	63.0	0.7	2.2	9.5	50.6	$30,973,053	$493,201	$13,662,636	$2,026,274	$15,284,143	40.6	$3,548,736	$354,874
Alternative D	66.5	3.1	22.8	0	40.6	$28,908,071	$436,019	$13,701,858	$1,891,182	$13,315,031	40.7	$6,161,064	$440,076
Alternative E	61.6	0.7	2.2	9.5	49.2	$30,886,605	$503,039	$13,897,532	$2,020,619	$14,968,453	41.3	$3,609,749	$360,975
Alternative F	65.1	3.1	22.8	0	39.2	$28,648,283	$441,422	$13,774,755	$1,874,187	$12,999,342	41.0	$3,577,858	$357,786
Alternative G	63.4	0.7	2.2	9.5	51.0	$31,269,843	$494,776	$13,912,339	$2,045,691	$15,311,813	41.4	$3,613,595	$361,359
Alternative H	66.8	3.1	22.8	0	40.9	$29,865,258	$468,636	$13,790,920	$1,953,802	$14,120,536	41.0	$3,582,057	$358,206
NNR Alternative	40.5	0	2.2	27.6	10.7	$17,276,424	$427,634	$8,882,827	$1,130,233	$7,263,364	26.4	$4,033,823	$288,130
NNR Alternative with MR Subroute	47.8	0	2.2	34.9	10.7	$19,780,301	$414,681	$10,175,696	$1,294,038	$8,310,567	30.2	$4,620,934	$330,037

Source: POWER 2011a and calculations by Economic Planning Resources. Economic Planning Resources' 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. Numbers may not sum precisely due to rounding.

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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
			ALTERNATIVES A-H	NNR ALTERNATIVE*	NNR ALTERNATIVE - MR SUBROUTE	
Aggregate	0.01	100	$100,000	$80,000	$90,000	26
Fencing and security	0.29	100	$37,298	$20,770	$23,769	323
Preformed concrete	0.27	50	$17,214	$9,586	$10,971	162
Electrical materials	79.58	2	$205,311	$114,333	$130,842	266
Misc. materials	0.02	75	$2,152	$1,198	$1,371	330
Real estate	1.36	100	$175,013	$97,461	$111,533	360
Equipment rental	14.08	50	$908,061	$505,679	$578,694	365
Research	0.20	100	$25,822	$14,380	$16,456	376
Advertising and printing	0.76	50	$48,774	$27,161	$31,083	377
Signage	0.07	75	$6,455	$3,595	$4,114	378
Management consultants	0.56	25	$17,932	$9,986	$11,428	374
Temporary hires	1.36	100	$175,013	$97,461	$111,533	382
Misc. services	0.04	100	$5,738	$3,195	$3,657	389
Fees	1.42	50	$91,810	$51,127	$58,509	432
Totals	100.0		$1,816,594	$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.
*Agency Preferred Alternative

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 recreation vehicle [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 1.7 million during the year of construction (assumed to be mid-2017-2018). 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			CONSTRUCTION TOTAL			IMPLAN SECTOR
	ALTS A-H	NNR ALT*	NNR ALT - MR SUBROUTE	ALTS A-H	NNR ALT*	NNR ALT - MR SUBROUTE	
Number workers	36.9	23.7	30.2		23.7	30.2	
Number visitors	5	5	5		5	5	
Lodging	$40	$40	$40	$611,153	$419,706	$512,498	411
Restaurants	$20	$20	$20	$305,577	$209,853	$257,149	413

CATEGORY	DAILY EXPENDITURES			CONSTRUCTION TOTAL			IMPLAN SECTOR
	ALTS A-H	NNR ALT*	NNR ALT - MR SUBROUTE	ALTS A-H	NNR ALT*	NNR ALT - MR SUBROUTE	
Entertainment	$10	$10	$10	$152,788	$104,927	$128,574	410
Food Stores	$15	$15	$15	$229,182	$157,390	$192,862	324
Misc. (gas, etc.)	$20	$20	$20	$305,577	$209,853	$257,149	330
Car rental (visitors only)	$50	$50	$50	$91,250	$91,250	$91,250	362
Total spending onsite workers	$155	$155	$155	$155	$155	$155	
Total daily spending	$4,017	$4,017	$4,017		$4,456	$5,460	
Annual spending				$1,695,527	$1,192,979	$1,441,982	

*Agency Preferred Alternative

4.9.5 Impact Types

4.9.5.1 Employment

Construction of the Project would provide an average of 26 to 41 jobs (peak of 45) 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 peak of 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 mid-2017-2018, 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 Utility 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

To consolidate the presentation of data tables, Alternatives A-H, the NNR Alternative with Design Options and MR Subroute, and the No Action Alternative are presented for each segment of socioeconomics. A summary of the impacts of each Alternative is presented in Section 4.9.4.2.

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.

4.9.6.1 Impacts of Action Alternatives

Employment

Impacts on employment would be generally very small under any Action Alternative. The impacts of 23.7 to 41.0 direct jobs would transfer, including all ripple effects, to a total of 58.9 to 66.3 jobs for the NNR Alternative and NNR Alternative - MR Subroute, respectively, and a total of 88 jobs for Alternatives A-H based on the IMPLAN analysis. This indicates a relatively high employment multiplier of approximately 2.2. 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. Only very minor differences among Alternatives A-H would exist because employment is estimated to vary by so little (40.6 to 41.4 jobs on average for one year). The IMPLAN analysis results are displayed in Table 4.9-4.

It is notable that the ripple effects and impact multipliers 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.

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. Action Alternatives not involving Grant County (Alternatives B, C, E, and G) would likely result in the bulk of the total Study Region impacts occurring in Yakima and Kittitas counties. The Action Alternatives involving locations in Grant County (Alternatives A, D, F, and H) would likely create greater impacts in Grant County, since nearly half of construction activities and, thus, demand for housing, food, and miscellaneous retail goods would take place in Grant County. Under the NNR Alternative and NNR Alternative - MR Subroute, 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.

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				
Alternatives A-H	41.0	$4,013,778	$15,648,941	$28,648,283
NNR Alternative	23.7	$2,881,302	$8,874,410	$17,276,424
NNR Alternative - MR Subroute	30.2	$3,300,667	$10,166,054	$19,780,301
Ripple Effects				
Direct Effect (suppliers)				
Alternatives A-H	34.8	$1,004,928	$1,743,835	$3,036,853
NNR Alternative	24.0	$711,967	$1,233,984	$2,187,328
NNR Alternative - MR Subroute	26.6	$793,135	$1,372,718	$2,434,541
Indirect Effect (supply chain)				
Alternatives A-H	4.8	$203,186	$310,435	$569,514
NNR Alternative	3.2	$142,559	$217,396	$406,740
NNR Alternative - MR Subroute	3.6	$158,797	$242,242	$452,604
Induced Effect (re-spending of household income)				
Alternatives A-H	7.5	$271,813	$475,723	$791,508
NNR Alternative	5.2	$201,116	$351,862	$579,080
NNR Alternative - MR Subroute	5.9	$225,723	$394,916	$649,933
Total Ripple Effects				
Alternatives A-H	47.1	$1,479,927	$2,529,993	$4,397,875
NNR Alternative	32.5	$1,055,641	$1,803,242	$3,173,148
NNR Alternative - MR Subroute	36.1	$1,177,655	$2,009,877	$3,537,077
Total Impact				
Alternatives A-H	88.1	$5,493,705	$18,178,934	$33,046,158
NNR Alternative	58.9	$3,936,943	$10,884,287	$20,449,572
NNR Alternative - MR Subroute	66.3	$4,478,322	$12,175,931	$23,317,378
Impact Multiplier				
Alternatives A-H	2.15	1.37	1.16	1.15
NNR Alternative	2.23	1.37	1.23	1.18
NNR Alternative - MR Subroute	2.20	1.36	1.20	1.18

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). Labor income would increase for all Action Alternatives (Table 4.9-5).

Impacts on labor income would be similar compared to the labor income of the Study Region than impacts on employment. Compared to total personal income of about $13.8 billion in the Study Region in 2013, the total impact of the proposed Project of $3.9 million to $5.5 million would be 0.03 and 0.04 percent for the NNR Alternative and Alternatives A-H, respectively.

Table 4.9-5 Current and Project Labor Income by Action Alternatives

ACTION ALTERNATIVE	LABOR INCOME	WAGE AND BENEFIT PAYMENTS	INCOME MULTIPLIER
Alternatives A-H	$5,500,000	$4,000,000	1.38
NNR Alternative*	$3,936,943	$2,881,302	1.37
NNR Alternative - MR Subroute	$4,478,322	$3,300,667	1.36

*Agency Preferred Alternative

Only very minor differences among Alternatives A-H would occur because wages paid and purchases of local goods and services vary by extremely small amounts.

Population and Housing

Only three or four 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 15 to 20 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 or four jobs expected to be filled by local hires and the 8 to 12 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 2.74 in 2010 (Table 3.9-3, Section 3.9.2.3). If in-migrants bring with them households of this size, the population impact of the Project would be 43 to 58 persons. This estimate may be high as persons who migrate for employment opportunities generally have smaller household sizes than the general population. This represents an unnoticeable increase in the 2013 Study Region population of 386,970 (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 3.9-3, Section 3.9.2.3), the local rental and ownership housing supply can readily accommodate an increase in demand of an estimated 15 to 20 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, transient workers would number about 50 persons. Some of the itinerant construction workers would travel via RVs, increasing demand for RV spaces, with the remainder seeking hotel rooms and a few renting temporary housing.

As described in Section 3.9.2.3, RV and hotel spaces close to the Action Alternatives 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 distances, 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 any of the Action Alternatives; 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.

4.9.6.4 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.

Between $160,041 and $248,707 in sales and use taxes are estimated to be paid due to the Project, shown in Table 4.9-6. These estimates are based on the local and state sales and use tax rates, the value of local purchases of Project construction in Table 4.9-2 and itinerant worker spending effects shown in Table 4.9-3 and are adjusted to reflect likely locations of purchases. The estimates are conservative, however, since they assume spending is taxable at county rates and do not include spending arising due to the multiplier effects on personal income (and spending) or spending by local residents who work on the construction site. As a result of construction, Alternatives A-H would result in 32 percent more total sales and use tax revenues than the NNR Alternative - MR Subroute and 55 percent more than the NNR Alternative (Table 4.9-6).

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 4.9-7 indicate a total of $209,352 to $236,718 in property taxes would be paid to the counties and the state in the first taxable year. Alternative G would result in the most property tax payments and the NNR Alternative the least (Table 4.9-7).

Table 4.9-6 Sales and Use Taxes Paid to Counties

AREA / REGION	TAX RATE	CONSTRUCTION PURCHASES (%)	PER DIEM SPENDING (%)	SALES AND USE TAX REVENUE – CONSTRUCTION PURCHASES			SALES AND USE TAX REVENUE – PER DIEM SPENDING			SALES AND USE TAX REVENUE – TOTAL TAXES		
				ALTS A-H	NNR ALT*	NNR ALT – MR SUB-ROUTE	ALTS A-H	NNR ALT*	NNR ALT - MR SUB-ROUTE	ALTS A-H	NNR ALT*	NNR ALT – MR SUB-ROUTE
Benton County	0.012	0.1	0	$1,744	$0	$0	$0	$0	$0	$1,744	$0	$0
Grant County	0.014	10%	10%	$2,035	$1,183	$1,337	$0	$1,670	$2,018	$2,035	$2,853	$3,355
Kittitas County	0.015	50%	55%	$1,090	$6,336	$7,164	$2,543	$9,842	$11,891	$3,633	$16,178	$19,054
Yakima County	0.014	30%	30%	$15,259	$3,548	$4,012	$21,364	$5,011	$6,053	$36,623	$8,558	$10,065
State	0.065	100%	100%	$94,463	$54,909	$62,086	$110,209	$77,544	$93,683	$204,672	$132,452	$155,769
Total	-	-	-	$114,591	$65,976	$74,599	$134,116	$94,067	$113,645	$248,707	$160,041	$188,243

*Agency Preferred Alternative

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.

Table 4.9-7 Property Taxes Paid to Counties and State, by Action Alternative[1]

AREA / REGION	A	B	C	D	E	F	G	H	NNR ALT*	NNR ALT – MR SUB-ROUTE
Total Cost	$28,605,725	$30,780,488	$30,973,053	$28,908,071	$30,886,605	$28,648,283	$31,269,843	$28,850,000	$17,276,424	$19,780,301
Total Miles	64.5	61.0	62.8	66.3	61.4	64.9	63.2	66.7	40.4	47.7
Benton	3.1	0.7	0.7	3.1	0.7	3.1	0.7	3.1	0.0	0.0
Grant	22.8	2.2	2.2	22.8	2.2	22.8	2.2	22.8	2.2	2.2
Kittitas	0.0	9.5	9.5	0.0	9.5	0.0	9.5	0.0	27.6	34.9
Yakima	38.6	48.6	50.5	40.3	49.1	39.0	50.9	40.7	10.6	10.6
PERCENT IN COUNTY										
Benton	4.8%	1.1%	1.1%	4.7%	1.1%	4.8%	1.1%	4.6%	0%	0%
Grant	35.3%	3.6%	3.5%	34.4%	3.6%	35.1%	3.5%	34.2%	5.4%	4.6%
Kittitas	0.0%	15.6%	15.1%	0.0%	15.4%	0.0%	15.0%	0.0%	68.3%	73.2%
Yakima	59.8%	79.7%	80.4%	60.9%	79.8%	60.1%	80.4%	61.1%	26.2%	22.2%
PROPERTY TAXES										
Benton	$16,211	$4,165	$4,064	$15,961	$4,145	$16,135	$4,077	$15,833	-	-
Grant	$131,843	$14,474	$14,125	$129,81	$14,406	$131,224	$14,170	$128,776	$12,267	$11,895
Kittitas	-	$42,165	$41,148	-	$41,967	-	$41,279	-	$103,817	$127,300
Yakima	$198,755	$284,721	$288,711	$204,317	$286,295	$199,874	$291,929	$204,693	$52,628	$51,034
Total Counties	$346,809	$345,526	$348,047	$350,093	$346,813	$347,234	$351,456	$349,303	$168,712	$190,228
State	$69,397	$72,215	$72,658	$70,064	$72,462	$69,484	$73,353	$69,908	$40,640	$46,490
Total State and Counties	$416,205	$417,741	$420,705	$420,157	$419,275	$416,718	$424,809	$419,211	$209,352	$236,718

*Agency Preferred Alternative

[1]Note: Average Property Tax Rates (per $1,000); Benton – 11.7907963; Grant – 13.03854; Kittitas – 8.79603366; Yakima – 11.61015016; State – 2.298, 2.594, 2.2.339, and 2.337 for Benton, 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 Action 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 Action Alternatives or the No Action Alternative.

Right-of-Way Lease Payment
Payments for use of public lands would be made under each Action 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 calculate 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 Action 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 Action Alternative, the annual rent payments in 2015 are shown in Tables 4.9-8 and 4.9-9. The rental rates escalate each year by 1.9 percent. These estimates indicate a wide range among Action Alternatives of ROW rent payments to BLM ranging from $2,194 to $7,806.

Substantial line distances would traverse the JBLM YTC for Alternatives A-D and the NNR Alternative and NNR Alternative - MR Subroute, but little or no distance for Alternatives E-H. Payments for use of JBLM YTC land for ROWs would be made for Action Alternatives crossing 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 4.9-8 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 4.9-8 and the distances in the JBLM YTC for each Action Alternative (see Table 2-1), it was determined that all Action Alternatives except Alternatives F and H would result in payments of over $9,000 annually (for Alternatives F and H, no ROW in JBLM YTC lands would be needed). This substantial use means that the BLM schedule of costs would probably not be a good proxy for the ultimate price charged by the USACE for JBLM YTC ROWs for the Project. In the absence of the appraisal needed upon which to base a preliminary cost estimate, no estimate of the approximate ultimate payments is possible at this time.

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 45 people in the three-county Study Region plus Benton County). 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 firefighting services would be expected for all Action Alternatives. Operation and maintenance 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.

Table 4.9-8 BLM ROW By Action Alternative

COUNTY	2015 RENT PER ACRE	A	B	C	D	E	F	G	H	NNR ALT*	NNR ALT – MR SUB-ROUTE
Grant	$68.97	4.4 acres	0 acres	0 acres	4.4 acres	0 acres	4.4 acres	0 acres	4.4 acres	0 acres	0 acres
Kittitas	$172.43	0 acres	0.4 acres	0.4 acres	0 acres	0.4 acres	0 acres	0.4 acres	0 acres	1.8 acres	1.8 acres
Yakima	$51.73	1.7 acres	1.7 acres	1 acres	1 acres	1.7 acres	1.7 acres	1 acres	1 acres	2.3 acres	2.3 acres
Total		6.1 acres	2.1 acres	1.4 acres	5.4 acres	2.1 acres	6.1 acres	1.4 acres	5.4 acres	4.1 acres	4.1 acres

*Agency Preferred Alternative
Source: BLM 2015.

Table 4.9-9 Annual ROW Rental Payments to BLM, 2015

COUNTY	A	B	C	D	E	F	G	H	NNR ALT*	NNR ALT – MR SUB-ROUTE
Grant	$5,517	$0	$0	$5,517	$0	$5,517	$0	$5,517	$0	$0
Kittitas	$0	$1,254	$1,254	$0	$1,254	$0	$1,254	$0	$5,643	$5,643
Yakima	$1,599	$1,599	$940	$940	$1,599	$1,599	$940	$940	$2,163	$2,163
Total	$7,116	$2,853	$2,194	$6,457	$2,853	$7,116	$2,194	$6,457	$7,806	$7,806

*Agency Preferred Alternative
Source: BLM 2015.

4.9.4.2 Impact Summary by Action Alternative

Table 4.9-10 presents a summary of the impacts for all of the Action Alternatives.

Socioeconomic impacts on the Study Region economy would be predominantly beneficial, as job opportunities increase due to any of the Action Alternatives. Impacts as a whole would not greatly vary between the Action 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 Action Alternatives, as was shown in Table 4.9-1. Average on-site employment would total between 26 and 41 workers among Action Alternatives and the total cost of construction would range from $17.3 million to $31.3 million.

The primary distinction in the impacts among Action Alternatives arises from their location. The Columbia River presents a barrier to movement of people and goods between Grant County and Yakima and Kittitas counties. Work sites located on the Grant County side of the Columbia River can readily be accessed from Grant County residence sites, but have poor access from residence sites across the Columbia River in Yakima and Kittitas counties. As a result, the Action Alternatives that have appreciable distances in Grant County (A, D, F, and H) would bring increased demand for housing, both long-term and transient, in Grant County compared to Yakima and Kittitas counties.

Long-term housing supplies (rental and owner housing) are adequate to accommodate small increases in demand under any Action Alternative. However, the Grant County supply of transient housing (RV spaces and hotel rooms) near the Action Alternatives 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 Substation 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. It is anticipated that this impact would be very temporary. Furthermore, potential impacts on transient housing availability in Grant County would be offset because more of the region's employment and income benefits would occur in Grant County, less in Yakima and Kittitas counties, under Alternatives A, D, F, and H.

Table 4.9-10 Socioeconomic Impact Summary of Action Alternatives

ACTION ALTERNATIVES	IMPACT ON EMPLOYMENT AND INCOME	IMPACT ON POPULATION	IMPACT ON HOUSING	IMPACT ON GOVERNMENT REVENUE[1]
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.7 miles	Impact approximately equal to Alternative F.	Impact approximately equal to Alternative F.	Impact approximately equal to Alternative F.	-County Property Tax: $346,809 -State Property Tax: $69,397 -BLM ROW Rent: $7,116
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.2 miles	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Greater potential for excess transient accommodation demand in Kittitas and Yakima counties than under Alternative F; no potential in Grant County for excess demand.	-County Property Tax: $345,526 -State Property Tax: $72,215 -BLM ROW Rent: $2,853
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 63.0 miles	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Greater potential for excess transient accommodation demand in Kittitas and Yakima counties than under Alternative F; no potential in Grant County for excess demand.	-County Property Tax: $348,047 -State Property Tax: $72,658 -BLM ROW Rent: $2,194

ACTION ALTERNATIVES	IMPACT ON EMPLOYMENT AND INCOME	IMPACT ON POPULATION	IMPACT ON HOUSING	IMPACT ON GOVERNMENT REVENUE[1]
Alternative D 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.5 miles	Impact approximately equal to Alternative F.	Impact approximately equal to Alternative F.	Impact approximately equal to Alternative F.	-County Property Tax: $350,093 -State Property Tax: $70,064 -BLM ROW Rent: $6,457
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.6 miles	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Greater potential for excess transient accommodation demand in Kittitas and Yakima counties than under Alternative F; no potential in Grant County for excess demand.	-County Property Tax: $346,813 -State Property Tax: $72,462 -BLM ROW Rent: $2,853
Alternative F 1a, 1b, 2a, 2b, 2d, 3a, 3c 65.1 miles	Temporary (one year) increase to Study Region employment of 88 jobs or 0.02 percent of Study Region total employment and $5.5 million in personal income. Noticeable proportion of jobs in Grant County.	An impact of an increase in population of 45; nearly imperceptible in light of baseline population.	Increase of demand for long-term housing of approximately 50 spaces/rooms. Potential excess demand in Grant County.	-County Property Tax: $347,234 -State Property Tax: $69,484 -BLM ROW Rent: $7,116
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.4 miles	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Greater potential for excess transient accommodation demand in Kittitas and Yakima counties than under Alternative F; no potential in Grant County for excess demand.	-County Property Tax: $351,456 -State Property Tax: $73,353 -BLM ROW Rent: $2,194
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.8 miles	Impact approximately equal to Alternative F.	Impact approximately equal to Alternative F.	Impact approximately equal to Alternative F.	-County Property Tax: $349,303 -State Property Tax: $69,908 -BLM ROW Rent: $6,457
NNR Alternative* NNR-1, NNR-2, NNR-3, NNR-4 NNR-5, NNR-6, NNR-7, NNR-8 40.5 miles	Temporary (one year) increase to Study Region employment of 59 jobs or 0.01 percent of Study Region total employment and $3.9 million in personal income.	An impact of an increase in population of 45; nearly imperceptible in light of baseline population.	Increase of demand for long-term housing of approximately 50 spaces/rooms. Temporary and very slight increase in demand and potential slight crowding and/or price increases during peak tourist season of summer and fall.	-County Property Tax: $168,712 -State Property Tax: $40,640 -BLM ROW Rent: $7,806

ACTION 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 47.8 miles	Temporary (one year) increase to Study Region employment of 66 jobs or 0.01 percent of Study Region total employment 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 Alternative with no MR Subroute, but minimal.	-County Property Tax: $190,228 -State Property Tax: $46,490 -BLM ROW Rent: $7,806

[1]Reliable estimates of the total costs of ROW payments for Action 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 Action Alternatives.
*Agency Preferred Alternative

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 Action Alternatives 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 and Section 4.16 - Public Health and Safety). Pacific Power 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. 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 to 345 kilovolts. 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, 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 (U.S. Environmental Protection Agency 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 Action Alternatives. The results of analyses of race/ethnicity and low-income statuses for Census Block Groups in which the Action Alternatives are located or are within a three-mile radius were summarized in Section 3.10. The primary outcomes of the analysis were that: 1) overall, the Action Alternatives traverse some Block Groups with substantially above-average presence of Latinos, but not other minorities and low-income persons, relative to the Project study area (comprised of Benton, Grant, Kittitas, and Yakima counties); and 2) because the set of Census Block Groups traversed by each of the Action Alternatives is so similar, the distinctions among Action Alternatives are negligible.

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.

4.10.2 Impact Level

4.10.2.1 Minority Populations

As previously discussed in Section 3.10, four of the nine Action Alternatives are within 3 miles of the same Census Block Groups as one other Action Alternative, meaning there are only five distinct sets of Block Groups out of the nine Action Alternatives (four sets of duplicate Block Group lists). The New Northern Route (NNR) Alternative with or without the Manastash Ridge (MR) Subroute are all within three miles of the same Census Block Groups. Additionally, the only difference in the route segments, MR-1, is not within three miles of any communities.

The Block Groups with particularly high proportions of minority populations were identified. This identification entailed 1) ranking Census Block Groups from highest to lowest presence of minorities, and 2) identifying Block Groups that are outliers in terms of minority population. “Outliers” was defined as having a proportion of a minority over 150 percent of the proportion of that minority in the four-county Project study area which contained 39.3 percent minority population. Therefore, all outlier Block Groups contained at least 58.9 percent minority population. It should be noted that Block Group 1, Census Tract 120 in Benton County was removed from this analysis due to having insufficient sample size with a total population of only 5 people. By comparison, the next lowest Block Group contained 644 people and the average Block Group contained a total population of 1,789 people.

Use of the 150 percent threshold resulted in a list of Block Groups that contained Latino populations of 51% or higher. Only Block Group 2, Census Tract 1 in Yakima County contained a non-Latino minority population which met the 150 percent threshold. This Block Group contained a 5.7 percent Black or African American population and a 7.2 percent American Indian and Native Alaskan population. The populations of these two minorities in the Block Group were 115 and 147, respectively, considered large enough to be a concern. The racial and ethnic compositions of Block Groups that were identified as potentially affected using this criterion are detailed in Table 4.10-1.

Table 4.10-1 Potentially Affected Census Block Groupse Based on Minority Populations

BLOCK GROUP	ALTER-NATIVES	TOTAL	MINORITY		HISPANIC OR LATINO		NOT HISPANIC OR LATINO		WHITE ALONE		BLACK OR AFRICAN AMERICAN ALONE		AMERICAN INDIAN AND ALASKA NATIVE ALONE		ASIAN ALONE		NATIVE HAWAIIAN AND OTHER PACIFIC ISLANDER ALONE		SOME OTHER RACE ALONE		TWO OR MORE RACES	
		#	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Block Group 3, Census Tract 114.02, Grant County	A, B, C, D, E, F, G, H	5,937	5,529	93.1	5,481	92.3	456	7.7	408	6.9	12	0.2	10	0.2	5	0.1	0	0.0	10	0.2	11	0.2
Block Group 1, Census Tract 6, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	1,537	1,333	86.7	1,269	82.6	268	17.4	204	13.3	27	1.8	15	1.0	2	0.1	0	0.0	0	0.0	20	1.3
Block Group 2, Census Tract 6, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	2,394	2,002	83.6	1,901	79.4	493	20.6	392	16.4	32	1.3	20	0.8	7	0.3	0	0.0	0	0.0	42	1.8
Block Group 2, Census Tract 2, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	1,362	1,111	81.6	1,051	77.2	311	22.8	251	18.4	12	0.9	21	1.5	5	0.4	0	0.0	0	0.0	22	1.6
Block Group 3, Census Tract 2, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	1,364	1,017	74.6	949	69.6	415	30.4	347	25.4	20	1.5	23	1.7	9	0.7	0	0.0	1	0.1	15	1.1
Block Group 1, Census Tract 2, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	2,827	2,104	74.4	1,895	67.0	932	33.0	723	25.6	61	2.2	71	2.5	15	0.5	1	0.0	14	0.5	47	1.7
Block Group 4, Census Tract 114.02, Grant County	A, B, C, D, E, F, G, H, NNR - MR Subroute	1,377	967	70.2	946	68.7	431	31.3	410	29.8	0	0.0	12	0.9	3	0.2	0	0.0	1	0.1	5	0.4
Block Group 1, Census Tract 118, Benton County	A, B, C, D, E, F, G, H	644	449	69.7	437	67.9	207	32.1	195	30.3	1	0.2	5	0.8	1	0.2	0	0.0	1	0.2	4	0.6
Block Group 2, Census Tract 1, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	2,034	1,360	66.9	1,045	51.4	989	48.6	674	33.1	115	5.7	147	7.2	9	0.4	0	0.0	7	0.3	37	1.8
Block Group 1, Census Tract 114.02, Grant County	A, B, C, D, E, F, G, H	2,516	1,495	59.4	1,453	57.8	1,063	42.2	1,021	40.6	4	0.2	3	0.1	6	0.2	0	0.0	2	0.1	27	1.1
FOUR-COUNTY PROEJCT STUDY AREA		548,443	215,702	39.3	179,450	32.7	368,993	67.3	332,741	60.7	4,823	0.9	11,484	2.1	8,558	1.6	473	0.1	738	0.1	36,252	1.9

Block Groups are in order of high to low minority percentage.
Source: U.S. Census 2010

Only the minority group of Latinos was present to a greater degree in the Block Groups as a whole than in the general population of the four-county Project study area. This remained true in the analysis of individual Action Alternatives, with the exception of Block Group 2, Census Tract 1 described above, which had additional high proportions of two other minority groups.

Using the 150 proportion threshold, all Action Alternatives considered were extremely similar. Only three Block Groups presented in Table 4.10-1 are not found within three miles of all Action Alternatives. These three Block Groups are located in Grant and Benton Counties along the Columbia River and are not within three miles of the NNR Alternative - MR Subroute. Block Group 4, Tract 114.02 in Grant County contains the Vantage Substation. All Block Groups from Table 4.10-1 located in Yakima County are within three miles of the Pomona Heights Substation. Therefore, given the substation locations are already established, it would not be possible to route the transmission line anywhere to avoid these Block Groups.

4.10.2.2 Low Income Populations

Overall, the Project study area has somewhat more poverty than the four-county Project study area (Benton, Grant, Kittitas, and Yakima counties). The Project study area population contained 16.5 percent of persons who had incomes below the poverty level in 1999. For all Census Block Groups within three miles of any Action Alternative, the percentage was slightly higher, at 17.7 percent. The distinction among Action Alternatives was very small, with all Action Alternatives having 18.3 percent of the population below poverty level except for the NNR Alternative with or without the MR Subroute. The NNR Alternative contained a population 18.2 percent below poverty level. 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. Using the threshold of population living under twice the poverty level, the area within three miles of any Action Alternatives was generally poorer than the Project study area as a whole.

As with the analysis for race and ethnicity, the next step in the evaluation was to examine each Action Alternative 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 Project study area proportion being 16.5 percent, the selection of Block Groups with over 24.7 percent of their population with incomes below the poverty level is the 150 percent threshold; similarly, Census Block Groups with over 56.9 percent of population being under twice the poverty threshold were included.

The resulting list of potentially affected Block Groups was the same for the every Action Alternative, with one exception: Block Group 4, Census Tract 9814, Grant County is not within three miles of the NNR Alternative with or without the MR Subroute. All other potentially affected Block Groups applied to all nine Action Alternatives. These results are displayed in Table 4.10-2.

Table 4.10-2 Potentially Affected Census Block Groups Based on Populations with Incomes Below Poverty Level

BLOCK GROUP	ACTION ALTERNATIVES	TOTAL	BELOW POVERTY LEVEL		BELOW 1.5 TIMES POVERTY LEVEL		BELOW TWICE POVERTY LEVEL	
		#	#	%	#	%	#	%
Block Group 2, Census Tract 1, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	1,043	561	53.8	755	72.4	842	80.7
Block Group 1, Census Tract 1, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	868	441	50.8	635	73.2	734	84.6

BLOCK GROUP	ACTION ALTERNATIVES	TOTAL	BELOW POVERTY LEVEL		BELOW 1.5 TIMES POVERTY LEVEL		BELOW TWICE POVERTY LEVEL	
		#	#	%	#	%	#	%
Block Group 1, Census Tract 6, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	1,305	631	48.4	896	68.7	1,007	77.2
Block Group 2, Census Tract 6, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	2,319	1,068	46.1	1,439	62.1	1,708	73.7
Block Group 1, Census Tract 2, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	2,512	1,053	41.9	1,755	69.9	1,988	79.1
Block Group 3, Census Tract 2, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	1,358	501	36.9	665	49.0	852	62.7
Block Group 2, Census Tract 2, Yakima County	A, B, C, D, E, F, G, H, NNR - MR Subroute	1,395	480	34.4	765	54.8	826	59.2
Block Group 1, Census Tract 9814, Grant County	A, B, C, D, E, F, G, H, NNR - MR Subroute	1,234	422	34.2	747	60.5	927	75.1
Block Group 4, Census Tract 9814, Grant County	A, B, C, D, E, F, G, H,	5,515	1,198	21.7	2,946	53.4	3,455	62.6
FOUR-COUNTY PROJECT STUDY AREA		464,966	76,518	16.5	129,456	27.8	176,489	38.0

Source: U.S. Census 2000

Nine Census Block Groups were included under these criteria. These Block Groups are similar to those identified under the race and ethnicity analysis. However, it should be noted that the two Block Groups identified in Grant County in Table 4.10-2, which is from the 2000 Census, were renamed and redrawn prior to the 2010 Census from which the race and ethnicity analysis data were collected. Block Group 1, Census Tract 9814 in Grant County is equivalent to Block Group 4, Census Tract 114.02 in Table 4.10-1. Block Group 4, Census Tract 9814 in Grant County is equivalent to the combination of Block Groups 1 and 3, Census Tract 114.02 in Table 4.10-1. Block Group 1 Census Tract 188, Benton County was the only Block Group to meet the threshold in the race and ethnicity analysis, but not in the low income analysis. Block Group 1, Census Tract 1, Yakima County was the only Block Group to meet the threshold in the low income analysis, but not in the race and ethnicity analysis.

Having identified the potentially affected Block Groups, the populations within each Block Group were examined in greater detail. The result was that, with a few exceptions, there were no appreciable low-income communities within one mile of the Action Alternatives. The exceptions were the small incorporated community of Beverly in Grant County, which is located about one mile from Route Segments 3b and 3c which are a part of all Action Alternatives except the NNR Alternative with or without the MR Subroute. Although Beverly had a high proportion of low-income persons in 1999, the absolute number was very small (under 50 persons). At the Pomona Heights Substation, all Action Alternatives approach the Substation from the east. There are no low-income populations due east of the Pomona Heights Substation. To the west of the Pomona Heights Substation, an appreciable population is no closer than a mile, with the city boundary for Selah approximately one mile away. There are no appreciable low-income communities within three miles of the NNR Alternative with or without the MR Subroute.

4.10.3 Impact 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 Action Alternatives

Because the Action Alternatives and areas within a three mile radius include almost identical potentially affected Census Block Groups, at the Block Group level of analysis, only very minor differences in impacts on EJ were evident. The difference in impact among Action Alternatives consists of the addition of one Census Block Group with disproportionate populations of minorities and/or low-income persons for Alternatives A, D, F, and H. These impacts are summarized in Table 4.10-3.

Some potential impact on the unincorporated community of Beverly is possible under each Action Alternative except the NNR Alternative with or without the MR Subroute. This is particularly true for those Action Alternatives using Route Segment 3c (Alternatives A, D, F, and H). However, the impact on this small population of minority and/or low-income persons is assessed as minimal due to distance from the Action Alternatives and the very small absolute size of the minority and/or low-income population of Beverly. Impacts to the community of Beverly do not differ appreciably by Action Alternative.

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 the three-mile radius of the Action Alternatives. 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 Action Alternatives. Upon closer examination of the potentially affected Census Block Groups, it was determined that no significant impacts on EJ populations would occur under any Action Alternative.

Table 4.10-3 EJ Impact Summary of Alternatives

ACTION ALTERNATIVES	QUANTITATIVE DATA	
	IMPACT ON RACIAL OR ETHNIC MINORITIES	IMPACT ON LOW-INCOME PERSONS
Alternative A 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	Ten Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within one mile of any Action Alternative. No significant impact.	Nine Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low-income persons within one mile of any Action Alternative. No significant impact.
Alternative B 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	Ten Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within one mile of any Action Alternative. No significant impact.	Nine Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low-income persons within one mile of any Action Alternative. No significant impact.
Alternative C 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	Ten Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within one mile of any Action Alternative. No significant impact.	Nine Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low-income persons within one mile of any Action Alternative. No significant impact.

ACTION ALTERNATIVES	QUANTITATIVE DATA	
	IMPACT ON RACIAL OR ETHNIC MINORITIES	IMPACT ON LOW-INCOME PERSONS
Alternative D 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	Ten Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within one mile of any Action Alternative. No significant impact.	Nine Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low-income persons within one mile of any Action Alternative. No significant impact.
Alternative E 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	Ten Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within one mile of any Action Alternative. No significant impact.	Nine Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low-income persons within one mile of any Action Alternative. No significant impact.
Alternative F 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	Ten Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within one mile of any Action Alternative. No significant impact.	Nine Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low-income persons within one mile of any Action Alternative. No significant impact.
Alternative G 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	Ten Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within one mile of any Action Alternative. No significant impact.	Nine Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low-income persons within one mile of any Action Alternative. No significant impact.
Alternative H 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	Ten Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within one mile of any Action Alternative. No significant impact.	Nine Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low-income persons within one mile of any Action Alternative. No significant impact.
NNR Alternative 1a/NNR-1, NNR-2, NNR-3, NNR-4 NNR-5, NNR-6, NNR-7, NNR-8 40.4 miles	Seven Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within one mile of any Action Alternative. No significant impact.	Eight Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low-income persons within one mile of any Action Alternative. No significant impact.
NNR Alternative - MR Subroute 1a/NNR-1, NNR-2, NNR-3, NNR-5, NNR-6, NNR-7, NNR-8, MR-1, 47.8 miles	Seven Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within one mile of any Action Alternative. No significant impact.	Eight Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low-income persons within one mile of any Action Alternative. No significant impact.

4.10.4 Conclusion

No significant impacts on minority or low-income populations are expected with the implementation of any of the Action Alternatives. Although, some of the Census Block Groups within three miles of the Action Alternatives do contain substantial populations of minority and low-income populations, appreciable concentrations of such populations are more distant than one mile, limiting the potential impact of the Action Alternatives to no more than minimal and not significant. Differences in impacts among Action Alternatives would be extremely small with the NNR Alternative with or without the MR

Subroute impacting the smallest proportions and number of Census Blocks containing potentially affected populations.

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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 Action Alternative for the Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project (Project), 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:

- Are associated with events that have made a significant contribution to the broad patterns of history;
- Are associated with the lives of persons significant in the past;
- 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
- 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.

For the purposes of this Final Environmental Impact Statement (FEIS), the impact analysis area (Project study area) for cultural resources included both a 150-foot wide corridor (75 feet to each side of the Action Alternative route segment centerlines) and a 500-foot wide corridor (250 feet to either side of the Action Alternative route segment centerlines). Because most of the cultural resources in the Project 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 overhead and underground route segments for the proposed Project (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.

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 study 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 vicinity of the proposed Project.

The Yakama Nation Cultural Resources Program (YNCRP) recently conducted cultural resource surveys on federal land along the NNR Alternative and Alternative D (Camuso and Lally 2014; Camuso and Lally 2015).

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 the Confederated Tribes of the Colville Reservation to identify traditional cultural properties (TCPs) and other culturally sensitive locations within the Project study area (Oosahwee-Voss 2014). Because of the extreme confidentiality of these studies, only limited information is available about TCPs that could be impacted by the route segments of the nine Action Alternatives.

4.11.1.2 Impact Criteria

For cultural resources, including archaeological sites, architectural resources, TCPs, 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 proposed Project, the most 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 to the National Register under Criteria A (event), B (person), or C (distinctive characteristics) may be subject to both physical 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 study area could be subject to both direct and indirect impacts; although the nature of impacts would vary depending on whether the proposed transmission line route segment would be overhead or underground.

For the proposed Project (all Action Alternatives including the 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 new 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 construction of overhead transmission line route segments, 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 proposed Project.

For construction of overhead transmission line route segments, 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 proposed Project route segments 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 construction of underground transmission line route segments, 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 proposed Project.

For construction of underground transmission line route segments, direct visual impacts could result in areas that have been cleared of vegetation, changing the setting of visually sensitive cultural resources nearby.

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 route segment than for an overhead transmission line route segment. However, the likelihood of there being changes in visual setting would be less for an underground transmission line route segment, in which clearance of vegetation would be the most visible evidence, than for an overhead transmission line route segment, in which there would be cleared right-of-way (ROW) corridor, tall structures, and conductors visible from nearby cultural resources.

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 proposed Project 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

4.11.3.1 Physical Impacts

It can be assumed that the proposed 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 corridor of a route segment.

4.11.3.2 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.

4.11.3.3 Native American Concerns

Transmission line 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 Specific to Route Segments

As previously stated, for the purpose of this FEIS, the Project study area for cultural resources included both a 150-foot wide corridor (75 feet to each side of the Action Alternative route segment centerlines) and a 500-foot wide corridor (250 feet to either side of the Action Alternative route segment centerlines). Previously identified cultural resources occur within 750 feet of the route segment centerlines that have DAHP-defined buffers that may extend into the 150-foot ROW corridor (Project study area). However, these buffers are not included in the analysis as the resources are outside the potential area of impact associated with the Project.

4.11.4.1 Route Segment 1a/NNR-1

Route Segment 1a/NNR-1 is 2.4 miles long. Within one mile of the route segment there has been very limited cultural resource survey and the few surveys that have been done have revealed a low density of cultural resources except on land close to the Yakima River. Most of the land along the route segment is privately owned and some is managed by the U.S. Bureau of Reclamation (Reclamation). Along the Yakima River, large, complex prehistoric archaeological sites have been recorded. Farther from the river, prehistoric archaeological sites are typically lithic scatters (i.e., concentrations of stone flakes or tools on the ground surface) and often occur near ephemeral drainages. No historic-period archaeological sites or architectural resources are recorded within one mile of Route Segment 1a/NNR-1, but unrecorded historic resources, if they exist, would be most likely to occur near roads.

Physical Impacts

The total amount of land within 75 feet of the route segment centerline is 44 acres. Short-term and long-term ground disturbance along this route segment would total 12.8 acres. None of the land within 75 feet of the centerline of Route Segment 1a/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 route segment centerline. No TCPs have been reported within 75 feet of the route segment centerline.

Overall, the potential for physical impacts to archaeological resources along Route Segment 1a/NNR-1 is moderate. There are no identifiable physical impacts to architectural resources. The potential for physical impacts to TCPs along Route Segment 1a/NNR-1 is anticipated to be low.

Visual Impacts

None of the land within 250 feet of the centerline of Route Segment 1a/NNR-1 had been previously surveyed for cultural resources prior to the completion of this FEIS. There is one previously recorded cultural resource, an unevaluated prehistoric archaeological site, within 250 feet of the route segment 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 route segment.

Undiscovered archaeological sites, should they exist, would probably not be visually sensitive and there are no documented architectural resources in the Project study area. Also, the presence of the existing Pomona-Wanapum 230 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 1a/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 route segment centerline.

Native American Concerns

The YNCRP has identified a TCP located approximately three miles from the centerline of Route Segment 1a/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 corridor, and JBLM YTC. Therefore, impacts to the resource are at this time expected to be low (Lally and Camuso 2013; Camuso and Lally 2014).

4.11.4.2 Route Segment 1b

Route Segment 1b is just within the JBLM YTC border and parallels an existing firebreak road. The route segment is 12.5 miles long. Approximately 55 percent of this route segment has been covered by cultural resource surveys resulting in the identification of 18 cultural resources consisting of prehistoric lithic scatters, historic debris scatters and isolated occurrences of both prehistoric and historic artifacts.

Physical Impacts

Short-term and long-term ground disturbance along this route segment would total 57.9 acres. Approximately 55 percent of the land within 75 feet of the centerline of Route Segment 1b has been previously surveyed for cultural resources resulting in the identification of 18 archaeological sites and isolated finds. One of the sites is recommended eligible for listing on the National Register and future research is needed to assess the National Register eligibility of the rest. There would be no physical impacts to architectural resources.

Overall, the potential for physical impacts to cultural resources is high, with a somewhat higher potential for impacts near drainages.

Visual Impacts

Little of the land within one mile and none of the land within 250 feet of the centerline of Route Segment 1b had been previously surveyed for cultural resources. The only recorded cultural resources within one mile are archaeological sites, which are unlikely to be sensitive to changes in visual setting.

Visual impacts are anticipated to be low because undiscovered archaeological sites, should they exist, would probably not be visually sensitive, and there are no recorded architectural resources.

Native American Concerns

The YNCRP has identified six resources of special concern in the vicinity of Route Segment 1b. However, as discussed for Route Segment 1a/NNR-1, the integrity of the visual setting has been compromised. The resources are located 3 to 7 miles from the centerline of this route segment. Impacts to the resources from the presence of a new transmission line are expected to be low (Lally and Camuso 2011).

4.11.4.3 Route Segment 1c

Route Segment 1c is on private land just outside JBLM YTC and parallels the installation boundary. The route segment is 12.9 miles long and is very close to and just south of Route Segment 1b. There has been very limited survey within 1.0 mile of Route Segment 1c. There are no previously recorded cultural resources in the area.

Physical Impacts

Short-term and long-term ground disturbance along this route segment would total 70.9 acres. None of the land within 75 feet of the centerline of Route Segment 1c has been previously surveyed for cultural resources and there are no previously recorded cultural resources in the area. If archaeological sites exist along Route Segment 1c, they would most likely be near drainages. There would be no physical impacts to architectural resources.

Overall, the potential for physical impacts to cultural resources is low, with a somewhat higher potential for impacting archaeological sites near drainages.

Visual Impacts
Little of the land within one mile and none of the land within 250 feet of the centerline of Route Segment 1c had been previously surveyed for cultural resources. The only recorded cultural resources within one mile are archaeological sites, which are unlikely to be sensitive to changes in visual setting.

Visual impacts are anticipated to be low because undiscovered archaeological sites, should they exist, would probably not be visually sensitive and there are no recorded architectural resources.

Native American Concerns
The six resources of special concern identified by YNCRP, located near Route Segment 1b are also located in the vicinity of Route Segment 1c. The resources are located 3 to 7 miles from the centerline of this route segment. However, as discussed for Route Segment 1a/NNR-1 and 1b, the integrity of visual setting has been compromised by extensive development in the areas. Therefore, impacts to the resources from the presence of a new transmission line are expected to be low (Lally and Camuso 2011).

4.11.4.4 Route Segment 2a
Route Segment 2a is only 1.0 mile long. There have been no surveys within a mile and only one small lithic scatter recorded within one mile. The terrain and environmental conditions are similar to those of Route Segments 1b and 1c, although, for its entire length, this route segment roughly parallels an ephemeral drainage 100 to 500 feet to the west.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 6.0 acres. None of the land within 75 feet of the centerline of Route Segment 2a has been previously surveyed for cultural resources and there are no previously recorded cultural resources within 75 feet. Physical impacts are anticipated to be low to moderate because archaeological site densities in nearby areas appear to be low except possibly near drainages. There would be no physical impacts to architectural resources.

Overall, the potential for physical impacts to cultural resources is low to moderate.

Visual Impacts
Little of the land within one mile and none of the land within 250 feet of the centerline of Route Segment 2a had been previously surveyed for cultural resources. The only recorded cultural resource within one mile is a small prehistoric archaeological site, which is unlikely to be sensitive to changes in visual setting.

Visual impacts are anticipated to be low because undiscovered archaeological sites, should they exist, would probably not be visually sensitive and there are no recorded architectural resources.

Native American Concerns
The six resources of special concern identified by YNCRP, located near Route Segments 1b and 1c are also located in the vicinity of Route Segment 2a, but are located at a greater distance from this route segment (Lally and Camuso 2011). Therefore, impacts are expected to be low.

4.11.4.5 Route Segment 2b
Route Segment 2b is 16.3 miles long. The terrain along this segment is more pronounced than that to the east, with deeper drainages and more surface relief. While the DAHP WISAARD database does not indicate extensive systematic and intensive cultural resource surveys within one mile of the centerline of Route Segment 2b, at least 36 cultural resources have been recorded in the general area of the route segment. Most of these are on JBLM YTC. Prehistoric archaeological sites are generally lithic scatters, although there is at least one burial site and at least one talus pit. Historic sites include trash scatters and

the remains of houses and homesteads. There are no recorded architectural resources. A few of the cultural resources are considered potentially eligible to the National Register.

Physical Impacts

Short-term and long-term ground disturbance along this route segment would total 95.3 acres. Only 0.3 percent of the land within 75 feet of the centerline of Route Segment 2b has been previously surveyed for cultural resources and there are no previously recorded cultural resources within 75 feet of the route segment centerline. While the density of cultural resources appears to be low, some archaeological sites in the general vicinity have been recommended as potentially eligible to the National Register, there is also a known burial site 0.85 mile from the route segment centerline, and a talus pit 0.6 mile from the route segment centerline, all of which suggest that similar resources could exist within 75 feet of the route segment centerline. There would be no physical impacts to architectural resources.

Physical impacts are anticipated to be low to moderate.

Visual Impacts

Only 0.5 percent of the land within 250 feet of the centerline of Route Segment 2b has been previously surveyed for cultural resources and there are no previously recorded cultural resources within 250 feet. Undiscovered archaeological sites, should they exist, would typically not be visually sensitive, but a prehistoric burial site within 0.85 mile and a talus pit within 0.6 mile could potentially be visually impacted by the presence of a new transmission line. There are no documented architectural resources within a mile of Route Segment 2b.

Visual impacts are anticipated to be low to moderate.

Native American Concerns

The YNCRP has not identified any sites of special concern along Route Segment 2b (Lally and Camuso 2011). Therefore, impacts are expected to be low.

4.11.4.6 Route Segment 2c

Route Segment 2c is 18.1 miles long. Much of the land along this route segment is privately owned, so there has been only limited cultural resource survey within one mile of the route segment centerline. In addition, unlike Route Segment 2b, where there is little cultivated land, over 35 percent of Route Segment 2c crosses cultivated land. Although mechanized agriculture may have impacted surface remains, subsurface archaeological remains may still be present and intact below the plow zone. On the non-cultivated portions of the route segment, drainages can be deep and rugged. For 8.6 miles, nearly half the distance, Route Segment 2c would be parallel and next to the Midway-Moxee 115 kV transmission line and the Union Gap-Midway 230 kV transmission line.

Twelve cultural resources have been previously recorded within one mile of the centerline of Route Segment 2c. These include six prehistoric lithic scatters, a burial site 0.5 mile from the route segment, and a site with talus pits 0.3 mile from the route segment. Historic resources include two trash scatters and one architectural resource; a stage stop with outbuildings.

Physical Impacts

Short-term and long-term ground disturbance along this route segment would total 88.8 acres. None of the land within 75 feet of the centerline of Route Segment 2c has been previously surveyed for cultural resources and there are no previously recorded cultural resources within 75 feet. Physical impacts are anticipated to be low to moderate because archaeological site densities in nearby areas appear to be low and also because 35 percent of the route segment would pass through cultivated land. There would be no physical impacts to architectural resources.

Visual Impacts
None of the land within 250 feet of the centerline of Route Segment 2c has been previously surveyed for cultural resources and there are no previously recorded cultural resources within this distance. Undiscovered archaeological sites, should they exist, would typically not be visually sensitive, but a prehistoric burial site 0.5 mile to the north and a site with talus pits 0.3 mile to the north could potentially be visually impacted by the presence of a new transmission line. One documented architectural resource, a stage stop with outbuildings, may also be visually sensitive, although an existing highway and the existing Midway-Moxee transmission line may have already substantially reduced the integrity of setting for this resource.

Visual impacts are anticipated to be low because of the existing transmission lines, the highway and the relatively large amount of cultivated land.

Native American Concerns
The YNCRP has not identified any sites of special concern along Route Segment 2c (Lally and Camuso 2011). Therefore, impacts to sites of Native American concern are expected to be low.

4.11.4.7 Route Segment 2d
Route Segment 2d is 7.0 miles long. This segment crosses Yakima Ridge, Cold Creek, and Umtanum Ridge and ends at the Columbia River. Terrain is rugged in places and drainages are deep. There has been limited cultural resource survey within one mile of the route segment centerline. Excluding sites across the Columbia River from where this route segment ends, only nine cultural resources have been previously recorded within a mile of the route segment centerline. These are mostly lithic scatters, but include one site 0.25 mile from the route segment centerline that is reported to contain burials. One historic resource, the Hanford Grade of the former Chicago, Milwaukee, St. Paul, & Pacific (C, M, SP, & P) Railroad, is along the river.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 41.9 acres. Within 75 feet of the centerline of Route Segment 2d, 3.0 percent of the land has been previously surveyed for cultural resources. Only one cultural resource, the Hanford Grade of the C, M, SP & P Railroad, has been previously recorded. There would be no physical impacts to architectural resources.

If construction of a portion of the proposed transmission line along Route Segment 2d were to directly disturb the Hanford Grade, this would potentially be a high physical impact. For most of route segment, the terrain and proximity to the Columbia River suggests that there would be a moderate impact.

Visual Impacts
Approximately 3.0 percent of the land within 250 feet of the route segment centerline has been previously surveyed for cultural resources. The only resource identified is the Hanford Grade of the former C, M, SP, & P Railroad. Because of the grade’s condition, it is probably not sensitive to changes in visual setting. Burial sites near Route Segment 2d may be visually sensitive.

Visual impacts are anticipated to be low for most of Route Segment 2d because undiscovered archaeological sites, should they exist, would probably not be visually sensitive. However, visual impacts on cultural resources on burial sites may be high.

Native American Concerns
The YNCRP has identified one resource of special concern in the northern portion of Route Segment 2d (Lally and Camuso 2011). A portion of this route segment would cross through a TCP. Therefore, the potential for impacts to the resource is expected to be high.

4.11.4.8 Route Segment 3a

Route Segment 3a is a very short route segment (only 0.1 mile long) that would connect to the existing Vantage Substation. The area surrounding the Vantage Substation and near Wanapum Dam has been extensively investigated by archaeologists and there are over 150 previously recorded cultural resources within one mile of Route Segment 3a.

Physical Impacts

Short-term and long-term ground disturbance along this route segment would total 1.2 acres. All of the land within 75 feet of the centerline of Route Segment 3a has been surveyed for cultural resources. Two archaeological resources and one architectural resource, the Vantage Substation, have been previously recorded. The substation has been determined eligible to the National Register, but the tie-in of a new transmission line would not have an impact on this existing facility. Of the two archaeological sites, both prehistoric lithic scatters, one has been determined not eligible to the National Register and one is unevaluated.

Therefore, physical impacts of Route Segment 3a would potentially be high only at the unevaluated archaeological site. The remainder of the route segment would have low physical impacts.

Visual Impacts

All of the land within 250 feet of the centerline of Route Segment 3a has been surveyed for cultural resources. In addition to the two archaeological resources mentioned above, the Vantage Substation, the Midway to Vantage No. 1 Transmission Line, and the Vantage to Columbia No. 1 Transmission Line have been recorded as cultural resources in this area. All three of these architectural resources have been determined eligible to the National Register by the Washington DAHP, but none of them would be visually impacted by the presence of this new transmission line route segment. The one unevaluated archaeological site in the vicinity does not have characteristics that would make it sensitive to changes in visual setting.

Therefore, visual impacts of Route Segment 3a on cultural resources would be low.

Native American Concerns

The YNCRP has not identified any resources of special concern along Route Segment 3a (Lally and Camuso 2011). Impacts are expected to be low.

4.11.4.9 Route Segment 3b

Route Segment 3b is 21.7 miles long and for most of its distance runs along the abandoned railroad ROW corridor next to or near (west of) the Columbia River. Much of the land within one mile and west of the route segment centerline is on JBLM YTC. The proportion of land surveyed for cultural resources is higher than most other segments, but it is still relatively small. Even without intensive surveys, there have been hundreds of cultural resources identified over the years within one mile of this route segment centerline, especially near the river. These include lithic scatters, village sites, burials, rock shelters, rock features of various sizes and shapes, petroglyphs and pictographs as well as many historic sites. Far fewer cultural resources have been recorded in the higher, more rugged terrain on JBLM YTC within one mile of the route segment centerline, with more than half being lithic scatters.

Physical Impacts

Short-term and long-term ground disturbance along this route segment would total 107.9 acres. In all, 12 percent of the land within 75 feet of the centerline of Route Segment 3b has been surveyed by archaeologists and cultural resources have also been recorded in locations not subject to intensive survey. There are 44 known archaeological resources within 75 feet of the route segment centerline. These include a prehistoric archaeological district; prehistoric lithic scatters, cairns and rock features, pictographs, rockshelters, and talus pits; and historic trash scatters, the Hanford Grade of the C, M, SP, & P Railroad, railroad camps, irrigation features, and the remains of a ranch. Some of the prehistoric sites may also qualify as TCPs, including the archaeological district. There are no architectural resources within 75 feet of Route Segment 3b. There would be no direct physical impacts to architectural resources.

Many of the archaeological sites have been vandalized in the past. Construction of the proposed transmission line along Route Segment 3b would require improvements along the former railroad grade to allow access by construction equipment, because access by land is currently very limited. Construction of Route Segment 3b could lead to increased public access to the area and vandalism of archaeological sites.

Because of the density of archaeological sites, the potential for direct and indirect physical impacts on cultural resources by Route Segment 3b is high.

Visual Impacts

Approximately 13 percent of the land within 250 feet of the centerline of Route Segment 3b has been previously surveyed by archaeologists. Eighty archaeological resources, including the 44 resources mentioned above, are within 250 feet of the centerline of Route Segment 3b. There is one architectural resource within the 250 feet of Route Segment 3b, the Midway to Vantage No. 1 Transmission Line, which would not be visually impacted by the presence of another transmission line. Many of the archaeological sites near the Columbia River contain the kinds of features (e.g., petroglyphs, burials, talus pits, rock features) that can be considered potentially sensitive to changes in the visual setting. The sites located farther up the hills and farther from the Columbia River tend to be smaller and less diverse; nearly half of them are prehistoric lithic scatters with no other features. It is likely that most, but not all, cultural resources farther from the river on JBLM YTC would not be visually sensitive.

Overall, Route Segment 3b would have high visual impacts on some cultural resources.

Native American Concerns

The YNCRP has reported that there are numerous resources of special concern to Native Americans along Route Segment 3b (Lally and Camuso 2011). There are several major sites of spiritual or historical importance to the Yakama and Wanapum within three miles of this route segment.

In addition, resolutions have been passed by the Yakama Nation Tribal Council Lands Committee (CA# 102 2011-5; and CA# 048 2010-10) expressing opposition to what is now known as Route Segment 3b because of its proximity to sensitive tribal resources.

Impacts to resources of special concern to Native Americans caused by Route Segment 3b would be high.

4.11.4.10 Route Segment 3c

Route Segment 3c is 25.2 miles long. It would run for a short distance along the south and north sides of the Columbia River and then would turn north to cross cultivated land, usually paralleling existing roads. Farther north it would cross the Wahluke Slope, the Saddle Mountains and lower Crab Creek before approaching the Vantage Substation area. Of the total distance, nearly nine miles (35 percent) would cross through cultivated land. For about four miles through the Saddle Mountain area, Route Segment 3c would parallel the existing Midway to Vantage No. 1 Transmission Line.

The private, cultivated land has not been previously surveyed for cultural resources, but it is likely that few cultural resources exist there. However, in the Saddle Mountain area, the route segment crosses an area in which hundreds of cultural resources have been recorded within one mile of the centerline of Route Segment 3c. In this one square mile section, a total of 105 cultural resources have been recorded, all but a few being prehistoric. These include 53 isolated stone flakes or tools (which are assumed for this

FEIS to be not eligible to the National Register) and 37 lithic scatters and sites described as "lithic material" with no other features. These sites are unevaluated and are assumed to be eligible to the National Register. Other prehistoric archaeological sites in or near this one square mile section contain pits (2) rock cairns and alignments (10), rockshelters, house pit depressions, and lithic procurement and quarry areas. If similar site densities are found elsewhere in the Saddle Mountains, there could be a density of one potentially eligible cultural resource for every 12 acres of ROW corridor (or approximately one eligible site every 0.7 mile along this route segment).

Physical Impacts

Short-term and long-term ground disturbance along this route segment would total 121.8 acres. Approximately 67.0 percent of the land within 75 feet of the Route Segment 3c centerline has been surveyed for cultural resources and 11 archaeological resources have been recorded. Prehistoric sites consist of lithic scatters, rock cairns, and talus pits. The historic-period Hanford Grade of the C, M, SP, & P Railroad runs along the Columbia River within 75 feet of the route segment centerline. There is one architectural resource within 75 feet of the route segment centerline, the Midway to Vantage No. 1 Transmission Line. There would be no physical impacts to architectural resources.

Given the extent of cultivated land and the density of cultural resources in the Saddle Mountains described above, physical impacts of Route Segment 3c would be moderate to high.

Visual Impacts

Approximately 24.0 percent of land within 250 feet of the route center centerline has been surveyed for cultural resources and 29 archaeological resources have been recorded. These include prehistoric lithic scatters, cairns, and talus pits, with most not being visually sensitive. The historic resources include a trash scatter and the Hanford Grade of the C, M, SP, & P Railroad. There is one architectural resource, the Midway to Vantage No. 1 Transmission Line. None of the historic-period cultural resources are visually sensitive.

Overall, visual impacts of Route Segment 3c on cultural resources would be moderate.

Native American Concerns

The YNCRP has reported that several resources of special concern are located along Route Segment 3c (Lally and Camuso 2011).

Route Segment 3c crosses several TCPs of concern. The portion of the route segment crossing Lower Crab Creek is of particular concern. The YNCRP opposes the portion of Route Segment 3c that crosses Lower Crab Creek.

Therefore, impacts to resources of concern to Native Americans by Route Segment 3c is considered high.

4.11.4.11 Route Segment NNR-2

Route Segment NNR-2 is 5.1 miles long. All of the land crossed by the route segment is on JBLM YTC and all the land within 250 feet of the route segment centerline has been surveyed for cultural resources.

Physical Impacts

The total amount of land within 75 feet of the route segment centerline is 92 acres. Short-term and long-term ground disturbance along this route segment would total 24.8 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 route segment 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 route segment 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.

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 route segment centerline. One TCP is crossed by Route Segment NNR-2.

Visual impacts of Route Segment NNR-2 are anticipated to be moderate to high because one TCP exists within 250 feet of the route segment 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.

4.11.4.12 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 route segment centerline is 169 acres. Short-term and long-term ground disturbance along this route segment would total 52.4 acres. Approximately 74 acres (43percent) 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 seven prehistoric isolated finds. All of these resources are unevaluated concerning their eligibility for listing on the National Register.

There are no architectural resources within 75 feet of the route segment 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.

Visual Impacts
One hundred forty-four acres (25 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.

4.11.4.13 Route Segment NNR-4o/NNR-4u

Route Segment NNR-4o/NNR-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 route segment centerline is 84 acres. Out of these 84 acres, at least 61 acres (73 percent) have been surveyed for archaeological resources. Ten archaeological resources are recorded within the Project study area, two unevaluated prehistoric lithic scatters and eight prehistoric isolated finds that are unevaluated as to their National Register eligibility. There are no architectural resources within 75 feet of the route segment centerline. One TCP has been identified.

Overhead Design Option Impacts

Short-term and long-term ground disturbance along Route Segment NNR-4o would total 23.0 acres. Because of the presence of two archaeological sites, no architectural resources, and one TCP along this route segment, physical impacts to cultural resources from the construction of the Overhead Design Option are expected to be moderate to high.

Underground Design Option Impacts

Short-term and long-term ground disturbance along Route Segment NNR-4u would total 46.7 acres. Because of the presence of two archaeological sites and one TCP along this segment, physical impacts to cultural resources from the construction of Route Segment NNR-4u 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 with Route Segment NNR-4o 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/NNR-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. One TCP has been identified in the Project study area.

Visual impacts are anticipated to be moderate to high because Route Segment NNR-4o/NNR-4u would cross a TCP.

Overhead Design Option Impacts

Because of the known TCP along this route segment, visual impacts to cultural resources from the construction of NNR-4o are expected to be high.

Underground Design Option Impacts

Because of the known TCP along this route segment, visual impacts to cultural resources from the construction of NNR-4u 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 with Route Segment NNR-4o because there would be few H-frame or monopole structures used.

Native American Concerns
One TCP has been identified along Route Segment NNR-4o/NNR-4u. At this time, physical and visual impacts are expected to be moderate to high.

4.11.4.14 Route Segment NNR-5
Route Segment NNR-5 is 1.8 miles long. This route segment is entirely on JBLM YTC land.

Physical Impacts
The total amount of land within 75 feet of the route segment centerline is 33 acres. Short-term and long-term ground disturbance along this route segment would total 9.1 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.

4.11.4.15 Route Segment NNR-6o/NNR-6u
Route Segment NNR-6o/NNR-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 route segment centerline is 118 acres. All the land has been surveyed for cultural resources. Inventories identified ten archaeological sites and five isolated finds: two prehistoric and three historic. Also, one TCP has been identified in the area.

Overhead Design Option Impacts
Short-term and long-term ground disturbance along Route Segment NNR-6o would total 30.6 acres. Because the route segment would cross at least ten archaeological sites and one TCP, physical impacts to cultural resources from the construction the Route Segment NNR-6o are expected to be moderate to high.

Underground Design Option Impacts
Short-term and long-term ground disturbance along Route Segment NNR-6u would total 47.4 acres. Physical impacts to cultural resources from the construction Route Segment NNR-6u 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 Route Segment NNR-6o 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/NNR-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/NNR-6u that may be visually sensitive. Visual impacts to this TCP may be moderate to high.

Overhead Design Option Impacts

Visual impacts to archaeological and architectural resources from the construction of Route Segment NNR-6o 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 of Route Segment NNR-6u are expected to be moderate to high. However, the potential for impacts may be lower than under Route Segment NNR-6o because there would be few H-frame or monopole structures used.

Native American Concerns

Because one TCP would be crossed by Route Segment NNR-6o/NNR-6u, visual impacts are expected to be moderate to high.

4.11.4.16 Route Segment NNR-7

Route Segment NNR-7 is 8.2 miles long. The route segment is entirely on JBLM YTC.

Physical Impacts

The total amount of land within 75 feet of the route segment centerline is 150 acres. Short-term and long-term ground disturbance along this route segment would total 38.1 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 13 prehistoric sites, four multi-component sites, and five prehistoric isolated finds. Six of the sites have been recommended eligible for listing on the National Register and the remaining sites have not been evaluated for National Register eligibility. No architectural resources have been identified. One TCP is crossed by Route Segment NNR-7.

Because the segment would cross at least 17 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 route segment centerline has been surveyed for cultural resources. The archaeological resources identified include those mentioned above and two additional prehistoric lithic scatters. 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. Visual impacts to this TCP may be moderate to high.

Native American Concerns
The YNCRP has identified one TCP along Route Segment NNR-7. Visual impacts to this TCP may be moderate to high.

4.11.4.17 Route Segment NNR-8
Route Segment NNR-8 is 2.7 miles long. The route segment crosses the Columbia River and includes the Vantage Substation. The land crossed by this route segment is a mixture of BLM, Reclamation, WSDOT, and private land.

Physical Impacts
The total amount of land within 75 feet of the route segment centerline is 50 acres. Short-term and long-term ground disturbance along this route segment would total 13.2 acres. Of the 50 acres of land within 75 feet of the Route Segment NNR-8 centerline, about 16 acres (32 percent) 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 with Route Segment NNR-8 would not have an adverse effect on this facility.

One TCP and one culturally sensitive area would be crossed by Route Segment NNR-8. 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 with Route Segment NNR-8 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.

4.11.4.18 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 state trust land, WSDOT, and private land.

Physical Impacts
The total amount of land within 75 feet of the route segment centerline is 216 acres. Short-term and long-term ground disturbance along this route segment would total 79.2 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 route 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 the Project study area.

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.

4.11.5 Mitigation Measures and Residual Impacts

4.11.5.1 Mitigation Measures

As part of the Section 106 process, a Programmatic Agreement (PA) has been prepared and is included in the FEIS as Appendix E. The PA sets forth the procedures for identifying, evaluating, and managing cultural resources along the selected Action Alternative. The parties to the agreement include BLM, JBLM YTC, Reclamation, Bonneville Power Administration, the Washington SHPO, other agencies, Pacific Power, and other interested parties. The PA includes: 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. Once the PA has been fully executed, the Section 106 process would be complete, although specific activities would still need to be carried out by the BLM and Pacific Power before construction would be allowed to begin. 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.

4.11.5.2 Residual Impacts

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 though the on-going consultation process.

4.11.6 Impact Summary By Alternative

4.11.6.1 No Action Alternative

Under the No Action Alternative, construction of the proposed Project including 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 study area would continue.

Under No Action, there would be no ground disturbance associated with the construction of the proposed Project such as clearing vegetation, grading of access roads, improving existing access roads, installing transmission tower foundations, assembling and erecting transmission towers, stringing and tensioning conductors wires, 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 new or additional modern structures being introduced into visual settings of cultural resources as the Project study area is already impacted by several modern structures.

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.

4.11.6.2 Action Alternatives

Physical Impacts

For this FEIS, physical impacts to cultural resources are related to the number and types of cultural resources in an area and to the amount and specific location 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 short-term and long-term disturbance for each Action Alternative and the combined total of short-term and long-term ground disturbance for each Action Alternative.

Table 4.11-1 Total Ground Disturbance (Short-Term and Long-Term) by Action Alternative

ACTION ALTERNATIVES	TOTAL ACRES (SHORT-TERM)	TOTAL ACRES (LONG-TERM)	TOTAL ACRES (SHORT- AND LONG-TERM COMBINED)
Alternative A 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3c	243.8	93.1	336.9
Alternative B 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3b	225.3	97.7	323.0
Alternative C 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3b	231.8	84.6	316.4
Alternative D 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3c	250.3	80.0	330.3
Alternative E 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3b	226.5	109.5	336.0
Alternative F 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3c	245.0	104.9	349.9
Alternative G 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3b	232.9	96.5	329.4
Alternative H 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3c	251.5	91.8	343.3
NNR Alternative - Overhead Design Option* 1a/NNR-1, NNR-2, NNR-3, NNR-4o NNR-5, NNR-6o, NNR-7, NNR-8	157.1	46.9	204.0
NNR Alternative - Underground Design Option 1a/NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8	196.2	58.3	254.5
NNR Alternative with MR Subroute 1a/NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6, NNR-7, NNR-8	184.7	75.5	260.2

*Agency Preferred Alternative

Table 4.11-2 includes cultural resources that have been previously documented within 75 feet of the Action Alternative route segment centerlines (150-foot corridor). The NNR Alternative options have the greatest number of previously identified cultural resources (N=85) within the Project study area, including nine TCPs, 47 archaeological resources, 28 isolated finds, and one architectural resource. The fewest cultural resources are found within 75 feet of Alternatives F and H, each with 23 resources. Table 4.11-3 summarizes previously documented cultural resources within 250 feet of the Action Alternative route segment centerlines (500-foot corridor). The greatest number of cultural resources are along the NNR Alternative options (N=120). Alternative F has the fewest cultural resources within 250 feet of the centerline (N=45).

Visual Impacts

For this FEIS, visual impacts to cultural resources are related to the number and types of visually sensitive cultural resources within 250 feet of the route segment centerline of each Action Alternative. Table 4.11-4 includes the number of visually sensitive cultural resources that have been previously documented within 250 feet of each Action Alternative. For this FEIS, 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. Based on this criteria, Alternatives B and C have the highest number of resources that may be potentially visually sensitive (N=32) closely followed by Alternatives E and G (N=31).

Native American Concerns

The YNCRP has identified only one resource of special concern in the vicinity of Route Segment 1a/NNR-1. The YNCRP has identified only six resources of special concern in the vicinity of Route Segments 1b, 1c, and 2a (Lally and Camuso 2011). Impacts to resources of special concern to Native Americans are expected to be low.

The YNCRP has not identified any sites of special concern along Route Segments 2b and 2c. One resource of special concern is located along Route Segment 2d (Lally and Camuso 2011). Because of the distance, impacts are expected to be low for Route Segments 2b and 2c. For Route Segment 2d, impact to a resource of special concern is expected to be high.

The YNCRP has reported that there are many resources of special concern to Native Americans along Route Segment 3b. In addition, the Yakama Nation Tribal Council Lands Committee and Cultural Committee have passed resolutions expressing opposition to Route Segment 3b. Impacts to resources of special concern to Native Americans caused by Route Segment 3b would be high.

There are several resources of special concern within three miles of Route Segment 3c. Although TCPs have been identified along Route Segment 3c, the route segment would have fewer impacts than Route Segment 3b. The proposed route segment across Lower Crab Creek (Route Segment 3c) is of particular concern to the YNCRP (Lally and Camuso 2011). Overall, Action Alternatives that include Route Segment 3b (Alternatives B, C, E, and G) would have higher impacts to sites of Native American concern than Action Alternatives that include Route Segment 3c (Alternatives A, D, F, and H).

Four TCPs and a culturally sensitive area are crossed by the NNR Alternative - Overhead and Underground Design Options. Visual and physical impacts are considered high. Studies have been performed by the YNCRP and the Confederated Tribes of the Colville Nation to identify TCPs and other culturally sensitive locations within the Study area (Oosahwee-Voss 2014).

Four TCPs and a culturally sensitive area are within 250 feet of the route segment centerline for the NNR Alternative - MR Subroute (Route Segment MR-1), the same resources as the NNR Alternative without the MR Subroute. For this reason, visual impacts are considered high. Studies have been performed by the YNCRP and the Confederated Tribes of the Colville Nation to identify TCPs and other culturally sensitive locations within the Project study area (Oosahwee-Voss 2014).

Table 4.11-2 Cultural Resources within 75-Feet of the Route Segment Centerline (150-foot corridor) by Action Alternatives*

ACTION ALTERNATIVES	TOTAL CULTURAL RESOURCES	RESOURCE TYPE					NATIONAL REGISTER STATUS[1]				
		Districts	TCPs	Archaeological Sites	Isolated Finds	Architectural Resource	Listed	Recommended For Listing	Determined Eligible	Not Eligible	Unevaluated
Alternative A	41	0	1	26	12	2	0	2	2	4	33
Alternative B	69	1	2	56	9	1	0	1	3	6	59
Alternative C	69	1	2	56	9	1	0	1	3	6	59
Alternative D	41	0	1	26	12	2	0	2	2	4	33
Alternative E	51	1	2	44	3	1	0	0	3	6	42
Alternative F	23	0	1	14	6	2	0	1	2	4	16
Alternative G	51	1	2	44	3	1	0	0	3	6	42
Alternative H	23	0	1	14	6	2	0	1	2	4	16
NNR Alternative – Overhead Design Option**	85	0	9	47	28	1	0	6	1	1	77
NNR Alternative – Underground Design option	85	0	9	47	28	1	0	6	1	1	77
NNR Alternative - MR-1	77	0	9	47	20	1	0	6	1	1	69

[1] National Register status determined by Washington DAHP
* Excludes cultural resources with only DAHP buffers extending into the corridors
**Agency Preferred Alternative

Table 4.11-3 Cultural Resources within 250-Feet of Route Segment Centerlines (500-foot corridor) by Action Alternative*

ACTION ALTERNATIVES	TOTAL CULTURAL RESOURCES	RESOURCE TYPE					NATIONAL REGISTER STATUS[1]				
		Districts	TCPs	Archaeological Sites	Isolated Finds	Architectural Resource	Listed	Recommended For Listing	Determined Eligible	Not Eligible	Unevaluated
Alternative A	65	0	1	39	21	4	0	3	4	13	45
Alternative B	110	1	2	87	16	4	0	1	6	11	92
Alternative C	111	1	2	88	16	4	0	1	6	11	93
Alternative D	66	0	1	40	21	4	0	3	4	13	46
Alternative E	90	1	2	73	10	4	0	0	6	11	73
Alternative F	45	0	1	25	15	4	0	2	4	13	26
Alternative G	91	1	2	74	10	4	0	0	6	11	74
Alternative H	46	0	1	26	15	4	0	2	4	13	27
NNR Alternative – Overhead Design Option**	120	0	9	66	44	1	0	10	1	1	108
NNR Alternative – Underground Design Option	120	0	9	66	44	1	0	10	1	1	108
NNR Alternative - MR-1	109	0	9	65	34	1	0	10	1	1	97

[1]National Register status determined by Washington DAHP
* Excludes cultural resources with only DAHP buffers extending into the corridors
** Agency Preferred Alternative

Table 4.11-4 Visually Sensitive Cultural Resources within 250-Feet of Route Segment Centerlines by Action Alternative*

ACTION ALTERNATIVE	POSSIBLE VISUALLY SENSITIVE CULTURAL RESOURCES[1]
Alternative A	7
Alternative B	32
Alternative C	32
Alternative D	7
Alternative E	31
Alternative F	6
Alternative G	31
Alternative H	6
NNR Alternative – Overhead Design Option**	24
NNR Alternative – Underground Design Option	24
NNR Alternative – MR Subroute	24

[1]Includes sites with burials, petroglyphs, pictographs, rockshelters, cairns, talus pits, or rock features.
* Excludes cultural resources with only DAHP buffers extending into the corridors
** Agency Preferred Alternative

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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 proposed 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 [*Bromus tectorum*]) 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 (High, Moderate, Low, No Identifiable Impact)

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 herbaceous vegetation (e.g., cheatgrass), is the dominant vegetation cover type, increasing the risk of wildland fire ignition (annual grassland or noxious weeds); 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 herbaceous vegetation (e.g., annual grasses) is present, but the plant community is dominated by native vegetation (rabbitbrush [*Chrysothamnus viscidiflorus* and *Ericameria nauseosa*]/annual grassland, sagebrush [*Artemisia* spp.]/annual grassland, intermittent stream or dry gully, or perennial grassland); 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 herbaceous vegetation (bitterbrush [*Purshia tridentata*]/perennial grassland, sagebrush/perennial grassland, rock/basalt cliffs, riparian, forb, or tree); 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 (agriculture, developed/disturbed/ fire break, or open water/canal); 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 Action Alternative route segments and for the New Northern Route (NNR) Alternative – Overhead Design Option and the Manastash Ridge (MR) Subroute. Impacts to wildland fire from the NNR Alternative – 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 study 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 right-of-way (ROW) corridors established for the proposed Project could lead to an increase in the number of human-caused ignitions in the Project study area. Increased fire danger can result from activities by unauthorized users on or near the Project ROW corridor 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 study area would further fragment the landscape. However, access roads could also be used as fire breaks and access for fire suppression vehicles. Required Design Features (RDFs) 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 ongoing maintenance activities 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.

The presence of power lines (distribution and/or transmission lines) can cause potential conflicts and risks to wildfire suppression tactics and can increase the complexity of fire suppression operations when wildland fires occur. Transmission line 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 conductor wires 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). RDFs 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, state and regional fire prevention staff, and U.S. Bureau of Land Management (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 2.3 for a complete list and description of RDFs.

It would be unlikely that proposed Project facilities would cause fires except in the rare case of arcing from the transmission line to the ground or nearby vegetation. In the event of a lightning strike, ground wires on the structures ground the current. Wildland fires would have the potential to affect the operation of the proposed 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 transmission 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 transmission 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 transmission lines (e.g., danger or hazard trees) would also be cleared from the ROW corridor.

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 1a/NNR-1

Route Segment 1a/NNR-1 generally parallels Pacific Power's existing Pomona-Wanapum 230 kilovolt (kV) transmission line along the southern property line of residences located along Sage Trail Road. The route segment then parallels Sage Trail Road and an existing distribution line. Construction of Route Segment 1a/NNR-1 would occur in annual grasslands for 0.3 mile. No recent fires have been documented along Route Segment 1a/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 1a/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 transmission line. With the implementation of RDFs, impacts to wildland fire ecology and management would include 0.5 mile of no identifiable, 1.6 miles of low, and 0.3 mile of moderate levels of wildfire risk based on vegetative fuels that could be ignited during construction activities.

4.12.4.2 Route Segment 1b

Construction of Route Segment 1b would occur in annual grasslands for approximately 1.8 miles. The majority of this route segment parallels an existing JBLM YTC fire break road. Several small fires have occurred within and near this route segment, primarily on the JBLM YTC. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a/NNR-1.

Route Segment 1b is not anticipated to have any impacts on fire suppression operations. This route segment 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 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, the JBLM YTC annually maintains over 240 miles of fire breaks to serve as a barrier to limit the potential spread of wildland fires and provide access for fire suppression crews (JBLM YTC 2002). Bonneville Power Administration's (BPA's) Ellensburg-Moxee No. 1 115 kV line intersects near the start of this route segment, but is not anticipated to add complexity to firefighting efforts. Impacts to wildland fire ecology and management from the construction of Route Segment 1b would include 1.1 miles of no identifiable, 9.7 miles of low and 1.8 miles of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.3 Route Segment 1c

Route Segment 1c parallels Route Segment 1b for the majority of the route segment. Construction of Route Segment 1c would occur in annual grasslands for approximately 7.3 miles. Fire history is the same as Route Segment 1b. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1b. Impacts to wildland fire ecology and management from the construction of Route Segment 1c would include 1.2 miles of no identifiable, 4.5 miles of low, and 7.3 miles of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.4 Route Segment 2a

Construction of Route Segment 2a would occur in annual grasslands for approximately 0.9 mile. Fire history records indicate that no recent fires have occurred along Route Segment 2a. Impacts from the construction of this short route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a/NNR-1. Impacts to wildland fire ecology and management from the construction of Route Segment 2a would include 0.1 mile of low and 0.9 mile of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.5 Route Segment 2b

Construction of Route Segment 2b would occur in annual grasslands for approximately 3.2 miles. Several fires have occurred near Route Segment 2b, including the Dry Creek Complex that burned over 48,000 acres in 2009 and a 2,633-acre fire that burned within JBLM YTC in 2013. Additionally, the Range 12 Fire of 2016 burned approximately 175,000 acres in areas located in Yakima and Benton counties, Washington. This fire burned approximately 13.2 miles along Route Segment 2b. Post fire restoration efforts for the Range 12 fire are in development and it is anticipated that construction of the transmission line would have minimal impacts on those restoration efforts due to the localized nature of the transmission line. This route segment would parallel JBLM YTC's fire-break for approximately eight miles. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1b. Impacts to wildland fire ecology and management from the construction of Route Segment 2b would include 1.1 miles of no identifiable, 12.1 miles of low, and 3.2 miles of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.6 Route Segment 2c

Construction of Route Segment 2c would occur in annual grasslands for approximately 5.9 miles. A substantial section (7.6 miles) of disturbance would occur to agricultural land and developed areas. Three fires have occurred near Route Segment 2c, including a 2,633-acre fire that occurred within the JBLM YTC boundary. The Range 12 Fire of 2016 burned approximately 15.2 miles along Route Segment 2c. As previously stated, post fire restoration efforts for the Range 12 fire are in development and it is anticipated that construction of the transmission line would have minimal impacts on those restoration efforts due to the localized nature of the transmission line. Route Segment 2c will be within an existing transmission line corridor that accommodates the Union Gap-Midway 230 kV and Midway-Moxee 115 kV transmission lines for approximately nine miles; however the addition of Route Segment 2c into this existing transmission line corridor is not anticipated to increase the complexity of fire suppression activities. Fire suppression efforts may be reduced for approximately eight miles where Route Segment 2c parallels the Midway-Moxee 115 kV transmission line at a distance of one mile to where it intersects the existing transmission line corridor. These lines would form a transmission bounded island. 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; however, transmission bounded islands already exist along the route segment and the new transmission line would not create an additional obstruction. Discussions with local fire districts and regional fire prevention staff will take place prior to construction to provide transmission line safety training, including safety procedures when conducting fire suppression near a transmission line, and are anticipated to reduce impacts to wildland firefighting efforts and danger to firefighters. Impacts to wildland fire ecology and management from the construction of Route Segment 2c would include 7.6 miles of no identifiable, 4.7 miles of low, and 5.9 miles of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities and potential firefighting barriers created by the presence of existing power lines.

4.12.4.7 Route Segment 2d

Construction of Route Segment 2d would occur in annual grasslands for approximately 0.7 mile. The entire length of Route Segment 2d occurs within the fire perimeter of the 2009 Dry Creek Complex fire. Additionally, the Range 12 Fire of 2016 burned approximately 4.5 miles along Route Segment 2d. As previously stated, post fire restoration efforts for the Range 12 fire are in development and it is anticipated that construction of the transmission line would have minimal impacts on those restoration efforts due to the localized nature of the transmission line. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a/NNR-1. Impacts to wildland fire ecology and management from the construction of Route Segment 2d would include 6.4 miles of low and 0.7 mile of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.8 Route Segment 3a

Route Segment 3a is a short segment with no history of recent fires. Construction of Route Segment 3a would not occur in locations dominated by annual grasslands. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a/NNR-1. Impacts to wildland fire ecology and management from the construction of Route Segment 3a would include 0.2 mile of low level of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.9 Route Segment 3b

A short section (0.5 mile) of annual grasslands would be disturbed through the construction of Route Segment 3b. This route segment occurs at the eastern edge of the JBLM YTC along the Columbia River. Fires have occurred within and near this route segment, burning in the late 1990s, 2004, and the 2009 Dry Creek Complex fire. A 23,261-acre fire started within the JBLM YTC boundary in 2014 and burned the northern portion of Route Segment 3b. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a/NNR-1. Impacts to wildland fire ecology and management from the construction of Route Segment 3b would include 12.6 miles of no identifiable, 8.7 miles of low, and 0.5 mile of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.10 Route Segment 3c

Construction of Route Segment 3c would occur in annual grasslands for approximately three miles. A substantial section (15.2 miles) of disturbance would occur to agricultural land and developed areas. The Incident #243 fire burned a portion of this route segment. Route Segment 3c will cross three transmission lines near the Columbia River: the Priest Rapids-Midway 230 kV transmission line, Schultz-Wautoma No. 1 500 kV transmission line, and the Midway-Vantage 230 kV transmission line, forming a transmission bounded island. Route Segment 3c will be within an existing transmission line corridor that accommodates the Hanford-Vantage No. 1 500 kV transmission line for approximately seven miles; however, the addition of Route Segment 3c into this existing transmission line corridor is not anticipated to increase the complexity of fire suppression activities. Eight existing transmission lines occur in the vicinity of Route Segment 3c for approximately 14 miles of the segment's length. These transmission lines would form multiple transmission bounded islands. These bounded islands could reduce the effectiveness of fire suppression efforts and create an area that poses a threat to firefighter safety; however, transmission line bounded islands already exist in all of these locations and the new transmission line would not create an additional obstruction. Discussions with local fire districts and regional fire prevention staff will take place prior to construction to provide transmission line safety training, including safety procedures when conducting fire suppression near a transmission line, and are anticipated to reduce impacts to wildland firefighting efforts and danger to firefighters.

Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 2c. Impacts to wildland fire ecology and management from the construction of Route Segment 3c would include 9.2 miles of no identifiable, 9.4 miles of low, and 6.7 miles of moderate levels of wildfire risk based surrounding vegetative fuels that could be ignited during construction activities and potential firefighting barriers created by the presence of other transmission lines.

4.12.4.11 Route Segment NNR-2

Construction of Route Segment NNR-2 would occur in annual grasslands and noxious weeds for approximately 1.2 miles. The majority of this route segment parallels an existing JBLM YTC fire break road, existing roads and 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. With the implementation of the fire management policy at the JBLM YTC (previously discussed in Section 4.12.4.2), fire ignition and spread at the JBLM YTC has been declining. 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 RDFs, impacts to wildland fire ecology and management would include 1.0 mile of no identifiable, 2.0 miles of low, and 2.2 miles of moderate levels of wildfire risk based on vegetative fuels that could be ignited during construction activities.

4.12.4.12 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 RDFs, 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.

4.12.4.13 Route Segment NNR-4o/NNR-4u

The majority of Route Segment NNR-4o/NNR-4u is located within 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 and both within JBLM YTC. The first fire was located just north of Route Segment NNR-4o/NNR-4u and occurred in 2002 and the second fire occurred south of Route Segment NNR-4o/NNR-4u in 2010. Route Segment NNR-4o/NNR-4u parallels the existing Pacific Power Pomona-Wanapum 230 kV transmission line for its entire length.

Overhead Design Option
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 Route Segment NNR-2. With the implementation of RDFs, 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.

Underground Design Option
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 transmission 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 caused by the arcing of the power line to the ground or nearby vegetation; however, this is a rare occurrence. With the implementation of RDFs, 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.

4.12.4.14 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 Pacific Power's existing Pomona-Wanapum 230 kV transmission line to avoid crossing private agricultural land. These two lines would form a transmission bounded island. This bounded island 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 transmission lines) currently create transmission bounded islands, the new transmission 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 transmission line, are anticipated to reduce impacts to wildland fire suppression efforts and danger to firefighters. With the implementation of RDFs, 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.

4.12.4.15 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. In 2014, a 23,261-acre fire burned within the JBLM YTC boundary, along and north of Route Segment NNR6o/NNR-6u. In addition, 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 Pacific Power's 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 Route Segment NNR-2. With the implementation of RDFs, 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 transmission 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 caused by the arcing of the transmission line to the ground or nearby vegetation; however, this is a rare occurrence. With the implementation of RDFs, impacts are anticipated to be low for the entire length of this 6.5-mile route segment.

4.12.4.16 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. In 2014, a 23,261-acre fire burned the majority of Route Segment NNR-7. In addition, 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 Pacific Power 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 RDFs, impacts are anticipated to be low for the entire length of this 8.3-mile route segment.

4.12.4.17 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. A 23,261-acre fire occurred within and near Route Segment NNR-8 in 2014. 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 Pacific Power's existing Pomona-Wanapum 230 kV transmission line and is not anticipated to have any impacts on fire suppression operations. With the implementation of RDFs, 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.

4.12.4.18 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 Pacific Power's 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 RDFs, 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

RDFs 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 Alternative

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 Action Alternatives

Table 4.12-1 presents a summary of the level of impacts to wildland fire ecology and management with the implementation of RDFs for each Action Alternative and design option.

Alternative H has the highest number of miles with moderate impacts (21.8 miles), which is attributed to locations with higher firefighting complexity due to the presence of multiple transmission lines. The NNR Alternative - Overhead Design Option and NNR Alternative - Underground Design Option have the lowest number of miles with moderate impacts (5.3 miles each). Alternative A has the highest number of miles with low impacts (39.5) and Alternative G has the lowest number of miles with low impacts (26.2). Alternative G has the highest number of miles identified as no identifiable impacts (21.9) and the NNR Alternative - Overhead Design Option and NNR Alternative - Underground Design Option have the lowest number of miles identified as no identifiable impacts (2.0 each). High impact levels are not anticipated for any of the Action Alternatives.

Table 4.12-1 Impact Summary of Action Alternatives for Wildland Fire Ecology and Management

ACTION ALTERNATIVES	IMPACT LEVELS[1]			
	High	Moderate	Low	No Identifiable
Alternative A 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3c 62.6 miles	0	13.6	39.5	11.9
Alternative B 1a/NNR-1, 1b, 2a, 2b, 2d, 3a, 3b 59.1 miles	0	7.4	38.8	15.3
Alternative C 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3b 60.9 miles	0	10.1	31.4	21.8
Alternative D 1a/NNR-1, 1b, 2a, 2c, 2d, 3a, 3c 64.4 miles	0	16.3	32.1	18.4
Alternative E 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3b 59.5 miles	0	12.9	33.6	15.4
Alternative F 1a/NNR-1, 1c, 2a, 2b, 2d, 3a, 3c 63.0 miles	0	19.1	34.3	12.0
Alternative G 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3b 61.3 miles	0	15.6	26.2	21.9
Alternative H 1a/NNR-1, 1c, 2a, 2c, 2d, 3a, 3c 64.8 miles	0	21.8	26.9	18.5

ACTION ALTERNATIVES	IMPACT LEVELS[1]			
	High	Moderate	Low	No Identifiable
NNR Alternative - Overhead Design Option* 1a/NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.9 miles	0	5.3	33.6	2.0
NNR Alternative - Underground Design Option 1a/NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.9 miles	0	5.3	33.6	2.0
NNR Alternative - MR Subroute 1a/NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 48.2 miles	0	9.9	33.7	4.6

[1] Impact levels in linear miles. Areas with no identifiable impacts include water, developed, agriculture, and rock.
* Agency Preferred Alternative

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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 Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project (Project) and summarizes the state of knowledge and science regarding global climate change and includes a brief climate impact analysis.

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 study area;
- Regional air quality attainment status; and
- Required Design Features (RDFs) 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 RDFs 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 RDFs 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 (PM) 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 Action 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.

PM 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 RDFs, 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 (CO_2), sulfur oxides, PM<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 (WDOE).

The RDFs (as described in Section 2.3) 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. 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 exceedance of the National Ambient Air Quality Standards. The Project study 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 study 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 Alternative

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 Action Alternatives

Implementation of any of the Action Alternatives including 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 the Action Alternatives and Overhead and Underground Design Options because these options would have varying amounts of surface disturbance and differences in terrain. Underground construction activities would disturb more land than overhead construction activities due to total vegetation removal and trenching of the right-of-way (ROW) 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 RDFs 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 (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 (GHG) 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 GHG 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 study area or on the Project itself, but may instead summarize and incorporate by reference the relevant scientific literature" (CEQ 2014).

Potential impacts related to GHGs would generally be the same for all Action Alternatives and NNR Alternative route configuration and design options. Implementation of any of the Action Alternatives or design options would contribute to GHG concentrations in several ways. CO_2, 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 study 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 GHG 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 (Kessavalou et al. 1998). Emissions from construction-related vehicles also would impact atmospheric GHG concentrations incrementally because construction equipment and vehicles would be fueled by gasoline and diesel.

The proposed Project will generate emissions of regulated pollutants, most notably PM and GHGs. Emissions of PM, including coarse (PM<10 microns [PM_{10}]) and fine ($PM_{2.5}$) PM, will be generated primarily from construction and maintenance activities conducted on unpaved access roads, tower pads, and staging areas. GHG emissions will be generated largely due to the combustion of fossil fuels in heavy duty construction equipment and vehicles used by construction workers to travel to the site, as well as the probable use of helicopters during construction. The temporary construction activities will not require air emission permits from the Yakima County Clean Air Agency or the Central (Kittitas County) and Eastern (Grant County) Regional Offices of the WDOE. Due to the nature of the emission sources (temporary and mobile) and the annual operational potential emissions being under the thresholds contained in Washington Administrative Code 173-400-110 (New Source Review [NSR] for sources and portable sources), the Project is also exempt from major USEPA regulatory programs such as NSR, Title V (Major Source Permitting Program), Prevention of Significant Deterioration, and National Emission Standards for Hazardous Air Pollutants, etc. Ultimately, consultation with the various local air agencies will be conducted to confirm that no air emission permits will be required for the Project construction. However, the construction activities must comply with local requirements for fugitive dust (PM) control.

For perspective, the following table presents a comparison of the emissions inventory values for the state of Washington for the year 2011 (data were published in 2014 and is the most recent for the state of Washington) and the Project's total emissions estimate during construction (expected to last 12 months) and annual operation (maintenance).

Table 4.13-1 Estimated Project Emissions

POLLUTANT	WASHINGTON STATE TOTAL EMISSIONS - 2011	TOTAL PROJECT CONSTRUCTION EMISSIONS (TONS)	CONSTRUCTION EMISSIONS - PROJECT % OF 2011 STATE TOTAL	ANNUAL PROJECT OPERATIONAL EMISSIONS (TONS/YEAR)	OPERATIONAL EMISSIONS - PROJECT % OF 2011 STATE TOTAL
PM_{10}	230,957	45.75	0.020%	0.15	0.000065%
$PM_{2.5}$	79,991	7.40	0.0093%	0.034	0.000042%
CO_2	101,082,000	3,282.75	0.0032%	6.25	0.0000062%

Source: Emissions estimates from 2011 for Washington State were obtained from the Washington State Department of Ecology (WDOE 2011b; WDOE 2014).

Emissions of fugitive dust are largely dependent on road moisture content, soil type, and vehicle miles traveled. GHG emissions (primarily CO_2) are the result of fuel combustion sources. Conservative assumptions were made in estimating emissions of fugitive dust and GHGs. Considering the portion of the overall Washington State total emissions inventory that the Project estimated emissions represent, the direct effects of PM and GHG emissions from the construction and operation of the project represent minor and short-term additions to the State annual totals of PM and GHG emissions. Given the emissions abatement techniques to be employed on the Project to minimize actual emissions, it is expected that the project emissions will have negligible environmental and public health impacts.

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 GHGs, primarily associated with maintenance activities, the long-term impacts would not be considered adverse.

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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 Action Alternative 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 route segment by water resource type. Refer to Chapter 2 for a description of the disturbance model.

Several assumptions were made in this analysis. For route segments with the Overhead Design Option (all except Route Segments New Northern Route [NNR]-4u and NNR-6u), the analysis assumed that the transmission line route segments 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 route segments proposed with the Overhead Design Option may occur only through construction of access road crossings. For route segments with an Underground Design Option (Route Segments NNR-4u and NNR-6u), the analysis assumed that open cut trenching would be used for stream and drainage course crossings. This construction method was selected for analysis because it is the most common method of construction for underground transmission line installation. Also, for route segments with an Underground Design Option (Route Segments NNR-4u and NNR-6u), it was assumed that underground splice vaults would not be placed in or near stream or drainage course crossings. The Underground Design Option was only considered for Route Segments NNR-4u and NNR-6u.

For access roads, the following assumptions were made for all Action Alternative route segments and 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 study 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
303(d) Impaired Surface Water	High
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 could result from placement of transmission line structures and any underground transmission line, 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 exception of route segments NNR-4u and NNR-6u, all route segments 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 NNR Alternative - 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 NNR Alternative - Underground Design Option could impact intermittent streams through drainage pattern alteration, increased erosion and sedimentation, and vegetation and soil removal. Impacts for the NNR Alternative - Underground Design Option are described in more detail in Section 4.14.4 for Route Segments NNR-4u and NNR-6u.

4.14.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Impact levels are based on water resources that occur along the proposed transmission line centerline of the Action Alternative route segments. 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.

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. Impacts would be classified as high if the proposed Project would result in one or more of the following:

- A wetland would be destroyed by permanently filling all or most of it or by altering wetland hydrology;
- Wetland vegetation cover type(s) would be affected on a long-term basis through altering soils or hydrology, such as converting a wetland to an open-water area;
- All or most of the native wetland vegetation would be replaced with weedy, non-native species;
- The connectivity of a wetland to other wetlands, surface waterways, or sub-surface water features would be destroyed;
- The amount of flood storage in a floodplain would be substantially decreased, or the course of flood waters would be greatly altered;
- Water quality for surface waters designated as impaired under the Clean Water Act (CWA) Section 303(d) would be degraded such that major reclamation, special designs, or special maintenance practices would be required; and/or

- Access road construction would substantially alter drainage patterns and increase sedimentation and flooding on a long-term basis.

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. Impacts would be classified as moderate if the proposed Project would result in one or more of the following:

- A portion of a wetland would be filled such that the majority of the wetland would still able to function as a wetland;
- A rare or unique wetland type would be degraded;
- A native wetland plant community would be degraded through the introduction of weedy, non-native species;
- Hydrology would be altered such that a wetland would decrease in size, or the vegetation cover type would be partially altered;
- The connectivity of a wetland to other waters would be diminished;
- The amount of flood storage in a floodplain would be moderately decreased;
- Water quality for surface waters designated as impaired under the CWA Section 303(d) is degraded below state or federal standards, but can be partially mitigated to lessen impacts;
- Construction and clearing takes place near a water resource on erodible soils that have moderate revegetation potential; and/or
- New access road construction would result in moderate amounts of sedimentation to nearby surface-water resources on a long-term basis.

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. Impacts would be classified as low if the proposed Project would result in one or more of the following:

- A wetland would be temporarily filled or wetland hydrology, soils, or vegetation would be altered. This would be followed by restoring the area to its former condition or enhancing the area;
- The amount of flood storage in a floodplain would slightly decrease;
- Water quality for surface waters designated as impaired under the CWA Section 303(d) could be easily mitigated to state or federal standards with Project Required Design Features (RDFs); and/or
- Access road construction, improvements or overland access would result in temporary increases in sedimentation to nearby surface water resources.

No Identifiable - No identifiable impact would be indicated where no measurable impact would occur to water resources. Impacts would be classified as no identifiable if the proposed Project would result in the following:

- Direct impacts to wetlands would be avoided;
- Wetland hydrology, vegetation, or soils would not be affected by nearby activities;
- The functions of a wetland area would not be affected;
- Direct impacts to CWA Section 303(d) impaired surface waters would be avoided;
- Direct impacts to floodplains would be avoided; and/or
- No access roads would be constructed near water resources.

4.14.3 Impacts Common to All Route Segments

This section presents information on impacts common to all Action Alternative 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, right-of-way clearing, and site preparation for structures and other facilities such as pulling and tensioning sites and, potentially, maintenance activities.

4.14.3.1 Surface Water

With the exception of the NNR Alternative - Underground Design Option Route Segments NNR-4u and NNR-6u, 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 and requisite permitting will be completed through the appropriate local floodplain agency. 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 proposed Project at this time, but, if needed, would be performed prior to construction to support CWA Section 404 permitting and to minimize proposed Project impacts. The delineation would identify both wetland and non-wetland waters of the United States (U.S.) that would be affected by the proposed 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.

4.14.3.2 Groundwater

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 RDFs. RDFs identified in Section 2.3 such as: providing spill prevention kits and other practices described in the Spill Prevention, Control, and Countermeasure Plan, will be 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 all 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.

Critical aquifer recharge area (CARA) data were not readily available for all the counties that correspond to the Action Alternatives route segments. It is not anticipated that the proposed Project would result in long-term impacts to CARAs or associated water resources as RDFs will be implemented to avoid impacts to these areas.

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 of 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 the RDFs described above and in Section 2.3, such as erosion control and other measures outlined in the SWPPP, minimizing vegetation removal, and revegetating disturbed areas. All short-term (temporary) 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 Washington State Department of Ecology (WDOE) 401 water quality certification requirements that govern activities within any waters of the U.S. and those areas would be restored to pre-construction condition to the greatest extent practicable. At this stage of design, the proposed Project does not identify exact locations of stream crossings.

4.14.4 Impacts Specific to Route Segments

As previously stated, long-term impacts to water resources are not anticipated to result from the proposed Project activities due to the implementation of avoidance and minimization measures included in the RDFs for the proposed Project. Additionally, the impact levels associated with water resources are expected to be low or no identifiable. Table 4.14-2 presents water resources that occur along each route segment and potential impacts for each route segment are discussed in detail in the following sections.

4.14.4.1 Route Segment 1a/NNR-1

Three water resources including two Bureau of Reclamation (Reclamation) irrigation canals (the Selah-Moxee Irrigation Canal and an unnamed irrigation canal) and an unnamed intermittent stream would be disturbed through the construction of Route Segment 1a/NNR-1. Existing roads would be used for the majority of the route segment. However, short-term impacts to the Roza Canal, Selah Moxee Irrigation Canal, and one unnamed intermittent waterway totaling 5.4 acres (1.0 mile) would result from construction (Table 4.14-2). No identifiable impacts would occur to the remainder of the 1.4 miles of the 2.4-mile long route segment.

4.14.4.2 Route Segment 1b

No long-term disturbance to water resources would occur with the construction of Route Segment 1b (Table 4.14-2). Short-term disturbance would occur to approximately 9.3 acres of water resources, including Kittitas Canyon Creek, Washout Gulch, six unnamed intermittent streams, and three unnamed perennial streams. Access would largely utilize the JBLM YTC’s existing fire break; however, improving this fire break for construction may require blading and the temporary installation of culverts, where needed. The flow in these streams would not be altered. The route segment’s transmission line would span all streams and no structures would be placed in active channels. Impacts for Route Segment 1b would be similar to those described above for all route segments (Section 4.14.3). Disturbance along this route segment would be minimized by the use of existing roads to access structure sites, where practicable, by implementing erosion and sediment control, reseeding following construction and conducting noxious weed control activities. Impacts to water resources from the construction of Route Segment 1b would include 10.5 miles of no identifiable impacts and 2.0 miles of low impacts.

4.14.4.3 Route Segment 1c

No long-term disturbance to water resources would occur with the construction of Route Segment 1c (Table 4.14-2). With Route Segment 1c, short-term disturbance would occur to approximately 11.6 acres of water resources. Route Segment 1c parallels Route Segment 1b, but would result in more short-term ground disturbance to water resources, approximately 2.3 additional acres. The additional short-term ground disturbance is due to: crossing an additional unnamed intermittent stream; crossing an additional unnamed perennial stream; and additional road construction in sloping and steep terrain where intermittent streams are present. With Route Segment 1c, short-term disturbance would occur at Kittitas Canyon Creek, Washout Gulch, seven unnamed intermittent stream crossings, and four unnamed perennial streams. The flow in these streams would not be altered. The transmission line would span all streams and no structures would be placed in active channels. Impacts for Route Segment 1c would be similar to those described above for all route segments (Section 4.14.3). Disturbance along this route segment would be minimized by using existing roads to access structure sites, where practicable, by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan. Impacts to water resources from the construction of Route Segment 1c would include 10.7 miles of no identifiable and 2.2 miles of low impacts.

Table 4.14-2 Linear Miles Crossed and Disturbance to Water Resources by Route Segment (Acres)

ROUTE SEGMENT	WATER RESOURCE TYPE (LINEAR MILES CROSSED AND ACRES OF DISTURBANCE)[1,2]												WATER RESOURCES CROSSED (MILES)	SHORT-TERM DISTURBANCE TO WATER RESOURCES[2,3] (ACRES)	LONG-TERM DISTURBANCE TO WATER RESOURCES[2] (ACRES)
	CANAL / DITCH		INTERMITTENT STREAM / GULLY		PERENNIAL STREAM		RIVER		WETLAND		FLOODPLAIN				
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac			
1a/NNR-1 2.4 miles	0.2	1.1	0.8	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	5.4	0.0
1b 12.5 miles	0.0	0.0	1.5	7.1	0.5	2.3	0.0	0.0	0.0	0.0	0.0	0.0	2.0	9.3	0.0
1c 12.9 miles	0.0	0.0	1.7	8.8	0.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	11.6	0.0
2a 1.0 mile	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.0
2b 16.3 miles	0.0	0.0	3.2	18.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	18.6	0.0
2c 18.1 miles	0.0	0.0	3.2	15.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	15.9	0.0
2d 7.0 miles	0.0	0.0	2.0	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	11.3	0.0
3a 0.1 mile	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
3b 21.7 miles	0.0	0.0	2.8	15.0	0.1	0.6	0.2	2.4	0.8	3.5	0.6	2.4	4.5	19.0	0.0
3c 25.2 miles	1.2	5.2	1.2	6.8	0.3	1.5	0.4	2.3	0.8	3.8	1.5	7.6	5.4	20.1	0.0
NNR-2 5.1 miles	0.1	0.5	0.7	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	3.9	0.0
NNR-3 9.3 miles	0.0	0.0	0.7	3.9	0.2	0.9	0.0	0.0	0.0	0.0	0.3	1.4	1.2	5.3	0.0
NNR-4o 4.5 miles	0.0	0.0	0.5	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4	0.0
NNR-4u 4.5 miles	0.0	0.0	0.5	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	4.1	0.0
NNR-5 1.8 miles	0.0	0.0	0.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.7	0.0
NNR-6o 6.4 miles	0.0	0.0	0.9	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	4.4	0.0

ROUTE SEGMENT	WATER RESOURCE TYPE (LINEAR MILES CROSSED AND ACRES OF DISTURBANCE)[1,2]												WATER RESOURCES CROSSED (MILES)	SHORT-TERM DISTURBANCE TO WATER RESOURCES[2,3] (ACRES)	LONG-TERM DISTURBANCE TO WATER RESOURCES[2] (ACRES)
	CANAL / DITCH		INTERMITTENT STREAM / GULLY		PERENNIAL STREAM		RIVER		WETLAND		FLOODPLAIN				
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac			
NNR-6u 6.4 miles	0.0	0.0	0.9	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	7.6	0.0
NNR-7 8.2 miles	0.0	0.0	2.1	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	9.6	0.0
NNR-8 2.7 miles	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.5	0.6	1.5	0.6	1.5	1.4	1.5	0.0
MR-1 11.9 miles	0.0	0.0	2.6	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	18.3	0.0

[1] Miles crossed (mi) = inventory measurement

[2] Long-term impacts to water resources will be avoided through Project RDFs, short-term (temporary) disturbance resulting from project construction activities (predominantly access roads) are presented.

[3] Totals do not match due to overlap between water resource types. Also, impact totals are based on the model described in Chapter 2, Project RDFs reduce amount of impact types.

4.14.4.4 Route Segment 2a

No long-term disturbance to water resources would occur with the construction of Route Segment 2a (Table 4.14-2). Construction in Route Segment 2a would result in approximately 0.6 acre of short-term ground disturbance to water resources. Short-term disturbance would occur at one unnamed intermittent stream crossing. The flow in this stream would not be altered. The transmission line would span all streams and no structures would be placed in active channels. Impacts for Route Segment 2a would be similar to those described above for all route segments (Section 4.14.3). Disturbance along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 2a would include 0.9 mile of no identifiable impacts and 0.1 mile of low impacts.

4.14.4.5 Route Segment 2b

No long-term disturbance to water resources would occur with the construction of Route Segment 2b (Table 4.14-2). Construction in Route Segment 2b would disturb approximately 18.6 acres of water resources on a short-term basis. Short-term disturbance would occur at Firewater Canyon and 25 unnamed intermittent stream crossings. The flow in these streams would not be altered. The transmission line would span all streams and no structures would be placed in active channels. Impacts for Route Segment 2b would be similar to those described above for all route segments (Section 4.14.3). Disturbance along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 2b would include 13.1 miles of no identifiable impacts and 3.2 miles of low impacts.

4.14.4.6 Route Segment 2c

No long-term disturbance to water resources would occur with the construction of Route Segment 2c (Table 4.14-2). Construction in Route Segment 2c would disturb approximately 15.9 acres of water resources on a short-term basis. Short-term disturbance would occur at 22 unnamed intermittent stream crossings. The flow in these streams would not be altered. The transmission line would span all streams and no structures would be placed in active channels. Impacts for Route Segment 2c would be similar to those described above for all route segments (section 4.14.3). Disturbance along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 2c would include 14.9 miles of no identifiable impacts and 3.2 miles of low impacts.

4.14.4.7 Route Segment 2d

No long-term disturbance to water resources would occur with the construction of Route Segment 2d (Table 4.14-2). Construction in Route Segment 2d would disturb approximately 11.3 acres of water resources on a short-term basis. Short-term disturbance would occur at Cold Creek and 12 unnamed intermittent stream crossings. The flow in these streams would not be altered. The transmission line would span all streams and no structures would be placed in active channels. Impacts for Route Segment 2d would be similar to those described above for and all route segments (section 4.14.3). Disturbance along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction, and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 2d would include 5.0 miles of no identifiable impacts and 2.0 miles of low impacts.

4.14.4.8 Route Segment 3a

No water resources were identified along Route Segment 3a. No impacts to water resources are anticipated for this short route segment (0.1 mile).

4.14.4.9 Route Segment 3b

No long-term disturbance to water resources would occur with the construction of Route Segment 3b (Table 4.14-2). Construction of Route Segment 3b would disturb approximately 19.0 acres of water resources on a short-term basis. Short-term disturbance would occur at Alkali Canyon, Hanson Creek, Sourdough Canyon Creek, Corral Canyon, Cow Canyon, and one unnamed intermittent stream. This line segment would also cross the Columbia River. The flow in the Columbia River, creeks and streams would not be altered. The transmission line would span all streams and rivers and no structures would be placed in active channels. Impacts for Route Segment 3b would be similar to those described above for all route segments (Section 4.14.3).

Floodplains (100-year) associated with the Columbia River occur along a 0.6-mile section of this route segment; however, it is expected that the structures and/or access roads would not alter the storage capacity, grade, or course that flood waters would take.

The segment of the Columbia River at Priest Rapids Reservoir has been listed as 303(d) water quality impaired due to temperature and pesticides from unknown sources. It is not anticipated that impacts from the construction of this route segment would further degrade water quality in this area.

Impacts along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 3b would include 17.2 miles of no identifiable impacts and 4.5 miles of low impacts.

4.14.4.10 Route Segment 3c

No long-term disturbance to water resources would occur with the construction of Route Segment 3c (Table 4.14-2). Construction of Route Segment 3c would disturb approximately 20.1 acres of water resources on a short-term basis. Short-term disturbance would occur to two unnamed intermittent streams. The flow in the Columbia River, creeks and streams would not be altered. The transmission line would span all streams and rivers and no structures would be placed in active channels. The implementation of a Noxious Weed Control Plan would minimize additional wetland degradation from the treatment and invasion of noxious weeds.

Floodplains (100-year) associated with the Columbia River occur along a 1.5-mile section of this route segment; however, it is expected that the structures and/or access roads would not alter the storage capacity, grade or course that flood waters would take.

Lower Crab Creek has been listed as 303(d) water quality impaired due to pH, temperature and pesticides from unknown sources. It is not anticipated that impacts from the construction of this route segment would further degrade water quality in this area because Lower Crab Creek would be spanned.

Impacts along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction, and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 3c would include 21.0 miles of no identifiable impacts and 4.2 miles of low impacts.

4.14.4.11 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. However, the route segment does cross an unnamed canal/ditch within the JBLM YTC, and two unnamed intermittent streams. No identifiable impacts to water resources would occur for the entire length of Route Segment NNR-2 (5.1 miles).

4.14.4.12 Route Segment NNR-3

With Route Segment NNR-3, short-term disturbance would occur to approximately 5.3 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 RDFs 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 2.3 for a complete list and description of RDFs.

Reclamation's proposed Wymer Dam and Reservoir project would be constructed under Reclamation's Yakima River Basin 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 storage capacity of the reservoir would be approximately 162,500 acre-feet. Reclamation's proposed Wymer Reservoir project could be developed along this route segment and would require two Project transmission line crossings of the reservoir. However, no impacts to Wymer Reservoir are anticipated to occur as the Reservoir would be spanned by the Project.

Following the implementation of RDFs, 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 8.1 miles of no identifiable and 1.2 miles of low impacts.

4.14.4.13 Route Segment NNR-4o/NNR-4u

Overhead Design Option

Construction of Route Segment NNR-4o would result in approximately 2.4 acres 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 RDFs 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 RDFs, 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 2.3 for a complete list and description of RDFs. Impacts to water resources from the construction of Route Segment NNR-4o would include 4.0 miles of no identifiable impacts and 0.5 mile of low impacts.

Underground Design Option

Construction of Route Segment NNR-4u would result in approximately 4.1 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 RDFs above for NNR-4o, the following additional RDFs 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 2.3 for a complete list and description of RDFs. Following the implementation of RDFs, 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 4.0 miles of no identifiable impacts and 0.5 mile of low impacts.

4.14.4.14 Route Segment NNR-5

With Route Segment NNR-5, short-term disturbance would occur to approximately 1.7 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 RDFs 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 2.3 for a complete list and description of RDFs. Following the implementation of RDFs, 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 1.5 miles of no identifiable and 0.3 mile of low impacts.

4.14.4.15 Route Segment NNR-6o/NNR-6u

Overhead Design Option

Construction of Route Segment NNR-6o would result in approximately 4.4 acres 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 RDFs 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 2.3 for a complete list and description of RDFs. Following the implementation of RDFs, 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 5.5 miles of no identifiable impacts and 0.9 mile of low impacts.

Underground Design Option

Construction of Route Segment NNR-6u would result in approximately 7.6 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 RDFs above for NNR-6o, the following additional RDFs 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 2.3 for a complete list and description of RDFs. Following the implementation of RDFs, 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 5.5 miles of no identifiable impacts and 0.9 mile of low impacts.

4.14.4.16 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. However, the route segment does cross several unnamed intermittent drainages. No identifiable impacts to water resources would occur for the entire length of Route Segment NNR-7 (8.2 miles).

4.14.4.17 Route Segment NNR-8

With Route Segment NNR-8, short-term disturbance would occur to approximately 1.5 acres of water resources. This transmission line route segment 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. Route Segment NNR-8 proposes to cross state-owned aquatic lands and will require a Right of Entry (ROE). As part of the ROE, potential encroachment on the littoral and near shore environment may impact aquatic species and associated habitat. These impacts may require a Habitat Stewardship Review by the DNR and mitigation measures as part of the conditions of the temporary ROE agreement. In addition, the authorization for temporary construction in the form of a DNR ROE, long-term property usage of aquatic lands requires that Pacific Power be authorized for the placement of the proposed transmission line including operation, maintenance, and repair. Therefore, for the long-term encumbrance, DNR will require Pacific Power to obtain an Aquatic Lands Easement to cross state-owned aquatic lands at any proposed crossing of the Columbia River.

Disturbance along this route segment would be minimized by RDFs 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 2.3 for a complete list and description of RDFs. Following the implementation of RDFs, 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 1.3 miles of no identifiable and 1.4 miles of low impacts.

4.14.4.18 Route Segment MR-1

With Route Segment Manastash Ridge Subroute (MR-1), short-term disturbance would occur to approximately 18.3 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 route segment transmission line would span the stream and no structures would be placed in its active channel. Reclamation's proposed Wymer Reservoir Project could be developed along this route segment and would require one Project transmission line crossing of the reservoir. However, no impacts to Wymer Reservoir are anticipated to occur as the reservoir would be spanned by the Project transmission line. Disturbance along this route segment would be minimized by RDFs 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 2.3 for a complete list and description of RDFs. Following the implementation of RDFs, 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 9.3 miles of no identifiable and 2.6 miles of low impacts.

4.14.5 Mitigation Measures

The RDFs and environmental protection measures described in Section 2.3 (Required Design Features Common to Action Alternatives) have been incorporated into the proposed 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 proposed 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 by the various authorizing agencies or entities. 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 and WDOE 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, DNR'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 Alternative

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 Project area.

4.14.6.2 Action Alternatives

Table 4.14-3 presents a comparison of the long-term impacts and impact levels following the implementation of RDFs for each of the end-to-end Action Alternatives including the NNR Alternative - Overhead Design Option, NNR Alternative - MR Subroute, and the NNR Alternative - Underground Design Option.

With the implementation of RDFs, no long-term disturbance to water resources would occur with the construction, operation, and maintenance of the end-to-end Action Alternatives including the NNR Alternative - Overhead Design Option, NNR Alternative - MR Subroute, or the NNR Alternative - Underground Design Option. Differences in impact levels are very similar for the end-to-end Action Alternatives including the NNR Alternative design options, with the majority of the impacts categorized as no identifiable. For Alternatives A through H, Alternative B has the lowest number of miles of no identifiable impacts (48.0 miles), Alternative H has the highest number of miles of no identifiable impacts

(54.1 miles), Alternatives A and D have the lowest number of miles with low impacts (12.4), and Alternatives E and G have the highest number of miles of low impacts (13.2 miles). For the NNR Alternative, both the Overhead Design Option and the Underground Design Option have no identifiable impacts totaling 32.1 miles and low impacts totaling 8.2 miles. The NNR Alternative with the MR Subroute has 30.0 miles of no identifiable impacts and 10.3 miles of low impacts. No moderate or high impacts to water resources are anticipated for any of the Action Alternatives.

Alternative A
Alternative A has 12.4 miles of low impacts and 52.1 miles of no identifiable impacts.

Alternative B
Alternative B has 13.0 miles of low impacts and 48.0 miles of no identifiable impacts.

Alternative C
Alternative C has 13.0 miles of low impacts and 49.8 miles of no identifiable impacts.

Alternative D
Alternative D has 12.4 miles of low impacts and 53.9 miles of no identifiable impacts.

Alternative E
Alternative E has 13.2 miles of low impacts and 48.2 miles of no identifiable impacts.

Alternative F
Alternative F has 12.6 miles of low impacts and 52.3miles of no identifiable impacts.

Alternative G
Alternative G has 13.2 miles of low impacts and 50.0 miles of no identifiable impacts.

Alternative H
Alternative H has 12.6 miles of low impacts and 54.1 miles of no identifiable impacts.

NNR Alternative – Overhead Design Option
The NNR Alternative - Overhead Design Option has 8.2 miles of low impacts and 32.1 miles of no identifiable impacts.

NNR Alternative – Underground Design Option
The NNR Alternative - Underground Design Option has 8.2 miles of low impacts and 32.1 miles of no identifiable impacts.

NNR Alternative – Manastash Ridge Subroute
The NNR Alternative - MR Subroute has 10.3 miles of low impacts and 30.0 miles of no identifiable impacts.

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Table 4.14-3 Impacts to Water Resources and Impact Summary of Action Alternatives

ACTION ALTERNATIVES	WATER RESOURCE TYPE (LINEAR MILES AND ACRES OF 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		FLOODPLAIN				HIGH	MODERATE	LOW	NO IDENTIFIABLE
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	mi	mi	mi
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	1.4	6.3	8.8	48.3	0.8	3.7	0.5	2.3	0.8	3.8	1.5	3.6	13.8	68.0	0.0	0.0	12.4	52.1
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	0.2	1.1	10.4	56.8	0.6	2.8	0.6	2.4	0.8	3.7	0.6	0.4	13.2	67.2	0.0	0.0	13.0	48.0
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	0.2	1.1	10.4	54.1	0.6	2.8	0.6	2.4	0.8	3.7	0.6	0.4	13.2	64.5	0.0	0.0	13.0	49.8
Alternative D 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	1.4	6.3	8.8	45.5	0.8	3.7	0.5	2.3	0.8	3.8	1.5	3.6	13.8	65.2	0.0	0.0	12.4	53.9
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	0.2	1.1	10.6	58.5	0.6	3.5	0.6	2.4	0.8	3.5	0.6	0.4	13.4	69.4	0.0	0.0	13.2	48.2
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	1.4	6.3	9.0	50.0	0.8	4.4	0.5	2.3	0.8	3.8	1.5	3.6	13.4	70.4	0.0	0.0	12.6	52.3
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	0.2	1.1	10.6	55.7	0.6	3.5	0.6	2.4	0.8	3.5	0.6	0.4	13.4	66.6	0.0	0.0	13.2	50.0
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	1.4	6.3	9.0	47.2	0.8	4.4	0.5	2.3	0.8	3.8	1.5	3.6	14.0	67.6	0.0	0.0	12.6	54.1
NNR Alternative – Overhead Design Option* NNR-1, NNR-2, NNR-3, NNR-4o, NNR-5, NNR-6o, NNR-7, NNR-8 40.3 miles	0.3	1.6	6.0	37.7	0.2	0.9	0.5	1.5	0.6	1.5	0.9	1.0	8.5	44.2	0.0	0.0	8.2	32.1

ACTION ALTERNATIVES	WATER RESOURCE TYPE (LINEAR MILES AND ACRES OF 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		FLOODPLAIN				HIGH	MODERATE	LOW	NO IDENTIFIABLE
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	mi	mi	mi
NNR Alternative - Underground Design Option NNR-1, NNR-2, NNR-3, NNR-4u, NNR-5, NNR-6u, NNR-7, NNR-8 40.3 miles	0.3	1.6	6.0	29.7	0.2	0.9	0.5	1.5	0.6	1.5	0.9	1.0	8.5	36.2	0.0	0.0	8.2	32.1
NNR Alternative - MR Subroute NNR-1, NNR-2, NNR-3, NNR-5, NNR-6o, NNR-7, NNR-8, MR-1 47.7 miles	0.3	1.6	8.1	42.5	0.2	0.9	0.5	1.5	0.6	1.5	0.9	1.0	10.6	49.0	0.0	0.0	10.3	30.0

[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.
*Agency Preferred Alternative

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., K 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 study 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	High
		Moderate	Low
		High	Low
	High (U)	Low	High
		Moderate	Moderate
		High	Moderate
High water erosion soils	High (O)	Low	High
		Moderate	Low
		High	Low
	High (U)	Low	High
		Moderate	Moderate
		High	Moderate
Very steep terrain (30%+)	High (O,U)	N/A	High

FEATURE	SENSITIVITY	RESTORATION POTENTIAL	POTENTIAL IMPACTS
Moderate wind erosion potential soils	Moderate (O)	Low	Moderate
		Moderate	Low
		High	Low
	Moderate (U)	Low	Moderate
		Moderate	Moderate
		High	Moderate
Moderate water erosion potential soils	Moderate (O)	Low	Moderate
		Moderate	Low
		High	Low
	Moderate (U)	Low	Moderate
		Moderate	Moderate
		High	Moderate
Steep Terrain (15-30%)	Moderate (O)	N/A	Low
	Moderate (U)	N/A	Moderate
Low wind erosion potential soils	Low (O)	Low	Low
		Moderate	Low
		High	Low
	Low (U)	Low	Moderate
		Moderate	Moderate
		High	Low
Low water erosion potential soils	Low (O)	Low	Low
		Moderate	Low
		High	Low
	Low (U)	Low	Moderate
		Moderate	Moderate
		High	Low
Sloping to flat terrain (<15%)	Low (O)	N/A	Low
	Low (U)	N/A	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 (end-to-end route segments, 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 Required Design Features (RDFs) 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 RDFs 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 RDFs 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, Benton, and Kittitas counties (Washington Division of Geology and Earth Resources 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 Action 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. Was 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.

Local Critical Areas

Steep terrain is considered a geologic hazard and a local critical area. For the purposes of this document, steep terrain is defined as slopes ranging from 15 percent to 30 percent and very steep terrain is defined as slopes greater than 30 percent. As stated in Section 3.15, both Yakima County and Grant County consider slopes 40 percent or greater to be high risk [Yakima County Code, Section 16.08.02(3)(a)(1); Grant

County Code, Section 24.08.500(c)(8)]. However, this Final Environmental Impact Statement provides a more conservative analysis than required by local codes and classifies steep slopes as specified above. Kittitas County is currently revising their critical areas ordinance and it is expected to be updated in 2017.

The RDFs would be implemented during construction and operation and are anticipated to be effective at minimizing impacts to geologic resources (refer to Section 2.3 - Required Design Features Common to Action Alternatives). The RDFs 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 study 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 Action Alternative. The SWPPP would be prepared as part of the Plan of Development. 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 study area have varying potentials for wind and water erosion. Detailed soil mapping units in the Project study area 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 study area soil resources.

The effective implementation of RDFs 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 Section 2.3 for a complete list and description of RDFs.

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 1a/NNR-1

Route Segment 1a/NNR-1 crosses no faults and no mapped landslides. Route Segment 1a/NNR-1 would cross 1.5 miles of slopes between 15 and 30 percent, 0.8 mile of slopes greater than 30 percent, and 0.1 mile of slopes between 8 and 15 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 2.3 acres of moderate restoration potential soils would also occur. As described above for impacts common to all route segments, the effective implementation of RDFs (Section 2.3) would minimize potential impacts to soil and geologic resources. The RDFs used for this route 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 RDFs, impacts to soil and geologic resources from the construction of Segment 1a/NNR-1 would be moderate to low.

4.15.4.2 Route Segment 1b

Route Segment 1b crosses no faults and two mapped landslide areas totaling 1.0 mile of the route segment. This area also is mapped as low-moderate potential for liquefaction. Approximately 5.5 miles of the route segment is located on slopes between zero to eight percent, 4.0 miles on slopes eight to 15 percent, 2.3 miles on slopes between 15 to 30 percent slope (considered steep slopes), and 0.8 mile of slopes greater than 30 percent (considered very steep slopes). However, access road construction will not occur in the steepest areas and access levels will be 0, 2, 4, 5, or 6, with the steepest areas along the route centerline spanned. The route segment would create long-term disturbances of 5.2 acres on moderate wind erosion potential soils and long-term disturbances of 5.0 acres and 6.2 acres on high and moderate water erosion potential soils, respectively. Impacts on 2.1 acres of moderate restoration potential soils and 4.8 acres of long-term disturbance on low restoration potential soils would also occur. As described above for impacts common to all route segments, the effective implementation of RDFs (Section 2.3) would minimize potential impacts to soil and geologic resources and the impacts to soil and geologic resources from the construction of Route Segment 1b would be moderate to low.

4.15.4.3 Route Segment 1c

Route Segment 1c crosses no faults and two mapped landslide areas totaling 1.7 miles of the route. This area is also mapped as low-moderate potential for liquefaction. Approximately 5.2 miles of the route segment is located on slopes between zero to eight percent, 4.3 miles on slopes eight to 15 percent, 3.2 miles on slopes between 15 to 30 percent slope (considered steep slopes), and 0.3 mile of slopes greater than 30 percent (considered very steep slopes). However, access road and transmission line construction will not occur in the steepest areas and access levels will be one to six, with the steepest areas along the route centerline spanned. The route segment would create long-term disturbances of 7.9 acres on moderate wind erosion potential soils, and 7.1 acres and 15.2 acres on high and moderate water erosion potential soils, respectively. Impacts on 6.2 acres of moderate restoration potential soils and 5.9 acres of long-term disturbance on low restoration potential soils would also occur. As described above for impacts common to all route segments, the effective implementation of RDFs (Section 2.3) would minimize potential impacts to soil and geologic resources and the impacts to soil and geologic resources from the construction of Route Segment 1c would be moderate to low.

4.15.4.4 Route Segment 2a

Route Segment 2a crosses no faults and no mapped landslide areas. The route segment crosses 0.8 mile and 0.2 mile of zero to eight percent and eight to 15 percent slopes, respectively. The route segment would create long-term disturbances of 1.2 acres on moderate wind erosion potential soils and 2.1 acres on high water erosion potential soils. As described above for impacts common to all route segments, the effective implementation of RDFs (Section 2.3) would minimize potential impacts to soil and geologic resources and the impacts to soil and geologic resources from the construction of Route Segment 2a would be low for the entire 1.0 mile route segment.

4.15.4.5 Route Segment 2b

Route Segment 2b crosses no faults and one mapped landslide area totaling 0.2 mile of the route; this area is also mapped as low-moderate potential for liquefaction. Approximately 9.2 miles of the route segment is located on slopes between zero to eight percent, 5.2 miles on slopes eight to 15 percent, 1.8 miles on slopes between 15 to 30 percent slope (considered steep slopes), and 0.2 mile of slopes greater than 30 percent (considered very steep slopes). However, access road construction will not occur in the steepest areas and access levels will be one to six for this route segment. The route segment would create long-term disturbances of 14.8 acres on moderate wind erosion potential soils and 15.2 acres and 20.5 acres on high and moderate water erosion potential soils, respectively. Impacts on 15.2 acres of moderate restoration potential soils and 14.1 acres of long-term disturbance on low 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 RDFs (Section 2.3). Following the implementation of RDFs, long-term impacts to soil and geologic resources from the construction of Route Segment 2b would be low for the entire route segment (16.3 miles).

4.15.4.6 Route Segment 2c

Route Segment 2c crosses no faults and no mapped landslide areas. The route segment corresponds to 14.9 miles of slopes zero to eight percent, 2.4 miles of eight to 15 percent slope, and 0.9 mile of 15 to 30 percent slope (considered steep slopes). The route segment would create long-term disturbances of 13.9 acres on moderate wind erosion potential soils and 17.0 acres and 3.0 acres on high and moderate water erosion potential soils, respectively. Impacts on 16.9 acres of moderate restoration potential soils and 2.8 acres of long-term disturbance on low restoration potential soils would also occur. As described above for impacts common to all route segments, the effective implementation of RDFs (Section 2.3) would minimize potential impacts to soil and geologic resources and the impacts to soil and geologic resources from the construction of Route Segment 2c would be moderate to low.

4.15.4.7 Route Segment 2d

Route Segment 2d crosses no faults and one mapped landslide area totaling 1.9 miles of the route segment. The slope classes crossed for this route segment include between zero and eight percent (1.4 miles), eight percent and 15 percent (3.1 miles), and 15 percent to 30 percent (1.7 miles). Steep slopes over 30 percent account for 0.9 mile of the route segment and would cause moderate impacts where access road and work pad clearing and grading would occur (0.3 mile of the route segment). Access road construction will occur on some of the steepest areas (Access Level 7). No road construction would occur along the steepest segments of the route where helicopter structure placement and construction would occur (Umtanum Ridge). The route segment would create long-term disturbances of 10.3 acres on moderate wind erosion potential soils and 10.2 acres and 4.3 acres on high and moderate water erosion potential soils, respectively. Impacts on 10.2 acres of moderate restoration potential soils and 4.0 acres of long-term disturbance on low 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 RDFs (Section 2.3). Following the implementation of RDFs, long-term impacts to soil and geologic resources from the construction of Route Segment 2d would be low for the entire route segment (7.0 miles).

4.15.4.8 Route Segment 3a

Route Segment 3a crosses no faults and no mapped landslide areas. The route segment is located on 0.1 mile of slopes of zero to eight percent. The route segment would create long-term disturbances of 0.1 acre on high wind erosion potential soils. Impacts on 0.1 acre of low restoration potential soils would also occur. As described above for impacts common to all route segments, the effective implementation of RDFs (Section 2.3) would minimize potential impacts to soil and geologic resources. With the implementation of RDFs, long-term impacts to soil and geologic resources from the construction of Segment 3a would be low for the entire route segment (0.1 mile).

4.15.4.9 Route Segment 3b

Route Segment 3b crosses six faults and one mapped landslide area, located at the slope toe of the Umtanum Ridge along the Columbia River, totaling 0.5 mile of the route segment. Most of the faults would require further study to determine whether they are active. Much of the route segment directly adjacent to the Columbia River is mapped as moderate-high, low-moderate, or low liquefaction potential, with moderate-high potential accounting for 9.1 miles of the route segment. Geotechnical investigations and site-specific engineering in these areas will result in low impacts and minimal potential for structure failure, equipment damage, or potential injury to construction personnel. The majority of the route segment is located on slopes between zero and eight percent (21.0 miles) and other slopes along the segment include eight to 15 percent (0.5 mile), 15 to 30 percent (0.2 mile, considered steep slopes), and greater than 30 percent slopes (0.1 mile, considered very steep slopes). However, access road construction will not occur in the steepest areas and access levels will be 0, 2, or 3, with the steepest areas spanned. The route segment would create long-term disturbances of 1.3 acres on high and 21.5 acres on moderate wind erosion potential soils and 18.5 acres and 5.8 acres on high and moderate water erosion potential soils, respectively. Impacts on 8.1 acres of moderate restoration potential soils and 7.7 acres of long-term disturbance on low restoration potential soils would also occur. High impacts would occur for 1.2 miles where the Project would be constructed in high water erosion potential soils with low restoration potential. 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 RDFs (Section 2.3). Following the implementation of RDFs, long-term impacts to soil and geologic resources from the construction of Route Segment 3b would be moderate to low.

4.15.4.10 Route Segment 3c

Route Segment 3c crosses two mapped faults and one mapped landslide area, located on the slope toe of the Umtanum Ridge along the Columbia River, totaling 0.1 mile of the route. A portion of the route segment is mapped as moderate-high, low-moderate or low liquefaction potential, with moderate-high potential accounting for 2.3 miles of the route segment. Geotechnical investigations and site-specific engineering in these areas will result in low impacts and minimal potential for structure failure, equipment damage, or potential injury to construction personnel. The majority of the route segment (19.8 miles) is located on slopes from zero to eight percent, and other slopes along the segment include eight to 15 percent (2.0 miles), 15 to 30 percent slope (2.2 miles, considered steep slopes), and greater than 30 percent (1.3 miles, considered very steep slopes). Access road construction will occur on some of the steepest areas (Access Level 7), but no road construction would occur along the steepest segments of the route where helicopter structure placement and construction would occur in the Saddle Mountains. The route segment would create long-term disturbances of 14.9 acres on high and 0.3 acres on moderate wind erosion potential soils and 1.0 acre and 3.9 acres on high and moderate water erosion potential soils, respectively. Impacts on 4.9 acres of moderate restoration potential soils and 10.1 acres of long-term disturbance on low restoration potential soils would also occur. High impacts would occur for 0.8 mile where the Project would be constructed in high water erosion potential soils with low restoration potential or crosses mapped landslide areas. As described above for impacts common to all route segments, the effective implementation of RDFs (Section 2.3) would minimize potential impacts to soil and geologic resources. With the implementation of RDFs, long-term impacts to soil and geologic resources from the construction of Route Segment 3c would include moderate and low impacts.

4.15.4.11 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 2.8 miles of the 5.1-mile long route segment would cross slopes between zero and eight percent, 0.7 mile would cross slopes between eight and 15 percent, 1.3 miles would cross slopes between 15 and 30 percent (steep slopes), and 0.4 mile would be located on slopes over 30 percent (very steep slopes). 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 2.9 acres of disturbance on moderate restoration potential soils would occur. As described above for impacts common to all route segments, the effective implementation of RDFs (Section 2.3) would minimize potential impacts to soil and geologic resources. With the effective implementation of RDFs, impacts to soil and geologic resources from the construction of Segment NNR-2 would be moderate to low.

4.15.4.12 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 long route segment crosses slopes greater than 30 percent (very steep slopes), 3.7 miles crosses slopes between 15 and 30 percent (steep slopes), 0.7 mile would be located on slopes less between eight and 15 percent, and 0.3 mile would be located on slopes between zero and eight 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 RDFs (Section 2.3). With the effective implementation of RDFs, impacts to soil and geologic resources from the construction of Segment NNR-3 would be moderate to low.

4.15.4.13 Route Segment NNR-4o/4u

Overhead Design Option

Route Segment NNR-4o crosses two mapped faults and no mapped landslides. A total of 1.6 miles of the 4.5-mile long route segment crosses slopes between 15 and 30 percent (steep slopes), 1.3 miles of slopes between eight and 15 percent, and 1.2 miles of slopes between zero and eight percent. Very 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 RDFs (Section 2.3). With the effective implementation of RDFs, impacts to soil and geologic resources from the construction of Segment NNR-4o would be moderate to low.

Underground Design Option

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 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 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 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 5.9 acres on moderate wind erosion potential soils, as well as, 0.2 acre and 7.6 acres on high and moderate water erosion potential soils, respectively. Impacts on 2.3 acres of low restoration potential soils and 11.0 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 RDFs (Section 2.3). With the effective implementation of RDFs, impacts to soil and geologic resources from the construction of Segment NNR-4u would generally be moderate.

4.15.4.14 Route Segment NNR-5

Route Segment NNR-5 crosses no mapped faults or landslides. A total of 0.9 mile of the 1.8-mile long route segment would cross slopes less between zero and eight percent, 0.6 mile would cross slopes eight to 15 percent, and 0.3 miles would cross slopes between 15 and 30 percent (steep slopes). The proposed route segment does not cross very steep slopes over 30 percent. Access road and transmission line construction would not occur in the steepest areas along the route centerline which would be 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 RDFs (Section 2.3). With the effective implementation of RDFs, impacts to soil and geologic resources from the construction of Segment NNR-5 would be moderate to low.

4.15.4.15 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 long 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 (very steep slopes), 2.2 miles cross slopes between 15 and 30 percent, 0.9 mile crosses slopes between eight and 15 percent, and 0.1mile crosses slopes less between zero and eight 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 RDFs (Section 2.3). With the effective implementation of RDFs, 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 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 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 5.4 acres on moderate wind erosion potential soils, as well as, 3.0 acres and 2.3 acres on high and moderate water erosion potential soils, respectively. Impacts on 0.2 acre of low restoration potential soils and 9.2 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 RDFs (Section 2.3). With the effective implementation of RDFs, impacts to soil and geologic resources from the construction of Segment NNR-6u would generally be moderate.

4.15.4.16 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-long route segment crosses slopes between 15 and 30 percent, 1.5 miles crosses slopes greater than 30 percent, 0.8 mile crosses slopes between eight to 15 percent, and 0.1 mile crosses slopes less between zero and eight 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 RDFs (Section 2.3). With the effective implementation of RDFs, impacts to soil and geologic resources from the construction of Segment NNR-7 would be moderate to low.

4.15.4.17 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 1.8 miles of the 2.7-mile long route segment is located on slopes between zero and eight percent, 0.4 mile on slopes between eight to 15 percent, 0.4 mile on steep slopes between 15 and 30 percent, and 0.2 mile of very steep slopes greater than 30 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 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. No impacts to areas identified as high or moderate water erosion potential soils would occur. 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 RDFs (Section 2.3). With the effective implementation of RDFs, impacts to soil and geologic resources from the construction of Segment NNR-8 would be moderate to low.

4.15.4.18 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-long route segment would cross slopes between 15 and 30 percent (steep slopes), 3.5 miles would cross slopes greater than 30 percent (very steep slopes), 2.9 miles would cross slopes between eight and 15 percent, and 0.3 mile would cross slopes between zero and eight percent slopes. 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 RDFs (Section 2.3). With the effective implementation of RDFs, 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

ROUTE SEGMENT	GEOLOGIC RESOURCES AND HAZARDS									SOIL RESOURCES (LINEAR MILES CROSSED, ACRES LONG-TERM DISTURBED, AND % OF RESOURCE TYPE DISTURBED BY 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	%
1a/NNR-1 2.4 miles	0	0.0	0.1	1.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.3	100.0	2.4	2.3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.3	100.0
1b 12.5 miles	0	5.5	4.0	2.3	0.8	1.0	0.0	1.0	0.0	0.0	0.0	0.0	5.0	5.2	46.3	4.8	5.0	44.8	7.8	6.2	55.2	4.2	4.8	42.3	2.9	2.1	19.0
1c 12.9 miles	0	5.2	4.3	3.2	0.3	1.7	0.0	1.7	0.0	0.0	0.0	0.0	5.0	7.9	34.3	4.4	7.1	30.8	7.6	15.2	65.8	3.7	5.9	25.5	3.7	6.2	26.8
2a 1.0 mile	0	0.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.2	56.6	1.0	2.1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.1	100.0
2b 16.4 miles	0	9.2	5.2	1.8	0.2	0.2	1.5	0.2	0.0	0.0	0.0	0.0	7.1	14.8	41.5	7.3	15.2	42.6	9.1	20.5	57.4	6.3	14.1	39.5	7.3	15.2	42.6
2c 18.1 miles	0	14.9	2.4	0.9	0.0	0.0	6.0	0.0	0.6	0.0	0.0	0.0	11.1	13.9	61.3	12.7	17.0	75.0	1.6	3.0	13.4	1.6	2.8	12.5	12.6	16.9	74.7
2d 7.0 miles	0	1.4	3.1	1.7	0.9	1.9	1.4	1.4	0.1	0.0	0.0	0.0	4.8	10.3	66.9	4.7	10.2	66.3	1.7	4.3	27.7	1.6	4.0	26.4	4.7	10.2	66.3
3a 0.1 mile	0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	100.0	0.0	0.0	0.0
3b 21.7 miles	6	21	0.5	0.2	0.1	0.5	0.4	0.8	9.1	1.8	1.3	4.2	15.2	21.5	69.5	12.4	18.5	59.8	4.3	5.8	18.8	6.3	7.7	24.9	6.7	8.1	26.1
3c 25.4 miles	2	19.8	2.0	2.2	1.3	0.1	1.5	5.1	2.3	12.5	14.9	56.6	0.5	0.3	1.0	0.7	1.0	3.7	3.6	3.9	14.8	9.4	10.1	38.3	3.3	4.9	18.5
NNR-2 5.0 miles	0	2.8	0.7	1.3	0.4	0.0	1.7	0.0	0.2	0.0	0.0	0.0	4.2	3.1	80.4	3.6	2.6	68.6	0.6	0.5	11.8	1.4	1.1	27.5	3.8	2.9	72.5
NNR-3 9.3 miles	4	0.3	0.7	3.7	4.6	0.0	0.0	0.0	0.1	0.0	0.0	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 miles	2	1.2	1.3	1.6	0.5	0.0	0.0	0.0	0.0	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 miles	2	1.2	1.3	1.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	5.9	44.4	0.3	0.2	1.5	3.0	7.6	57.1	1.2	2.3	17.3	3.4	11.0	82.7
NNR-5 1.8 miles	0	0.9	0.6	0.3	0.0	0.0	0.0	0.0	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	0.9	0.0	0.0	0.0	0.0	1.7	1.5	26.2	1.3	1.1	20.0	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	0.9	0.0	0.0	0.0	0.0	1.7	5.4	53.5	1.3	3.0	29.7	0.4	2.3	22.8	0.3	0.3	4.6	5.6	9.2	91.1
NNR-7 8.2 miles	6	0.1	0.8	5.9	1.5	0.5	0.0	0.3	0.0	0.0	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 miles	0	1.8	0.4	0.4	0.2	0.0	0.0	0.4	1.0	1.8	1.4	64.3	0.5	0.8	17.9	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.3	85.7	0.0	0.0	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	0.0	0.0	7.6	23.7	63.9	1.1	2.9	9.2	8.1	24.7	68.1	2.2	5.0	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 RDFs and environmental protection measures described in Section 2.3 (Required 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 RDFs 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 Alternative

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 Action Alternatives

Table 4.15-3 presents a comparison of impacts following the implementation of RDFs for the Project alternatives including Alternatives A through H, the NNR Alternative - Overhead Design Option, the NNR Alternative - Underground Design Option, and the NNR Alternative with MR Subroute.

With the implementation of RDFs, no long-term disturbance to geologic and soil resources would occur with the construction of the Action Alternatives. Overall impact levels are similar for all of the Action Alternatives with Overhead Design Options with the majority of the impacts categorized as moderate to low; however, the NNR Alternative - Underground Design Option would create more moderate impacts as compared to other Action Alternatives due to the displacement of greater volumes of soil as a result of excavated areas. Alternative F would have the highest amount of moderate impacts (19.6 miles) and Alternative B would have the highest amount of impacts characterized as high (7.9 miles). While geotechnical investigations are included in the RDFs, a more comprehensive geotechnical investigation would be required along the entire NNR Alternative - Underground Design Option as compared to the Overhead Design Option.

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 Action Alternatives due to the inability to span discovered faults.

Alternative A

Alternative A would have a majority of low impacts to geological resources with 39.0 miles (60 percent) of the impacts characterized as low and 18.7 miles (29 percent) characterized as moderate. Alternative A would cross two faults and 3.2 miles of high landslide hazard area.

Alternative B

Alternative B would have a majority of low impacts to geological resources with 36.8 miles (60 percent) of impacts characterized as low and 16.3 miles (27 percent) characterized as moderate. Alternative B would cross six faults and 3.6 miles of high landslide hazard area.

Alternative C

Alternative C would have a majority of low impacts to geological resources with 43.5 miles (69 percent) of impacts characterized as low and 11.5 miles (18 percent) characterized as moderate. Alternative C would cross six faults and 3.4 miles of high landslide hazard area.

Alternative D

Alternative D would have a majority of low impacts to geological resources with 45.7 miles (68 percent) of impacts characterized as low and 13.9 miles (21 percent) characterized as moderate. Alternative D would cross two faults and 3.0 miles of high landslide area.

Alternative E

Alternative E would have the greatest distance of high landslide hazard area crossing (4.3 miles) and cross six faults. Alternative E would have a majority of low impacts to geological resources with 37.1 miles (60 percent) of the impacts characterized as low and 17.2 miles (28 percent) characterized as moderate.

Alternative F

Alternative F would have a majority of low impacts to geological resources with 39.3 miles (60 percent) of impacts characterized as low and 19.6 miles (30 percent) characterized as moderate. Alternative F would cross two faults and 3.9 miles of high landslide hazard area.

Alternative G

Alternative G would have a majority of low impacts to geological resources with 43.8 miles (69 percent) of impacts characterized as low and 12.4 miles (19 percent) characterized as moderate. Alternative G would cross six faults and 4.1 miles of high landslide hazard area.

Alternative H

Alternative H would have a majority of low impacts to geological resources with 46.0 miles (68 percent) of impacts characterized as low and 14.8 miles (22 percent) characterized as moderate. Alternative H would cross two faults and 3.7 miles of high landslide hazard area.

NNR Alternative – Overhead Design Option

The NNR Alternative – Overhead Design Option would cross 14 faults and 2.1 miles of high landslide hazard area. The Overhead Design option would result in less moderate and low impacts than the Underground Design Option due to construction methodologies and less disturbed areas. This Action Alternative would result in 21.8 miles (53 percent) of low impacts to geological resources, 14.5 miles (35 percent) of high impacts, and 4.6 miles (11 percent) of moderate impacts.

NNR Alternative – Underground Design Option

The NNR Alternative – Underground Design Option would create more moderate impacts as compared to other Action 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 Action Alternatives due to the inability to span discovered faults. The NNR Alternative - Underground Design Option would affect a greater area of potentially moderate wind erodible soils and potentially high or moderate water erodible soils than the NNR Alternative - Overhead Design Option. The NNR Alternative - Underground Design Option also would affect substantially greater areas of moderate restoration potential soils compared to the NNR Alternative - Overhead Design Option, but would affect a similar area as the other routes. The NNR Alternative - Underground Design Option would also cross 14 faults and 2.1 miles of high landslide hazard area. This Action Alternative would result in 15.4 miles (38 percent) of low impacts to geological resources, 14.5 miles (35 percent) of high impacts, and 11.0 miles (27 percent) of moderate impacts.

NNR Alternative – Manastash Ridge Subroute

The NNR Alternative - MR Subroute would cross 13 faults and 2.9 miles of high landslide areas. This Action Alternative would result in 25.7 miles (53 percent) of low impacts to geological resources, 17.8 miles (37 percent) of high impacts, and 4.7 miles (10 percent) of moderate impacts.

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Table 4.15-3 Long-Term Disturbance to Geologic and Soil Resources by Action Alternative

ACTION ALTERNATIVE	GEOLOGIC RESOURCES AND HAZARDS: FAULTS (# CROSSED)	SLOPE % (MILES CROSSED): 0-8	SLOPE %: 8-15	SLOPE %: 15-30	SLOPE %: 30+	MAPPED LANDSLIDES (HIGH HAZARD: MILES CROSSED)	LIQUEFACTION POTENTIAL (MILES CROSSED): LOW	LIQUEFACTION: LOW-MODERATE	LIQUEFACTION: MODERATE-HIGH	SOIL RESOURCES (LINEAR MILES CROSSED, ACRES LONG-TERM DISTURBED, AND % OF RESOURCE TYPE DISTURBED BY TOTAL ROUTE SEGMENT)[1] SOIL ERODIBILITY POTENTIAL: WIND HIGH mi	WIND HIGH ac	WIND HIGH %	WIND MODERATE mi	WIND MODERATE ac	WIND MODERATE %	WATER HIGH mi	WATER HIGH ac	WATER HIGH %	WATER MODERATE mi	WATER MODERATE ac	WATER MODERATE %	RESTORATION POTENTIAL: LOW mi	LOW ac	LOW %	MODERATE mi	MODERATE ac	MODERATE %
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	2	36.9	14.6	9.5	4.0	3.2	4.4	7.7	2.4	12.7	15.0	16.1	20.4	34.0	36.5	20.9	35.7	36.0	22.2	34.8	37.4	21.7	33.1	35.6	20.4	34.0	37.1
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	6	38.1	13.1	7.5	2.8	3.6	3.3	3.4	9.2	2.0	1.4	1.4	35.1	55.2	56.5	32.6	53.3	52.2	22.9	36.8	37.7	18.6	30.8	31.5	35.1	55.2	38.5
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	6	43.8	10.3	6.6	2.6	3.4	7.8	3.2	9.8	2.0	1.4	1.7	39.1	54.3	64.2	38	55.0	62.4	15.4	19.3	22.8	13.9	19.5	23.0	39.1	54.3	46.4
Alternative D 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	2	42.6	11.8	8.6	3.8	3	8.9	7.5	3	12.7	15.0	18.7	24.4	33.1	41.4	26.3	37.5	44.0	14.7	17.4	21.7	17.0	21.9	27.4	24.4	33.1	45.1
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	6	37.8	13.4	8.4	2.3	4.3	3.3	4.1	9.2	2.0	1.4	1.3	35.1	57.9	52.9	32.2	55.3	48.4	22.7	45.7	41.7	18.1	31.9	29.1	35.1	57.9	38.1
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	2	36.6	14.9	10.4	3.5	3.9	4.4	8.4	2.4	12.7	15.0	14.3	20.4	36.7	35.0	20.5	37.8	33.8	22	43.8	41.8	21.2	34.2	32.6	20.4	36.7	36.7
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	6	43.5	10.6	7.5	2.1	4.1	7.8	3.9	9.8	2.0	1.4	1.5	39.1	57.0	59.1	37.6	57.1	56.8	15.2	28.3	29.3	13.4	20.6	21.4	39.1	57.0	45.0
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	2	42.3	12.1	9.5	3.3	3.7	8.9	8.2	3	12.7	15.0	16.3	24.4	35.8	39.0	25.9	39.6	40.6	14.5	26.4	28.7	16.5	23.0	25.0	24.4	35.8	43.8

ACTION 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	16.9	11.3	2.1	1.7	1.6	1.3	1.8	1.4	3.0	21.9	22.6	48.2	9.8	8.4	17.9	15.3	18.2	38.8	13.7	18.6	39.7	21.9	22.6	55.0
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	16.9	11.3	2.1	1.7	1.6	1.3	1.8	1.4	2.4	21.9	30.4	52.1	9.8	10.3	17.7	15.3	24.2	41.5	13.7	18.5	31.7	21.9	30.4	64.0
NNR Alternative with MR Subroute NNR-1, NNR-2, NNR-3, MR-1, NNR-5, NNR-6o, NNR-7, NNR-8 47.7 miles	13	6.3	7.1	20.5	14.3	2.9	3	2.4	1.3	1.8	1.4	1.9	27.6	44.4	58.8	10.6	11.0	14.6	20.4	39.2	51.9	14.7	21.3	28.2	27.6	44.4	57.1

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 Action Alternative.
* Agency Preferred Alternative

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 EMF 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 proposed transmission line, and potential impacts on equipment used near the proposed Project 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 EMF, 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 EMF 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 EMF 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 conductor wires. 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) EMF. 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 recommended by the European Union, the International Committee on Electromagnetic Safety (ICES), and the International Commission on Non-Ionizing Radiation Protection (ICNIRP), 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	TYPE OF EXPOSURE	LOCATION	ELECTRIC FIELD	MAGNETIC FIELD
European Union General	General Public Exposure	Edge of ROW	4.2 kV/m	0.833 G (833 mG)
International Committee on Electromagnetic Safety (ICES)	Occupational Exposure	Within ROW	10 kV/m	27.1 G (27,100 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)

Source: ICES 2002; ICNIRP 1998
Electric fields are measured in kilovolts per meter (kV/m)
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	TYPE OF LINE	LOCATION	ELECTRIC FIELD	MAGNETIC FIELD
Florida	500 kV single circuit	Within ROW	10 kV/m	NA
		Edge of ROW	2 kV/m	200 mG
	500 kV double circuit	Within ROW	10 kV/m	NA
		Edge of ROW	2kV/m	250 mG
	230 kV or less	Within ROW	8 kV/m	NA
		Edge of ROW	2 kV/m	150 mG
Minnesota	All transmission lines	Within ROW	8 kV/m	NA
Montana	All transmission lines	Within ROW – road crossing	7 kV/m	NA
		Edge of ROW	1 kV/m[1]	NA
New Jersey	All transmission lines	Within ROW	NA	NA
		Edge of ROW	3 kV/m	NA
New York	All transmission lines	Within ROW – open	11.8 kV/m	NA
		Within ROW – public road	7 kV/m	NA
		Edge of ROW	1.6 kV/m	200 mG
North Dakota	All transmission lines	Within ROW	9 kV/m	NA
		Edge of ROW	NA	NA
Oregon	All transmission lines	Within ROW	9 kV/m	NA
		Edge of ROW	NA	NA

Source: NIEHS 2002
[1]Can be waived by landowner;
kV = kilovolt; NA = Not Applicable (i.e., 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 proposed 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 $L_{eq\ (24\ hour)}$	Protection against annoyance and activity interference
Indoor residential	45 dBA L_{dn}	Protection against annoyance and activity interference
Indoor non-residential	45 dBA $L_{eq\ (24\ hour)}$	Protection against annoyance and activity interference

Source: USEPA 1974

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 (NSAs). 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 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)

Source: USDOT 2006

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

Kittitas County Code Chapter 9.45 covers disturbance/unlawful noise in the county. Sounds created by "lawfully established commercial and industrial uses" and "construction between 6:00 a.m. and 10:00 p.m." are exempt from this ordinance. No other standards are applicable to the proposed Project.

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 proposed 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 proposed 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. 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 presents 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 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 (Viemeister 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 (Viemeister 1972).

All household appliances and other devices that operate on 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

Source: Carstensen 1985; Enertech Consultants 1985
* 1 to 10 kV/m next to blanket wires.

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 (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

Source: Silva et al. 1989.

Many sources of magnetic field are encountered in everyday activities. Typical sources of these fields include power lines (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 Consultants 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.

Table 4.16-7 Summary of Spot Room Measurements of 992 residences in the United States (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

Source: Enertech Consultants 1993.
* Any room in which spot field measurement had the highest value.

Another comprehensive study of contemporary magnetic field personal exposure was performed by the U.S. Department of Energy (Enertech Consultants 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 4.16-8 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 Consultants 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 Consultants1998; 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 increases 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 Project was calculated for the edge of ROW corridor and within the ROW corridor. The EMF analysis was performed using the Bonneville Power Administration (BPA) 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 Project, 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 aluminum conductor steel-reinforced cable Bittern
- 326 Amps of balanced current
- Maximum operating voltage of 247 kV

There are five cases that were investigated for different structure types. 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 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 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.

Case IV is a single circuit H-frame structure with the 230 kV transmission line paralleling the BPA Midway-Moxee 115 kV line and the Pacific Power Union Gap – Midway 230 kV line. Both the BPA 115 kV structures and the Pacific Power 230 kV structures are H-frame structures. The total ROW width would be 317.5 feet. Refer to Figure 4.16-4 for a drawing of the configuration of the structures.

Case V is a single circuit H-frame structure with the line paralleling the BPA Hanford-Vantage No. 1 500 kV line. The BPA 500 kV structure is horizontal steel lattice. The total ROW width would be 325 feet. Refer to Figure 4.16-5 for a drawing of the configuration of the structures.

The maximum EMF values within the ROW corridor and at the edge of the ROW corridor for the proposed 230 kV transmission line Project 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 proposed transmission 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
IV	317.5	0.790	0.923	3.667
V	325	2.45	1.84	3.53

<u>*Case I*</u>
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 corridor is 3.45 kV/m and the maximum electric field at the edge of ROW is 0.935 kV/m.

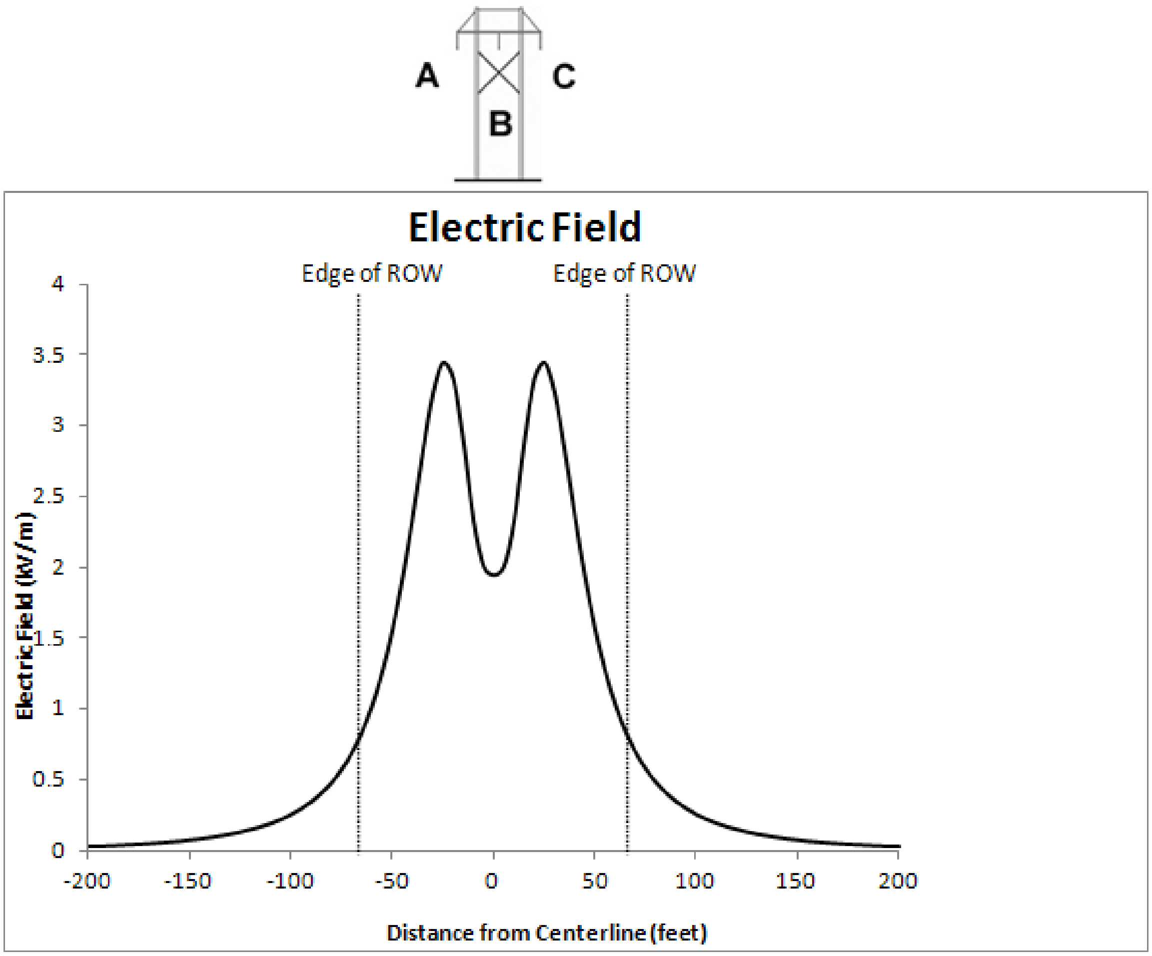

FIGURE 4.16-1 ELECTRIC FIELD CASE I: H-FRAME HORIZONTAL CIRCUIT

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 corridor is 2.75 kV/m and the maximum electric field at the edge of ROW corridor is 0.93 kV/m.

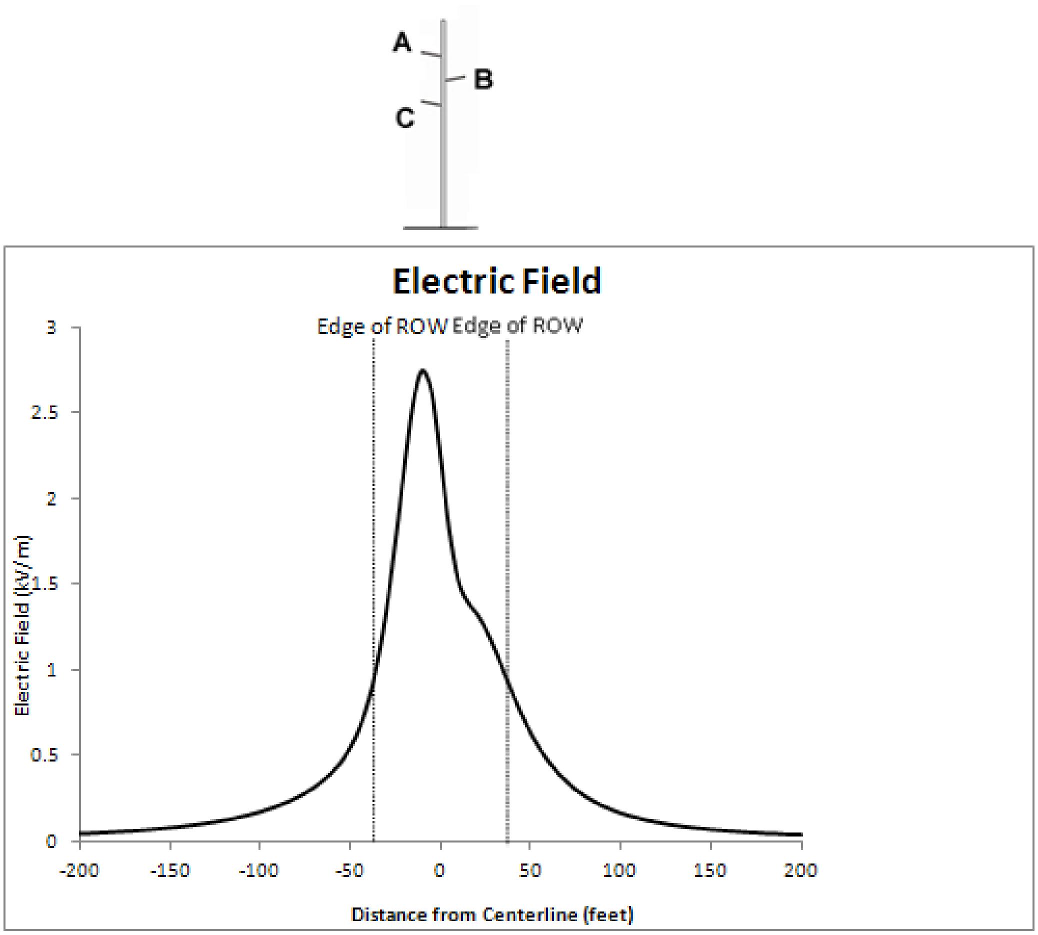

FIGURE 4.16-2 ELECTRIC FIELD CASE II: SINGLE POLE VERTICAL CIRCUIT

<u>*Case III*</u>
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 corridor is 0.67 kV/m and the maximum electric field at the edge of ROW corridor is 0.57 kV/m.

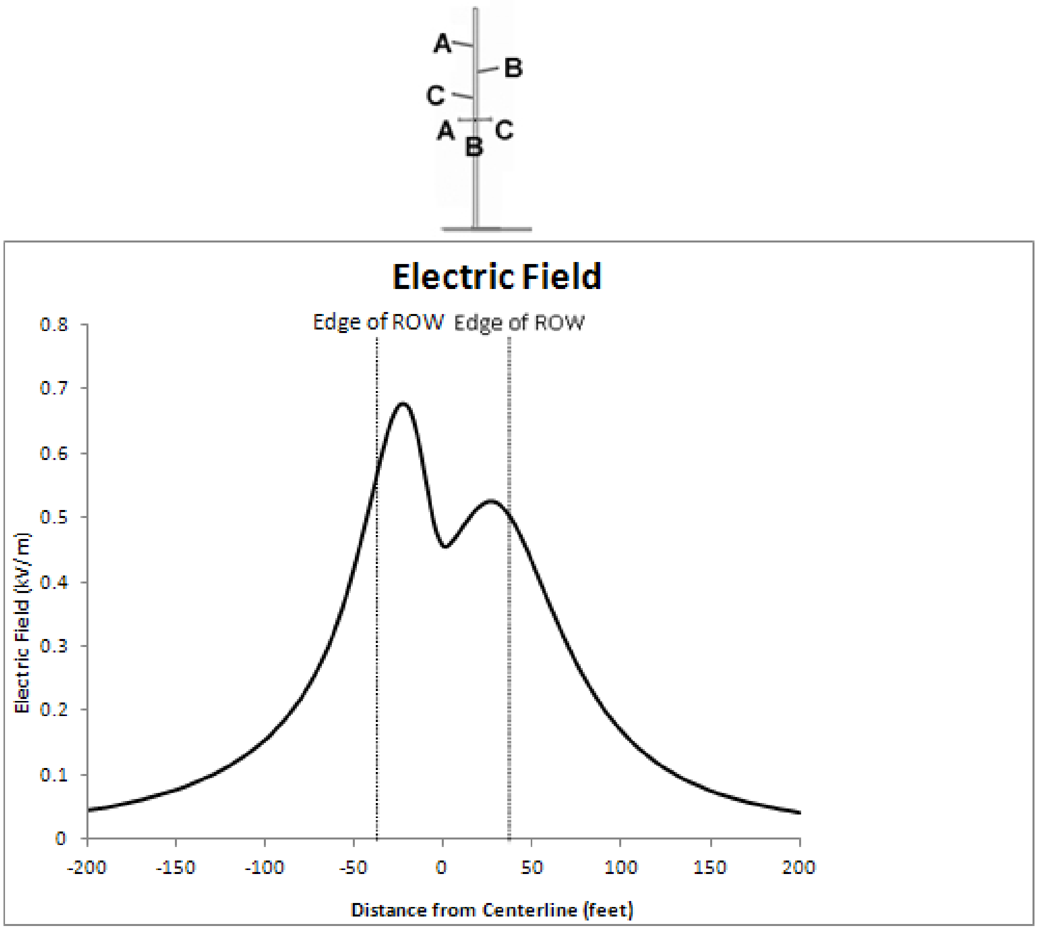

FIGURE 4.16-3 ELECTRIC FIELD CASE III: SINGLE POLE WITH 12 KV UNDERBUILD

Case IV

Figure 4.16-4 is a horizontal profile plot of the electric field levels for Case IV. The maximum electric field level inside the ROW corridor is 3.67 kV/m and the maximum electric field at the edge of ROW corridor is 0.92 kV/m.

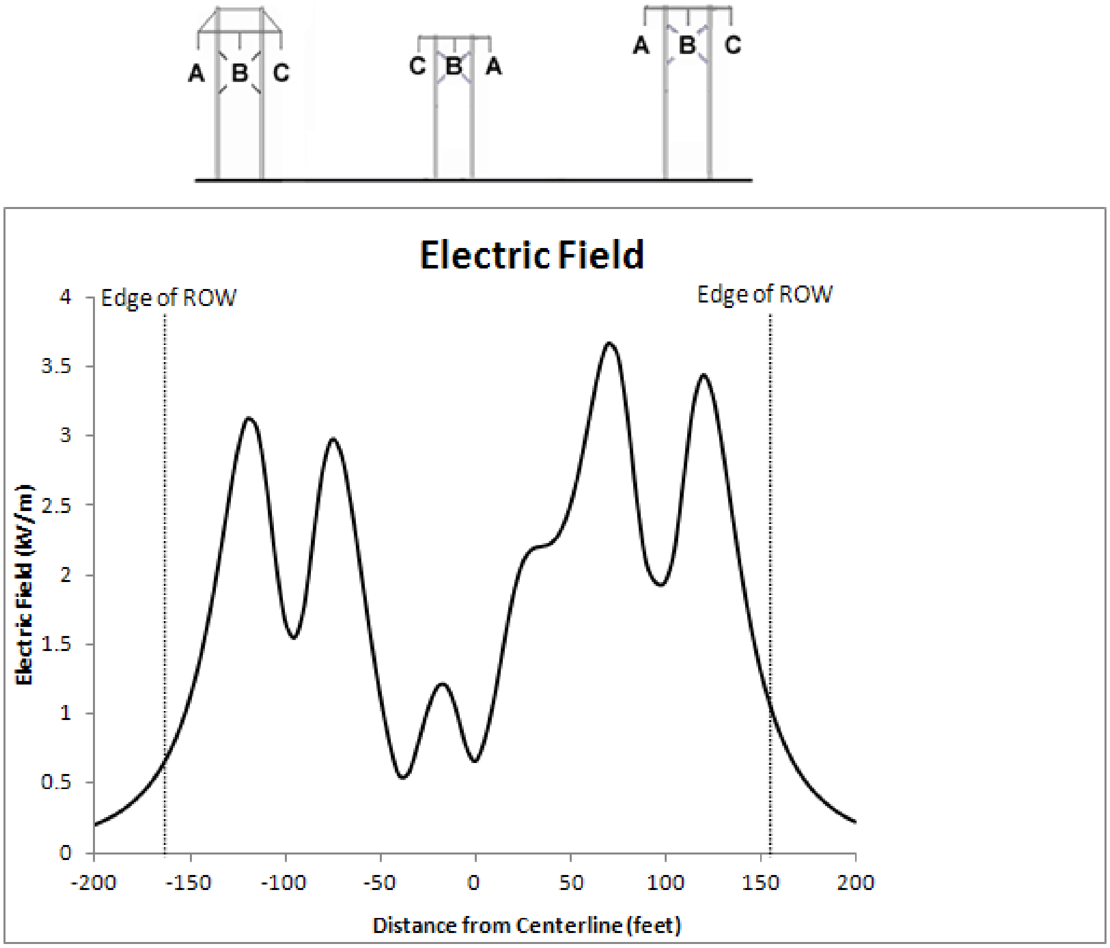

FIGURE 4.16-4 ELECTRIC FIELD CASE IV: H-FRAME PARALLEL TO UNION GAP-MIDWAY 230 KV AND MIDWAY-MOXEE 115 KV

Case V

Figure 4.16-5 is a horizontal profile plot of the electric field levels for Case V. The maximum electric field level inside the ROW corridor is 3.53 kV/m and the maximum electric field at the edge of ROW corridor is 1.84 kV/m.

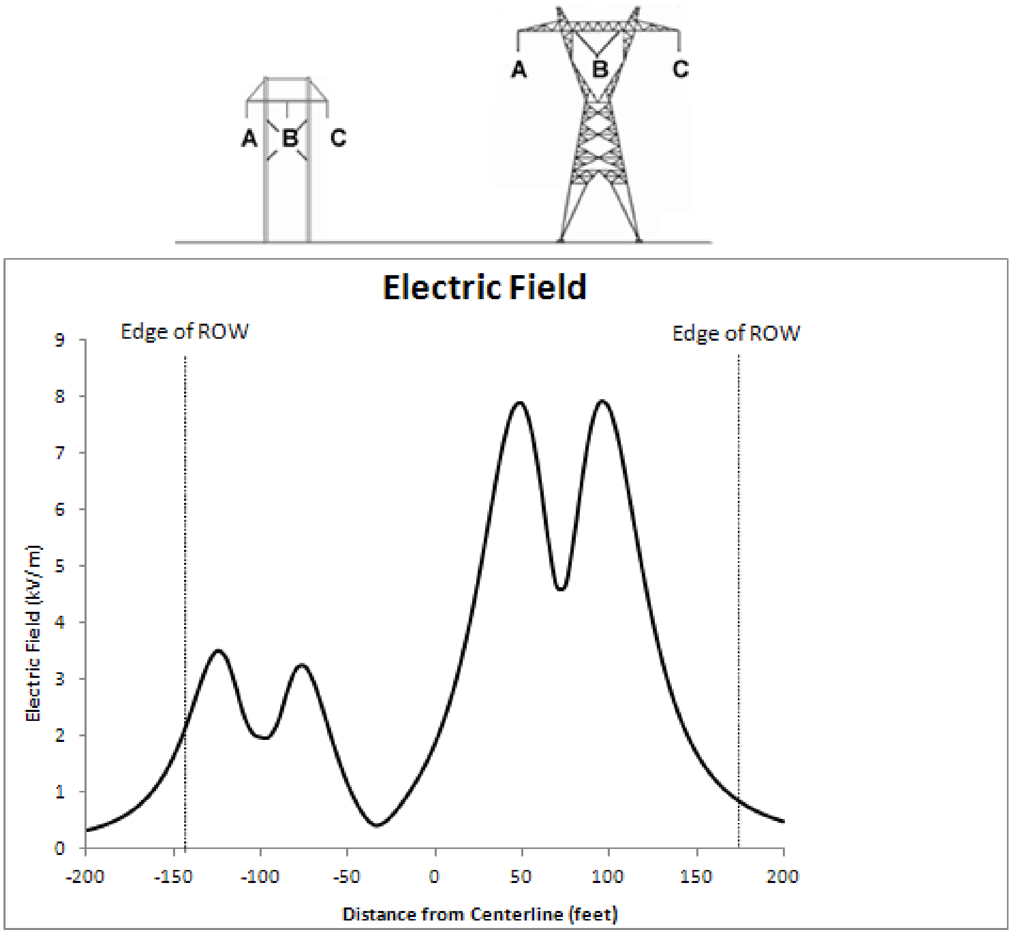

FIGURE 4.16-5 ELECTRIC FIELD CASE V: H-FRAME PARALLEL TO BPA HANFORD-VANTAGE NO. 1 500 KV

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 transmission line Project for all cases modeled would meet the limits of all states (see Table 4.16-2). There are no guidelines in the state of Washington for maximum or edge-of-ROW electric field 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 the proposed Project. Field values within the ROW corridor and at the edge of the ROW corridor of the proposed 230 kV transmission line Project are given for projected maximum currents and for minimum conductor clearances. The magnetic field levels and plots for the five cases are presented below (Figures 4.16-6 through 4.16-10).

Table 4.16-11 Calculated Magnetic Field Results

CASE	ROW WIDTH (FEET)	LEFT EDGE OF ROW (MG)	RIGHT EDGE OF ROW (MG)	MAXIMUM (MG)
I	125	17.96	17.96	77.06
II	75	17.31	13.92	39.64
III	75	8.76	8.24	12.44
IV	317.5	71.4	12.20	96.6
V	325	53.5	97.4	67.9

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 corridor is 77.06 mG and the maximum magnetic field at the edge of ROW corridor is 17.96 mG.

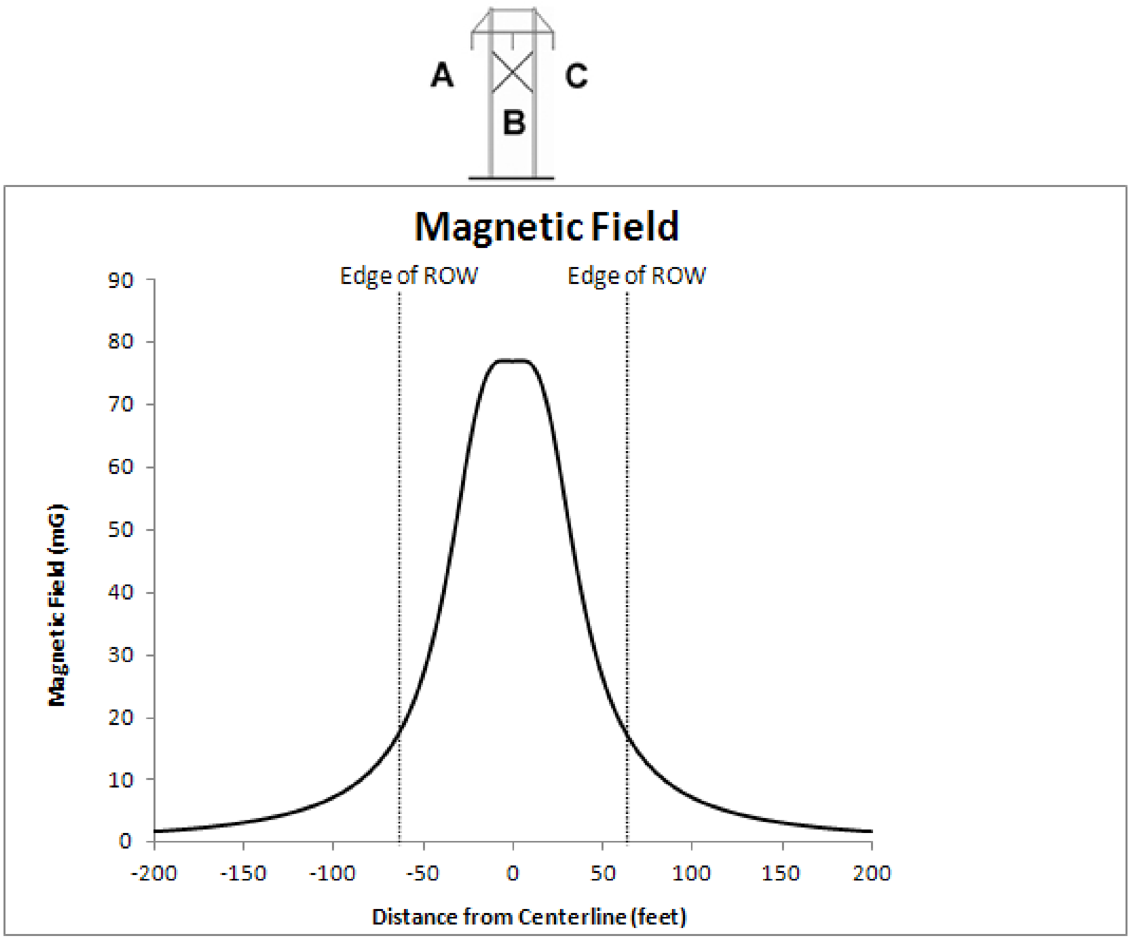

FIGURE 4.16-6 MAGNETIC FIELD CASE I: H-FRAME HORIZONTAL CIRCUIT

<u>*Case II*</u>

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 corridor is 39.64 mG and the maximum magnetic field at the edge of ROW corridor is 17.31 mG.

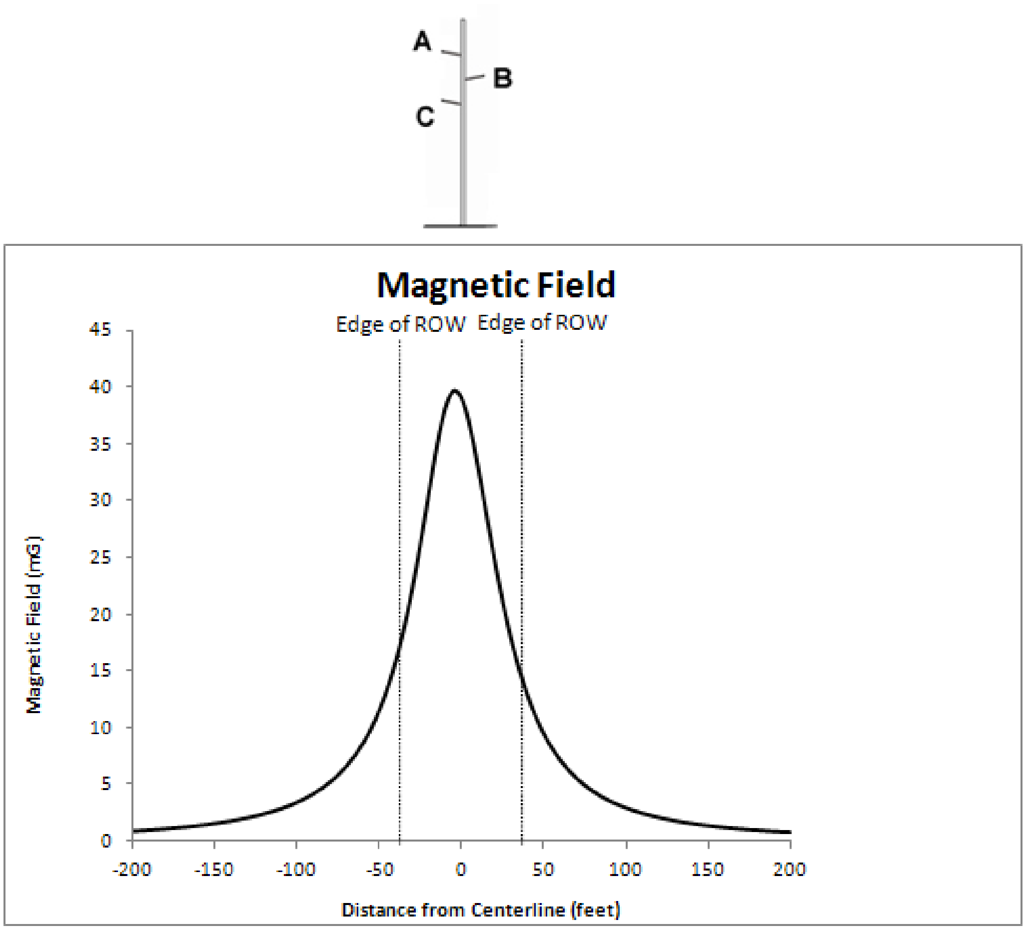

FIGURE 4.16-7 MAGNETIC FIELD CASE II: SINGLE POLE VERTICAL CIRCUIT

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 corridor is 12.44 mG and the maximum magnetic field at the edge of ROW corridor is 8.76 mG.

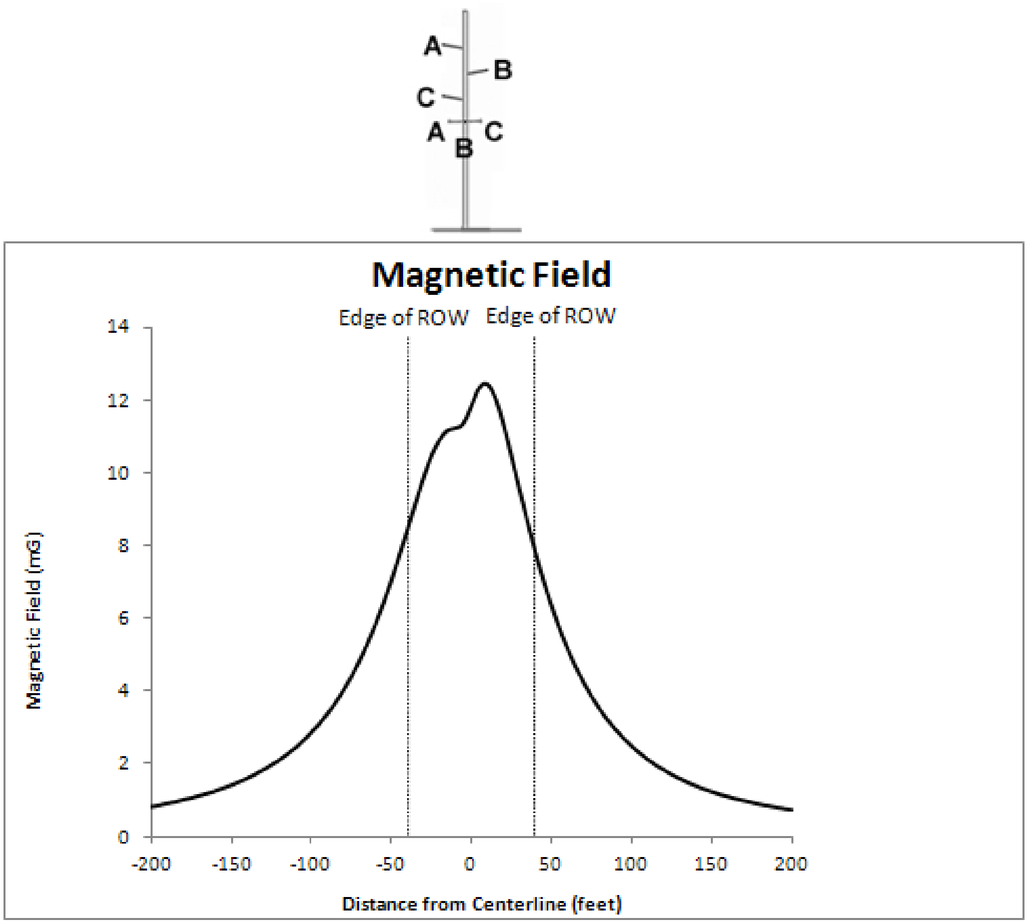

FIGURE 4.16-8 MAGNETIC FIELD CASE III: SINGLE POLE WITH 12 KV UNDERBUILD

<u>*Case IV*</u>
Figure 4.16-9 is a horizontal profile plot of the magnetic field levels for Case 4. The maximum magnetic field level inside the ROW corridor is 96.6 mG and the maximum magnetic field at the edge of ROW corridor is 12.2 mG.

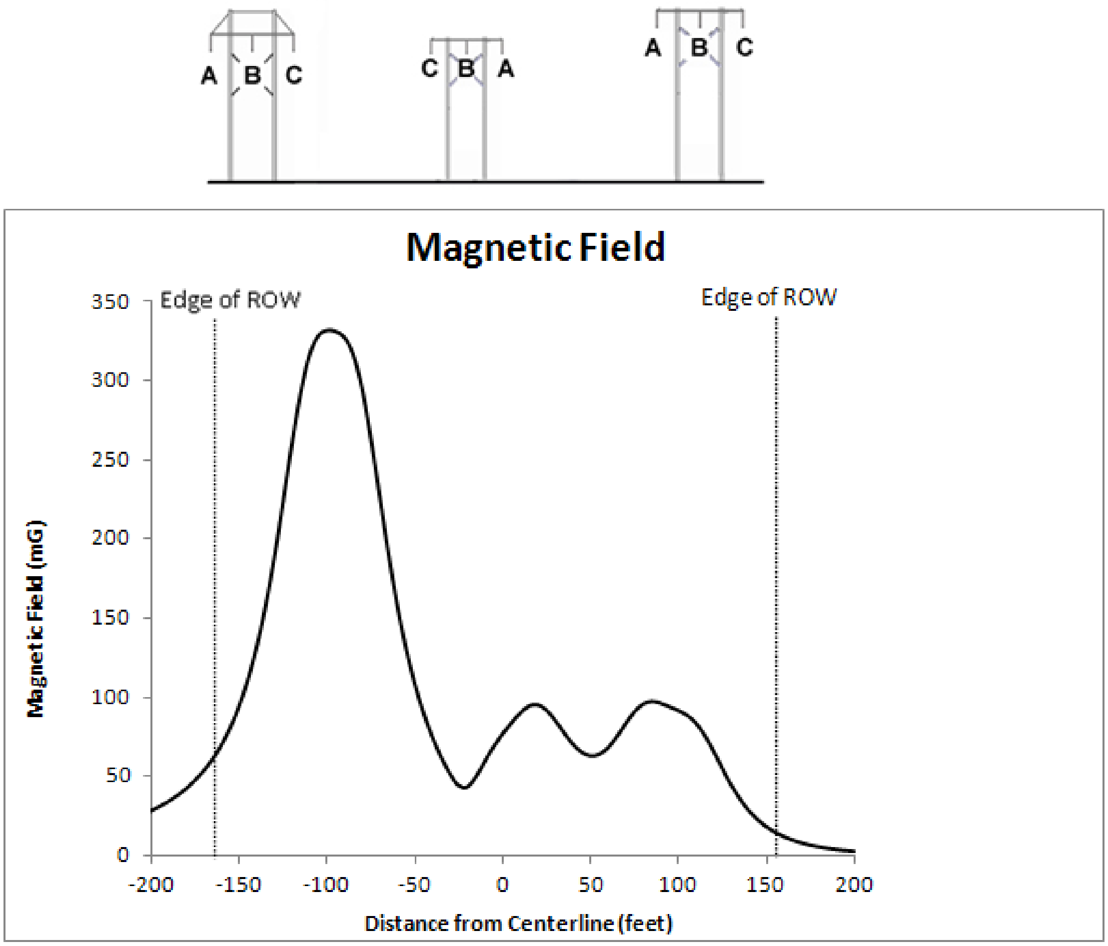

FIGURE 4.16-9 MAGNETIC FIELD CASE IV: H-FRAME PARALLEL TO UNION GAP-MIDWAY 230 KV AND MIDWAY-MOXEE 115 KV

Case V

Figure 4.16-10 is a horizontal profile plot of the electric field levels for Case 5. The maximum magnetic field level inside the ROW corridor of the 230 kV transmission line is 67.9 mG and the maximum magnetic field at the edge of ROW corridor of the 230 kV transmission line is 53.5 mG.

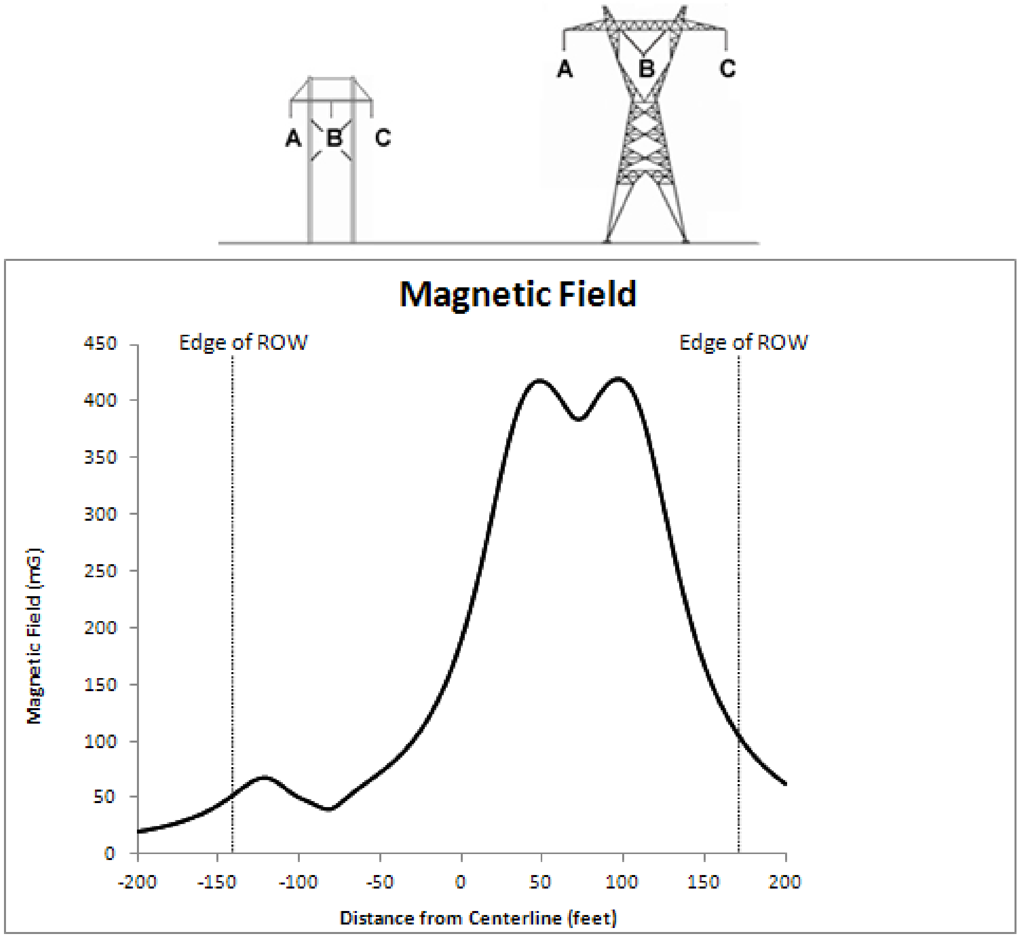

FIGURE 4.16-10 MAGNETIC FIELD CASE V: H-FRAME PARALLEL TO BPA HANFORD-VANTAGE 500 KV

The magnetic fields from the proposed Project 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 power lines 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 (1999), the Health Council of the Netherlands (2001, 2004), the National Radiological Protection Board of Great Britain (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 non-cancer 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. 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 (WHO 2007).

National Academy of Sciences
The National Academy of Sciences 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 EMF 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
The National Radiological Protection Board of Great Britain reports (2001, 2004) concluded:

> "Laboratory experiments have provided no good evidence that [ELF EMF] is 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 United Kingdom [or in the United States]."

> "Because of the uncertainty…and in absence of a dose response relationship, National Radiological Protection Board of Great Britain 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 Health Council of the Netherlands 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 power lines. 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 transmission 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 transmission line 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 a transmission line and small amounts of ozone and nitrous oxide can be released. These effects are most pronounced directly underneath transmission line conductors and decrease with distance from the transmission line. Other audible noise would occur as a result of construction activities associated with proposed Project

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. Higher noise levels also occur in motorized recreational areas in the Saddle Mountain Management Area and Beverly Sand Dunes Off-Highway Vehicle Park. 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 transmission 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 transmission 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 corridor. 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 transmission 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 transmission line would consist of construction noise and be limited to localized areas that have active construction activities. Once the transmission 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 corridor. These sources are described below. Construction of the proposed Project 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 proposed Project route segments at any one time. Construction of the proposed Project would be completed in stages as described in Section 2.4.3.

The proposed Project construction phases would produce noise as heavy equipment would be required to build the 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.

Table 4.16-12 Construction Equipment Noise Levels

TYPE OF EQUIPMENT	MAXIMUM DBA 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	
Pneumatic Wrenches	84-88
Jack Hammers and Rock Drills	72-93
Compactors	80-83
Helicopters	90-100

Source: USDOT 2006.

It is estimated that heavy-duty construction equipment such as graders and trucks would be on-site along the proposed Project alignment (once selected) for approximately twelve months, during which construction activities would mostly involve material delivery, road grading, direct embed pole auguring, and blasting in bedrock (when needed), foundation installation, and restoring the ROW corridor and temporary roads, tagging areas, etc. Route segments with an underground design option (Route Segments NNR-4u and NNR-6u) 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 steel lattice structures and clipping in the conductor. Activities in any specific area would be short term as activities progressed along the ROW corridor.

Noise would also be generated along the proposed Project route segment, 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, a 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 segment. 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. Proposed Project activities that would be facilitated by helicopters include moving equipment and materials to structure sites, structure placement, hardware installation, and conductor stringing operations.

Helicopter operations would occur for short periods several times per day. Therefore, the USDOT 90 dBA one-hour L_{eq} 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 conductor stringing phase of construction. It is anticipated that helicopter conductor 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 transmission line operation. A helicopter may be also be used to assist with steel lattice tower installation for the Columbia River crossing(s). When a helicopter is used, towers would be preassembled at one or more central staging areas and then transferred by helicopter to tower construction 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 construction 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.

Required Design Features (RDFs) would be used to minimize audible noise impacts. RDFs 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 would be 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 will develop procedures for responding to callers.

Refer to Section 2.3 (Required Design Features Common to Action Alternatives) for a complete list of RDFs 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 television station (i.e., TV noise). FM radio stations and the audio portion of a television 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 (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 corridor 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 transmission lines, such as this proposed Project, 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 proposed Project, 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 (e.g., 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; Canadian Centre for Occupational Health and Safety 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 correidor 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 corridor 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 to 7.0 gigahertz 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 Electric Power Research Institute 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 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 proposed Project could affect spray coverage. Spray is applied at a downward angle to reduce over-spray and, as a result, areas immediately adjacent to proposed new 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 electrical power 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 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 all these lines.

4.17 CUMULATIVE EFFECTS

This section describes the potential cumulative effects associated with the Vantage to Pomona Heights 230 kV (kilovolt) 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 Final Environmental Impact Statement (FEIS). 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 (USEPA 1999); and
- U.S. Bureau of Land Management (BLM) *NEPA Handbook*, H-1790-1 (BLM 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 Action Alternatives is 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 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 FEIS, 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 some resources (i.e. traditional cultural properties [TCPs], visual resources, and wildlife), this is not an appropriate time horizon in which to consider future actions because, for the majority of resources, the residual 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, visual resources, and wildlife, 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. In addition, the CE Area may also differ for each resource (e.g., for waterbody and wetland impacts, the area of effect may be a particular watershed; for threatened and endangered species, habitat demarcations). For the proposed Project, the CE Area boundary for each resource is presented in Table 4.17-1.

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

Past, present, and reasonably foreseeable future actions within the combined CE Area were identified through federal, state, and local agency and municipality websites and direct communications; permit applications; free-access database searches; and third-party communications. This public information was relied upon to identify projects within the combined CE Area and has not been independently verified or substantiated. Data were collected for existing and planned developments, transportation improvement projects, mining activities, and energy projects. As the project list comprises projects in various stages of planning and development, it is likely that some of these projects would be completed as currently proposed while others would not. To be conservative, the cumulative analysis assumes that all projects listed would be built and in operation during the operating lifetime of the proposed Project.

To the extent that mapping or locational information was readily available, cumulative actions within 50 miles (the wildlife boundary and the largest of the Project CE Area buffers) are presented in Figure 4.17-1. The figure is provided as a general reference to provide context for the number and type of projects within the overall Project CE Area. Additional information, including project names, for cumulative actions occurring within a resource-specific CE Area are summarized in Table 4.17-2 and discussed in Section 4.17.6 Cumulative Analysis. Those Projects requiring additional explanation are discussed below.

Table 4.17-1 Spatial and Temporal Boundaries by Resource

RESOURCE	SPATIAL BOUNDARY (CE AREA)	TEMPORAL BOUNDARY
Vegetation	The full extent of the Project area, as well as reasonably foreseeable future actions. This boundary was selected to encompass potential seed dispersal areas.	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	The full extent of the Project area, reasonably foreseeable projects, and the broader geographic region (approximately 50 miles). This boundary was selected to encompass migration corridors or individual home ranges of the majority of the species 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).
Land Use	Area in the vicinity of the Action Alternatives and more broadly the four counties that would be crossed by the route segments (Benton, 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 Action 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 Action Alternatives and more broadly the four counties that would be crossed by the route segments (Benton, 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 Action 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 four counties that would be crossed by the route segments (Benton, 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 Action Alternatives. This boundary was selected to allow the assessment of cumulative impacts in all directions from areas approximately four miles from the Action 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 Action Alternatives and more broadly the four counties that would be crossed by the route segments (Benton, 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 (CE AREA)	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 Action Alternatives and more broadly the four counties that would be crossed by the Action Alternatives (Benton, 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).

Table 4.17-2 Past, Present, and Reasonably Foreseeable Future Actions Within the Project Cumulative Effects Area

PROJECT NAME	OWNER / OPERATOR	TYPE OF PROJECT	PROJECT LOCATION AND DESCRIPTION[1]	SCHEDULE[1]
East Rowley Quarry	Granite Northwest, Inc.	Mining	Expansion of current mining to include an additional 7 parcels, Yakima County.[2]	Permit submitted in April 2015
Ellensburg-Moxee No. 1 115 kV Transmission Line	Bonneville Power Administration (BPA)	Transmission	Conduct subsurface geotechnical testing in support of the future direct burial of an existing overhead fiber optic cable. The geotechnical testing location is approximately one mile northwest of the line's Highway 821 crossing and 1.5 miles northwest of the New Northern Route (NNR) Alternative.	Completed in 2014
Fort Lewis Grow the Army Action	U.S. Army	Military	General increase in training throughout the training center. General increase in periodic training and personnel at Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) to accommodate training needs of variable numbers of units stationed at JBLM YTC.	Approved 2011; Ongoing
JBLM YTC Urban Operations Village	U.S. Army	Military	In Training Area 2. Two sites designed as small villages to provide tactical urban training.	Completed in 2012; Ongoing use
JBLM YTC Range Development - Combined Arms Collective Training Facility	U.S. Army	Military	Undecided location. Proposed training site designed to emulate an urban setting.	Planned for 2019 or later
Sniper Field Fire Range	U.S. Army	Military	Training Area 11 (Range 4). Small caliber automated target range.	Completed 2012; Ongoing use

PROJECT NAME	OWNER / OPERATOR	TYPE OF PROJECT	PROJECT LOCATION AND DESCRIPTION[1]	SCHEDULE[1]
Washington Army National Guard Tactical Unmanned Aerial System Training Facility	U.S. Army	Military	Training Area 12 (adjacent to Selah Creek Airstrip). Facility for housing unmanned aerial systems.	Planned (year not determined yet)
JBLM YTC Convoy Live Fire Range	U.S. Army	Military	Training Area 12. Range designed to emulate targetry encountered from a moving convoy.	Completed 2014; Ongoing use.
Selah Creek Airstrip Repair and Expansion	U.S. Army	Military	Training Area 12. The existing 75 feet x 4,600 feet runway will be milled out and repaved to extend the runway approximately 600 feet and widen the runway by 17.5 feet on both sides (35 feet overall) to provide a finished runway approximately 5,200 feet long by 110 feet wide in order to accommodate C-17 cargo aircraft.	Construction to begin Fall 2016
Multi-purpose Machine Gun Range	U.S. Army	Military	Training Area 11 (Range 5). Automated target range designed to accommodate machine gun training.	Completed in 2016
Meteorological Monitoring	EDP Renewables (Horizon Wind Energy)	Energy	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. Ultimately, only two towers were installed, on the eastern portion of the range.	Completed in 2010
Saddle Mountain West Wind Farm	EDP Renewables (Horizon Wind Energy)	Energy	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 megawatts (MW) each with a total capacity of 165 to 450 MW) on BLM and private land in the western half of the Saddle Mountains.	2016
Meteorological towers	EDP Renewables (Horizon Wind Energy)	Energy	EDP has a lease and meteorological towers on private lands located in the western portion of the Saddle Mountains.	Ongoing

PROJECT NAME	OWNER / OPERATOR	TYPE OF PROJECT	PROJECT LOCATION AND DESCRIPTION[1]	SCHEDULE[1]
Proposed Wymer Dam and Reservoir	U.S. Bureau of Reclamation (Reclamation)	Improve fish habitat/Water Storage/ Irrigation/Energy	The proposed Wymer Dam and Reservoir would be constructed under Reclamation's Yakima Basin 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. Development of Wymer Dam and Reservoir would involve federal acquisition of approximately 4,000 acres of private land in the Lmuma Creek basin. The land would be converted from open habitat and rangeland uses to dam and outlet works, reservoir pool, and shoreline management uses. Shoreline management is expected to include water quality protection, wildlife habitat, and reservoir-oriented recreation facilities (e.g., day use sites, boat ramp(s), etc.).	Yakima Basin Integrated Water Resource Management Plan (YBIP) Final Programmatic Environmental Impact Statement (PEIS) was published March 2012 and the Record of Decision was issued July 2013. The next steps are to undertake additional individual project definition, design, modeling, geotechnical review and other appropriate technical studies for the proposed projects. The outcomes from studies conducted by Reclamation will be used to determine the actual sequencing of the proposed Wymer Dam and Reservoir Project (Reclamation 2013b). According to information provided by Reclamation, project-level environmental review, permitting and design for the Wymer Dam and Reservoir Project is anticipated to occur in 2022-2024 or in 2032-2034, with project construction following environmental review, permitting and design (Reclamation 2016b).
Priest Rapids Hydroelectric Project	Public Utilities District No. 2 of Grant County, PacifiCorp, Grant County Public Utility District (PUD), and Puget Sound Energy	Energy	The Priest Rapids 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 and 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. On-going project activities for the operation and maintenance of the hydroelectric system.	Ongoing

PROJECT NAME	OWNER / OPERATOR	TYPE OF PROJECT	PROJECT LOCATION AND DESCRIPTION[1]	SCHEDULE[1]
Hanford Nuclear Reservation (now Hanford Site)	Department of Energy	Energy/ Reclamation	Site cleanup, waste disposal, and tank waste stabilization are currently underway on the Hanford Site, with several large areas in various states of reclamation. Current activities include the following: • Continued transport of U.S. Navy reactor compartments from the Columbia River and their disposal within the Hanford Site. • Continued operation of the Columbia Generating Station. • Continued operation of the commercial low-level radioactive waste disposal facility. • Current land use, biological and cultural management activities in support of the Hanford Site, Hanford Reach National Monument, and National Wildlife Refuge.	Ongoing
Hanford Reach National Monument	Department of the Interior	Recreation/ Restoration	Current land use, biological, and cultural management activities for the National Wildlife Refuge.	Ongoing
Hanford - Tank Closure and Waste Management	Department of Energy	Reclamation	Reclamation activities include the retrieval and treatment of waste from 177 underground storage tanks at Hanford, including closure of 149 single-shell tanks; final decontamination and decommissioning of the Fast Flux Test Facility and its support structures; and ongoing and expanded waste management operations on the Hanford Site, including the disposal of Hanford's low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) and of LLW and MLLW from other Department of Energy sites in an Integrated Disposal Facility	Ongoing
Hanford Natural Gas Pipeline	Department of Energy	Energy	Construction of a proposed natural gas pipeline that would originate at a new interconnect tap on the existing Williams Northwest Pipe transmission line in Franklin County, north of the Tri-Cities Airport in Pasco, Washington. The pipeline would run west across non-Department of Energy lands about 8.5 miles and under the Columbia River onto the Hanford Site under the 300 Area. The pipeline would then turn northwest and parallel Route 4S for about 20 miles, terminating at facilities in the 200 East Area of the Central Plateau. The estimated length of the proposed pipeline is approximately 30 miles.	Ongoing

PROJECT NAME	OWNER / OPERATOR	TYPE OF PROJECT	PROJECT LOCATION AND DESCRIPTION[1]	SCHEDULE[1]
Hanford - Management of Spent Nuclear Fuel from the K Basins at the Hanford Site	Department of Energy	Reclamation	Management and storage of approximately 2,100 metric tons of spent nuclear fuel located in the K Basins at the Hanford Site. The project included management and storage/disposal of sludge, debris, and water in the K Basins.	Completed in 2006
Hanford - Decommissioning of Eight Surplus Production Reactors at the Hanford Site	Department of Energy	Reclamation	The project included safe storage followed by deferred one-piece removal of eight surplus nuclear production reactors. Reactor blocks were removed intact on a tractor-transporter to disposal areas and contaminated fuels associated with the fuel storage basins were removed and disposed of. Uncontaminated materials were also removed and disposed of on site.	Completed in 2012
Hanford - Long-term Management and Storage of Elemental Mercury	Department of Energy	Reclamation	Pursuant to the Mercury Export Ban Act of 2008 (Public Law 110-414), the Department of Energy was directed to designate a facility or facilities for the long-term management and storage of elemental mercury generated within the United States. The Department of Energy analyzed the storage of up to 10,000 metric tons (11,000 tons) of elemental mercury in a facility(ies) constructed and operated in accordance with the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (74 Federal Register 31723). The Hanford Site (200-West Area) was included in the analysis but not selected as the preferred alternative.	Ongoing
Columbia Generating Station	Department of Energy	Energy	Renewal of Operating License for Columbia Generating Station on the Hanford Reservation.	Completed in 2010
Columbia-Rocky Ford 230 kV Transmission Line	Grant County PUD	Transmission	Grant County PUD built a new 230 kV transmission line that will extend 33 miles east of the BPA Columbia substation located west of the intersection of Palisades Road and Highway 28 in Douglas County to the Rocky Ford substation located on the east side of Highway 17, near Rocky Ford Creek in Grant County.	Completed in 2013
Geneva Substation	Grant County PUD	Energy	This substation project is located within the community of Mattawa in Grant County.	Completed in 2011
Integrated Resources Plan (IRP)	Grant County PUD	Energy	The IRP examined the PUD's current and future electric demand and future energy market conditions under a number of likely future scenarios.	Planning

PROJECT NAME	OWNER / OPERATOR	TYPE OF PROJECT	PROJECT LOCATION AND DESCRIPTION[1]	SCHEDULE[1]
Road Construction	Washington State Department of Transportation	Transportation	Construction of local and state highways and Interstate (I) 82 bisected native grassland, shrub-steppe habitat, and agricultural lands.	Ongoing
Agricultural	Private	Agriculture	Agricultural production is diverse, with large numbers of orchards as well as field crops.	Ongoing
Punkin Center Substation	PacifiCorp	Energy	Expansion of the current substation to include structures and fencing. Located at the intersection of Yakima Valley Highway and North Granger Road.[2]	Construction started in December 2015 and estimated to be completed in 2016
Warrior Orchards LLC Irrigation Holding Pond	Warrior Orchards LLC	Agriculture	Construction of approximately 2.25 million gallon impoundment of water (irrigation holding pond). The property is located on the west side of Warrior Road and north side of Bittner Road, approximately 1 mile northeast of the City of Moxee, Washington.[2]	Application approved October 2015
County Project RC 3573 Naches Rail to Trail Project	Yakima County Public Services-Transportation Division	Recreation	Develop a multipurpose trail to complete the Greenway Trail system. The project includes the replacement of an existing bridge over Cowiche Creek with a new110 foot steel pedestrian bridge. A total of 3 acres, located along the Naches River between the Gleed area and City of Yakima, Washington.[2]	Application submitted October 2015, Notice of Completeness November 24, 2015.
Water Reservoir	Yakima County Public Services – Utility Division	Water Storage	Construct a new 1.5 million gallon steel potable water reservoir next to the existing water reservoir. Located on the southeast corner of the intersection of N. 57th Street and Bohoskey Way, within the community of Terrace Heights, Washington.[2]	Notice of Application and Notice of Completeness September 23, 2015.
Veldhuis Dairy	Windmill Estates	Agriculture	A new bovine feed lot operation will be located north of the feed lot corrals. Total area consists of 1,200 acres with 55 acres directly affected. Land not used for the feed lot will likely be used for raising dry land crops. Type V streams within the project area. Located east of Glade Road and State Route (SR) 22, approximately 1.5 miles southeast of City of Mabton, Washington.[2]	Notice of Application and Notice Completeness May 21, 2015

PROJECT NAME	OWNER / OPERATOR	TYPE OF PROJECT	PROJECT LOCATION AND DESCRIPTION[1]	SCHEDULE[1]
Roza Irrigation District Reservoir	Anderson Family Holding, LLC	Water Storage & Mining	Construction of 1,600 acre-feet re-regulation reservoir on an 86-acre site. The proposal is to allow temporary mining of 200,000 cubic yards of rock material from adjoining properties for construction of the reservoir. Location is Washout Canyon on the north side of Erickson Road about 0.5 mile east of Washout Road and 4.5 miles north of the City of Sunnyside, Washington.[2]	Notice of Completeness June 18, 2015, Final Decision Issued September 16, 2015.
Nile-Cliffdell Fire Station	Yakima County Fire District #14	Public Safety	Construction of a new fire station, Located on undeveloped land, 17.5 mile northwest of Naches Community. The Naches River crosses on the south portion of the site.[2]	Final Decision and Approval issued on August 3, 2015. Under construction starting June 2016, with an anticipated construction schedule of 6 months.
Anderson Rock and Demolition Pits	Ron Anderson	Mining & Landfill	Limited purpose landfill expansion. Located at 41 Rocky Top Road, approximately 3 miles northwest of the City of Yakima, Washington.[2]	The application was submitted on May 15, 2015, and complete on July 7, 2015. Final Determination of Non-Significant issued October 5, 2015.
Telecommunication Facility	Bates – Atlas Tower Holding	Communication	Installation of a new telecommunication facility, approximately 2500 square feet. Located at Lynch Lane and Rutherford Road, Yakima, Washington.[2]	Application submitted on July 29, 2015 and complete on October 15, 2015.
Roy Farms Konnowoc Pass Irrigation Pond	James L. Bridges	Agriculture	The project consists of approximately 100,500 square feet of existing farm land to be excavated to create an irrigation storage pond to support existing farms. Location is the Konnowoc Passe Rd, Yakima County, Washington.[2]	Construction from October 2015 through May 2016
Midway-Moxee/Midway Grandview Upgrade Transmission Line Project	BPA	Transmission	Rebuild the 34-mile long Midway-Moxee transmission line and the 26-mile long Midway-Grandview transmission lines in Benton and Yakima counties, Washington.	Final Environmental Assessment issued March 2016. Construction is anticipated to begin in September 2016 and will be completed in spring 2018
Selah Cliffs Natural Area Preserve Activities	Washington State Department of Natural Resources	Recreation/ Restoration	Located off of Highway 821, south of mile marker 3. The entrance is approximately 7 miles north of Yakima, Washington or approximately 28 miles south of Ellensburg, Washington.[2]	Ongoing
I-82/SR-243/SR-24 Regular Maintenance	Washington State Department of Transportation	Transportation	Maintenance work.[3]	Ongoing

PROJECT NAME	OWNER / OPERATOR	TYPE OF PROJECT	PROJECT LOCATION AND DESCRIPTION[1]	SCHEDULE[1]
Columbia Basin Irrigation Project	Reclamation	Irrigation	Ongoing project activities for the operation and maintenance of the irrigation system. This project covers over 670,000 acres currently.[4]	Ongoing
Yakima Basin Irrigation Project	Reclamation	Irrigation	Ongoing project activities for the operation and maintenance of the irrigation system.[4]	Ongoing
Zayo Fiber Optic Line	Zayo Inc	Communications	Installation of over 200 miles of fiber-optic cable for communications within the Columbia Basin. Starting in Umatilla OR and passing through Franklin, Adams, Grant, and Kittitas counties end near Ellensburg, Washington.[4]	Application submitted on December 2014. Finding of No Significant Impact by U.S. Army Corps of Engineers in February 2016.
Odessa Groundwater Replacement Program	Washington State Department of Ecology and U.S. Bureau of Reclamation	Irrigation	Increase the area served by surface water to replace groundwater in the Odessa Special Study Area. Includes the expansion of the East Low Canal and the construction of pressurized laterals to serve the identified lands.[4]	Final Decision and Approval issued on April 2, 2013. Ongoing construction. Anticipated completion 2025.
Rehydrating Artesian and Black Lakes	Washington State Department of Ecology and U.S. Bureau of Reclamation	Irrigation	Feasibility Study to rehydrate and restore habitat and reduce groundwater declines within the Odessa Aquifer.[4]	Plan proposal submitted on October 30, 2015
Vantage Solar	Energy of Utah, LLC	Energy	Request to construct solar energy facility on 650 acres of Reclamation land to generate 80 MW of power.[4]	Ongoing

Sources: Federal, state, and local agency and municipality websites and direct communications; permit applications; paid and free-access database searches; and third-party communications. The information contained in this table has not been independently verified or substantiated.

[1] Based upon readily available public information

[2] Yakima County 2015.

[3] Washington State Department of Transportation. 2015. Personal communication regarding work within the South Central Region.

[4] U.S. Bureau of Reclamation. 2015. Personal communication regarding work within the Cumulative Effect Area.

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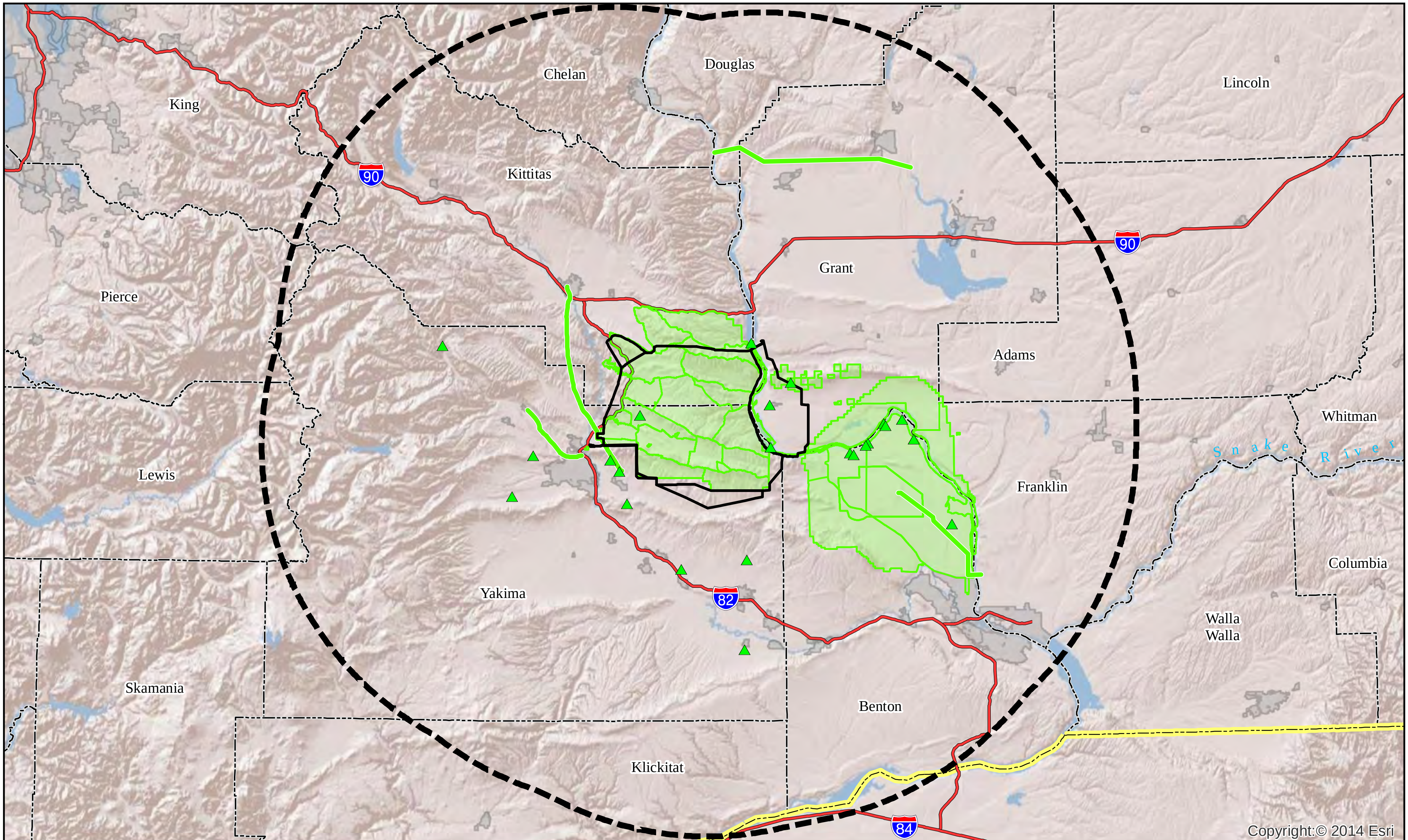

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 14.17-1: Cumulative Effects Area

Legend

Route Segment

Cumulative Effects Assessment Area (50 miles)

Cumulative Projects

Point

Line

Polygon

Interstate Highway

State Boundary

County Boundary

Water Body

0 10 20

Miles

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4.17.5.1 Past and Present Actions

Priest Rapids Hydroelectric Project

The Priest Rapids Hydroelectric Project is part of a network of dams and reservoirs on the Columbia River that comprise the single largest coordinated hydroelectric system in the country. The Priest Rapids 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 project was built by the Public Utility District (PUD) 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. Operation and maintenance of this hydroelectric system would be considered present actions, as well as past actions.

Transmission Lines and Substations

Numerous high voltage transmission lines and substations have been constructed or planned for construction since the completion of the Priest Rapids hydroelectric project in the 1960s by the Bonneville Power Administration (BPA), PacifiCorp, Grant County PUD, and Puget Sound Energy. There are over 15 transmission lines that are located in the CE Area that range in voltage from 115 kV to 230 kV and 500 kV. BPA will be rebuilding the Midway-Moxee and Midway-Grandview transmission lines as part of the Midway-Moxee/Midway-Grandview Upgrade Transmission Line Project. Major substations include: Midway Substation, Vantage Substation, Wautoma Substation, Moxee Substation, and Pomona Heights Substation. New and proposed substations include the Geneva Substation and the Punkin Center Substation. BPA conducted 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 geotechnical testing location is approximately one mile northwest of the line’s Highway 821 crossing and 1.5 miles northwest of the New Northern Route (NNR) Alternative. Operation and maintenance of these transmission lines and substations would be considered present and reasonably foreseeable actions, as well as past actions.

Grant County Public Utility District

The Grant County PUD has two past actions within its service territory which consists of Grant County and southern Douglas County:

Columbia-Rocky Ford 230 kV Transmission Line

Grant County PUD built a new 230 kV transmission line that extends 33 miles east of the BPA Columbia Substation, located west of the intersection of Palisades Road and Highway 28 in Douglas County, to the Rocky Ford Substation located on the east side of Highway 17, near Rocky Ford Creek in Grant County. Construction was completed in 2014 (Grant County PUD 2015). The project is located near Quincy and Ephrata, Washington; north of Interstate (I) 90, over 60 miles from the Vantage-Pomona CE Area. Due to its distance from the CE Area, this Grant County PUD project is not considered in the cumulative effects analysis.

Geneva Substation

This substation project is located within the community of Mattawa in Grant County. The project work was completed in 2011. While this project is within the CE Area, it has been completed and, therefore, is not considered a reasonably foreseeable future project for the cumulative effects analysis.

Agriculture

European settlement began throughout the region including the CE Area circa the mid-nineteenth century with economic activity in the region consisting primarily of raising livestock (e.g., Veldhuis Dairy). 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 U.S. Bureau of Reclamation's (Reclamation's) 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 system that is essential to the agricultural industry also supports the related industries of food processing and wholesale trade and trucking. Several irrigation ponds and reservoirs are proposed to support the agricultural activities and they include the Roy Farms Konnowoc Pass Irrigation Pond, Roza Irrigation District Reservoir, Wymer Reservoir, and the Warrior Orchards LLC Irrigation Holding Pond. Agricultural activities would be considered present and reasonably foreseeable actions as well as past actions.

Joint Base Lewis-McChord Yakima Training Center

Joint Base Lewis-McChord Yakima Training Center (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 I-82, on the south by the City of Yakima and State Route (SR) 24, on the north by the city of Ellensburg and I-90, and on the east by the Columbia River. From 1942 to 1946 the Army leased 160,000 acres of land in the area for the Yakima Anti-Aircraft Artillery Range. In 1951 the Army purchased 261,000 acres for the Yakima Firing Center, which would become the modern Yakima Training Center. 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.

Table 4.17-2 lists recent, ongoing, and future actions on JBLM YTC and their approximate locations and schedules. JBLM YTC projects would be considered present and reasonably foreseeable actions, as well as past actions.

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, meteorological stations, telecommunication facilities, a Natural Area Preserve (NAP), small suburban residential communities, a proposed fire station, wildlife management areas, transmission lines and substations, the JBLM YTC, agricultural areas, and a variety of recreation facilities.

The predominant land uses would be considered past and present actions. There are no reasonably foreseeable projects or actions that would alter or dramatically change the present land use character of the Project area.

Hanford Nuclear Reservation (Hanford Site)

Previous activities at Hanford Nuclear Reservation (now Hanford Site) focused on the national production of nuclear materials related to armaments and nuclear power. Established in 1943 as part of the Manhattan Project, the site was home to the B Reactor, the first full scale plutonium reactor in the world. Plutonium manufactured at the site was used in the first nuclear bomb. During the Cold War, the project was expanded to include nine nuclear reactors and five large plutonium processing complexes. The weapons production reactors were decommissioned at the end of the Cold War, but decades of manufacturing left behind two-thirds of the nation's high-level radioactive waste. Today, much of the activity at Hanford Site is directed at cleanup efforts.

The Hanford Site currently occupies 586 square miles in Benton County. The land is uninhabited and is closed to the general public. The original Reservation was 670 square miles and included buffer areas across the Columbia River in Grant and Franklin counties. Some of this land has been returned to private ownership and is now covered with orchards and irrigated fields. Hanford Site activities associated with plutonium production would be considered past actions; clean-up activities would be considered present and reasonably foreseeable future actions. Hanford Site projects include:

Hanford Tank Closure and Waste Management

This project included reclamation activities that consisted of the retrieval and treatment of waste from 177 underground storage tanks at the Hanford Site, including closure of 149 single-shell tanks; final decontamination and decommissioning of the Fast Flux Test Facility and its support structures; and ongoing and expanded waste management operations on the Hanford Site, including the disposal of Hanford's low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) and of LLW and MLLW from other Department of Energy sites in an Integrated Disposal Facility.

Hanford Management of Spent Nuclear Fuel from the K Basins

This project included the management and storage of approximately 2,100 metric tons of spent nuclear fuel located in the K Basins at the Hanford Site. The project included management and storage/disposal of sludge, debris, and water in the K Basins.

Hanford Decommissioning of Eight Surplus Production Reactors at the Hanford Site

The project included safe storage followed by deferred one-piece removal of eight surplus nuclear production reactors. Reactor blocks were removed intact on a tractor-transporter to disposal areas and contaminated fuels associated with the fuel storage basins were removed and disposed of. Uncontaminated materials were also removed and disposed of on site.

Hanford Tank Waste Remediation System

The project analyzed the management and disposal of the Hanford Site Tank Waste Remediation System radioactive, hazardous, and mixed waste. This waste was stored in 177 large underground storage tanks and in approximately 60 smaller active and inactive miscellaneous underground storage tanks. The project also included managing and disposing of approximately 1,930 cesium and strontium capsules stored in the Waste Encapsulation and Storage Facility.

Hanford Reach National Monument

In 2000, large portions of the Hanford Reservation were turned over to the U.S. Fish and Wildlife Service (USFWS) and became a unit of the National Wildlife Refuge System renamed as the Hanford Reach National Monument. The western boundary of the Hanford Reach National Monument is near the Project area, in the vicinity of the Midway Substation. The Hanford Reach National Monument is managed for conserving unique biological, cultural, and recreation resources that have remained largely untouched over the past six decades. The activities of the Hanford Reach National Monument would be considered a present and reasonably foreseeable future action.

Highway and Road Construction and Maintenance

Construction of local and state highways and I-82 bisected native grassland, shrub-steppe habitat, and agricultural lands. Ongoing maintenance activities occur along the I-82, SR-243 and SR-24 (Washington State Department of Transportation [WSDOT] 2015). Highway and road construction and maintenance activities would be considered.

4.17.5.2 Reasonably Foreseeable Actions

BPA's Midway-Moxee/Midway Grandview Upgrade Transmission Line Project

The project will rebuild the 34-mile long Midway-Moxee transmission line and the 26-mile long Midway-Grandview transmission lines in Benton and Yakima counties, Washington. These lines were built in the 1940s and are deteriorating due to age and need to be rebuilt to ensure reliable electric service. In addition, the Midway-Grandview line would be upgraded to increase the electrical capacity to allow local utilities to meet increased demand for power.

For both lines, the project would include replacing all wood-pole structures and conductor (wires), improving existing access roads, and creating new access where needed. Most structures will be replaced with similar size poles next to the existing location unless changes are needed for safety or to minimize potential environmental impacts. Both lines will continue to operate at 115 kV (BPA 2016). BPA prepared a final Environmental Assessment (EA) published in March 2016 to evaluate the potential impacts of the proposal and identify ways to reduce those impacts. The final EA also considers a No Action Alternative where the transmission lines would not be rebuilt and upgraded. Based on the analysis in the EA and comments received, BPA prepared a finding of no significant impact. Construction is anticipated to begin in September 2016 and will be completed in spring 2018 (BPA 2016).

EDP Renewables (Horizon Wind Energy) Meteorological Monitoring

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 meteorological towers were installed on the eastern portion of the ROW. The BLM 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.

Hanford Natural Gas Pipeline

This proposed project includes the construction of natural gas pipeline that would originate at a new interconnect tap on the existing Williams Northwest Pipe transmission line in Franklin County, north of the Tri-Cities Airport in Pasco, Washington. The pipeline would run west across non-Department of Energy lands about 8.5 miles and under the Columbia River onto the Hanford Site under the 300 Area. The pipeline would then turn northwest and parallel Route 4S for approximately 20 miles, terminating at facilities in the 200 East Area of the Central Plateau. The estimated length of the proposed pipeline is approximately 30 miles.

Hanford Long-term Management and Storage of Elemental Mercury

Pursuant to the Mercury Export Ban Act of 2008 (Public Law 110-414), the Department of Energy was directed to designate a facility or facilities for the long-term management and storage of elemental mercury generated within the United States. The Department of Energy analyzed the storage of up to 10,000 metric tons (11,000 tons) of elemental mercury in a facility(ies) constructed and operated in accordance with the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (74 Federal Register 31723). The Hanford Site (200-West Area) was included in the analysis, but not selected as the preferred alternative.

Reclamation's Columbia Basin and Yakima Irrigation Projects

The Columbia Basin Project (CBP) provides storage and water for irrigation and electricity, controls floods, provides recreation, regulates streamflow, and, also, provides water for cities, industries, navigation, and endangered species. The CBP is located in east central Washington in portions of Grant, Lincoln, Adams, and Franklin counties, with some northern facilities located in Douglas County and currently serves approximately 671,000 acres, approximately 65 percent of the 1,029,000 acres originally authorized by Congress. The first half of project lands was developed primarily in the 1950s and 1960s, with some acreages being added sporadically until 1985. The 1945 feasibility report anticipated a 70-year period of incremental development to complete the CBP. It was anticipated that further incremental development of the CBP would depend on future needs and any irrigation of additional lands would utilize water from the Columbia River already reserved for the CBP. Principal project features include Grand Coulee Dam, Franklin D. Roosevelt Lake, Grand Coulee Powerplant Complex, switchyards, and a pump-generating plant. Primary irrigation facilities are the Feeder Canal; Banks Lake; the Main, West, East High, and East Low Canals; O`Sullivan Dam; Potholes Reservoir; and Potholes Canal. There are over 300 miles of main canals, approximately 2,000 miles of laterals, and 3,500 miles of drains and wasteways on the project. All of the principal features have been constructed, except the East High Canal and the extension of the East Low Canal, on which construction has been indefinitely deferred. The CBP is ongoing and activities include construction, operation, and maintenance of the irrigation system (Reclamation 2016a).

The Yakima Project provides irrigation water for a comparatively narrow strip of fertile land that extends for 175 miles on both sides of the Yakima River in south-central Washington. The irrigable lands presently being served total approximately 464,000 acres. There are seven divisions in the project: Storage, Kittitas, Tieton, Sunnyside, Roza, Kennewick, and Wapato. The Wapato Division is operated by the Bureau of Indian Affairs, but receives most of its water supply from the Yakima Project for irrigation of 136,000 acres of land. Over 45,000 acres not included in the seven divisions are irrigated by private interests under water supply contracts with Reclamation. Storage dams and reservoirs on the project are Bumping Lake, Clear Creek, Tieton, Cle Elum, Kachess, and Keechelus. Other project features are five diversion dams, canals, laterals, pumping plants, drains, three powerplants, and transmission lines. The Yakima Basin Project is ongoing and includes activities for the construction, operation, and maintenance of the irrigation system (Reclamation 2013a).

Reclamation and Washington State Department of Ecology's Proposed Yakima River Basin Integrated Water Resource Management Plan – Including Reclamation's Proposed Wymer Dam and Reservoir

Federal legislation in 2003 authorized and directed Reclamation to conduct the Yakima River Basin Water Storage Feasibility Study to examine the feasibility, acceptability, and environmental consequences of alternatives to create additional water storage for the Yakima River Basin for the benefit of anadromous fish, irrigated agriculture, and future municipal water supply. The need for the study was based on the finite existing water supply and limited storage capability of the Yakima River Basin. This finite supply and limited storage capability does not meet the water supply demands in all years and result in significant adverse impacts to the Yakima River Basin's economy, which is agriculture-based, and to the basin's aquatic resources - specifically those resources supporting anadromous fish.

Storage augmentation, as defined within the study, included two concepts: 1) diverting Columbia River water to a potential Black Rock Reservoir for further water transfer to irrigation entities in the Yakima River Basin as exchange supply, thereby reducing irrigation demand on Yakima River water and improving Yakima Project stored water supplies; and 2) creating additional water storage for the Yakima River Basin to provide increased management flexibility of the existing water supply. A No Action Alternative and three Joint Alternatives were evaluated. These alternatives are referred to as 'Joint Alternatives' because they were originally developed by both Washington State Department of Ecology

(WDOE) and Reclamation. The three Joint Alternatives considered were: Black Rock Alternative; Wymer Dam and Reservoir Alternative; and Wymer Dam Plus Yakima River Pump Exchange Alternative. The Wymer Dam and Reservoir Alternative involves construction of an off-channel storage facility on Lmuma Creek, approximately 8 miles upstream of Roza Diversion Dam. Wymer reservoir would have an 162,500-acre-foot active capacity filled by pumping water from the Yakima River and would release water back to the Yakima River by gravity. The study's Final Planning Report/ Environmental Impact Statement (Final PR/EIS) was completed in December of 2008. The No Action Alternative was Reclamation's Preferred Alternative in the Final Planning Report/Environmental Impact Statement and a Record of Decision was not issued (Reclamation 2008).

The proposed Wymer Dam and Reservoir Project was again evaluated in the Yakima River Basin Integrated Water Resource Management Plan (YBIP) Final Programmatic Environmental Impact Statement (PEIS) completed by Reclamation and WDOE in March 2012 (Reclamation and WDOE 2012). In 2013, a Record of Decision was signed by Reclamation, which selected the Integrated Plan Alternative, which included the consideration of Wymer Dam and Reservoir as a water storage project. Following technical analyses for the proposed projects, project-level environmental review will be conducted to analyze the impacts of individual projects and to develop appropriate mitigation measures. In addition, project-level planning report feasibility analyses, including benefit-cost analysis, will be conducted. The outcomes from studies conducted by Reclamation will be used to determine the actual sequencing of the proposed Wymer Dam and Reservoir Project (Reclamation 2013b). According to information provided by Reclamation, project-level environmental review, permitting and design for the Wymer Dam and Reservoir Project is anticipated to occur in 2022-2024 or in 2032-2034, with project construction following environmental review, permitting and design (Reclamation 2016b).

The proposed Wymer Dam and Reservoir Project would be constructed under Reclamation's YBIP 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 storage capacity of the reservoir would be approximately 162,500 acre-feet. The majority of the Wymer Dam and Reservoir major project features, including the main dam, saddle dike, outlet works spillway, and improvements to Lmuma Creek, are located on privately owned land. The relocated intake, fish screen and bypass, pumping plant, and pipeline (from SR 821 to pumping plant), a small portion of the transmission line, substation, and associated access roads are located on property that is also privately owned. The electrical system interconnection and transmission line is located on land owned by Washington Department of Fish and Wildlife (WDFW) and Washington State Department of Natural Resources (DNR; Reclamation 2014). The proposed Wymer 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 proposed dam and reservoir (Reclamation and WDOE 2012).

The proposed Wymer 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 proposed Wymer Reservoir would be filled by a pumping plant with a capacity of approximately 400 cfs that would withdraw water from the Yakima River. The surface storage element could create additional opportunities for hydropower generation in the Yakima River Basin at the new Wymer Reservoir; however, at this time construction of power recovery facilities at these sites is not included as part of the YBIP. It is anticipated the YBIP projects would be constructed in a way that allows future addition of power recovery facilities (Reclamation and WDOE 2012).

The proposed Wymer Reservoir would be crossed by the NNR Alternative at two locations for a total of approximately 0.2 mile. At these crossings, the NNR Alternative is directly adjacent to Pacific Power's existing Pomona-Wanapum 230 kV Transmission Line. Concerns have been raised regarding the compatibility of the YBIP, specifically the proposed Wymer Dam and Reservoir Project, with the proposed Vantage to Pomona Heights 230 kV Transmission Line Project. Concerns raised have been primarily related to potential cumulative Project-related impacts to Greater Sage-Grouse (Sage-Grouse; *Centrocercus urophasianus*) and to the acquisition of mitigation lands. The proposed Vantage to Pomona Heights Project has been designed and sited to avoid and then minimize impacts to Sage-Grouse and their habitat to the extent practicable. A Framework for the Development of a Greater Sage-Grouse Compensatory Mitigation Plan (Framework) was cooperatively developed by the Project's Sage-Grouse Subgroup (comprised of biologists from federal and state agencies) to address the residual impacts (i.e., the unavoidable impacts) to Sage-Grouse which may result from the construction, maintenance, and operation of the proposed Project. The Framework is intended to facilitate Pacific Power's development of a Greater Sage-Grouse Compensatory Mitigation Plan (CMP). The CMP is intended to be consistent with and build upon the Framework, which outlines the principles and methodologies that will ensure that the mitigation will achieve a net conservation gain for the species and its habitat. The YBIP Final PEIS states that mitigation land acquisition and habitat enhancement components are intended to result in a net improvement in conditions for Sage-Grouse. Through the implementation of mitigation for residual impacts from the proposed Vantage to Pomona Heights and the proposed Wymer Dam and Reservoir Projects, a net conservation gain for Sage-Grouse and its habitat is anticipated to occur.

Other Reasonably Foreseeable Future Projects

Pending, anticipated, or foreseeable projects on Reclamation-managed land include improvements within BPA's Vantage Substation, which is bounded on three sides by Reclamation, to accommodate the interconnection of the proposed Vantage to Pomona Heights 230 kV Transmission Line (Hutson 2011); the Odessa Groundwater Replacement Program which includes the expansion of the East Low Canal; the Rehydrating Artesian and Black Lakes Project which is a feasibility study to rehydrate and restore habitat and reduce groundwater declines within the Odessa aquifer; the Vantage Solar Project; and the Zayo Fiber Optic Line Installation Project which includes over 200 miles of fiber-optic cable for communications within the Columbia Basin (Reclamation 2015).

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 Grant County PUD's current and future electric demand and future energy market conditions under a number of likely future scenarios. The planning effort concluded that Grant County PUD has sufficient stable generation resources to meet projected demand and specific resource project additions would be studied further if required.

Selah Cliffs Natural Area Preserve (NAP)

The NAP was established in 1993 to protect the largest known population of basalt daisy (*Erigeron basalticus*), a state-listed threatened species known from only a 10-mile stretch of the Yakima River Canyon (DNR 2015). The basalt daisy makes its home on the basalt cliffs where few other plants can grow, rooting into cracks and fissures on the rock faces. The daisies are typically in bloom May through October, with a peak in June. The cliffs, much of which are covered by colorful lichens, also provide nesting and roosting habitat for raptors including prairie falcons (*Falco mexicanus*), red-tailed hawks (*Buteo jamaicensis*), and American kestrels (*Falco sparverius*). Current management by DNR includes control of invasive weeds, primarily diffuse knapweed (*Centaurea diffusa*) and cheatgrass (*Bromus tectorum*). Future land management will include restoration of native species in the previously impacted areas of the NAP.

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 Site, located over 25 miles from the proposed Vantage to Pomona Heights Transmission Line Project Action Alternatives. 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 summarized on Table 4.17-3 for each resource. 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 FEIS. For each resource, a spatial boundary and temporal boundary are described in order to properly analyze the potential impacts (Table 4.17-1).

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. 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.

Reclamation’s proposed Wymer Dam and Reservoir Project would construct a new dam and 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 private land would be converted from open habitat and rangeland uses to dam and outlet works, reservoir pool, access roads, and shoreline management uses. Shoreline management is expected to include water quality protection, wildlife habitat, and reservoir-oriented recreation facilities (e.g., day use sites, boat ramp(s), etc.). This represents a relatively large geographical area of impact and disturbance when compared to the proposed Project, which is a linear facility with disturbance primarily associated with the construction of access and spur roads. The access and spur road construction, work areas and structure installation would result in approximately 47 to 110 acres of permanent disturbance, depending upon the Action Alternative. Assuming an estimated 4,000 acres of disturbance associated with the proposed Wymer Dam and Reservoir Project, disturbances associated with the Project would marginally cumulatively impact most resources due to Required Design Features (RDFs) described in the Project description (see Chapter 2); the requirement of agency coordination prior to any construction activities; the required resource protection plans in the Plan of Development (POD); and the small amount of cumulative disturbance the proposed Project would introduce. The overall impacts of all reasonably foreseeable actions (including the proposed Wymer Dam and Reservoir Project) is not anticipated to substantially alter resource conditions within the cumulative effects area from existing conditions or trends.

Table 4.17-3 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 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; ongoing operation of CBP and Yakima Basin Irrigation Project; proposed Wymer Dam and Reservoir; Vantage Solar Project; Zayo Fiber Optic Line, wildfire cycles, and commercial development.
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 activities at the Selah Cliffs NAP, ongoing operation and maintenance of other transmission lines; ongoing construction, operation and maintenance of CBP and Yakima Basin Irrigation Project; ongoing operation of Columbia River dams; proposed Wymer Dam and Reservoir; Vantage Solar Project; Zayo Fiber Optic Line, unknown communication sites; influx of noxious weeds/invasive species and their management, wildfire cycles, and 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 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 construction, operation, and maintenance of CBP and Yakima Basin Irrigation Project; ongoing operation of Columbia River dams; proposed Saddle Mountain West Wind Project; proposed Vantage Solar Project; Zayo Fiber Optic Line, proposed Wymer Dam and Reservoir; and 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/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 construction, operation, and maintenance of CBP and Yakima Basin Irrigation Project; the County Project RC 3573 Naches Rail to Trail Project; ongoing operation of Columbia River dams; proposed Wymer Dam and Reservoir; unknown communication sites, Yakima River Canyon State Scenic Byway activities, and local road construction.
Transportation	Highway, local road, and railroad construction; construction and operation of Columbia River dams and reservoirs; construction of Desert Aire Airport; residential, subdivision, and commercial development.	Ongoing road maintenance projects; transportation of freight and agricultural products by highways and roads; operation of the Desert Aire Airport.	Ongoing road maintenance projects; transportation of freight and agricultural products by highways and roads and operation of the Desert Aire Airport; ongoing operation and maintenance of the Vantage and Pomona Heights substations; ongoing operation and maintenance of other transmission lines; ongoing construction, operation, and maintenance of CBP and Yakima Basin Irrigation Project; residential/subdivision development depending on economic situation; proposed Wymer Dam and Reservoir; proposed Vantage Solar Project; proposed Zayo Fiber Optic Line, and 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/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 construction, operation, and maintenance of CBP and Yakima Basin Irrigation Project; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Wymer Dam and Reservoir; unknown communication sites; proposed Vantage Solar Project; proposed Zayo Fiber Optic Line, Yakima River Canyon State Scenic Byway activities; off-road motorized use; local road construction; and 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 construction, operation, maintenance of CBP and Yakima Basin Irrigation Project; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Wymer Dam and Reservoir; proposed Vantage Solar Project; proposes Zayo Fiber Optic Line; and 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 construction, operation, and maintenance of CBP and Yakima Basin Irrigation Project; 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 Wymer Dam and Reservoir; proposed Vantage Solar Project; proposed Zayo Fiber Optic Line, and 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 construction, operation, and maintenance of CBP and Yakima Basin Irrigation Project; ongoing operation and maintenance of other transmission lines; proposed Wymer Dam and Reservoir; proposed Vantage Solar Project; proposed Zayo Fiber Optic Line, and 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; ongoing construction, operation, maintenance of CBP and Yakima Basin Irrigation Project; agricultural activities and irrigation; proposed Wymer Dam and Reservoir; proposed Odessa Groundwater Replacement Program; proposed Rehydrating Artesian and Black Lakes; proposed Yakima County Water Reservoir; and the Roza Irrigation District 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 construction, operation, maintenance of CBP and Yakima Basin Irrigation Project; ongoing operation and maintenance of other transmission lines; proposed Wymer Dam and Reservoir; proposed Vantage Solar Project; proposed Zayo Fiber Optic Line, and telecommunication 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 construction, operation, maintenance of CBP and Yakima Basin Irrigation Project; ongoing operation and maintenance of other transmission lines; ongoing operation of Columbia River dams; proposed Wymer Dam and Reservoir; proposed Vantage Solar Project; proposed Zayo Fiber Optic Line, telecommunication sites, and wildfire cycles.

4.17.6.1 Wildlife

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects analysis for wildlife extends beyond the proposed Project study 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. Grassland and shrub-steppe habitats account for approximately 69 percent of the Project study area. Numerous species inhabit grassland and shrub-steppe habitat; a few characteristic species include long-billed curlew (*Numenius americanus*), burrowing owl (*Athene cunicularia*), and northern pocket gopher (*Thomomys talpoides*). Basalt cliffs and exposed rock habitats provide important nesting and cover habitats for a variety of wildlife species such as bighorn sheep (*Ovis canadensis*), sagebrush lizard (*Sceloporus graciosus*), western diamondback rattlesnake (*Crotalus atrox*), striped whipsnake (*Masticophis taeniatus*), and gopher snake (*Pituophis catenifer*). Within the CE Area, riparian habitats comprise a small portion of the Project study area (743 acres; 0.4 percent), but these communities are characterized by higher productivity and greater habitat and species diversity compared to adjacent uplands. Riparian habitats occur along the Yakima and Columbia Rivers, as well as smaller streams including Lower Crab Creek, Burbank Creek, and Foster Creek. A small wetland is located in the JBLM YTC Cantonment Area. These riparian and wetland areas are an important resource for a large number and variety of species, including bald eagle (winter only; *Haliaeetus leucocephalus*), red-tailed hawk, American kestrel, and great horned owl (*Bubo virginianus*), as well as numerous other birds, fish, reptiles, amphibians, mammals, and invertebrates.

Five species [including one with two distinct population segments (DPSs)] listed as endangered, threatened, or candidate under the Endangered Species Act (ESA) occur or may occur within the CE Area. These include: bull trout (*Salvelinus confluentus*), Chinook salmon (*Oncorhynchus tshawytscha*), gray wolf (*Canis lupus*), steelhead (*Oncorhynchus mykiss*; Middle Columbia River and Upper Columbia River DPSs), and Washington ground squirrel (*Urocitellus washingtoni*). Sixty-nine special status species occur or may occur within the Project study area. These include state of Washington-listed (endangered, threatened, critical, and sensitive) species, BLM Sensitive species, and USFWS Animal Species of Concern.

Wildlife in the CE Area has 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; and 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). The Selah Cliffs NAP was established to help protect the basalt daisy and as a result the shrub-steppe habitat is one of many features protected within the NAP. The activities of the NAP would include vegetation management and it is anticipated that the NAP project actions would have a positive impact within the CE Area.

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, among special status species that have been impacted by past actions and are at risk of being impacted by present actions, the Sage-Grouse has drawn the most concern. 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; and 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 Sage-Grouse population in Washington has been in overall decline since 1970. 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 JBLM YTC supports one of two Washington populations remaining in the Columbia Basin of eastern Washington. The second population is located in Douglas and Grant counties. The populations of 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 the Army has designated protection zones (limitations on training) on 44,320 acres, approximately 13.5 percent of the JBLM YTC. 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 related to the application of fire management practices and habitat restoration efforts within these areas (JBLM YTC 2002). Annual surveys for leks and lek counts have been conducted by JBLM YTC to monitor trends and assess population status. In 2015, eight occupied leks from seven lek complexes (defined as active leks within 1.8 miles of each other) were documented within the JBLM YTC Sage-Grouse population with a total count of 95 lekking males. An additional three leks were occupied in 2014, for a total of 11 currently active leks. Four of the 11 active leks are within four miles of the proposed Project’s Action Alternatives. During the past five years, the estimated Sage-Grouse population at JBLM YTC has averaged 203 birds and has fluctuated dramatically, with a high of 263 birds estimated in 2014 and a low of 140 birds estimated in 2016.

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 and fires. The two remaining Sage-Grouse populations at the JBLM YTC and in Douglas and Grant counties are too small to be considered secure. 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 Reasonably Foreseeable Future Actions on Wildlife without the Proposed Project

Reasonably foreseeable actions in the CE Area consist of the proposed Midway-Moxee and Midway Grandview Upgrade Transmission Line projects, East Rowley Quarry expansion, Punkin Center Substation, regular maintenance of I-82 and SR 243, commercial development projects, and public development projects (e.g., Nile-Cliffdell Fire Station), and the proposed Wymer Dam and Reservoir Project, refer to Table 4.17-2 for a complete list of cumulative projects considered.

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 permanently remove vegetation through the inundation of the reservoir and construction and maintenance of the access roads and dam facilities. It has been estimated by Reclamation that 4,000 acres of private land would be required for the proposed Wymer Dam and Reservoir Project. According to the YBIP Final PEIS, vegetation communities within the proposed Wymer Dam and Reservoir Project site consist of shrub-steppe (approximately 80 percent), grassland (approximately 15 percent), riparian (approximately five percent), and forest (less than one percent). Although the proposed dam and 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 and reservoir area provide habitat for a number of species, including Sage-Grouse, ferruginous hawk (*Buteo regalis*), sage sparrow (*Artemisiospiza nevadensis*), Brewer's sparrow (*Spizella breweri*), bighorn sheep, mule deer (*Odocoileus hemionus*), black-tailed jackrabbit (*Lepus californicus*), and numerous other birds and small mammals (Reclamation and WDOE 2012).

According to the YBIP Final PEIS, the reservoir, dam, and access roads could result in some loss of wildlife movement and could further isolate some populations. General threats to animal species and their habitats include habitat degradation, habitat fragmentation, displacement, and injury/death. Although direct impacts to individuals may be limited, indirect impacts may arise from increased human presence, introduction of invasive species, increased densities of predators, collision risk, and avoidance of infrastructure. These impacts could contribute to regional declines in these wildlife communities; however, proposed land acquisition and habitat enhancement components of the YBIP are anticipated to result in a net improvement in conditions for Sage-Grouse and other wildlife species by protecting and enhancing existing high value habitat areas within the Yakima Basin (Reclamation and WDOE 2012).

Given the fairly high level of recreational use occurring in the Yakima River Canyon downstream from the dam site, indirect impacts from recreational use are not expected to be substantial. The only recreation currently occurring at the Wymer Dam and Reservoir site is hunting on private land. The reservoir would displace this activity, but is not expected to be a major impact on recreation because of the limited current use. 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 (Reclamation and WDOE 2012).

No impacts to elk (*Cervus canadensis*) 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 WDOE 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 and 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 WDOE 2012).

The proposed Wymer Dam and Reservoir Project lies entirely within the USFWS-designated Yakima Training Center (YTC) Sage-Grouse Priority Area for Conservation (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 proposed Wymer Dam and Reservoir 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 in 2004 and 2005. The upstream edge of the reservoir, near I-82, would be approximately four miles from an active 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 Sage-Grouse to migrate to the north or south of the reservoir. The YBIP Final PEIS states that the Habitat/Watershed Protection and Enhancement Element of the YBIP would acquire large tracts of shrub-steppe habitat as mitigation to reduce impacts to residual habitat (Reclamation and WDOE 2012). Additionally, USFWS recommends that wildfire protection plans be developed and implemented for large shrub-steppe areas on lands acquired under the YBIP for long-term habitat protection. USFWS also recommends that Sage-Grouse be inventoried and monitored in any newly acquired lands to determine the location of areas used by Sage-Grouse, population size, habitat use, and how Sage-Grouse use of the area might be displaced by the proposed construction of the Wymer Dam and Reservoir Project. USFWS will continue to evaluate impacts to Sage-Grouse throughout the project-specific environmental review and permitting of the proposed Wymer Dam and Reservoir Project. According to information provided by Reclamation, project-level environmental review, permitting and design for the Wymer Dam and Reservoir Project is anticipated to occur in 2022-2024 or in 2032-2034, with project construction following environmental review, permitting, and design (Reclamation 2016b).

Commercial and Energy Projects

The primary impacts to terrestrial wildlife will be from habitat fragmentation and degradation and indirect impacts such providing perching and nesting substrates for avian predators and tall infrastructure avoidance by steppe species. Because most of the projects are anticipated to require ground clearing, especially for energy generation and transmission (e.g., Vantage Solar Project, Columbia-Rocky Ford 230 kV Transmission Line) and commercial projects, there is potential for wildlife habitat to be removed or degraded by construction activities. Vegetation clearing of a ROW could result in long-term linear corridors of bare ground or minimal vegetation; however, because energy transmission project ROWs are not generally used by the public, they would not present the same dangers to wildlife migration and levels of fragmentation as development of high-use road. The various commercial and public development projects (e.g., Nile-Cliffdell Fire Station, Veldhuis Dairy) have potential to represent higher concentrated habitat fragmentation because they will impact entire blocks of wildlife habitat.

Cumulative Effects on Wildlife from Reasonably Foreseeable Future Actions including the Proposed Project

Incremental cumulative effects upon general wildlife species and special status species could result from construction, operation, and maintenance of the Vantage to Pomona Heights Project and the proposed cumulative projects. General threats to animal species and their habitats include habitat degradation, habitat fragmentation, displacement, and injury/death. Although direct impacts to individuals may be limited, indirect impacts may arise from increased human presence, introduction of invasive species, increased densities of predators, collision risk, and avoidance of infrastructure. With the exception of commercial venues that are expected to bring increased human presence (Veldhuis Dairy, Nile-Cliffdell Fire Station, County Project RC 3573 Naches Rail to Trail Project), increased human activity and the presence of heavy equipment, noise, and construction-related materials and supplies will be temporary and short-term, lasting only for the duration of construction activities. The permanent features (i.e., access roads, wind turbines, transmission towers, dams, reservoir, etc.), could result in the incremental cumulative effects such as increased collision hazard, habitat loss, and wildlife species displacement.

Habitat for species which utilize grassland and shrub-steppe habitats (e.g., sagebrush obligates such as the sage sparrow, Brewer's sparrow, sage thrasher [*Oreoscoptes montanus*], Sage-Grouse, sagebrush vole [*Lemmiscus curtatus*], sagebrush lizard, and pronghorns [*Antilocapra americana*]) is scattered throughout the CE area, but occurs primarily in locations adjacent to and within JBLM YTC. The proposed Project is expected to temporarily and permanently disturb approximately 204 to 350 acres of habitat, depending on Action Alternative, and represents a small fraction of cumulative past, present, and future project disturbances. The YBIP Final PEIS states that 4,000 acres would be acquired for the reservoir footprint, and associated access roads and dam facilities. The proposed Wymer Dam and Reservoir Project would result in considerably more habitat loss than the proposed Vantage to Pomona Heights Project. 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 Alternative and a side-canyon spanned by Route Segment NNR-4. The inundated area would include habitat identified by the NNR Alternative habitat assessment as suitable during breeding, winter, and summer seasons, as well as habitat identified as marginal. RDFs implemented for the proposed Vantage to Pomona Heights Project during construction, operation, and maintenance are anticipated to be effective at reducing the scale of biological change to existing shrub-steppe habitat. RDFs 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. As previously stated, with the Development of the Sage-Grouse Mitigation Framework and the implementation of the Project's Sage-Grouse CMP, the Project is anticipated to achieve a net conservation gain for the Sage-Grouse. The Wymer Dam and Reservoir Project represents a relatively large geographical area impact and disturbance area when compared to the proposed Project which is a linear facility with disturbance primarily associated with access and spur roads. The impacts associated with the proposed Wymer Dam and Reservoir Project could contribute to regional declines in wildlife habitat; however, proposed land acquisition and habitat enhancement components of the YBIP are anticipated to result in a net improvement in conditions for Sage-Grouse and other wildlife species by protecting and enhancing existing high value habitat areas within the Yakima Basin (Reclamation and WDOE 2012). Added to the effects of wide-spread agricultural, urban and military land conversion, and the proposed Wymer Dam and Reservoir Project, the proposed Vantage to Pomona Heights Project is not expected to significantly contribute to cumulative impacts to wildlife resources that utilize the shrub-steppe habitat.

Construction of the proposed Vantage to Pomona Heights Project near Wanapum Reservoir, Roza Irrigation District Reservoir, Yakima County Water Reservoir, and Warrior Orchards LLC Irrigation Holding Pond could impact waterfowl concentrated in the area by causing injury and mortality through impact with the transmission line. For the proposed Project, RDFs such as minimizing disturbance, seasonal restrictions on construction, and installing bird flight diverters where necessary 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 water storage projects. Waterfowl utilizing the proposed projects could collide with the proposed Vantage to 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), including installing flight diverters in areas with known avian collision mortality.

During construction of the proposed Project, impacts to general wildlife and special status species such as bald and golden eagle (*Aquila chrysaetos*), ferruginous hawk, and osprey (*Pandion haliaetus*) would be reduced through seasonal restrictions and buffers to avoid key habitat during nesting or wintering periods (RDFs BIO-13 and BIO-15). Adherence to reasonable speed limits in construction areas would reduce the incidence of collisions and disturbance from human interaction (RDF 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 (RDF 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 (RDFs BIO-5 and BIO-9). It is anticipated that the proposed Saddle Mountain West Wind Farm would implement construction 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 and the other proposed energy generation, transmission, water storage, and commercial projects 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. Although several projects have the potential to occur within the CE Area, it is anticipated that most, if not all, of the projects will trigger some level of federal, state, or local environmental review and/or permitting. Projects requiring any type of federal permit or funding will be subject to environmental review under NEPA. As part of its NEPA review, the federal lead agency will assess potential biological resource impacts on a project-specific basis, including direct and indirect impacts to plant and animal species, including impacts to populations, habitat, and sensitive or special-status resources. The proposed Project will marginally contribute to cumulative impacts to grassland and shrub-steppe dependent species and the overall impacts of the reasonably foreseeable future actions will alter resource conditions within the CE Area from existing conditions.

4.17.6.2 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 Project area or the CE Area, as well as reasonably foreseeable future actions. 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 vegetation 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; and construction, operation, and maintenance of telecommunication sites. Prior to European settlement, eastern Washington was covered by a relatively contiguous expanse of shrub-steppe (Army 2010). Land use changes over the past century have resulted in the loss of over half of Washington's shrub-steppe (Dobler et al. 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 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 vegetation 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 Reasonably Foreseeable Future Actions on Vegetation without the Proposed Project

Reasonably foreseeable actions in the CE Area consist of the proposed Saddle Mountain West Wind Farm, Vantage Solar Project, Zayo Fiber Optic Line, East Rowley Quarry expansion, Punkin Center Substation, commercial and public development projects (e.g., Nile-Cliffdell Fire Station), regular maintenance of I-82 and SR 243, and the proposed reservoir/water storage projects (e.g., Wymer Dam and Reservoir project proposed by Reclamation), refer to Table 4.17-2 for a complete list of cumulative projects. These projects would contribute to the influx of noxious weeds and invasive species and the degradation of vegetation communities.

Wymer Dam and Reservoir Project

The proposed Wymer Dam and Reservoir project would permanently remove vegetation for the reservoir, access roads and dam facilities. The YBIP Final PEIS states that 4,000 acres would be acquired for the reservoir footprint and associated access roads and dam facilities. According to the YBIP Final PEIS, vegetation communities within the proposed Wymer Dam and Reservoir Project site consist of shrub-steppe (approximately 80 percent), grassland (approximately 15 percent), riparian (approximately five percent), and forest (less than one percent). Although the proposed dam and reservoir project area has been grazed, it consists of relatively undisturbed shrub-steppe, and permanent vegetation removal would further reduce shrub-steppe 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 species, and destruction of special status species and their habitat. According to the Washington Natural Heritage Program 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 WDOE 2012).

Commercial and Energy Projects

It is reasonable to expect that commercial and energy projects within the CE Area will involve vegetation clearing, grading, and other ground-disturbing activities that have the potential to affect fish, wildlife, and vegetation resources. In addition to vegetation clearing, as previously discussed, another potential impact to existing plant species and populations is the introduction or spread of invasive, non-native species, such as noxious weeds. Areas that are dominated by native plants may be more susceptible to shifts in species composition and dominance. It is reasonable to assume that other proposed projects in the CE Area may be planned in areas with existing weed seed banks and/or populations. Similar to the proposed Project, it is anticipated that other proposed projects will be subject to environmental review under NEPA (at a minimum) will also be required to minimize invasive and non-native species introduction and spread.

Cumulative Effects on Vegetation from Reasonably Foreseeable Future Actions including the Proposed Project

Vegetation in the Vantage to 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 (*Agropyron cristatum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), squirreltail (*Elymus elymoides*), and Thurber's needlegrass (*Achnatherum thurberianum*). 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- 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 Action Alternatives include the following:

- Long-term disturbance to vegetation ranges from 140 to 209 acres, depending on the Action Alternative.
- 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.

RDFs implemented for the proposed Project would include:

- Best management practices (BMPs) and RDFs implemented to reduce impacts to vegetation resources.
- Noxious Weed and Invasive Plant Management Plan to prevent and control the noxious weeds and invasive plants.
- A Wildlife and Plant Species Protection Plan to identify specific measures to protect vegetation resources.
- Reclamation, Revegetation, and Monitoring 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 at the location of proposed projects within the CE Area. The construction of the additional projects in the area could increase the spread of exotic plants, including noxious weeds; however, the implementation of RDFs 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 projects would implement similar measures to minimize impacts from exotic plants.

Pedestrian surveys for targeted special status plants were conducted on accessible federal and state lands within the 150-foot wide survey corridor for proposed route segments (Appendix B-3 Special Status Plants Reports). Sections of some route segments and the majority of Manastash Ridge Subroute (MR-1) were not surveyed due to route adjustments that were made following the completion of the pedestrian surveys and additional survey timing being outside the appropriate seasonal survey period. Federal and state lands comprise approximately 43 percent of the total survey corridor for all of the Action Alternatives. The remaining 57 percent is comprised of non-federal (private and county) land and was not surveyed. Of the 1,378.9 acres of federal and state lands within the 150-foot wide survey corridor, 645.9 acres (47 percent) were accessible and surveyed (see Table 3.2-3). As not all land within the Action Alternative's survey 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, 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.

According to WHNP data, 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 Wymer Dam and Reservoir 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 energy projects, commercial projects, 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 within the CE Area due to required agency coordination prior to any construction activities and resource protection plans in the POD.

4.17.6.3 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 reasonably foreseeable future actions that affects agricultural and range land, residential, military, and urbanized areas of the four counties in which the proposed 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 Project area generally encompasses substantial portions of the three counties of Yakima, Kittitas, and Grant counties and smaller portions of Benton County. 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 livestock grazing, 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 protection actions which include training restrictions, the construction of other transmission lines within the JBLM YTC boundaries and surrounding 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 Reasonably Foreseeable Future Actions on Land Use without the Proposed Project

Reasonably foreseeable actions in the CE Area consist of the proposed Midway-Moxee Rebuild and Midway Grandview Upgrade transmission line projects, Vantage Solar Project, Zayo Fiber Optic Line, East Rowley Quarry expansion, Punkin Center Substation, commercial development projects (e.g., Nile-Cliffdell Fire Station), and the proposed water storage projects (e.g., Wymer Dam and Reservoir project proposed by Reclamation), refer to Table 4.17-2 for a complete list of cumulative projects considered.

The proposed Wymer Dam and Reservoir project would be located in Kittitas County. The land proposed for and surrounding the Wymer Dam and Reservoir 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 these private lands. 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 space and rangeland to water storage with its 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 WDOE 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.

Other Development

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. These regulations are detailed in the 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; Benton County Comprehensive Land Use Plan (Benton County 2006) and Benton County Code Title 11; 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

Cumulative land use resource impacts would come primarily from the construction of the Wymer Dam and Reservoir project, agricultural, and commercial projects and not from the construction of the proposed Project. Additional grazing impacts (quantity is unknown) resulting from private grazing land considered with the impacts on grazing resulting from other past, present, and reasonably foreseeable projects would only be a small fraction of the overall impacts in the CE Area when cumulatively considered. 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.

According to the YBIP Final PEIS, the proposed Wymer Dam and Reservoir Project would require the acquisition of approximately 4,000 acres of private land. The pump station would affect the Yakima River which is a Shoreline of Statewide Significance. Reclamation would comply with all applicable existing and future regulatory requirements for the property acquisition and shoreline use. The proposed Wymer Dam and Reservoir 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. 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.

Short- 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, Benton, and Grant counties.

The Project proponent (Pacific Power) would obtain transmission perpetual 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 Wymer Dam and Reservoir project, transmission line projects, commercial projects 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.

4.17.6.4 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 CE Area 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 Columbia 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 (e.g., County Project RC 3573 Naches Rail to Trail Project). 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 OHV use, hunting, camping, and others), and other ongoing land uses and practices.

Effects of Reasonably Foreseeable Future Actions on Recreation without the Proposed Project

Reasonably foreseeable actions within the vicinity of the proposed Project 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, Vantage Solar Project; Zayo Fiber Optic Line, and the proposed Wymer Dam and Reservoir project.

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.

According to the YBIP, 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 WDOE 2012).

Cumulative Effects on Recreation from Reasonably Foreseeable Future Actions including the Proposed Project

Overall, the addition of new structures, roads, man-made features and infrastructure to the area associated with the proposed Project and other projects within the CE Area 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 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.

4.17.6.5 Transportation

Geographic Scope and Timeframe of Analysis

The geographic scope and timeframe for cumulative effects on transportation resources includes the four counties that would be crossed by the Action Alternatives (Benton, Yakima, Grant, and Kittitas counties). There are no roads maintained by Benton County within the Project area. 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 Action 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; and 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 97 and 12, and state and local State Routes 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 Railroad runs through the CE 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 Reasonably 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 (e.g., regular maintenance of I-82, SR-243, and SR-24) and construction of the proposed Wymer Dam and Reservoir project, commercial projects, and proposed energy projects that would generate increased traffic volumes on local roads.

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 onto the Army’s JBLM YTC, 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 WDOE 2012).

Cumulative Effects on Transportation from Reasonably Foreseeable Future Actions including the Proposed Project

The proposed Wymer Dam and Reservoir project would not coincide in time with construction of the proposed Vantage to 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 RDFs, including the use of flaggers, signage, and traffic reroutes, where necessary, potential cumulative impacts to roads would be reduced. Similar impacts from the commercial development, agricultural projects, transmission line and substation projects, 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. Significant traffic impacts could occur if several large-scale projects are constructed concurrently and use the same local roadway network to access their respective sites. This is an unlikely scenario given how few projects occur within five miles or less of the Project area. 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.

4.17.6.6 Visual

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects visual resources analysis includes four miles either side of the Project area. 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 Reasonably Foreseeable Future Actions on Visual Resources without the Proposed Project

Reasonably foreseeable actions in the vicinity of the Project area consist of the proposed Wymer Dam and Reservoir project; ongoing agricultural activities; Vantage Solar Project, Zayo Fiber Optic Line, 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; Yakima River Canyon State Scenic

Byway activities; off-road motorized use; local road construction; Nile-Cilffdell Fire Station; mining operations; and wildfire cycles.

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. According to the YBIP Final PEIS, it is only within the Yakima River Canyon where facilities associated with the Wymer Dam and Reservoir Project 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 WDOE 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 environmental 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 WDOE 2012).

It is reasonable to expect that projects within the CE Area will involve vegetation clearing and ground-disturbing activities associated with project construction activities. Activities have the potential to affect visual resources and impacts will be similar to those described for the proposed Project.

Cumulative Effects on Visual Resources from Reasonably Foreseeable Future Actions including the Proposed Project

The proposed Project 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.

Construction of the proposed Wymer Dam and Reservoir project would result in substantial long-term visual impacts. The YBIP Final PEIS states that 4,000 acres would be acquired for the reservoir footprint, and associated access roads and dam facilities. The reservoir would 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 Yakima 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 WDOE 2012).

The addition of the proposed Vantage to Pomona Heights Project 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 Project 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 Vantage to Pomona Heights Project, the proposed energy projects, 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.

4.17.6.7 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 Action Alternatives (Yakima, Grant, and Kittitas counties), as well as reasonably foreseeable future actions. There are no communities within 40 miles of the Project area in Benton County; therefore, it is not included in this analysis. 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.

Effects of Reasonably 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, electric transmission infrastructure, and the construction of the Wymer Dam and Reservoir project.

The proposed Midway-Moxee Rebuild and Midway Grandview Upgrade Transmission Line projects, Geneva Substation, and the Punkin Center Substation are not likely 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 the projects 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 recreational vehicle (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 energy development projects 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 energy projects are 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.

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 WDOE 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 counties) 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 WDOE 2012).

Cumulative Effects on Socioeconomics from Reasonably Foreseeable Future Actions including the Proposed Project

Construction and operation of the proposed Project, the proposed energy projects 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. It 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.

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 energy projects or the proposed Wymer Dam and Reservoir project is not anticipated to coincide with construction of the proposed Project. Even if the energy projects 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 energy projects, 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.

4.17.6.8 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 proposed Project Action Alternatives. 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 They Have 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 affecting subsistence farming or gathering practices within TCPs.

Effects of Reasonably Foreseeable Future Actions on Cultural Resources without the Proposed Project

There is the potential for archaeological resources to be impacted during the construction of 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 the proposed Wymer Dam and Reservoir 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. Sites that have not yet been evaluated are considered eligible to the National Register of Historic Places. 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

During construction of the proposed Project, there is the potential for archaeological resources to be impacted. Implementation of measures described in Section 2.3.6 - Required 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 Project 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. 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 proposed Wymer Dam and Reservoir project may impact up to 4,000 acres. 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 effects 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 Project 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 with the 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 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 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, construction of water conveyance structures and facilities with the development of hydropower associated with the Wymer Dam and Reservoir Project, 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.

4.17.6.9 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 four counties (Yakima, Grant, and Kittitas counties and a small portion of Benton County). 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 Reasonably 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 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 proposed Wymer Reservoir and Dam 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

Air emissions from the proposed Project would occur during Project construction, principally as 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, RDFs (as described in Section 2.3) 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 exceedance of the NAAQS.

Because emissions from 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.

4.17.6.10 Water Resources

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis for water resources includes portions of five Water Resource Inventory Areas (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, Yakima Basin Irrigation Project, CBP, livestock grazing, commercial and residential development, road maintenance, noxious weed and invasive species establishment, and hydroelectric dams on the Columbia River and a diversion dam on the Yakima 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 Reservoir 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 and the Roza Diversion Dam on the Yakima 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 Reasonably Foreseeable Future Actions on Water Resources without the Proposed Project

Reasonably foreseeable actions in the CE Area consist of the proposed Midway-Moxee Rebuild and Midway Grandview Upgrade Transmission Line projects, Rehydrating Artesian and Black Lakes, Odessa Groundwater Replacement Program, East Rowley Quarry expansion, Punkin Center Substation, commercial development projects (e.g., Nile-Cliffdell Fire Station), regular maintenance of I-82 and SR-243 and the proposed reservoir projects (e.g., Wymer Dam and Reservoir project proposed by Reclamation), refer to Table 4.17-2 for a complete list of cumulative projects considered.

Regional surface water quality will continue to be influenced by local and regional land use trends and activities, including commercial and residential use and development. There are also several agricultural activities occurring within the CE Area that have or will contribute to future water quality levels. An accidental release of fuels or other hazardous materials to into a stream, wetland, or an area with a low groundwater table could degrade water quality within the CE Area.

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 Saddle Mountain West Wind Farm project area. The segment of the Columbia River at Priest Rapids Reservoir 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.

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 WDOE 2012).

Cumulative Effects on Water Resources from Reasonably Foreseeable Future Actions including the Proposed Project

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.

A small portion of the proposed Project would occur within the Lower Crab Creek WRIA, with the remainder distributed within the Alkali-Squilchuck and Upper Yakima WRIAs. 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 proposed Project. The YBIP Final PEIS states that 4,000 acres would be acquired for the reservoir footprint, and associated access roads and dam facilities (Reclamation and WDOE 2012).

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. The proposed Project will marginally contribute to cumulative impacts to water resources. It is reasonable to assume that other projects occurring within the CE Area with potential to impact water resources will be subject to some level of water quality permitting, either through the U.S. Army Corps of Engineers for dredge and fill of Waters of the United States (Clean Water Act [CWA] Section 404), and/or through the state for Water Quality Certification (CWA Section 401). Discharges, including storm water and other low-threat discharges would be subject to Section 402 of the CWA. Overall impacts of all reasonably foreseeable future actions, especially construction of the proposed Wymer Dam Project, will not substantially alter resource conditions within the CE area from existing conditions.

4.17.6.11 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 such as primarily crop production and livestock grazing.

Effects of Reasonably Foreseeable Future Actions on Soils and Geology without the Proposed Project

Reasonably foreseeable actions in the CE Area consist of the proposed Midway-Moxee Rebuild and Midway Grandview Upgrade Transmission Line projects, East Rowley Quarry expansion, Zayo Fiber

Optic Line Project, Vantage Solar Project, Punkin Center Substation, commercial development projects (e.g., Nile-Cliffdell Fire Station), and the proposed reservoir projects (e.g., Wymer Dam and Reservoir project proposed by Reclamation), refer to Table 4.17-2 for a complete list of cumulative projects considered. 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.

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 WDOE 2012).

Cumulative Effects on Soils and Geology from Reasonably Foreseeable Futures Actions including the Proposed Project

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 other projects within the CE Area 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.

Overall, the additional disturbance and new roads associated with the proposed Project, the proposed transmission line work, substation projects, 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.

4.17.6.12 Public Health and Safety and Noise

Geographic Scope and Timeframe of Analysis

The geographic scope or CE Area of the cumulative effects analysis for public health and safety and noise and hazardous material includes the four counties (Yakima, Grant, and Kittitas counties and a small portion of Benton County).

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 CE 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, Wanapum, and Roza Diversion dams; agricultural activities; highway and railroad construction; JBLM YTC military operations; and construction and operation of the numerous high voltage transmission lines and substations in the CE 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 Reasonably Foreseeable Future Actions on Public Health and Safety and Noise without the Proposed Project

Reasonably foreseeable future actions in the CE Area and vicinity that could increase noise levels and hazardous materials include ongoing agricultural activities, Zayo Fiber Optic Line Project, Vantage Solar Project, ongoing road maintenance activities, JBLM YTC military operations, and operation of existing transmission lines and substations. Cumulative noise impacts in the CE 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 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 Washington Administrative Code (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

Reasonably foreseeable future actions in the CE Area 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 Wymer Dam and Reservoir project.

The construction of the proposed Vantage to Pomona Heights Transmission Line Project and the proposed construction of 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 Wymer Dam and Reservoir project.

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 including the proposed action, 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 of 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 proposed Project; whereas, long-term is defined as an indefinite period beyond the construction of the proposed 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 Required Design Features, best management practices, and stipulations.

The proposed 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 line 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 an increase in 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 continue to occur. A similar productivity recovery outcome following construction of the proposed Project is expected.

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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 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 non-renewable 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 of 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 effects 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

RESOURCE TYPE	TYPE OF COMMITMENT/CHANGE *REASON FOR COMMITMENT/CHANGE*	IRREVERSIBLE	IRRETRIEVABLE
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 electrical power utility facilities (electrical 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.

Bonneville Power Administration (BPA) has also seen a significant increase in metal theft from its electrical facilities when the price of metal is high on the salvage market. Since 2003, over 900 thefts have been reported with about $2.9 million in material losses. BPA estimates that the average monetary damage for each crime is $150,000, but this figure also does not include all the labor-related costs associated with repairing the damage (BPA 2016).

Stealing equipment from electrical substations can be extremely dangerous. Throughout the nation, thieves have been electrocuted while attempting to steal equipment from energized electrical facilities; however, no deaths associated with thefts have occurred at Pacific Power or BPA facilities.

To prevent theft, vandalism, and unauthorized access to electrical facilities, all Pacific Power and BPA electrical facilities are secured with fencing and warning signs, with sites that are classified as critical infrastructure 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 transmission 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, public health, 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 could be disrupted.

Overhead transmission conductors and the towers that carry them are mostly on unfenced utility right-of-way corridors. All new equipment associated with substations of the proposed Project would be installed within existing fencing at both the Pacific Power Pomona Heights Substation and the existing BPAVantage 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 overall transmission system functioning. The U.S. 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.

CHAPTER 5 CONSULTATION AND COORDINATION

5.1 INTRODUCTION

This chapter summarizes public, agency, and Native American tribal government involvement activities undertaken by the U.S. Bureau of Land Management (BLM) for the Draft Environmental Impact Statement (DEIS), Supplemental Environmental Impact Statement (SDEIS), and the Final Environmental Impact Statement (FEIS). These activities have been conducted for Pacific Power's proposed Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project (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), which includes the DEIS, SDEIS and FEIS, 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 Action Alternatives, and define issues of importance and potential environmental impacts to be addressed in 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 Action 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 Action 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 Action Alternative routes of Pacific Power's proposed Project, of BLM's 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, local agencies, and elected officials notifying them of the proposed 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 Action Alternative routes 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 and other local)
- 11 Native American Tribes
- 22 Elected Officials
- 50 Organizations
- 19 Schools and 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 proposed 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.

5.2.3.1 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

5.2.3.2 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 its website at: http://www.blm.gov/or/districts/spokane/plans/vph230.php. The posted information consisted of the proposed 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; and/or
- 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 Department 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 Action Alternative routes presented for comment during the formal scoping period (January 5, 2010 through March 8, 2010). As a result of the changes to the Action Alternative routes, 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 Action Alternatives routes.

The purpose of the letter was to provide agencies, Native American tribes, landowners, and other interested parties an update on the EIS process and schedule, as well as to present changes to the Action Alternative routes for review and comment. Comments on the revised Action Alternative routes 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 and local)
- 15 Native American Tribes
- 27 Elected Officials
- 16 Organizations
- 12 Schools and 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 (NOA) letter announcing the availability of the 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

Initially, a 30-day comment period was established for the DEIS. After public meetings occurring on February 5 and 6, 2013, the comment period was extended to 45-days. The public comment period for the DEIS began on January 4, 2013 and ended on March 8, 2013. The BLM received 63 unique 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 NNR Alternative and the reasons for its identification and consideration. The letter also informed interested parties that the BLM decided that a 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 SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT

5.5.1 Notice of Availability

A NOA letter announcing the availability of the SDEIS was mailed to agencies, organizations, interested parties, and landowners in December 2014 in advance of the Federal Register notice on January 2, 2015. The letter was mailed to 1,100 parties. It announced the public comment period, location where copies of the SDEIS would be available for review, and ways to submit comments.

5.5.2 Federal Register Notice

A Federal Register notice published January 2, 2015, announced the availability of the SDEIS.

5.5.3 SDEIS Comment Period

The 45-day public comment period for the SDEIS began on January 2, 2015 and ended on February 17, 2015. The BLM received 37 unique letters and e-mails containing more than 90 comments during the comment period.

5.5.4 SDEIS Public Meetings

Two public meetings were also held to receive comments on the SDEIS.

- January 28, 2015 at the Sagebrush Senior Center, Desert-Aire, Mattawa, Washington from 6 p.m. to 8 p.m. Twenty-four persons attended the meeting.
- January 29, 2015 at the Selah Civic Center, Selah, Washington from 6 p.m. to 8 p.m. Twelve persons attended the meeting.

5.6 CONSULTATION AND COORDINATION

Federal, state, and local agencies, Native American tribes, organizations, and individuals having jurisdiction, special expertise, and/or specific interest in the proposed Project were contacted at the beginning of the scoping process, during the resource inventory and surveys and prior to the publication of the DEIS to inform them of the proposed Project, prior to the publication of the DEIS, SDEIS, and FEIS to verify the status and availability of existing environmental data, request data and comments, and solicit input regarding the proposed Project. This section describes the consultation and coordination efforts that have occurred throughout this EIS process.

5.6.1 Cooperating Agencies

The CEQ regulations implementing NEPA encourage the lead federal agency to invite other federal, state, tribal, and 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 12 Cooperating Agencies.

A summary of each Cooperating Agency's interests and responsibilities with respect to the proposed Project is provided below.

- **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 the 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. Under its Open Access Transmission Tariff, 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 FEIS as the basis on which to make its decision on whether or not to accommodate Pacific Power's request for the proposed interconnection.
- **Federal Highway Administration (FHWA):** The FHWA is a formal Cooperating Agency responsible for approving Pacific Power's application to use Interstate (I) 82 land owned by Washington State Department of Transportation (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 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.
- **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 (SF-299) for a right-of-way (ROW) on federal lands managed by the U.S. Department of the Army (Army). The original SF-299 was filed JBLM YTC in April 2011, and updated SF-299 applications were submitted to JBLM YTC in November 2013 and June 2016. 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 FEIS as the basis from which to make decisions related to Pacific Power's ROW request 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.
- **U.S. Bureau of Reclamation (Reclamation):** Reclamation is a formal Cooperating Agency responsible for processing Pacific Power's ROW application (SF-299) filed in April 2011 and an updated application filed in June 2016, requesting a grant of ROW across federal lands

managed by Reclamation. Reclamation will use this FEIS as the basis from which to make decisions relating to Pacific Power's ROW request for construction, operation, and maintenance of proposed Project and the need for any required mitigation of impacts occurring on Reclamation-managed lands

- **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 (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) pursuant to the implementing regulations of the Endangered Species Act (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 (BGEPA; 16 U.S.C. §668-668d), respectively.

  USFWS is responsible for providing technical assistance, as necessary, in evaluating proposed 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 proposed Project. USFWS is also responsible for consultation or conferencing with BLM as the Lead Federal Agency to fulfill Interagency Cooperation obligations in accordance with Section 7(a) (2) of the ESA.
- **Washington State Department of Archaeology and Historic Preservation (DAHP):** DAHP is a formal Cooperating Agency and is responsible for reviewing cultural resource documents and issuing Archaeological Excavation and Removal Permits under Revised Code of Washington 27.44 and 27.53 and Washington Administrative Code 25-48 on state and private lands in Washington.
- **Washington State Department of Fish and Wildlife (WDFW):** WDFW is a formal Cooperating Agency with responsibility for preserving, managing, and protecting fish, wildlife, and ecosystems within the State of Washington.
- **Washington State Department of Natural Resources (DNR):** 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, Pacific Power's proposed Project will need to comply with the Washington State Environmental Policy Act (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.
- **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 I-82 and State Route 243. In order for WSDOT to make a determination on Pacific Power's application(s), the proposed Project will need to comply with SEPA.

  WSDOT is the SEPA co-lead agency with Yakima County, and WSDOT's South Central Region Environmental Office is serving as the nominal lead agency. WSDOT has final responsibility for the completion of all SEPA procedures and documentation. This FEIS may be utilized by State and local governments in meeting SEPA requirements. The proposed Project's SEPA Environmental Checklist is included as Appendix D of the FEIS.

  WSDOT would also be responsible for coordinating the 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 NEPA and SEPA, the ESA, and the National Historic Preservation Act (NHPA).

- **Grant County:** Grant County is a formal Cooperating Agency. Grant County has a coordinating ordinance (Chapter 21.04 Coordinating Government Regulation of Land and Natural Resource Use) which establishes as county law the basis and process for determining how federal and state agencies are to coordinate and consult with Grant County in actions affecting land and natural resource use within the county.

  A section of the Grant County Unified Development Code (Chapter 25.08) which historically regulated electrical transmission lines exceeding 115 kV as a major utility development and subject to land use and environmental review and a conditional use permit (CUP) was eliminated through amendment to the county code by the Board of County Commissioners in July 2011. However, the Grant County Building Code does not exempt private regulated utilities, like Pacific Power from a requirement to obtain a building permit from the county. The building permit is considered a "Project Permit" and, as such, a SEPA review is required (D. Hooper, personal communication, July 2011). The building permit is an administrative permit; no Planning and Zoning or Board of County Commissioners approval is required. Grant County may choose to adopt this FEIS to satisfy SEPA requirements. The proposed Project's SEPA Environmental Checklist is included as Appendix D of the FEIS.
- **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 CUP process. The application for a 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 a 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 SEPA. Due to the size and timing of this Project, a Development Agreement (DA) may also be required. The DA is subject to public notice, a public hearing before the Board of County Commissioners, and approval by the Board of County Commissioners prior to processing of the CUP and any other land use permits deemed necessary at the time of project permitting with Kittitas County. Kittitas County may choose to adopt this FEIS to satisfy SEPA requirements. Kittitas County may choose to adopt this FEIS to satisfy SEPA requirements. The proposed Project's SEPA Environmental Checklist is included as Appendix D of the FEIS. The Kittitas County Board of County Commissioners approved the County's updated Shoreline Master Program (SMP) on December 2, 2014. Washington State Department of Ecology (WDOE) granted final approval of the County's updated SMP on February 22, 2016 making the County's comprehensive SMP update effective as of March 7, 2016. Depending on the exact locations of the transmission line towers, shoreline permitting may be required.
- **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. 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 proposed Project to comply with SEPA. Yakima County may choose to adopt this FEIS to satisfy SEPA requirements. The proposed Project's SEPA Environmental Checklist is included as Appendix D of the FEIS. Yakima County is the SEPA co-lead agency with WSDOT; WSDOT's South Central Region Environmental Office is serving as the nominal lead agency for SEPA.

Two coordination conference calls were held each month; one call consisted of the BLM, Cooperating Agencies' primary points-of-contact, and BLM's third-party NEPA contractor (POWER Engineers, Inc. [POWER]); the second call consisted of the Project Steering Committee. The Steering Committee is composed of managers (or their representatives) of the following entities: BLM, JBLM YTC, Reclamation, USFWS, DAHP, DNR, Washington Department of Fish and Wildlife (WDFW), WSDOT, WSDOT's SEPA Consultant David Evans & Associates, Kittitas County, Grant County, Yakima County, Washington Governor's Office for Regulatory Innovation and Assistance, Pacific Power, South Columbia Basin Irrigation District, Roza Irrigation District, and 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 Subgroup was formed to guide the analysis of potential impacts to Greater Sage-Grouse (*Centrocercus urophasianus*), as well as to develop a Project-Specific Framework for Development of a Compensatory Mitigation Plan. The Subgroup consisted of representatives of the BLM, JBLM YTC, USFWS, WDFW, and POWER.

5.6.2 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 proposed 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 (Yakama Nation) and the Confederated Tribes of the Colville Reservation. The BLM has also consulted with the non-federally recognized Wanapum Band of Indians.

Tribal consultation to date has consisted of:

- Visit to the proposed Project vicinity by JBLM YTC and the Yakama Nation Cultural Resource Program representatives on January 12, 2010.
- The public scoping letter for the proposed Project was sent to the tribes and tribal organizations on January 14, 2010.
- Information meeting at the JBLM YTC on January 19, 2010 with Yakama Nation representatives, JBLM YTC, and Pacific Power .
- Letter from the Wanapum Band of Indians to JBLM YTC on October 19, 2010 stating the Wanapum Band of Indians do not support any of the proposed Action Alternatives routes identified at that time.

- Second letter from the Wanapum Band of Indians to JBLM YTC on October 19, 2010 stating the Wanapum Band of Indians do not support an Action Alternative route segment along the abandoned railroad ROW (Route Segment 3b).
- Letter from 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 Action Alternatives.
- Information meeting at the JBLM YTC on December 9, 2010 with the Yakama Nation and Wanapum Band of Indians Tribal Representatives and BLM, JBLM YTC, Pacific Power, POWER, and Grant County Public Utility District (PUD) representatives.
- During 2010, there were numerous changes to Action Alternatives. As a result of the changes to the 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 the Yakama Nation Cultural Committee and the Wanapum Band of Indians at the Yakama Nation Agency main offices, Toppenish, Washington on January 27, 2011, attended by Yakama Nation 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 the 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, the Wanapum Band of Indians, and the Confederated Tribes of the Colville Reservation.
- Resolution from the 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 the 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 ROW (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.
- The DEIS Preferred Route Selection Workshop (Workshop) held in Yakima, Washington on May 17, 2012. The Workshop included 40 participants from the BLM, JBLM YTC, BPA, Reclamation, Yakima County, Grant County, WDFW (not a Cooperating Agency at the time of the Workshop), Pacific Power, POWER, and representatives from the Yakama Nation and Wanapum Band of Indians. During this Workshop, the Yakama Nation and the Wanapum Band of Indians expressed concern for cultural resources and requested surveys be conducted for all Action Alternative route segments.
- The Yakama Nation and the 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 formal cooperating agencies for the proposed Project.
- The revised draft Section 106 PA was submitted to the Cultural Resource Management Program for both the Yakama Nation and the Wanapum Band of Indians for review and comments on February 19, 2013.
- The Yakama Nation, Confederated Tribes of the Colville Reservation, 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, Confederated Tribes of the Colville Reservation, and the Wanapum Band of Indians dated May 31, 2013 requested review of the APE for the NNR Alternative.
- The revised draft Section 106 PA was submitted to the Confederated Tribes of the Colville Reservation's Tribal Historic Preservation Office for review and comments on August 23, 2013.
- The Yakama Nation, Confederated Tribes of the Colville Reservation, 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, Confederated Tribes of the Colville Reservation, and the Wanapum Band of Indians were notified in a letter dated January 9, 2014 of plans to analyze the NNR Alternative's Manastash Ridge (MR) Subroute (NNR Alternative MR-1) and two route segments with an Underground Design Option (NNR-4u and NNR-6u).
- In response to the BLM letter of January 9, 2014, the Confederated Tribes of the Colville Reservation requested a contract for preparing a Traditional Cultural Properties (TCPs) report for the NNR Alternative in the letter of January 29, 2014.
- The revised draft Section 106 PA was submitted to the Yakama Nation Cultural Resource Management Program, the Confederated Tribes of the Colville Reservation's History and Archaeology Department, and the Wanapum Band of Indians for review and comments on March 13, 2014.
- Letter from the Yakama Nation to BLM on January 29, 2015 requesting a meeting to discuss the proposed Project.
- Meeting with BLM, USFWS, Washington Governor's Office for Regulatory Innovation and Assistance and the Yakama Nation on March 10, 2015 in Toppenish to discuss the proposed Project.
- Letter from the BLM to the Yakama Nation, Confederated Tribes of the Colville Reservation and the Wanapum Band of Indians on June 2, 2015 requesting a meeting regarding selection of the Agency Preferred Alternative. BLM sought their official input to assist BLM on the selection of an Agency Preferred Alternative to be carried forward in the FEIS.
- In response to the BLM letter of June 2, 2015 regarding consideration of the Agency Preferred Alternative, the Yakama Nation Cultural Resource Program stated in a letter dated July 1, 2015 that Alternative D and the NNR Alternative both cross archaeological sites, TCPs, and sensitive areas. Based on the Yakama Nation Cultural Resources Program technical review of the TCP studies, they recommend Alternative D; however, this technical recommendation is contingent upon Pacific Power and BLM addressing serious cultural resource concerns early in the process.
- In response to the BLM letter of June 2, 2015 regarding consideration of the Agency Preferred Alternative, the Confederated Tribes of the Colville Reservation stated in a letter dated July 29, 2015 that they have no concerns except with the proposed NNR Alternative, which is the only alternative with impact in their traditional territories. The Confederated Tribes of the Colville Reservation did not find that there was an adverse impact to significant historic properties and, therefore, did not have a preference for one Action Alternative over another.
- Letter from the BLM to the Yakama Nation, Confederated Tribes of the Colville Reservation and the Wanapum Band of Indians on January 22, 2016 informing them of the Agency Preferred Alternative to be identified in the FEIS. BLM offered to meet with the tribes to discuss the Agency Preferred Alternative carried forward in the FEIS.

As an outgrowth of the consultation process Pacific Power funded a study of TCPs in the Project vicinity. The Yakama Nation Cultural Resource Program prepared two TCP reports (Lally and Camuso 2011;

Lally and Camuso 2013) identifying sites and issues of concern regarding the proposed Project Action Alternatives. A separate TCP report (Oosahwee-Voss 2014) was prepared for the NNR Alternative by the Colville Confederated Tribes History and Archaeology Program. The TCP studies were performed under the direction of the BLM.

5.6.3 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 Pacific Power's proposed Project during agency scoping in 2008. In accordance with ESA regulations, the BLM initiated informal consultation with the USFWS in 2010 for the Action 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 third-party NEPA 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 Action Alternative: the NNR Alternative with two design options and a subroute. BLM briefed USFWS and WDFW on the NNR Alternative during an in-person meeting in Ellensburg, Washington on July 17, 2013. On November 21, 2013 USFWS and WDFW attended an in-person meeting hosted by BLM at JBLM YTC to discuss cooperating agency status and the SDEIS schedule. USFWS entered into a Memorandum of Understanding (MOU) with BLM on April 4, 2014 formalizing their Cooperating Agency status on the proposed Project. WDFW entered into a MOU with BLM on June 15, 2015 formalizing their Cooperating Agency status for the proposed Project.

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, BGEPA, 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 study area, state of Washington listed species, the BLM sensitive species list, and JBLM YTC sensitive species. The Project study area for biological resources was defined as a two-mile wide corridor (i.e., a one-mile buffer of route segment centerlines of each Action Alternative). The species list also included other sensitive species protected under the BGEPA and/or MBTA and game species that may occur within the Project study 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 DNR's Washington Natural Heritage Program and WDFW's Priority Habitats and Species databases, and BLM (Geographic Biotic Observations). 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; Interagency Special Status/Sensitive Species Program species; and JBLM YTC. Special status wildlife species are discussed in Section 3.3 and special status plant species are discussed in Section 3.2.

Six wildlife species listed as endangered, threatened, or candidate occur, or are likely to occur, within the Project study area (Sections 3.3 and 4.3). No federally listed plant species are known to occur within the Project study area; however, four additional plant species listed as endangered, threatened, or candidate are suspected to occur within the Project study area (Sections 3.2 and 4.2).

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 crossings for Route Segments 3b, 3c, and NNR-8 (Agency Preferred Alternative). 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. 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.

5.6.4 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 this requirement for JBLM YTC, Reclamation, BPA, and FHWA. On March 21, 2011, the BLM sent a letter to the SHPO requesting consultation for the proposed 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 proposed Project that would establish procedures for identifying historical, archaeological, and cultural resources; evaluating their eligibility to the National Register; assessing effects; and implementing measures to avoid or mitigate adverse effects. The PA is included in the FEIS as Appendix E. The ACHP was notified on March 1, 2011 of the undertaking and notification of adverse effects and plans to develop a PA for the proposed Project was submitted on May 17, 2012. On June 16, 2012, the ACHP elected not to participate in the consultation process.

On May 31, 2013, BLM notified the Washington SHPO of the NNR Alternative for the proposed Vantage to Pomona 230 kV Transmission Line Project and requested concurrence with BLM’s definition of the APE for this new Action Alternative. Consultation was initiated with the Washington SHPO again on January 9, 2014 for the definition of the APE for the NNR Alternative’s MR Subroute (MR-1) and the two design options (overhead or underground) for two route segments (Route Segments NNR-4 and NNR-6) 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 Action 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 were prepared for the NNR Alternative by the Yakama Nation Cultural Resource Program and the Confederated Tribes of the Coleville Reservation’s History and Archaeology Program. An intensive Class III inventory survey of the final Agency Preferred Alternative and a sample of route segments will be conducted. The survey will be conducted to specifically identify those cultural resources that occur within the Project’s APE.

5.6.5 Agencies, Organizations or Individuals Consulted

The following agencies, organizations, and interested parties were consulted as part of the EIS process:

5.6.5.1 Federal Agencies

U.S. Fish and Wildlife Service

- Washington Fish and Wildlife Office (Lacey, Washington)
- Central Washington Ecological Services Field Office (Wenatchee, Washington)

Bureau of Reclamation

- Pacific Northwest Regional Office (Boise, Idaho)
- Columbia-Cascades Area Office (Yakima, Washington)
- Pacific Northwest Region-Ephrata Field Office (Ephrata, Washington)

Joint Base Lewis-McChord Yakima Training Center (Yakima, Washington)

U.S. Army Corps of Engineers

- Seattle District Regulatory Branch (Seattle, Washington)
- Eastern Washington Regulatory Field Office (Spokane, Washington)

Columbia National Wildlife Refuge (Royal City, Washington)

Hanford Reach National Monument (Washington)

Department of Energy

Federal Aviation Administration

- Northwest Mountain Region (Renton, Washington)
- Washington Division (Renton, Washington)

U.S. Environmental Protection Agency

- Pacific Northwest Region 10 (Seattle, Washington)

Federal Highway Administration

- Washington Division (Olympia, Washington)

Bonneville Power Administration (Portland, Oregon)

Advisory Council on Historic Preservation

Pacific Northwest Regional Infrastructure Team

5.6.5.2 State Agencies

Washington Department of Natural Resources

- Headquarters (Olympia, Washington)
- Southeast Region, Rights-of-Way Program (Ellensburg, Washington)
- Natural Heritage Program and Natural Area Program (Olympia, Washington)

Washington Department of Fish and Wildlife

- South-Central Region 3 Office (Yakima, Washington)
- Priority Habitats and Species (Olympia, Washington)

Washington Department of Ecology
- Central Regional Office (Union Gap, Washington)
- Eastern Regional Office (Spokane, Washington)

Washington State Department of Transportation
- South Central Region (Union Gap, Washington)
- Aviation Division (Olympia, Washington)

Washington Department of Archaeology and Historic Preservation
- State Historic Preservation Officer (Olympia, Washington)

Washington Army National Guard
- Camp Murray, Washington

Washington Governor's Office of Regulatory Innovation and Assistance (Olympia, Washington)

5.6.5.3 Regional and Local Entities

Port of Mattawa

Yakima Regional Clean Air Agency

Grant County Public Utility District No.2

Desert Aire Community

Grant County Airport District No. 1

Western Electricity Coordinating Council

South Columbia Irrigation District

5.6.5.4 Counties

Benton County
- Planning Department
- Public Works Department
- Noxious Weed Control Board

Grant County
- County Commissioners
- 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

Yakima County
- County Commissioners
- Public Services - Planning and Transportation
- Noxious Weed Control Board

5.6.5.5 Native American Tribes
Confederated Tribes and Bands of Yakama Nation

Wanapum Band of Indians

Confederated Tribes of the Colville Reservation

5.6.5.6 Organizations and 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

Jack Eaton

5.7 PUBLIC AVAILABILITY OF THE FEIS

In accordance and compliance with NEPA (40 CFR Part 1502.9(e) and 40 CFR Part 1506.6(b)(2)), a NOA of the DEIS, SDEIS, and FEIS must be published in the Federal Register, thus beginning the public comment period for the DEIS and SDEIS or 30-day availability period for the FEIS. The DEIS, SDEIS, and FEIS are 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 DEIS, SDEIS, and FEIS is received (40 CFR Parts 1506.9, 1506.10).

The BLM, as the Lead Federal Agency, is responsible for analyzing the effects of granting, granting with conditions, or denying Pacific Power's ROW applications submitted to the Federal agencies to construct, operate, and maintain a 230 kV transmission line, associated access roads, and other ancillary facilities. The BLM will not issue a final decision on the proposed Project for a minimum of 30 days following the date the USEPA publishes its Notice of Availability in the Federal Register. The JBLM YTC, Reclamation, BPA, FHWA, USFWS, DAHP, WDFW, DNR, WSDOT, and Grant, Kittitas, and Yakima counties are Cooperating Agencies that assisted with the preparation of the FEIS. Each of these Cooperating Agencies will subsequently make decisions related to the proposed Project within their respective jurisdictions.

Copies of the FEIS have been sent to Federal, State, tribal, and local governments and public libraries in the Project area. The FEIS and supporting documents are available electronically on the Project website at: http://www.blm.gov/or/districts/spokane/plans/vph230.php.

5.8 SUMMARY OF PUBLIC COMMENTS ON THE DEIS AND SDEIS

In accordance with CEQ Regulations (40 CFR, Part 1503), the BLM has received and evaluated the public comments on the DEIS and SDEIS for the proposed Project and has prepared written responses to substantive comments. Written comment letters, comments submitted on forms provided at public meetings, comments transcribed during public meetings, and emails received on the proposed Project are contained in Appendix F in their entirety. Responses to comments are also included in Appendix F.

The comments received on the DEIS and SDEIS are organized by member of the general public, agency, or organization. Appendix F, Table F1-1 contains responses to substantive comments received on the DEIS and Table F1-2 contains responses to non-substantive comments received on the DEIS. Appendix F, Table F2-1 contains responses to substantive comments received on the SDEIS, and Table F2-2 contains responses to non-substantive comments received on the SDEIS. Each comment letter/e-mail is assigned a unique number. Individual comments within each comment letter/email are alphabetized individually along the margins.

Table 5-2 lists all individuals of the general public, agencies and organizations that provided written comments on the DEIS and SDEIS. Each comment letter was assigned a unique number and each comment was individually lettered. For example, comment 1-A is the first substantive comment in Comment Letter 1. "1" represents the comment letter; the "A" refers to the first comment in that letter.

Table 5-2 Comments Received on the DEIS and SDEIS

LETTER	COMMENTER	CORRESPONDENCE DATE	COMMENT TYPE
		DEIS	
1	Haynes & Sylvia Gearheart	1/25/2013	Individual
2	Haynes & Sylvia Gearheart	2/5/2013	Individual
3	William Maples	2/5/2013	Individual
4	Cliff & Gail Nopp	2/5/2013	Individual
5	Ray Risenmay	2/5/2013	Individual
6	Jeff Gallacci	2/6/2013	Individual
7	Joe Balmelli	2/6/2013	Individual
8	Phil Hull	2/6/2013	Individual
9	Jerry Yorgensen	2/6/2013	Individual
10	Vicky Jansen	2/7/2013	Individual
11	Larry & Zongqi Alton	2/8/2013	Individual
12	Larry & Zongqi Alton	2/8/2013	Individual
13	Larry & Zongqi Alton	2/8/2013	Individual
14	Guy Warren	2/8/2013	Individual
15	Larry & Zongqi Alton	2/9/2013	Individual
16	Larry Alton	2/9/2013	Individual
17	Douglas Burk	2/11/2013	Individual
18	Gary Logston	2/11/2013	Individual
19	Haynes & Sylvia Gearheart	2/12/2013	Individual
20	Lynn Gearheart	2/12/2013	Individual
21	Tom Guderian	2/12/2013	Individual
22	Robert Diefenbach	2/14/2013	Individual
23	Robert Gibbs	2/15/2013	Individual
24	Neil Christensen	2/18/2013	Individual
25	Kelley Family	2/18/2013	Individual
26	Mark Roy	2/18/2013	Individual
27	Kene Larson	2/19/2013	Individual
28	Scott Gearheart	2/20/2013	Individual
29	Cliff Plath	2/20/2013	Individual
30	Robert Christensen	2/21/2013	Individual
31	Haynes & Sylvia Gearheart	2/22/2013	Individual
32	Phil Hull	3/1/2013	Individual
33	Robert Amundson	3/4/2013	Individual
34	Henry and Martina Charvet	3/4/2013	Individual
35	Thomas Gilfoil	3/4/2013	Individual
36	Mike Martinez	3/4/2013	Individual
37	John Klingele	3/4/2013	Individual
38	Christy Malone	3/4/2013	Individual
39	Tedd Wildman	3/6/2013	Individual
40	Zine Badissy	3/7/2013	Individual

LETTER	COMMENTER	CORRESPONDENCE DATE	COMMENT TYPE
41	Ronald & Judith Buermann	3/7/2013	Individual
42	Bradley Martinez	3/7/2013	Individual
43	Carol Martinez	3/7/2013	Individual
44	Susan Bangs	3/11/2013	Individual
45	Charles Lyall	3/11/2013	Individual
46	Johnson Meninick	2/4/2013	Agency-Yakama Nation
47	Steven Lewis	2/15/2013	Agency-USFWS
48	Gwen Clear	2/19/2013	Agency-WDOE
49	Dale Morlock	2/19/2013	Agency-National Park Service
50	Kristina Proszek	2/19/2013	Agency- Yakama Nation
51	John Gamon	2/19/2013	Agency- DNR
52	Herry Smiskin	2/19/2013	Agency- Yakama Nation
53	Christine Reichgott	2/19/2013	Agency- USEPA
54	Zachary Guill	2/24/2013	Agency- U.S. Congress
55	Grant County Board of Commissioners	2/27/2013	Agency- Grant County Board of Commissioners
56	Fromherz/Welker	3/7/2013	Agency- DNR
57	Karin Neely	3/7/2013	Agency- South Columbia Irrigation District
58	John Gamon	3/8/2013	Agency- DNR
59	Kelly Larimer	3/8/2013	Agency- Grant County PUD
60	Mark Teske	3/9/2013	Agency- WDFW
61	Vicky Scharlau	2/18/2013	Organization -Columbia Basin Development League
62	Rex Buck	3/8/2013	Agency-Yakama Nation
63	Stuart Kelly	3/8/2013	Organization –Pacific Power
SDEIS			
64	Katie Ableidinger-Walker	12/31/2014	Individual
65	Eric Stonemetz	1/4/2014	Individual
66	Joyce Edie	1/28/2014	Individual
67	Keith Edie	1/28/2014	Individual
68	Dorothy Bozorth	1/28/2014	Individual
69	Robert Reed Christensen	1/28/2014	Individual
70	James Eckenberg	1/28/2014	Individual
71	Jack W Eaton	1/29/2014	Individual
72	Pamalia Ray	2/12/2015	Individual
73	Dick A. and Margie L. Angel	2/12/2015	Individual
74	Ronda Yorgesen	2/13/2015	Individual
75	Kevin Yorgesen	2/13/2015	Individual
76	Jeff Gallacci	2/13/2015	Individual
77	Michael, Cheryl, and Richard Albin	2/14/2015	Individual
78	Jerry Yorgesen	2/15/2015	Individual
79	Carol Martinez	2/16/2015	Individual

LETTER	COMMENTER	CORRESPONDENCE DATE	COMMENT TYPE
80	David Yorgesen	2/16/2015	Individual
81	Christy Malone	2/17/2015	Individual
82	Cheryl Wolff	2/17/2015	Individual
83	Pamalia Ray	2/17/2015	Individual
84	Albert C. and M. Lorene Ford	2/17/2015	Individual
85	Richard Leitz	2/17/2015	Individual
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CHAPTER 7 LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYM / ABBREVIATION	DEFINITION
°F	Fahrenheit
AADT	average annual daily traffic
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
Applicant	Pacific Power
Army	U.S. Department of the Army
ASM	American Society of Mammalogists
AUM	animal unit month
B&O	Washington State Business and Occupation
BCAA	Benton Clean Air Agency
BEA	Bureau of Economic Analysis
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Bureau of Land Management
BMP	Best Management Practice
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
CARA	Critical aquifer recharge area
CBCC	Cloudbase Country Club
CBP	Columbia Basin Project
CCD	Census County Division
CCP	Comprehensive Conservation Plan
CDP	Census Designated Place
CE	cumulative effects
CEC	California Energy Commission
CEMP	Comprehensive Emergency Management Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulation
cfs	cubic feet per second
CH_4	methane
CMP	Compensatory Mitigation Plan
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2(e)	Carbon dioxide equivalent
COE	Chief of Engineers
COT	Conservation Objectives Team
CRP	Conservation Reserve Program
CUP	Conditional Use Permit
CWA	Clean Water Act
DA	Development Agreement
DAHP	Washington Department of Archaeology and Historic Preservation

ACRONYM / ABBREVIATION	DEFINITION
DASA	Deputy Assistant Secretary of the Army
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
EA	Environmental Assessment
EDNA	environmental designation for noise abatement
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EJ	Environmental Justice
ELF	extremely low frequency
EMF	electric and magnetic fields
EO	Executive Order
EPR	Economic Planning Resources
EPRI	Electric Power Research Institute
ERMA	Extensive Recreation Management Area
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
FR	Federal Register
Framework	Framework for Development of a Sage-Grouse Compensatory Mitigation Plan
FRCC	Fire Regime Condition Class
FSA	Farm Service Agency
G	Gauss
GAP	Gap Analysis Program
GeoBOB	Geographic Biotic Observations
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
HDD	Horizontal Directional Drilling
HPFF	high pressure fluid filled
HRNM	Hanford Reach National Monument
HTS	high temperature superconductors
Hz	hertz
I	Interstate
IARC	International Agency for Research on Cancer
IBA	Important Bird Area

ACRONYM / ABBREVIATION	DEFINITION
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
IPaC	Information Planning and Conservation System
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
JARPA	Joint Aquatic Resources Permit Application
JBLM YTC	Joint Base Lewis-McChord Yakima Training Center
KCC	Kittitas County Code
kcmil	kilo-circular mils
kHz	kilohertz
KOP	Key Observation Point
kV	kilovolt
kV/m	kilovolt per meter
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
LGFRS	Local Government Financial Reporting System
LLW	Low-level radioactive waste
LPP	laminated polypropylene paper
mA	milliampere
MA	Management Area
MBTA	Migratory Bird Treaty Act
MCL	Maximum Containment Level
mG	milligauss
MHz	megahertz
MLLW	Mixed low-level radioactive waste
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

ACRONYM / ABBREVIATION	DEFINITION
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
NOP	National Organic Program
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NSA	Noise Sensitive Area
NSR	New Source Review
NTAC	Northwest Transmission Assessment Committee
NWI	National Wetland Inventory
NWPP	Northwest Power Pool
NWR	National Wildlife Refuge
O_3	Ozone
OATT	Open Access Transmission Tariff
OFM	Office of Financial Management
OHV	off-highway vehicle
OHWM	ordinary high water mark
OPGW	fiber optic ground wire
ORR	outstandingly remarkable resource
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PAC	Priority Areas for Conservation
Pb	Lead
PCCP	Portland cement concrete pavement
PEIS	Programmatic Environmental Impact Statement
PF	Project Facilities
PHS	Priority Habitat and Species
PLSS	Public Land Survey System
PM	Particulate matter
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
RDF	Required Design Feature
REC	Record of Environmental Consideration
Reclamation	U.S. Bureau of Reclamation
Recovery Plan	Greater Sage-grouse Recovery Plan
RM	Resource Management
RMP	Resource Management Plan

ACRONYM / ABBREVIATION	DEFINITION
RNA	Research Natural Area
ROA	Report of Availability
ROD	Record of Decision
ROE	Right of Entry
ROW	Right-of-Way
RV	recreational vehicle
S&R	Scenic and Recreational
Sage-Grouse	Greater Sage-Grouse
SCFF	self-contained fluid filled
SDEIS	Supplemental Draft Environmental Impact Statement
SEE	Stell Environmental Enterprises
SEPA	Washington State Environmental Policy Act
SF-299	Standard Form 299
SHPO	State Historic Preservation Officer
SLMP	Shoreline Management Plan
SMA	Special Management Area
SMP	Shoreline Management Program
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
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
UWIN	Utah Wildlife in Need
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
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
WESD	Washington Employment Security Department
WFO	Wenatchee Field Office
WHCWG	Washington Wildlife Habitat Connectivity Working Group

ACRONYM / ABBREVIATION	DEFINITION
WHO	World Health Organization
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WNHP	Washington Natural Heritage Program
Workshop	Preferred Route Selection Workshop
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
WSR	National Wild and Scenic Rivers
XLPE	Cross-Linked Polyethylene
Yakama Nation	Confederated Tribes and Bands of the Yakama Nation
YCC	Yakima County Code
YFC	Yakima Firing Center
YNCRP	Yakama Nation Cultural Resource Program
YRCAA	Yakima Regional Clean Air Agency
YTC	Yakima Training Center
$\mu g/m^3$	micrograms per cubic meter

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